

**Addressing the burden of pregnancy among
adolescent girls:
Approaches to increase the utilization of
adolescent sexual and reproductive health
services in Kenya**

Lilian Mutea

Supervisors:

Prof. Dr. Peter Gichangi

Prof. Dr. Kristien Michielsen

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benaderingen om het gebruik van seksuele en reproductieve gezondheidsdiensten door
adolescenten in Kenia te vergroten

PH.D. SUPERVISORS:

Prof. Dr. Peter Gichangi

Visiting Professor, Department of Public Health and Primary Care

Faculty of Medicine, and Health Sciences, Ghent University, Belgium

Full Professor and Deputy Vice-Chancellor, Academic Affairs, Research & Extension

Technical University of Mombasa, Kenya.

Prof. Dr. Kristien Michielsen

Associate Professor, Institute for Family and Sexuality Studies

Department of Neurosciences, Biomedical Sciences Group

Catholic University of Leuven, Belgium.

MEMBERS OF THE JURY:

Prof. Dr. Olivier Degomme, MD. (Chair)

Director, International Center for Reproductive Health
Department of Public Health and Primary Care
Faculty of Medicine and Health Sciences, Ghent University, Belgium.

Prof. Dr. Marleen Temmerman, MD, MPH, OB/GYN, Ph.D, FRCOG, FAAS, MBS

Professor Emeritus, Faculty of Medicine and Health Sciences
Ghent University, Belgium
Founding Director, International Centre Reproductive Health
Director Centre of Excellence Women Child Health, Aga Khan University East Africa.

Dr. Nina Van Eekert, Ph.D.

Postdoctoral fellow, fundamental research of the Research Foundation – Flanders (FWO)
Centre for Population, Family and Health, University of Antwerp
University of Antwerp, Belgium.

Prof. Dr. Ines Keygnaert, Ph.D.

International Centre for Reproductive Health
Department of Public Health and Primary Care
Faculty of Medicine and Health Sciences, Ghent University, Belgium

Dr. Viola Nyakato, Ph.D.

Senior Lecturer, Faculty of Interdisciplinary Studies (FIS)
Mbarara University of Science and Technology (MUST), Uganda
Associate, Nordic Africa Institute (NAI), Sweden
Institute of Interdisciplinary Training and Research (IITR).

Dr. Davy Vanden Broeck, Ph.D.

Department of Public Health and Primary Care
Faculty of Medicine and Health Sciences, Ghent University, Belgium.

Prof. Dr. Tammary Esho, Ph.D.

Deputy Vice-Chancellor, Academic Affairs and Student Affairs
AMREF International University, Nairobi, Kenya

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Abbreviations

AFS	Adolescent Friendly Services
ASRH	Adolescent Sexual Reproductive Health
ASRHR	Adolescent Sexual Reproductive Health and Rights
CEDAW	Convention on the Elimination of All Forms of Discrimination Against Women
COVID-19	Coronavirus disease 2019
CSE	Comprehensive Sexuality Education
CPR	Contraceptive Prevalence Rate
DHS	Demographic Health Survey
FGM/C	Female genital mutilation/Cutting.
FP	Family Planning
GBV	Gender Based Violence
HIV/AIDS	Human Immunodeficiency Virus / Acquired Immunodeficiency Syndrome
ICPD	International Conference on Population and Development
ICPD+25	International Conference on Population and Development twenty-five years later
ICRH	International Center for Reproductive Health
KDHS	Kenya Demographic Health Survey
KHIS	Kenya Health Information System
LMICs	Low-and Middle-Income Countries
MOE	Ministry of Education
MOH	Ministry of Health
NACC	National AIDs Control Council
NCPD	National Council for Population and Development
NHIF	National Health Insurance Fund
PASU	Presidential Policy and Strategic Unit
SDG	Sustainable Development Goals
SGBV	Sexual and Gender-Based Violence
SRH	Sexual Reproductive Health
SSA	Sub-Saharan Africa
STI	Sexually Transmitted Infection
UHC	Universal Health Coverage
UN	United Nations
WHO	World Health Organization
YFS	Youth-friendly services

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Executive Summary

Globally, there is an increasing focus on the health of adolescents, including Adolescent Sexual and Reproductive Health (ASRH). There are 1.3 billion adolescents (10-19 years old) in the world, making up 16 percent of the world's population. Investing in the health and wellbeing of this population is key to achieving their full potential and the sustainable development of societies. Adolescent pregnancy affects the health of adolescents and their newborns and curtails education and economic development of women. While adolescent pregnancy in sub-Saharan Africa has decreased in the past decade, it is still disproportionately high in comparison with developed countries. In Kenya, there has been limited progress towards reducing pregnancy among adolescents. Data from the Kenya Demographic Health Survey (KDHS) shows that adolescent pregnancy has remained at 18% in 2003, 2008/9, and in 2014. Results from the latest DHS survey shows that adolescent pregnancy rate has declined from 18 percent in 2014 to 15 percent in 2022. Increasing access to and use of SRH services, including use of contraceptives prevents unplanned pregnancy among adolescents. In addition, increasing the use of contraceptives among sexually active adolescents would spare women and families the health, social, and economic consequences of unplanned pregnancies while increasing young women's education and economic productivity. However, adolescents globally continue to face barriers towards accessing ASRH services; in Kenya, these are experienced at the legal, policy, health system, community, and individual levels. Many interventions that aim to increase the use of SRH services among adolescents have been developed. A number of these have been implemented as stand-alone interventions (e.g., youth-friendly services) and have shown varied effectiveness. In 2015, the Ministry of Health in Kenya defined an ASRH implementation approach that entails the delivery of SRH information and services in schools, facilities, and communities. The effectiveness of this approach has not yet been tested. This is the premise upon which this thesis is designed. The main objective of this doctoral study was to contribute to the reduction of adolescent pregnancies in Kenya by focusing on improving access to SRH services. The specific objectives were to:

1. To describe the trends and determinants of pregnancy among adolescents aged 15-19 years in Kenya.

2. To analyze the barriers, facilitators, preferences, and experiences towards uptake of ASRH services among adolescents in Kenya.
3. To conceptualize and test the effectiveness of a customized combined health facility and community ASRH program intervention model towards improving utilization of ASRH services in Kisumu and Kakamega Counties, Kenya.

The doctoral study employed three research methods.

1. A secondary analysis of cross-sectional data of the 2003, 2008/9 and 2014 Kenya Demographic Health Survey to describe the trends and determinants of adolescent pregnancy in Kenya.
2. A qualitative formative assessment to establish the barriers and facilitators towards use of SRH information and services by adolescents.
3. A quasi-experimental design: to evaluate the effectiveness of a combined ASRH program intervention model towards improving utilization of ASRH services.

The literature shows a reducing trend in adolescent pregnancy globally, and in sub-Saharan Africa (SSA) specifically. Despite high level commitments towards improving ASRH in Kenya, there is limited progress towards reducing adolescent pregnancy; results from our DHS data secondary analysis shows that there has been limited progress in reducing the prevalence of adolescent pregnancy for over three decades. The percentage of women aged 20 to 24 years who reported their first pregnancy between ages 15-19 years was 42% in 2003 and 42.2% in 2009 but significantly declined to 38.9% in 2014. Regression analyses established that low education status, a lower wealth quintile, and child marriage were associated with adolescent pregnancy.

Results from the formative assessment showed that barriers continue to hinder adolescents' access to SRH information and services. Some of the key barriers were negative health workers' attitudes, distance to the health facility, unaffordable cost of services, negative social and cultural influences, and a lack of privacy and confidentiality. Facilitators for ASRH services were few and included giving priority to school-going adolescents receiving SRH

services at health facilities and creating an enabling environment for partnerships on adolescent health issues.

Finally, an intervention to improve utilization of adolescent SRH services was developed and implemented. This intervention was a combined facility-community ASRH model towards increasing utilization of ASRH services, consisting of contraceptives, ASRH information, STI/HIV screening and treatment, and post-abortion care, among others. Effectiveness was studied through a quasi-experimental approach, comparing the change in utilization of ASRH services between the intervention and comparison groups after 15 months of the intervention. We obtained mixed findings. While our results did not show an improvement in utilization of ASRH information or services, improvements were noted in other areas. A multivariate regression analysis showed a significant decrease in the number of adolescents whose fear of parents made them uncomfortable when seeking ASRH services and those whose lack of support from partners made them uncomfortable when seeking ASRH services. This suggests an improvement in adolescents' comfort with seeking ASRH services. We attribute the mixed findings to various factors, including the study design and the negative effects of the COVID-19 pandemic. The pandemic led to the closure of schools, and hence the social behavior change element of the study was not implemented. Several improvements were also noted in the comparison arm, indicating potential contamination caused by the presence of other similar interventions.

The summary of findings from this thesis are aligned with various ASRH theoretical frameworks that include a) the conceptual framework on social and gender norms and power for ASRH; b) the Community Pathway to ASRH Framework; and c) a framework and promising approaches: *Creating an Enabling Environment for ASRH*. In this thesis, the factors affecting ASRH, and adolescent pregnancies have been summarized along the socio-ecological model at individual, interpersonal, community, and societal levels.

- 1) **Individual factors:** Our findings show that individual factors influencing use of ASRH services and adolescent pregnancies included adolescents' limited level of knowledge on ASRH; their level of education and household poverty.

- 2) **Interpersonal factors:** Our findings show that interpersonal relationships with parents and community members (e.g., community health volunteers, peer educators) were likely to influence adolescents' behavior towards SRH, and uptake of SRH services.
- 3) **Community factors:** Our findings show that negative health workers attitude, lack of privacy and confidentiality at health facilities, adolescents' limited trust in health workers, discomfort in visiting health facilities, low availability of commodities and limited flexibility of facility opening hours negatively affected utilization of ASRH services. The COVID-19 pandemic also reduced the uptake of ASRH services.
- 4) **Societal factors:** Our findings show that societal factors affecting ASRH included harmful socio-cultural practices, child marriage and limited implementation of policies and legislation. In addition, mixed opinions on the use of contraception without parental consent has contributed to adolescents being denied services by health workers in some regions.

Reflections from implementing a complex ASRH intervention

The combined community facility ASRH model was a multi-faceted intervention, and its rollout faced significant challenges, which are further described in the limitations section of this thesis. Besides the key results, below is a description of the lessons learned from implementing an ASRH intervention in a complex environment. We suggest that these reflections can inform researchers at design and implementation of future ASRH studies.

- 1) **Coordination of programs and intervention studies:** The ASRH intervention study was embedded in a larger family planning and maternal health program which may have had an effect on the study outcomes. Effective coordination protects the fidelity of the study and improves efficiency in use of resources. Capacity building is needed for researchers on study designs that can accurately measure the effectiveness of public health interventions in the context of programs.
- 2) **Requirements for ASRH studies targeting young adolescents:** Studies in this thesis did not include young adolescents, i.e., those below 15 years. Studies targeting minors have a higher threshold for approvals at Institutional Review Boards (IRBs) which is critical to safeguard the

welfare of the study participants. Still, new evidence is required for effective programming among young adolescents. Partnerships, collaboration among the various entities is key executing studies among young adolescents.

- 3) **Sustainability of ASRH interventions:** Studies in this thesis were implemented with donor resources, and due to limited funding at county level, the interventions are unlikely to be sustained beyond the study period. Continuous advocacy is needed for Counties to prioritize and allocate budgets to expand access to ASRH services.
- 4) **Policy dialogue on ASRH:** Policy dialogue was not included as part of the studies in this thesis. We however observed development of key policies was halted due to limited consultations among key stakeholders. Policy dialogue can help stakeholders understand the impact of policies on the health of adolescents. This could be coupled with advocacy targeting change makers at political, policy, programmatic and service delivery levels.
- 5) **Politics, and Reproductive Health and Rights:** ASRH programming in Kenya has been faced with unique challenges such as lack of political support, opposition from religious and conservative groups and mixed messaging from mainstream and social media. During the study period (2017-2021), political utterances urging women to have more children to increase the voting population were common. Various entities provided different perspectives on ASRH, with many calling for abstinence among adolescents and for health workers to cease provision of contraceptives to adolescents. This is an emerging strong barrier that is likely to erode gains made in ASRH in Kenya.

Study Limitations

Due to the cross-sectional nature of these studies, a cause-and-effect relationship between exposure and study outcomes could not be established. The school element, a key approach in the study towards the delivery of ASRH information, was not implemented due to the extended closure of schools occasioned by the COVID-19 pandemic. The Introduction of similar interventions by other partners contributed to the contamination of the

comparison sites. The differences in socio-demographic characteristics between study groups may have affected the comparison of the changes in outcomes of interest. Coarsened exact matching was done to address this limitation. Other limitations included the purposeful selection of study sites, which means that the results obtained from these studies cannot be generalized.

Conclusions

The findings from this doctoral research highlight the slow pace of reduction in adolescent pregnancies in Kenya and emphasize the need for concerted efforts towards reducing the burden. The findings also describe the barriers faced by adolescents in seeking and using ASRH services and demonstrate the importance of understanding local contexts to effectively deliver SRH services to adolescents. Findings from this doctorate research also demonstrate the complex nature of delivering ASRH information and services to adolescents and the need for combining multiple approaches for higher impact. We suggest that Kenya needs to implement interventions that address the barriers to utilization of ASRH services in order to reduce the burden of pregnancy among adolescents. Finally, we describe lessons learned from designing and implementing complex ASRH interventions. Based on the key findings from this doctoral research, the following recommendations are proposed at policy, program, and research levels so as to increase utilization of ASRH information and services and contribute to a reduction of adolescent pregnancy in similar settings.

Recommendations

The following are recommendations arising from the findings of studies undertaken as part of this thesis:

- 1) **Recommendations for policymakers** include reinforcement of legislation and policies that improve economic empowerment of women, reduce poverty, keep girls in school, and protect girls from child marriage. This also includes sensitizing communities about harmful social and cultural practices such as child marriage. Dissemination of policies and strategies to health workers is key to improving understanding of ASRH programming and enhancing the provision of adolescent-friendly

services. To provide quality health services, an adequate number of health workers are needed at health service delivery points, including ASRH clinics.

- 2) **Recommendations for programming:** Improving adolescents' knowledge would empower them to make decisions on their SRH. Strengthening the school platform in Kenya to deliver the Comprehensive Sexuality Education (CSE) model will expand the reach for adolescents with ASRH information. We recommend strengthening coordination mechanisms for multisectoral ASRH programming. Additionally, continuous data analysis is important to monitor progress towards achieving ASRH goals and to inform the design of practical interventions to increase use of ASRH services and reduce unintended pregnancies among adolescents
- 3) **Recommendations for further research:** Given the study was not implemented as designed, we suggest the implementation of the complete ASRH model covering schools, communities, and facilities to test its contribution to improved ASRH outcomes. It's also critical to design and implement studies that can inform SRH programming for younger adolescents aged 10-14 years. Policy analysis to determine its impact on addressing negative ASRH outcomes in Kenya is recommended.

Samenvatting

Momenteel zijn er 1,3 miljard adolescenten (10-19 jaar) in de wereld, die samen zo'n 16% van de wereldbevolking uitmaken. Investeren in de gezondheid en het welzijn van deze groep is essentieel zodat ze volledige potentieel kunnen bereiken, én voor de duurzame ontwikkeling van samenlevingen. Daarom is er wereldwijd is er steeds meer aandacht voor de gezondheid van adolescenten, inclusief voor hun seksuele en reproductieve gezondheid (SRG). Deze thesis gaat over tienerzwangerschap, een cruciaal onderdeel van SRG. Tienerzwangerschap heeft mogelijk grote gevolgen voor de gezondheid van adolescente moeders en hun baby. Bovendien heeft het vaak ook sociale en economische gevolgen: in veel landen betekent zwanger worden als adolescent sociale uitsluiting en het einde van de schoolcarrière. Hoewel het aantal tienerzwangerschappen in sub-Saharaans Afrika in het afgelopen decennium is afgenomen, blijft het aantal onevenredig hoog in vergelijking met andere regio's. In Kenia is de prevalentie van tienerzwangerschappen de voorbije twee decennia stabiel op 18%.

Het vergroten van de toegang tot en het gebruik van SRG-diensten, waaronder het gebruik van anticonceptie kan ongeplande zwangerschap bij adolescenten helpen voorkomen. Adolescenten wereldwijd worden echter nog steeds geconfronteerd met verschillende barrières die de toegang tot SRG-diensten in het algemeen, en anticonceptie specifiek, verhinderen. In Kenia situeren deze barrières zich op verschillende niveaus: juridisch, beleid, gezondheidssysteem, in de gemeenschap en individueel. Er werden reeds veel interventies ontwikkeld die als doel het gebruik van SRG-diensten door adolescenten als doel hebben. Een aantal hiervan is geïmplementeerd als op zichzelf staande interventies (bv. youth-friendly services) met wisselende effectiviteit. In 2015 ontwikkelde het ministerie van Volksgezondheid in Kenia een nieuwe aanpak om SRG van adolescenten te verbeteren. Deze aanpak combineert interventies in verschillende settings: het voorzien van informatie en diensten in scholen, faciliteiten en gemeenschappen. De effectiviteit van deze aanpak is niet getest. Dit is het uitgangspunt voor deze thesis..

De hoofddoelstelling van deze doctoraatsstudie was om bij te dragen aan de vermindering van tienerzwangerschappen in Kenia door het verbeteren van de toegang tot SRG-diensten. De specifieke doelstellingen waren:

1. Het beschrijven van de trends en determinanten van zwangerschap onder adolescenten (15-19 jaar) in Kenia.
2. Het analyseren van de barrières, faciliterende factoren, voorkeuren en ervaringen met betrekking tot het gebruik van SRG-diensten door adolescenten in Kenia.
3. Het conceptualiseren en testen van de effectiviteit van een op maat gemaakte gecombineerd interventiemodel dat tot doel heeft het gebruik van SRG-diensten door adolescenten in de provincies Kisumu en Kakamega, Kenia, te verhogen.

De doctoraatsstudie maakte gebruik van drie onderzoeksmethoden:

1. Een secundaire analyse van cross-sectionele gegevens van de 2003, 2008/9 en 2014 Kenya Demographic Health Survey om de trends en determinanten van tienerzwangerschap in Kenia te beschrijven.
2. Een kwalitatieve studie om de barrières en faciliterende factoren vast te stellen die het gebruik van SRG-diensten door adolescenten beïnvloeden.
3. Een quasi-experimentele studie die effectiviteit van een gecombineerd SRG-interventiemodel om het gebruik van SRG-diensten te verbeteren evalueert.

De literatuur toont een afnemende trend in adolescente zwangerschap wereldwijd, en in subSahara Afrika (SSA) in het bijzonder. Echter, ondanks verschillende politieke verklaringen over het verbeteren van SRG, is er in Kenia slechts beperkte vooruitgang wat betreft het verminderen van tienerzwangerschappen. De resultaten van de secundaire analyse van DHS-gegevens tonen aan dat de prevalentie van adolescente zwangerschap al meer dan drie decennia relatief stagneert: het percentage vrouwen van 20 tot 24 jaar dat hun eerste zwangerschap meldde tussen de leeftijd van 15-19 jaar was 42% in 2003 en 42,2% in 2009 en 38,9% in 2014. Regressieanalyses stelden vast dat een lage onderwijsstatus, een lagere socio-economische status en kindhuwelijken significant geassocieerd waren met tienerzwangerschap.

Uit de resultaten van de kwalitatieve studie bleek dat verschillende barrières de toegang van adolescenten tot SRG-diensten blijven belemmeren. Enkele van de belangrijkste barrières waren de negatieve houding van gezondheidswerkers, de afstand tot de gezondheidsfaciliteit, de kost van diensten, negatieve sociaal-culturele invloeden, en een gebrek aan privacy en vertrouwelijkheid. De studie detecteerde slechts een beperkt aantal faciliterende factoren voor het gebruik van SRG-diensten. Deze waren ondermeer: het geven van prioriteit aan schoolgaande adolescenten om SRG-diensten te ontvangen in gezondheidsfaciliteiten en het creëren van een omgeving die bevorderend is voor het opzetten van partnerschappen die werken rond gezondheidsproblemen van adolescenten.

Ten slotte werd een interventie ontwikkeld en geïmplementeerd om het gebruik van SRG-diensten door adolescenten te verbeteren. Deze interventie was combineerde interventies in gezondheidscentra en gemeenschappen (omwille van COVID-19 kon de geplande component in scholen niet door gaan). De effectiviteit van de interventie werd geëvalueerd door middel van een quasi-experimentele studie, waarbij de verandering in het gebruik van SRG-diensten tussen de interventie- en controlegroep 15 maanden na de interventie werd vergeleken. De evaluatie vond geen toename in het gebruik van SRG-diensten door adolescenten in de interventiegroep. Echter, op een aantal andere gebieden werden wel verbeteringen gevonden. Een multivariate regressieanalyse toonde een significante afname van adolescenten wiens angst voor ouders hen ongemakkelijk maakte bij het zoeken naar SRG-diensten en degenen wiens gebrek aan ondersteuning van de partner hen ongemakkelijk maakte bij het zoeken naar SRG-diensten. Dit suggereert een verbetering van het comfort van adolescenten bij het zoeken naar deze diensten. We schrijven de gemengde bevindingen toe aan verschillende factoren, waaronder het onderzoeksopzet en de negatieve effecten van de COVID-19-pandemie.

De bevinden van de verschillende studies in deze thesis met betrekking tot factoren die een invloed hebben op toegang tot SRG-diensten door adolescenten werden samengevat volgende de verschillende niveau's van het socio-ecologisch model:

1. **Individuele factoren:** het beperkte kennisniveau van adolescenten over SRG omvatten, het opleidingsniveau en de socio-economische status.
2. **Interpersoonlijke factoren:** interpersoonlijke relaties met ouders en leden van de gemeenschap (bijv. vrijwillige gezondheidswerkers en peer educators) beïnvloedden de toegang tot SRG-diensten.
3. **Gemeenschapsfactoren:** de negatieve houding van gezondheidswerkers, gebrek aan privacy en vertrouwelijkheid in gezondheidsfaciliteiten, het beperkte vertrouwen van adolescenten in gezondheidswerkers, ongemak bij het bezoeken van gezondheidsfaciliteiten, lage beschikbaarheid van anticonceptiemiddelen, de beperkte flexibiliteit van openingstijden van faciliteiten en de COVID-19-pandemie.
4. **Maatschappelijke factoren:** schadelijke socio-culturele praktijken, kindhuwelijken en beperkte implementatie van het SRG-beleid . Bovendien hebben gemengde meningen over het gebruik van anticonceptie zonder toestemming van de ouders ertoe bijgedragen dat adolescenten in sommige regio's geen diensten konden krijgen van gezondheidswerkers.

Reflecties over het implementeren van een complexe ASRH-interventie

De uitrol van het gecombineerde SRG-model werd geconfronteerd met aanzienlijke uitdagingen, waaruit een aantal belangrijke lessen getrokken kunnen worden die onderzoekers kunnen helpen bij de ontwikkeling en uitvoering van toekomstige SRG-studies.

1. **Coördinatie van programma's en interventiestudies:** De ASRH-interventiestudie was ingebed in een groter programma voor gezinsplanning en de gezondheid van moeders, wat mogelijk een effect heeft gehad op de onderzoeksresultaten. Effectieve coördinatie beschermt de betrouwbare implementatie van de studie en verbetert de efficiëntie in het gebruik van middelen. Capaciteitsopbouw is nodig voor onderzoekers en programmamedewerkers wat betreft het opzetten van

effectiviteitsstudies van complexe volksgezondheidsinterventies in de context van grotere programma's.

2. **SRG-studies gericht op jonge adolescenten:** De studies in dit proefschrift omvatten geen jonge adolescenten (jonger dan 14 jaar). Studies gericht op minderjarigen hebben een hogere drempel voor goedkeuringen bij Institutionele Toetsingscommissies (IRB's), wat van cruciaal belang is om het welzijn van de studiedeelnemers te waarborgen. Toch is er bewijs nodig voor effectieve interventies bij jonge adolescenten. Partnerschappen, samenwerking tussen de verschillende entiteiten is de sleutel tot het uitvoeren van studies onder jonge adolescenten.
3. **Duurzaamheid van SRG-interventies:** Studies in dit proefschrift werden geïmplementeerd met donormiddelen. Omwille van de beperkte financiering op lokaal niveau is het onwaarschijnlijk dat de interventies na de onderzoeksperiode zullen worden volgehouden. Er is continue belangenbehartiging nodig bij de lokale en nationale overheden om prioriteiten te stellen en budgetten toe te wijzen om de toegang tot SRG-diensten voor adolescenten uit te breiden.
4. **Beleidsdialoog over SRG:** Beleidsdialoog werd niet opgenomen als onderdeel van de studies in dit proefschrift. We zagen echter dat de ontwikkeling van belangrijke beleidsmaatregelen werd stopgezet als gevolg van beperkt overleg tussen de belangrijkste belanghebbenden. Beleidsdialoog kan belanghebbenden helpen de impact van beleid op de gezondheid van adolescenten te begrijpen. Dit kan worden gekoppeld aan belangenbehartiging gericht op politiek, beleidsmatig, programmatisch en dienstverleningsniveau.
5. **Verkeerde informatie over SRG:** Tijdens de onderzoeksperiode gaven verschillende entiteiten verschillende perspectieven op SRG, waarbij velen opriepen tot onthouding bij adolescenten en voor gezondheidswerkers om te stoppen met het verstrekken van voorbehoedsmiddelen aan adolescenten. Correcte en eenduidige berichten van alle niveaus zijn belangrijk om mythes en misvattingen over SRG te verdrijven. Leiderschap vanuit het ministerie van

Gezondheid is de sleutel tot het bieden van coherente SRG-beleidsinterpretatie door alle belanghebbenden.

Beperkingen van het onderzoek

Vanwege de cross-sectionele aard van deze studies kon geen oorzakelijk verband tussen de blootstelling en studie-uitkomsten worden vastgesteld. De verschillen in sociaal-demografische kenmerken tussen de interventie- en controlegroep hadden mogelijk een invloed op de studie-uitkomsten. Er werd een coarse exacte matching gedaan om deze beperking aan te pakken. Andere beperkingen waren de doelgerichte selectie van studielocaties, wat betekent dat de resultaten van deze studies niet kunnen worden veralgemeend. De schoolcomponent, een belangrijke benadering in de studie naar het leveren van SRG-informatie, werd niet geïmplementeerd vanwege de langdurige sluiting van scholen als gevolg van de COVID-19-pandemie. De introductie van andere interventies, die tegelijk geïmplementeerd werden in de studieregio, had mogelijk een impact op de studieresultaten.

Conclusies

De bevindingen van dit doctoraatsonderzoek benadrukken het trage tempo in de reductie van tienerzwangerschappen in Kenia en maken de noodzaak van gezamenlijke inspanningen duidelijk. De bevindingen beschrijven ook de barrières waarmee adolescenten worden geconfronteerd bij het zoeken naar en gebruiken van SRG-diensten en tonen het belang aan van het begrijpen van lokale contexten om SRG-diensten aan adolescenten te leveren. Verder wijst dit doctoraatsonderzoek naar de complexe aard van het leveren van SRG-diensten aan adolescenten en de noodzaak om meerdere benaderingen te combineren voor een hogere impact. Op basis van de belangrijkste bevindingen van dit doctoraatsonderzoek worden de volgende aanbevelingen voorgesteld op beleids-, programma- en onderzoeksniveau om het gebruik van SRG-diensten door adolescenten te vergroten en bij te dragen aan een vermindering van tienerzwangerschap in vergelijkbare omgevingen:

1. **Aanbevelingen voor beleidsmakers:** de versterking van wetgeving en beleid dat de economische empowerment van vrouwen verbetert, armoede vermindert, meisjes in school houdt en

beschermst tegen kindhuwelijken. Dit omvat ook het sensibiliseren van gemeenschappen over schadelijke sociaal-culturele praktijken zoals kindhuwelijken. Disseminatie van beleid en strategieën voor gezondheidswerkers is van cruciaal belang om het begrip van SRG-programmering en de levering van adolescentvriendelijke diensten te verbeteren. Om goede gezondheidsdiensten te bieden is een voldoende aantal gezondheidswerkers nodig.

2. **Aanbevelingen voor programma's:** verbeterde kennis van adolescenten zou hen in staat stellen om beslissingen te nemen over hun SRG. Het versterken van het schoolplatform in Kenia om het Relationele en Seksuele Vorming te leveren, zal het bereik voor SRG-informatie vergroten. Daarnaast is continue monitoring belangrijk om de voortgang bij het bereiken van SRG-doelen te volgen en om het ontwerp van praktische interventies te informeren.
3. **Aanbevelingen voor verder onderzoek.** Aangezien de studie niet werd geïmplementeerd zoals ontworpen, stelden we voor om het volledige SRHG-model te implementeren in scholen, gemeenschappen en gezondheidsfaciliteiten en om de impact ervan te testen. Het is ook van cruciaal belang om studies te ontwerpen en te implementeren die SRG-programmering voor jongere adolescenten in de leeftijd van 10-14 jaar bestuderen.

1 INTRODUCTION

This chapter provides background on the status of sexual and reproductive health (SRH) among adolescents globally, within sub-Saharan Africa, and in Kenya, with a focus on adolescent pregnancy (1.1). Further, access to and use of ASRH services is identified as a major driver of poor ASRH outcomes, and the factors affecting utilization of ASRH services and adolescent pregnancy are presented (1.2). Subsequently, current evidence on approaches towards increasing access to and use of ASRH services to reduce adolescent pregnancy is presented (1.3). The seriousness of these problems is in sharp contrast with the global and country commitments and policies towards improving adolescent sexual and reproductive health (ASRH), which are described in section (1.4). The chapter ends with gaps in research and a problem statement (1.5).

1.1 Adolescent sexual and reproductive health

There are 1.3 billion adolescents (10-19 years old) in the world, making up 16 percent of the world's population (UNICEF, 2022). The physical and social world in which adolescents are growing up is changing rapidly, with, among others, rapid urbanization, changing social norms, and shifting trends in the age of marriage and premarital sexual activity (Singh et al., 2019). Beginning interventions in adolescence or even earlier in childhood maximizes the impact on the individual's health in adult life (Lassi et al., 2015). Evidence suggests that promoting SRH is one of the key interventions that can contribute to improved health outcomes in young adolescents (Lassi et al., 2015). Improving the ASRH is also central to the 2030 SDG agenda (WHO, 2015).

1.1.1 Status of sexual and reproductive health among adolescents

The SRH status of adolescents can be described through multiple possible indicators. These include, but are not limited to, having ever had sex, abstinence, early sexual debut, sexual violence, use of contraception, use of condoms, number of sexual partners, frequency of sex, ever being diagnosed with a sexually transmitted infection (STI), HIV and presence of STI symptoms and/or pregnancy/childbirth, sexual wellbeing, and body image. This thesis,

however, focuses on adolescent pregnancy and utilization of ASRH services including contraception.

Global levels and trends

Annually, an estimated 21 million girls aged 15 to 19 years and 2 million girls aged under 15 years become pregnant in developing regions (Darroch et al., 2016). In addition, about 16 million girls aged 15 to 19 years and 2.5 million girls under age 16 years give birth in developing regions every year (WHO, 2018a). The proportion of girls getting pregnant during the adolescent period has decreased. The global adolescent birth rate (ABR) declined from 63 to 44 per 1,000 adolescent girls (aged 15–19 years) between 1994 and 2017. This decline has primarily been in the developed world and, to a lesser extent, in the developing ones (United Nations, 2015). Globally, the adolescent birth rate for girls 10–14 years old in 2022 was estimated at 1.5 per 1000 women and at 4.6 per 1000 women in sub-Saharan Africa (WHO, 2018a).

Sub-Saharan Africa levels and trends

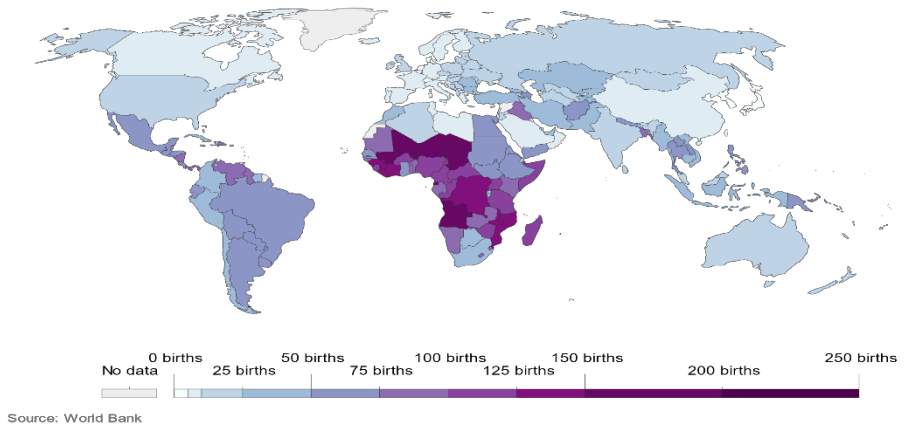
In the year 2020, sub-Saharan Africa (SSA) was home to over 250 million adolescents aged 10–19 years, which was estimated to be 20% of all adolescents globally, with an expected increase to 24% by 2030 (UN economic social affairs, 2019). In SSA, adolescents aged between 10 to 19 years have a huge and disproportionate burden of poor SRH outcomes (Bearak et al., 2018). An estimated 16 million adolescents give birth between the ages of 15–19 annually, with many becoming mothers before the age of 15 years (Neal et al., 2012). The prevalence of adolescent pregnancy, unsafe abortion, child marriage, sexual and gender-based violence (SGBV), and female genital mutilation (FGM) is substantially higher in SSA compared with other regions of the world (Ahinkorah, 2020). A systematic review and meta-analysis found a higher prevalence of adolescent pregnancy in Africa compared to other low- and middle-income countries (LMIC); the pooled prevalence of adolescent pregnancy in sub-Saharan African countries was 19.3%, higher than the overall prevalence of adolescent pregnancy in Africa (18.8%) (Kassa et al., 2018).

For many adolescents in SSA, pregnancy and childbirth are neither planned nor wanted; an estimated 45% of the pregnancies among young women aged

15–19 are unintended, resulting in unplanned births, unsafe abortions, and miscarriages (Darroch et al., 2016). In addition, in low- and middle-income countries, early childbearing increases risks for newborns; hence, babies born to mothers under 20 years of age face higher risks of low birthweight, preterm delivery, and severe neonatal conditions (Ganchimeg et al., 2014). The disproportionate burden of adolescent pregnancy in SSA is illustrated in figure 1 below:

Figure 1: Adolescent Birth Rate in SSA

Adolescent birth rate per 1,000 women aged 15-19, 2016
Adolescent fertility rate is the number of births per 1,000 women aged 15-19.



Despite SSA having the highest rates of adolescent pregnancy in the world, it also has the lowest rates of contraceptive use (Salam et al., 2016). The proportion of adolescent women in need who are not using modern contraceptive methods is higher in Asia (69%) and Africa (68%) than in Latin America and the Caribbean (36%) (Darroch et al., 2016). In more than 20 SSA countries, more than 50% of unmarried, sexually active 15–19-year-olds have an unmet need for contraception (Woog et al., 2015). Adolescents need access to accurate information and access to contraception to maintain a healthy sexual life and prevent early and unintended pregnancies (Salams et al., 2016). Adolescents in SSA also have the highest burden of negative SRH outcomes like HIV infection, whereas in East and Southern Africa, the majority of new HIV infections occur among adolescent girls (UNAIDS, 2021).

Moreover, West Africa has the highest number of countries with the highest rate of child marriage (UNICEF, 2018), as well as the highest level of unmet need for modern contraception among adolescents (Chandra-Mouli & Akwara, 2020).

Over the last few decades, sub-Saharan Africa has made advancements in improving key ASRH outcomes. These include a reduction in the adolescent fertility rate from 126 per 1000 live births between 2000 and 2005 to 103 from 2015 to 2020, a reduction in child marriage, and a slowing down of the HIV epidemic (UN economic social affairs, 2019). Despite this improvement, the burden of poor ASRH outcomes is still high, and disparities continue to exist. Adolescents still have a higher unmet need for contraception compared to all women of reproductive age who want to avoid pregnancy (43% vs. 24%) (Sully et al., 2020). In the LMICs, an estimated 38 million girls were sexually active and wanted to avoid pregnancy in 2016, but only 15 million reported use of a modern contraceptive, leaving 23 million at risk of unintended pregnancy (Darroch et al., 2016). Due to the evident inequalities in the trends and levels of key SRH challenges in SSA, there is a pressing need to address SRH needs among the adolescents within the region to be comparable to those of adolescents from other parts of the world.

Sexual and Reproductive Health of Adolescents in Kenya

Adolescents constitute 24% of the Kenyan population and continue to experience adverse SRH outcomes. Teenage pregnancy, sexually transmitted infections including HIV, unsafe abortion, female genital mutilation, sexual and gender-based violence ((S)GBV), child marriage, drug and substance abuse, poor school retention and transition, and mental health, among others, are key challenges that face adolescents in Kenya (AFIDEP, 2016; WHO, 2018b). Overall, Kenya has made limited improvements in reducing adolescent pregnancy over the last 15 years. According to the Kenya Demographic Health Survey (2014), nearly 1 in 5 adolescents aged 15-19 years had already begun childbearing (Kenya National Bureau of Statistics et al., 2015). Findings from the latest DHS survey shows that the adolescent pregnancy rate has declined from 18 percent in 2014 to 15 percent in 2022 (KNBS and ICF, 2023). About 50% of all new HIV infections in Kenya occur among 15-24-year-olds, disproportionately affecting young girls more than

young men (NACC & National AIDS Control Council/Kenya, 2016). Pregnancy and childbirth among adolescents are also associated with GBV and SGBV. The 2014 DHS report showed that 21% of adolescent girls and young people aged 15-24 years have experienced some form of GBV Kenya (Kenya National Bureau of Statistics et al., 2015). A recent report shows that approximately 30% of females and 18% of males in Kenya experienced sexual violence with more than 3 in 5 females experiencing multiple incidences by age 18 (UNICEF Kenya, 2020). From this report, only 31.8% female survivors of sexual violence aged 13-17 years knew where to seek help. Perpetrators of sexual violence among females aged 18-24 years included current or former spouse, boyfriend or romantic partner (34.9%), authority figure (12.4%) and friend (22%) (UNICEF Kenya, 2020). More recently over 60% of SGBV cases reported through the Kenya Health Information System (KHIS) in 2021 were among persons below 18 years.

Child marriage, a key determinant of adolescent pregnancy, has declined in Kenya; data from DHS reports shows that the percentage of minors getting married has declined from 26.4% percent (KDHS 2008-2009) to 23% in the 2014 DHS. Despite this progress, the burden of child marriage is still unacceptably high, especially for girls from disadvantaged communities where poverty is rife (UNICEF, 2018). Child marriage also contributes to school dropout, which further adds to the gender disparity in education attainment and economic empowerment. In Kenya, adolescent pregnancy contributes to 13,000 girls dropping out of school every year (Muturi, 2020).

The use of contraceptives is a key intervention in preventing unplanned pregnancy. The KDHS 2014 report showed that there has been an increase in Contraceptive Prevalence Rate (CPR) among married adolescents from 15% in 2003, 27% in 2008-09 to 36.8% in 2014. The CPR has remained unchanged at 36.9% as shown in the 2022 DHS report. The KDHS 2014 report also shows that the unmet need for contraception is higher among unmarried adolescent girls (43.9%) as compared to married adolescent girls (23%) and among all married women (18%). Findings from the 2022 DHS survey (released in February 2023) show that the unmet need for family planning is 21.6% among married adolescents as compared to 34.5% among sexually active unmarried adolescents and 14% among all married women of reproductive age (KNBS and ICF, 2023). The low use of contraceptives shows that sexually active

adolescents are at risk of unplanned pregnancy. Distinctive measures are needed to address the high unmet need among sexually active adolescents.

1.1.2 Effects of pregnancy and childbirth among adolescents

Pregnancy among adolescents is an issue of public health concern. Adolescent pregnancy is a major contributor to morbidity and mortality in women and children, as well as reduced economic empowerment for women (WHO, 2018a). Adolescent pregnancy increases the risk of maternal mortality and morbidity, including because of complications of unsafe abortion, prolonged labor during delivery, and post-partum hemorrhage during the post-natal period (Banke-Thomas et al., 2017). Adolescent mothers face higher risks of eclampsia, puerperal endometritis, and systemic infections than women aged 20 to 24 years (Ganchimeg et al., 2014). Obstetric fistula is also more likely to occur in adolescents than in older women.

Socially, the emotional, psychological, and social needs of pregnant adolescent girls are greater than those of older women (Darroch et al., 2016). Unmarried adolescent girls may have to raise their children as single parents while still going through the challenges of adolescence and adapting to being mothers (Banke-Thomas et al., 2017). Pregnancy during adolescence also curtails education and economic empowerment. Girls who marry before they turn 18 are less likely to remain in school. Adolescent births also increase vulnerability and, in some communities, contribute to forced marriages and domestic violence (Batha, 2020). Potential discrimination and rejection by family or community members, psychosocial stress, forced marriage, and violence often impact these young women (WHO, 2007). These issues make pregnancy, childbirth, and motherhood very challenging for adolescents, hence the need for interventions that combine prevention of pregnancy as well as appropriate care during pregnancy and child health (Banke-Thomas et al., 2017).

1.2 Factors influencing utilization of ASRH services and adolescent pregnancy.

One of the leading contributors to negative ASRH outcomes, such a pregnancy, is low utilization of ASRH information and services. Evidence shows that use of ASRH services, such as contraception, is a key approach to

preventing early pregnancy. Due to the interconnectedness of the use of ASRH services and the outcome of pregnancy among adolescents, key factors contributing to adolescent pregnancies and births are related to those contributing to low utilization of ASRH services, and are therefore jointly described below at personal, interpersonal, community, and societal levels. The description is aligned with the socio-ecological framework (Bronfenbrenner, 1979). The socio-ecological model can be interpreted to indicate that the SRH of adolescents is influenced by various personal, social, cultural, political, and economic factors which increase adolescents' vulnerability to SRH risks (e.g., unsafe sex, sexual coercion, early pregnancy) and pose barriers to their access to SRH information and services (Svanemyr et al., 2015).

1.2.1 Personal level

Adolescents who want to avoid pregnancies may not be able to do so due to knowledge gaps and misconceptions on where to obtain contraceptive methods and how to use them (WHO, 2011). A review of LMICs shows that adolescents, especially unmarried ones, face more barriers to health education, information, and SRH services than those in developed countries (Chandra-Mouli & Akwara, 2020). Personal barriers to seeking ASRH services also include fear (of people finding out and other confidentiality issues that may result in violence), shame, and embarrassment (Blanc et al., 2009). Adolescents also lack accurate knowledge on ASRH information and services, and many rely on their peers or social media for information on actions to seek when in need of services; for instance, adolescents may lack the autonomy to ensure the correct and consistent use of a contraceptive method. Myths and misinformation on pregnancy and contraception are rife among religious, cultural, and organized groups that deter adolescents from seeking SRH services. The social stigma associated with seeking ASRH services by unmarried adolescents, including those in school contributes to reduced access to ASRH services and consequently exposes them to the risk of pregnancy.

Limited resources at household and health system level can hinder the access to ASRH information and services contributing to an increase on the risk of unwanted pregnancies, sexually transmitted infections as well as HIV

transmission (WHO, 2018b). This can occur due to lack of transportation to health facilities and financial constraints to pay for SRH services. Low education status contributes to the burden of adolescent pregnancy; in many places girls choose to become pregnant because they have limited educational and employment prospects (Wodon et al., 2017). Excessive use of alcohol and substance abuse promotes risky sexual behavior such as multiple partners and unprotected sex which contributes to unplanned pregnancy and STIs including HIV (Yakubu & Salisu, 2018).

1.2.2 Interpersonal level

Adolescents' risk of pregnancy can be influenced by the type of interactions they have. This includes interactions with their parents, friends, and sexual partners. Peer pressure influences sexual behavior, access to SRH services and consequently contributes to pregnancy among adolescents. In many societies, girls are under pressure to marry and bear children early (García-Moreno et al., 2013). In other cases, older males take advantage of girls from families with low socio-economic status. Due to the power difference between adolescents and their adult partners, girls are powerless to negotiate for safer sex which contributes to unplanned pregnancy and the spread of sexually transmitted infections (Yakubu & Salisu, 2018). At community level, societal, cultural, and religious factors create an inhibitive environment for discussion of ASRH as many societies hold a deeply embedded sense of disapproval of adolescent sexual activity. This is often demonstrated through the stigmatization of sexual health concerns, in particular STIs/HIV (Morris & Rushwan, 2015). Additionally, communities and health providers often have judgmental attitudes about sexual activity especially for sexually active girls which makes it difficult for them to seek SRH services (Ahanonu, 2014). Creating a supportive environment at among the people adolescents interact with, is likely to reduce barriers towards access to and use of ASRH services.

1.2.3 Community level

The community factors include those experienced at the health system, where absence of adolescent-sensitive services is a key barrier in many health facilities in developing countries (Geary et al., 2014). Lack of integration of services e.g., counselling and family planning to include HIV/STI care also

creates missed opportunities for ASRH services as adolescents will receive only one service at one point in time. A systematic review in SSA showed that, despite evidence that adolescents are sexually active and have an unmet need for contraception, they continue to experience many barriers at health facilities towards use of contraceptives (Munakampe et al., 2018). Studies have also shown that some healthcare providers preferred to discourage sexually active adolescents from using contraceptives and prefer to counsel them on abstinence (Ahanonu, 2014; Banke-Thomas et al., 2017). Health worker bias and/or lack of willingness to acknowledge adolescents' sexual health needs also hinders ASRH use (Chandra-Mouli et al., 2013; WHO, 2020). This creates a gap in sharing of information and services about contraception to adolescents. Long waiting time and lack of privacy at health facilities keeps adolescents away from seeking ASRH services. Studies recommend that health systems need to provide flexible working hours to improve adolescents' comfort to seek ASRH services (Denno et al., 2015). This flexi model would provide privacy and confidentiality while also enabling those in learning institutions to access SRH services.

1.2.4 Societal level

Key issues increasing the risk of pregnancy include restrictive laws and policies regarding provision of contraceptive based on age or marital status. Adolescent pregnancies are more likely to occur in marginalized communities, commonly driven by low socio-economic status, lack of education and limited employment opportunities (Yakubu & Salisu, 2018). An additional cause of unintended pregnancy is sexual violence, which is widespread with more than a third of girls in some countries reporting that their first sexual encounter was coerced (WHO, 2020). In least developed countries, at least 39% of girls marry before they are 18 years of age and 12% before the age of 15 (WHO, 2020). While, in recent years, many international commitments have prioritized the health of adolescents (see introduction chapter) many countries have low commitment to ASRH, with often restrictive legislation and policies. These include policies that inhibit the use of contraception among unmarried adolescents without parental consent (Morris & Rushwan, 2015). Policy implementation is also a barrier to access ASRH services. Even where there are no legal restrictions, health workers in many places refuse to provide unmarried adolescents with ASRH information and services because

they do not approve of premarital sexual activity (WHO, 2011). Married adolescents also face challenges and often do not want a pregnancy but have lower access to FP; recent data shows that current use of contraceptives is often lower among sexually active, married adolescents than older women (Blanc et al., 2009). It is critical that countries enable execution of policies to ensure that all sexually active adolescents, regardless of marital status access SRH services. An enabling environment of the system at health facility, policy and political level is key to addressing the burden of adolescent pregnancy.

1.3 Approaches towards increasing access to and use of SRH services by adolescents.

ASRH services have been described as a set of approaches, services and procedures that are aimed at preventing and treating sexual health problems among adolescents as well as promoting their overall well-being (Roudi-Fahimi & Ashford, 2008). Experts have listed key ASRH interventions as being: use of contraceptives and/or condoms, HIV and STI counseling and testing; care, support, and treatment, pregnancy counseling testing and support, maternity care, safe abortion services, post-abortion care, care for victims of sexual violence, male circumcision, HPV vaccinations and primitive guidance regarding SRH and development (Denno et al., 2015). Kenya has developed and rolled out a protocol for post-rape care, including care for children who are victims of sexual violence. The care package includes specimen collection and preservation, documentation, HIV counseling and testing, emergency contraception, post exposure prophylaxis, management of STIs, counseling (trauma, survivor debriefing, adherence counseling, psychosocial support, long term family planning, and a baseline pregnancy test (MOH, Kenya, 2018). Informed assent is required for children under 18 years, as well as written consent from the non-offending caregiver. The requirement for parental consent creates a barrier to universal access for some children who may be victims of sexual violence from family members. For unaccompanied minors, health workers are allowed to provide offer post rape care services as defined in the post rape care protocol. Evidence shows that accessibility to equitable and high-quality ASRH services could help in the reduction of unintended pregnancies and sexually transmitted diseases (Brittain et al., 2022; Denno et

al., 2015). As described above, barriers to ASRH services use continue to exist and many initiatives taken to reduce them have been insufficient.

Several studies have been undertaken to assess approaches towards increasing access to and utilization of SRH services among young people. Systematic reviews of published literature suggest that current interventions targeting youth tend to have significant positive effects on improving young people's knowledge and sometimes attitudes regarding sexual behavior, but are less effective in demonstrating change in sexual behavior outcomes (Chandra-Mouli et al., 2013). A review of evidence on interventions commonly accepted as best practices '*what does not work in ASRH*', established that many ASRH interventions are implemented in an uncoordinated and piecemeal fashion, hence do not result in positive outcomes (WHO, 2018b). Literature also suggests that a combination of multiple strategies is likely to reach more adolescents as opposed to one standalone approach (Chandra-Mouli et al., 2013). There is however lack of scientifically sound data on the effectiveness of approaches targeting young people in SSA, in comparison to the magnitude of ASRH challenges experienced in the region (Salam et al., 2016). Results show that interventions with multiple components such as a combination of health services and outreaches services are often reported to lead to increased ASRH service use by young people (Salam et al., 2016). This shows that levels of adolescent pregnancies are attributable to multiple factors and its therefore critical for policy makers to understand them to inform development of comprehensive ASRH approaches. It also shows that there are multiple barriers to accessing SRH services by adolescents and underscores the urgency to address them through efforts at policy, health system, community, and individual level. It also calls for a paradigm shift from single intervention models towards comprehensive approaches that takes a multisectoral lens within local contexts to increase adolescents' use of ASRH services. Implementation of context-specific evidence-based approaches is needed to reach adolescents with lifesaving interventions, increase use of ASRH services and consequently reduce adolescent pregnancy and unsafe abortions.

1.3.1 Access to ASRH services during emergencies

Studies in this thesis were implemented during a global crisis, the COVID-19 pandemic. Access to ASRH services can be confounded by conflict, migration, and public health emergencies. The COVID-19 pandemic had an unprecedented global impact, leading to significant interruptions on provision of essential services and supplies, hence asserting enormous pressure on global health systems. Factors such as lockdown, limited autonomy, increased vulnerability due to age, and lack of adolescent friendly services affected adolescents' sexual health practices and disrupted provision of routine health services including contraceptive services (Nanda et al., 2020). In Kenya, the COVID-19 pandemic brought out the increasing inequalities, exposing adolescents' vulnerabilities in social, education and economic systems. A 2021 assessment report on the impact of the COVID-19 pandemic on adolescents in Kenya showed that loss of employment and income and restricted movement forced families to spend time in smaller spaces which contributed to increased sexual violence among girls and unintended pregnancies (Presidential Policy and Strategy Unit (Kenya) and Population Council., 2021). The report "Promises to keep: Impact of COVID-19 on adolescents in Kenya" recommends institutionalizing measures that address school dropout, teenage pregnancies, domestic violence among adolescents in Kenya. The reduced access to ASRH services during the COVID-19 pandemic is shown to have contributed to an increased risk to adolescent pregnancy in Kenya. The negative consequences experienced during this period call for strengthening of the health system to be more resilient in the event of emergencies, and the need to keep protective structures functional during such periods.

1.4 Commitments towards improving the health of adolescents.

Although disregarded historically, international agencies, government and non-governmental organizations are now focusing on improving ASRH by providing programmatic direction and funding. Additionally, whilst several strategies, partnership and movements have defined commitments for promoting ASRH, those described below have a direct attribution to adolescents' health with clear deliverables and timelines.

1.4.1 Global commitments and partnerships

Sustainable Development Goals

Although adolescents did not get the attention they were justified to in the Millennium Development Goals, there is a strong commitment to adolescent health in the Sustainable Development Goals (SDGs) (United Nations, 2016). The goal of SDG 3 is to “ensure healthy lives and promote well-being for all at all ages”. The target 3.7 calls on countries “by 2030, to ensure universal access to sexual and reproductive health-care services, including for family planning, information and education, and the integration of reproductive health into national strategies and programs”. One of the two indicators for measuring progress against this target is adolescent birth rate (aged 10–14 years and 15–19 years) per 1,000 women in that age group. The health and well-being of adolescents are therefore essential in achieving the SDGs, predominantly the ones targeting poverty, health security, education, and the reduction of inequalities.

Commitments by the United Nations (UN) General assembly

A UN general assembly special session on Children in 2002 recognized the need to develop and implement health policies and programs for adolescents that promote their physical and mental health (Morris & Rushwan, 2015). The Committee of the Convention on the Rights of the Child (2003) also issued a general comment acknowledging the special health and development needs and rights of adolescents and young people (UN committee on rights of the child, 2003). Subsequently, the convention on the rights of the child issued a general comment No. 20 (2016) on the implementation of the rights of the child during adolescence. This powerful case called for increased focus on adolescents to promote the realization of their rights, strengthen their potential contribution to positive and progressive social transformation and overcome the challenges they face in the transition from childhood to adulthood in an increasingly globalized and complex world. Established in 1979 the Convention on the Elimination of All Forms of Discrimination Against Women (CEDAW) monitors implementation of all forms of discrimination against Women. This convention impacts adolescents’ welfare in health, education, empowerment and addresses key issues such as FGM, child marriage, among others. In 1948, the universal declaration of human rights

(hereafter called Declaration), was unanimously proclaimed by the UN General Assembly as a common standard for all humanity (UN General Assembly, 1948). This 'international right to health' guarantees the right of everyone to the enjoyment of the highest attainable standard of physical and mental health. Countries therefore have the responsibility to ensure the rights of SRH for adolescents are met.

Global strategy for women, children, and adolescents

The Global Strategy for Women's, Children's, and Adolescents' Health (2016–2030) reiterates that the survival, health and well-being of women, children and adolescents are essential to ending extreme poverty, promoting development and resilience, and achieving the SDGs by 2030. Adolescent health is a key priority in this strategy. Further, the UN Secretary-General appointed the Independent Accountability Panel (IAP) for Every Woman, Every Child, Every Adolescent to provide an independent and transparent review of progress and challenges on the implementation of the 2016-30 global strategy. In 2017 the IAP issued an important appeal for increased accountability for investments for adolescents' health and well-being. The World Health Organization (WHO) also issued guiding principles on prevention of early pregnancy and poor reproductive outcomes among adolescents in developing countries in the year 2011 (United Nations, 2016; WHO, 2011) which looked at increasing access to and use of contraception as one of the four outcomes to prevent early pregnancy. Other outcomes include increasing knowledge and understanding the importance of pregnancy prevention; and preventing forced sex (United Nations, 2016).

Family Planning (FP) 2030

FP2030 is the successor to FP2020, a global initiative that ran from 2012 to 2020. The partnership is built up of governments, foundations, multilateral agencies, and civil society organizations and supports countries in strengthening health systems to increase women and girls gained access to modern contraception. FP2030 which runs from 2021-2030 is built on the following principles 1) Country-led partnerships and mutual accountability 2) Voluntary, person-centered, rights-based approaches to FP 3) A commitment to gender equality 4) Intentional and equitable partnerships with adolescents, youths, and marginalized populations. While all indicators in the FP2030

measurement matrix are relevant to ASRH, several of them measure priority processes and outcomes that directly relate to adolescent pregnancy such as 1) Modern contraception 2) Unintended pregnancies 3) Unintended pregnancies averted 4) Unsafe abortions averted 5) Maternal deaths averted and 6) FP counselling and decision making.

International Conference on Population and Development twenty-five years later ICPD25+

At the landmark International Conference on Population and Development (ICPD) in 1994, representatives of 179 governments gathered in Cairo and adopted the ICPD Program of Action, which recognized reproductive health and the empowerment of women and gender equality as pillars of sustainable development. Twenty-five years later, in November 2019, the Nairobi Summit, also known as ICPD+25, was held in Nairobi, Kenya, to celebrate the 25th anniversary of the Cairo conference. ICPD+25 noted that despite the significant progress in reducing maternal mortality and advanced gender equality over the past 25 years, the ICPD Program of Action promise remains a reserved reality to millions of people across the globe. The Nairobi summit made commitments that promote SRH and rights of women and girls including 1) To uphold the human rights of all people, including their right to SRH, to accelerate gender equality and the empowerment of women and girls 2) To eliminate all preventable maternal and child mortality and morbidities, eradicate gender-based violence against women, girls and youth, and to eliminate the unmet need for FP 3) To support investments in the capabilities of adolescents and youth that uphold their rights and fulfill their potential by guaranteeing access to quality education including access to comprehensive sexuality education and youth-friendly services for the realization of the demographic dividend.

1.4.2 Kenya's commitments and policies towards improving ASRH.

Kenya has made commitments towards improving SRH among adolescents. These include ratification of international treaties and development of legislation and policies that promote the health of women and girls.

Commitment to international laws

Kenya has advanced the protection of women, girls, and children through signing international treaties, joining global partnerships and adopting legal measures on key issues such as female genital mutilation, gender-based violence and child, early and forced marriages. These include the Universal Declaration of Human Rights which is operationalized through Kenya's 2010 constitution. The right to health in Kenya is stipulated in the 2010 constitution under Article 43 (1)(a), which states "every person has the right to the highest attainable standard of health which includes the right to health care services, including reproductive health care." Other treaties include the Convention on Discrimination Against women (CEDAW), ratified in 1984, the convention of the Rights of the Child (CRC), ratified in 1990.

During the family planning Summit in London, 2017, Kenya committed to work with partners to improve the of long-acting reversible methods (LARMs), expand commodities security, advance youth friendly services to focus mostly on adolescent girls as part of its FP 2020 commitments. To this effect Kenya has made great progress toward increased uptake of family planning and exceeded its 2020 target of 58% modern contraceptive use by married women. Kenya's new vision under FP2030 is to reap the socio-economic benefits to all citizens through accessible, acceptable, equitable and affordable quality family planning service. In the year 2021, Kenya made 8 commitments in the FP2030 movement whose goal is to improve access to family planning among all women and three are significant towards improving SRH among adolescents: 1) To increase CPR among married women from current 58% to 64% 2) To reduce unmet need for FP for all women from 14% to 10% 3) To reduce pregnancy among adolescent girls (15-19 years) from 18% to 10% by 2025. To meet the international commitments of achieving universal access to reproductive health by 2030, monitoring key family planning indicators is critical. During the ICPD25+ summit, Kenya committed to end teenage pregnancy by 2030, through providing information and services and managing complications of pregnancy. Kenya also committed to harnessing the demographic dividend by improving life skills and employability of young people. On gender equality, ending female genital mutilation, child marriage, sexual and gender-based violence as well as other forms of harmful practices and discrimination are key priorities in ICPD 25+

commitments. Other commitments include improving gender parity in school enrolment at primary school level, 100 % transition from primary school to secondary school, a return to school policy, making it possible for school-age girls to go back to school after childbirth.

Despite Kenya having ratified international frameworks on SRHR, the country has limited mechanisms to operationalize them. This can be attributed to lack of political leadership and limited funding to spearhead SRH programs. Also, the negative social cultural and religious practices also hinder the advancement of SRHR at country level. Policy analyses have showed that the difference between SRH and SRHR leads to confusion at both policy and program levels thereby causing a barrier to operationalization (Oronje et al., 2011). This is coupled with the lack of a universally recognized definition of SRHR at international level, resulting in varied interpretation by different stakeholders. (Chandra-Mouli et al., 2015). Additionally, some SRHR issues such as provision of safe abortion, provision of SRH information and services to adolescents, sexual orientation, and identities (Lesbian, Gay, Bisexual, Trans-gender, and Intersex), access to SRH services by people living with HIV/AIDS (PLWHAs), and sexual violence against women and girls, remain controversial in most countries. The controversies arise from their contradiction with certain cultural, religious and individual beliefs, norms and values (Kulczycki, 1999). Thus, efforts to change SRHR policy often receive strong opposition from certain political, religious and community leaders. Given this 'hostile' environment, many African governments either shy away from addressing these issues or take discriminatory approaches in policymaking and legislation. The political, economic, socio-cultural and religious issues affect provision of SRHR in SSA and have contributed to the lack of or slow implementation of international frameworks that Kenya is signatory to. Additionally, Kenya has limited formal structures to oversee alignment to international SRH frameworks, hence implementation is left to the discretion of individuals and is therefore subject to individual biases. The leadership of some of the international treaties (e.g., ICPD 25+) is provided by multilateral agencies, with Government taking a passive role in advancing the key commitments. To ensure alignment at country level, international frameworks should ensure there is Country buy in linked to a government led mechanism with the right political and social mandate to support

implementation. Other suggested strategies to operationalize SRHR in Africa include strategic framing of SRH and ensure decision makers do not feel threatened, forging strategic alliances, working with host governments as lead and seizing opportunities, such as shifts in political leadership to advance certain key issues (Oronje et al., 2011).

Kenya's legal and policy frameworks on ASRH

Article 43 of Kenya's constitution stipulates that every person has the i) right to the highest attainable standard of health, which includes the right to health care services, including reproductive health care and ii) A person shall not be denied emergency medical treatment. Anchoring the right to health in the supreme law indicates the highest level of legal commitment by the country towards the health of its people. Kenya has also prioritized the youth segment of the population and developed structures and policies to promote the health of young people. The President's delivery unit, established in 2015, is charged with coordination of National Government flagship programs, as well as monitoring, evaluation, and reporting on the timely fulfillment of the President's key development priorities. Health is one of the presidents big four agenda, and adolescents and youth have been made a key priority under the Presidential Policy and Strategic Unit (PASU). This is a deliberate and systematic effort to appropriately equip and empower the youth of Kenya to attain and realize their full potential and in turn drive attainment of development objectives set out in Kenya Vision (2030). Provision of SRH services is key to ensuring that young people attain their full potential.

To operationalize SRH programming among adolescents, Kenya has been implementing its National Adolescent Sexual and Reproductive Health Policy 2015-2021 which provides guidance to government ministries and partners on how to respond to ASRH needs (Ministry of Health, 2015). The policy advocates for a multisectoral approach to addressing adolescents' health needs and to realize the demographic dividend and achieve vision 2030. To further accelerate progress towards addressing ASRH, the Government of Kenya, launched a multisectoral campaign in 2022, "*ending the triple threat of new HIV infections, teenage pregnancies and gender-based inequalities*" This approach is led by the Ministry of Interior, the National Council for Population and Development (NCPD) and the National AIDs Control Council

(NACC) in collaboration with development partners and other sectors - education, gender, and social services among others. This multisectoral approach, endorsed by top national government leadership is expected to advance SRH and address the triple threat to adolescents prosperity (NCPD, 2022).

Kenya's policy environment provides a framework that is key to advancing SRH and the rights of girls in Kenya. Despite the availability of various policies and commitment to international agreements, adolescents in Kenya continue to have unmet SRH needs, mainly due to lack of knowledge, social stigma, laws, and policies preventing provision of contraception and abortion to unmarried (or any) adolescents, and judgmental attitudes among service providers. This shows a clear disconnect between the Country's commitments to advancing SRHR for adolescents and the practices across the various levels of the system.

Further, Kenya's progress towards attaining ASRH goals is under threat, which if not addressed could erode the gains made over the last decade. A new Children Act 2022 Article 16 (1) stipulates that *'Every child shall have the right to the highest attainable standard of healthcare services in accordance with Article 43 of the Constitution, provided that the provisions of reproductive health services to children shall be subject to the express consent of the parent or guardian'*. The requirement for parental consent for provision of SRH services creates a huge barrier and has led to some adolescents being denied health services. Post devolution of the system of governance in Kenya, the national ministry of health retained responsibility to lead the development of inclusive policies, guidelines, and frameworks to guide delivery of ASRH interventions. In 2021, the MOH started a process to develop and revise key policies that are relevant to ASRH:

- A new reproductive Health Policy 2022-2032, launched in July 2022 has elicited concerns from stakeholders for requiring parental consent to provide contraceptives to adolescents (Ministry of Health, 2022).
- Kenya's ministry of health has begun a process to review the 2015 ASRH policy and to develop a new AYSRH policy. This is timely because the 2015 Implementation framework ended in 2021 hence

the need to avoid a policy gap. The new policy is expected to respond to the minors and adults in the context of Kenya's constitution, incorporate new evidence and provide a framework for domesticated holistic interventions for ASRH. It is also expected to address emerging issues such as COVID -19 and its implication for ASRH.

- The ministry of health is also leading a process to develop a new FP policy for Kenya. A requirement for parental consent for adolescents when seeking use of contraceptives, has been included in the new policies, which are also widely supported by political, cultural, and religious leaders, individuals who have a strong influence within communities. Due to the lack of inclusivity in the policy development, and the anticipated negative implication, several civil society organizations have challenged the RH policy in a court of law. For success, a policy development process should be transparent, inclusive of an array of relevant stakeholders, traverse different sectors, and cut across all levels of government (Agu et al., 2022). For Kenya, key actors in SRH include ministries of health, planning and development, education, gender and children services, interior among others; non-state actors- including academia, civil society, media, religious groups representatives, parents, young people and adolescents among others. It also includes multisectoral collaboration and coordination of various government entities that address adolescents' health including: NCPD, Division of Adolescent and school Health, National AIDs control and STI's program, National AIDs control Council, the Ministry of education, the Ministry of Gender, and social services among others. Involvement of key stakeholders would provide relevant expertise to ensure new policies are in harmony with existing legislation, and also accurately reflect the rights of adolescents as per the constitution of Kenya that guarantees right to health to all. Use of evidence to inform policy development is also key to ensure inclusion of tested proven context specific interventions.

- An additional policy challenge facing Kenya is that provision of comprehensive sexuality education is not fully embraced in schools, where most adolescents spent most of their time.

The lack of acceptance of Comprehensive Sexuality Education (CSE) is not unique to Kenya and different frameworks have explored the key issues affecting CSE (Wangamati, 2020). The faith-and culture-based approaches believe that sexuality education should impart cultural and religious “moralistic” views on sexuality to prevent adolescents and young people from engaging in premarital or extramarital sex (Ketting & Winkelmann, 2013). The strong religious belief system in Kenya has led to increased family restrictions that prevent dialogue, encourage abstinence and bar adolescents, who may already be sexually active, from seeking ASRH services. As a result, many are exposed to the risk of STIs, unplanned pregnancy and unsafe abortion. The public health approaches to CSE aim to impart knowledge that will help adolescents and young people to protect themselves from sexually transmitted illnesses (STIs), and unintended pregnancies (Ketting & Winkelmann, 2013). This approach teaches the use of contraceptives as well as interpersonal and communication skills that help young people avoid risks and pursue their goals in life. To be effective, the public health approach requires a functioning health system. In Kenya, lack of budget allocation for health commodities has led to shortage of contraceptives and other ASRH products, exposing adolescents to further risks since they cannot afford to buy from private sector clinics. Additionally, some health workers are not willing to provide ASRH services to adolescents without parental consent. Consequently, adolescents are not fully empowered to seek SRH services, and also face barriers from the health care system to obtaining SRH commodities. The rights-based approach emphasizes the principles of SRHR with content beyond pregnancy and disease prevention (Berglas et al., 2014). The rights approach covers issues such as gender norms, diversity, sexual expression and pleasure, sexual relations and violence. The restrictive culture on sexuality in Kenya and lack of family support also exposes adolescents to the risk of sexual exploitation. Evidence shows that quality CSE improves children and young peoples’ sexual knowledge, self-confidence and esteem, positively changes attitudes, gender and social norms, strengthens decision-making and communication skills and builds self-efficacy (Fonner et al., 2014; UNESCO,

2015). For Kenya to succeed in meeting the health needs of adolescents, considerations should be made on how CSE can be applied based on local context.

1.5 Problem Statement

Despite the existence of a policy framework in Kenya, the implementation of ASRH services is weak, and barriers to access and use of SRH services by adolescents continue to exist (WHO, 2011). This is evidenced by the low contraceptive prevalence rate among married adolescent females, 15–19 years (36.8%), and among sexually active unmarried adolescents (49.3%), and the high unmet need for contraceptives, estimated at 23% for adolescent girls 15-19 years as compared to 18% for older women (García-Moreno et al., 2013). This is also coupled with the high adolescent pregnancy rate, which has remained stagnant at 18% for three decades, with a slight decline to 15% as per the KDHS report 2023 (KNBS and ICF, 2023).

Additionally, Kenya has huge disparities in meeting the SRH need of adolescents. Part of this challenge has been due devolution, whereby each county government is responsible for reaching adolescents, creating variation in implementation of ASRH policies. Recognizing the high burden of adolescent pregnancy in Kenya, disparities, and low use of ASRH services, including contraceptive use, context specific solutions are needed to address the problem. This doctoral research study was designed to establish the trends and determinants of adolescent pregnancy in Kenya, establish the barriers to access and use of ASRH services, and to test a combined intervention model that aims to reach adolescents at health facilities and in communities.

2 RESEARCH OBJECTIVES

The main objective of this doctoral study was to establish the burden of pregnancy among adolescents in Kenya and describe key approaches towards increasing use of contraceptives and SRH services. The specific objectives of this doctoral study are:

- To describe the trends and determinants of pregnancy among adolescents aged 15-19 years in Kenya. This was a secondary analysis of the 2003, 2008/9 and 2014 KDHS data.
- To identify the barriers, facilitators, preferences, and experiences towards the uptake of ASRH services among adolescents in Kenya. This was done through a formative qualitative assessment whose key findings were used to inform the ASRH program interventions.
- To develop, implement and test the effectiveness of a customized combined ASRH program intervention model towards improving utilization of ASRH services in Kisumu and Kakamega Counties, Kenya. This was achieved through a quasi-experiment study to test the effectiveness of delivering ASRH services in schools, facilities, and communities.

This thesis is based on papers that have been published or are under review in peer reviewed journals. The manuscripts are presented in full in the results section:

- **Mutea L.,** Were V., Ontiri S., Michielsen K., Gichangi P. Trends and Determinants of Adolescent Pregnancy: Results from Kenya Demographic Health Surveys 2003–2014: Published October 2022 *BMC Women's Health* (2022) 22:416; <https://doi.org/10.1186/s12905-022-01986-6>.
- **Mutea L.,** Ontiri S., Kadiri F., Michielsen K., Gichangi P. Access to information and use of adolescent sexual reproductive health services: Qualitative exploration of barriers and facilitators in Kisumu and Kakamega, Kenya. Published: November 12, 2020: *PLOS one Journal*. <https://doi.org/10.1371/journal.pone.0241985>.

- **Mutea L.**, Ontiri S., Macharia S., Tzobotaro M., Ajema C., Odiara V. Kadiri F., Orero S., Kabue M., Michielsen K., Gichangi P. Evaluating the effectiveness of a combined approach to improve utilization of adolescent sexual reproductive health services in Kenya: a quasi-experimental design study protocol. Reproductive Health volume 16, Article number: 153 (2019) <https://doi.org/10.1186/s12978-019-0825-3>.
- **Mutea L.**, Maluni Justinah., Kabue M., Were V, Ontiri S., Michielesen K, Gichangi P. The effectiveness of a combined approach towards improving utilization of Adolescent Sexual Reproductive Health Services: Results from a quasi-experimental study in Kenya: Submitted to the Journal of Sexual and Reproductive Health Matters, February 2023.

Supporting articles

Supporting articles are secondary papers published by the author which are not part of the core subject matter, but are aligned in certain elements, including core objectives, methodology and/or technical contribution to the core subject of the thesis:

- **Mutea L.**, Kathure I, Kadengye D, Kimanzi S, Wacira D, Onyango N, Wao H. Determinants of contraceptive use among women 0–23 months postpartum in Kitui County, Kenya: A cross-sectional study. Published: June 2, 2022, <https://doi.org/10.1371/journal.pgph.0000482>. The methodology used in this study is similar to the one used in the ASRH intervention study in. This was a cross-sectional study design employed whereby quantitative data were collected using a structured household survey. A structured household survey questionnaire was used to obtain information on characteristics of women using contraceptives at 0-23 months postpartum. Results showed that discussing family planning with women; educating women about different family planning methods; providing family planning information or services during other routine services was associated with increased likelihood of contraceptive uptake by women during postpartum

period. There was no disaggregation of data to study the association in the adolescent sub-population.

- Ontiri S, **Mutea L**, Muganda M, Mutanda P, Ajema C, Okoth S, et al. Protocol for a prospective mixed-methods longitudinal study to evaluate the dynamics of contraceptive use, discontinuation, and switching in Kenya. *Reprod Health*. 2019;16(1):134. This protocol describes studies that are mixed methods, using a formative assessment using interviews with various participants including adolescents, health workers, and community health volunteers. The studies utilized a qualitative study design.
- Ontiri S, **Mutea L**, Naanyu V, Kabue M, Biesma R, Stekelenburg J. A qualitative exploration of contraceptive use and discontinuation among women with an unmet need for modern contraception in Kenya. *Reprod Health*. 2021 Feb 9;18(1):33. doi: 10.1186/s12978-021-01094-y. The methodology used in this study is similar the one used in the formative assessment of this thesis: *Access to information and use of adolescent sexual reproductive health services: Qualitative exploration of barriers and facilitators in Kisumu and Kakamega, Kenya*, with regards to its methodology. Data in this qualitative study was collected using in-depth interviews and focus group discussions from women of reproductive age including adolescents. Key results show that engaging men and other social influencers in family planning programs and services will help garner support for contraception, rather than focusing exclusively on women.
- Parish E, Ajema C, **Mutea L** and Susan Ontiri: Determinants of contraceptive use among unmarried young women in Kakamega County, Kenya. *Adolescents* 2023, 3(3), 382-393 <https://doi.org/10.3390/adolescents3030026>. The Barrier Analysis methodology was used to examine determinants of the behavior of young unmarried women currently use modern contraceptive methods. Participants included adolescents aged 15-19 in Kakamega County who were sexually active, unmarried, and were using or not using modern contraception. Findings revealed that both users and

non-users understand the risk of non-use, and there was no statistically significant difference between both groups in understanding of contraceptive benefits and perceived drawbacks. The study is similar to others in this thesis on use of qualitative methodology, age of participants and geographical region. Findings from the gender analysis were utilized in defining community engagement approaches during delivery of ASRH interventions.

3 METHODOLOGY

This chapter presents information on the study design and how it addressed the study objectives. It starts with an in-depth description of the study setting (3.1), the study population (3.2), and data collection approaches (3.3). Further, this chapter describes the study methods (3.4), and instruments that were used to collect, manage, and analyze data (3.5) and concludes with details of the consent procedures and ethical considerations utilized to facilitate data collection (3.6). The details of the methods for each sub-study are described in the articles included in the Results chapter.

3.1 Study Setting

The research took place in Kenya, both at the national level (secondary data analysis) and in the two counties of Kisumu and Kakamega (the qualitative assessment and the intervention study). The secondary data analysis of the DHS was a national survey which used nationally representative data from three demographic health surveys to establish the trends and determinants of adolescent pregnancy in Kenya. The DHS data secondary analysis covered data from the periods 2003, 2008/9 and 2014. During the first two DHS, data was collected at provincial level, while the 2014 DHS was implemented after devolution and therefore data collected at County level.

The formative assessment and quasi-experimental study were undertaken in Kisumu and Kakamega counties as part of a 5-year Family planning, Maternal, Child, and Adolescent Health project (USAID Kenya, 2021). The two counties were selected because they are among counties with the highest burden of teenage pregnancy in Kenya at 22% and 15% respectively as per the KDHS 2014. The two counties are also faced with social economic and socio-cultural barriers to utilization of ASRH services, contributing to low levels of contraceptive use. Within these counties, two sub-counties within Kisumu County (Nyando and Kisumu East) and two sub-counties within Kakamega County (Matungu and Navakholo) were selected as the study areas. Further, within each of the identified four sub-counties, one ward (i.e., an administrative unit) was selected, making a total of two wards per evaluation group (comparison and intervention). The sub-counties and wards were

purposively selected based on the low use of family planning and the high burden of the adolescent pregnancy.

Kenya

Kenya is a country located in East Africa, along the equator, on the eastern coast of the African continent. It borders South-Sudan and Ethiopia to the north, Uganda to the west, Somalia to the east, Tanzania to the south and Indian ocean to the southeast. The Republic of Kenya covers a total area of 582,646 km² with a 536 km stretch along the Indian Ocean. According to the 2019 population and housing census, Kenya's population was reported as 47.6 million of which 23.6 million are male, while 24.0 million are females. The census report also showed that Kenya has a youthful population, about 35.7 million Kenyans (75.1%) are below 35 years. With a youthful population, harnessing the potential of young people through strategic investments in the health, education, economic and governance sectors, can accelerate its socio-economic development and wellbeing of the citizenry over the next few decades. This is articulated in Kenya's Demographic Dividend Roadmap in 2017 whose four key pillars include; health, education, economic and governance (NCPD, 2021).

In 2014, Kenya was ranked as a lower middle-income country because its per capita GDP of \$1,160 surpassed the World Bank threshold of \$1,036 to qualify. Despite this boost in GDP, Kenya has not yet overcome its economic and development challenge and more than four in ten Kenyans live in poverty (World Bank, 2018). The country development agenda is outlined in the Vision 2030 Agenda, a blueprint charged with industrializing the nation and making it a middle-income economy (Ndung'u et al., 2011). Kenya's expenditure on health as a percentage of the total government expenditure ranges between 4% and 6% against the 12% recommended in the Kenya Health Sector Strategic Plan, and the 15% in the Abuja Declaration. This inadequate financing coupled with weak accountability systems and structures may hinder achievement of Kenya's health goals.

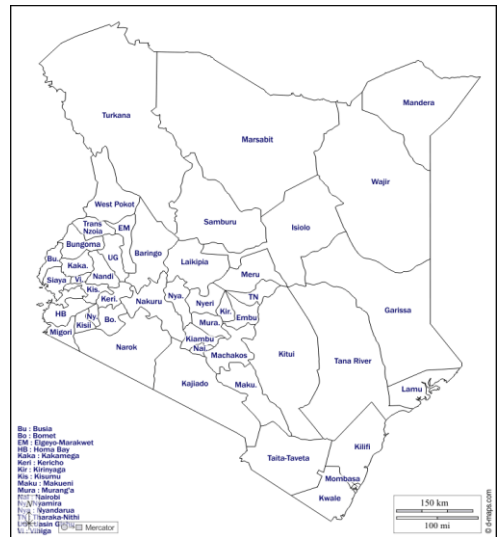
Kenya has made significant progress in reducing preventable child mortality; according to the DHS reports 2014, under five child mortality decreased from 79 per 1000 live births in 2008/9 to 54 per 1000 live birth in 2014. Further, the DHS report 2022 shows that the under-five mortality is now down to 41

deaths per 1000 live births. The maternal mortality ratio, and newborn mortality rate have however remained unchanged at 362 per 100, 000 live births and 21 per 1000 live births respectively, over the same period. The SRH of women and girls also continues to lag behind. The Universal Health Coverage plan, launched in 2018 is however expected to support improvement of access to and use of health services by vulnerable populations.

Figure 3: Kenya's 8 provinces before devolution



Figure 2: Kenya's 47 counties post devolution

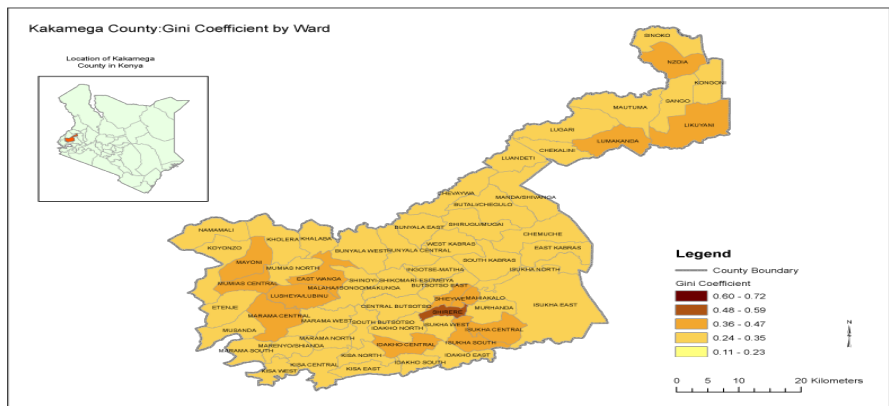


Before 2010, Kenya was divided into eight provinces under one national government system. After the promulgation of the 2010 constitution, Kenya was divided into 47 counties and in 2013, transitioned into a devolved system of governance comprising two levels: the national government and 47 semi-autonomous county governments. Under this devolution, the health service delivery function was transferred to county governments while the national government retained policy and regulatory functions. The maps below show Kenya's 8 provinces before devolution and 47 counties after devolution.

A description of Kakamega and Kisumu Counties

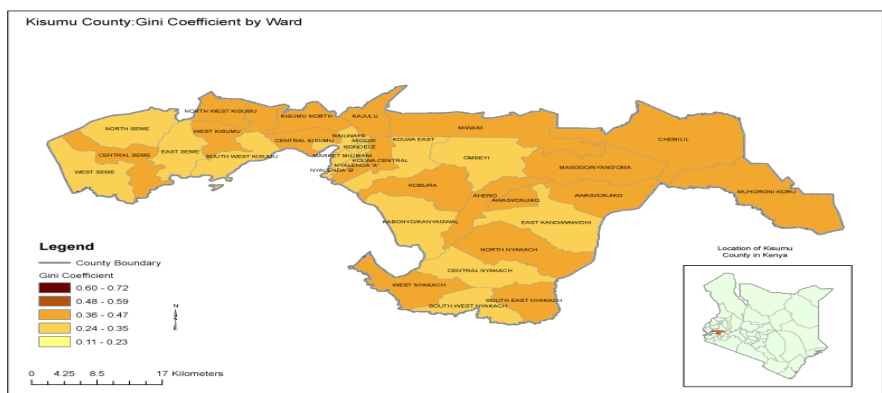
Kakamega is the second most populous county in Kenya with a population of approximately 1,8687,000 people of which 52% are women. Administration wise, the county is divided into twelve sub counties and sixty county assembly wards. The map of Kakamega showing all the wards here is illustrated in figure 4 below. Two of the wards (Kholera and Bunyala East) were the study areas:

Figure 4: Map of Kakamega County by wards



Kisumu County has a population of 1,155,574 with a total of 49% being females. Administratively the County is composed of seven sub-counties and thirty-five wards as illustrated in figure 5. Two of the wards, Kobura and Kajulu ward were the study areas:

Figure 5: Map of Kisumu County by wards



Data from surveys done in the last decade, including the 2022 Demographic health survey show that Kisumu and Kakamega counties have made great improvement in priority indicators related to sexual reproductive health. Table 1 below shows the performance of the two counties as compared to the national average on SRH.

Table 1: Performance of key SRH indicators in the study regions

Indicator	Performance /status		
	National average (Kenya)	Kisumu County	Kakamega County
Use of Modern contraception	53.2%*	59.3%*	60.3%*
	57%**	56.6%**	63.4%**
HIV prevalence+	4.9%	17.5%	3.9%
Fertility rate*	3.9%	3.6%	5.6%
Skilled birth attendance	62%*	58%*	47%*
	89%**	98%**	96%**
Adolescent Pregnancy Rate	18%*	15%*	18.5%*
	15%**	11%**	15%**
% of population with secondary education or higher++	22.8%	25.5%	18.5%

Sources: *Kenya Demographic Health Survey 2014, **Kenya Demographic Health Survey 2023, +KENPHIA 2018 Report, 2020.

++2019 census report

Both counties have a high skilled birth attendance, and a relatively high use of modern contraception. Kakamega County however has a higher fertility rate of 5.6% and adolescent pregnancy rate of 15% as compared to Kisumu at 3.6% and 11% respectively. A report by the National Council for Population and Development (NCPD) indicates that Kakamega County registered the second-highest rate of teenage pregnancy in 2019 at 17,555 cases against the Nairobi County's reported cases at 26, 538 and Kenya's annual reported cases of 378, 397. In this report, cases of child defilement and incest were also reported to be on the rise during the year 2019 (Sammy Mwibanda, 2020). The rise in reported cases of defilement and teenage pregnancy in Kakamega county has been attributed to factors such as poverty, poor parenting, child labor, traditional beliefs, and negligence (Sammy Mwibanda, 2020). The situation is estimated to be worse because many sexual violence cases mostly go unreported. Literature indicates that the most common barrier to accessing ASRH services in Kakamega County are, financial constraints to

access services, including paying for transport to the health facility, consultation, and medicine fees; negative attitude among the HCWs, hence discouraging most adolescents from visiting health facilities regardless of them needing care.

The HIV prevalence in Kisumu County is higher at 17.5% as compared to Kakamega County at 3.9%. It is also one of the highest in Kenya. Kisumu county is primarily inhabited by the Dholuo community. Due to high poverty levels, sex in exchange for money is reported frequently. Some of the social cultural practices in this community contribute to barriers to unplanned pregnancy and the high prevalence of HIV. Disco funerals (dancing to celebrate the dead) are held at night and are a common place where young people hang out and engage in risky sexual activities (Njue et al., 2009). These events involve music and dancing and are held daily, until the body is buried, with the primary goal being to mourn, celebrate and raise money to provide a proper burial for the dead. During these parties, both old and young men generally drink local brew, smoke marijuana or chew khat, and pay for girls whom they want as dance partners. The paid dance is later used for transactional sex (Zolnikov, 2014). During these occasions, many adolescents are reported to have casual sex sometimes with multiple partners, and mostly without condoms (Njue et al., 2009). For unwilling girls and young women, this often puts them at risk of sexual exploitation; and forced sex, and gang rape have been reported to occur. Drugs and alcohol use among adolescents are common and facilitates forced, unprotected, multiple-partner sexual interactions. A study conducted in the neighboring Homabay County showed that risky risk behaviors contributing to teenage pregnancies included multiple sexual partners, engagement in casual condom less sex, drug and substance abuse and cultural practices such as disco Matanga (Fiona Samuels et al., 2020). Poor access to SRH services further compounds the risks to poor health outcomes by adolescents in Kisumu County. A study conducted Kisumu indicated that adolescents accessed youth friendly services (YFCs) based on geographical location of health facilities/YFCs, accessibility of YFCs, convenience of operational hours of health facilities, consideration of privacy and confidentiality during service provision inconsideration to the room structural design, the cost of AYSRH services and availability of IEC material (Onyando et al., 2018). To maintain sexual and reproductive health,

adolescents need access to accurate information and to safe, effective, affordable, and acceptable SRH information and services.

3.2 Study population

Study participants for both study phases were drawn from among women aged 20-24 years (DHS data), adolescents, community members, teachers, healthcare workers, and county health managers in the two counties. Each participant group is described in this section.

3.2.1 Secondary data

Women aged 20-24 years: In each DHS, the subpopulation of women aged 15–19 is composed of respondents who may not have experienced a pregnancy at the time of their interview but could still experience this outcome as adolescents at a later date since they were still within the adolescent years. Therefore, the analysis focused on the subpopulation of women who most recently completed adolescence (i.e., women aged 20–24) since all women in this subpopulation had surpassed the age at which there would be a possibility of adolescent pregnancy.

3.2.2 Primary data

Adolescents: For FGDs and IDIS, both male and female adolescents were purposively selected in the intervention sites. The FGD participants were identified by youth leaders in the community and churches, and by health workers based on previous interactions. The IDI participants were identified during FGD based on their engagement and ability to communicate verbally in the FGD. Adolescent girls were the participants in the household survey, undertaken in intervention and comparison sites and were selected using a stratified cluster sampling approach. Stratification was done by county and the units of data collection (clusters) were randomly selected. Study participants were adolescent girls aged 15–19 years who did not have children and were not pregnant.

Community representatives: This group comprising of parents of adolescents, community health workers/volunteers, community leaders like chiefs, and religious leaders and youth champions were selected for IDIs to explore their decision-making processes around adolescents' use of ASRH

services, gender roles, and personal beliefs on key issues such as gender-based violence against adolescents, and legal issues (if any). The participants were purposively selected with the help of community influencers.

ASRH Health Service Providers: Service providers in the participating health facilities who routinely provide ASRH services to adolescents were selected for IDIs. Investigators drew a list of all ASRH providers in the participating facilities. With the help of the sub county management team, participants with more years of experience providing ASRH services were purposively selected.

Teachers were identified from primary and secondary schools in the study sub-counties and selected to participate. IDIs were conducted with guidance and counselling teachers/counsellors with an aim of exploring their experiences with providing ASRH information and services to adolescents in schools. Research assistants drew a list of all guidance and counselling teachers from primary and secondary schools in the study area, and participants were purposively identified.

County Leadership: Six participants were selected from county leadership in each of the two counties. KII were conducted with County Directors in the Ministry of Education, Health and Youth, and the Reproductive Health Coordinator.

3.3 Data collection approaches

This doctoral study was designed to employ two design methods: a cross-sectional formative assessment (Phase 1) and a quasi-experimental study design (Phase 2). Data was collected using various methods as per the study objective, illustrated in **Table 2**.

Table 2: Overview of study objectives and data collection approaches

Specific Aims Data Collection	Study design	Approach Used	Study phase
To describe the trends and determinants of pregnancy among adolescents aged 15-19 years in Kenya.	Cross-sectional	Secondary data analysis on the results of three Demographic Health Surveys: 2003, 2008, 2014	Phase I: Formative phase: Analysis of secondary DHS data for women aged 20-24 years.
To identify the barriers, facilitators, preferences, and experiences towards the uptake of ASRH services among adolescents in Kenya. This was done through a formative qualitative assessment whose key findings were used to inform the ASRH program interventions.	Qualitative assessment	Semi-structured qualitative interviews and focus group discussions	Phase I: Formative phase: A qualitative cross-sectional study design was used to establish the barriers preferences, and experiences of adolescents while seeking and utilizing ASRH services. The formative assessment was done in the intervention wards and the findings used to inform the design of the ASRH package of interventions.
To develop, implement and test the effectiveness of a customized combined ASRH program intervention model towards improving utilization of ASRH services in Kisumu and Kakamega Counties, Kenya.	Quasi-experimental	A cross-sectional survey undertaken at baseline and end line of the intervention.	Phase II: A quasi-experimental design was used to evaluate the ASRH program intervention rollout, on the effectiveness of a combined model towards improving utilization of ASRH services. In both counties, program intervention and comparison groups were selected while taking measures to ensure that the comparison group matches the program intervention group in general composition, such as possession of similar socio-demographic characteristics.

3.4 Study methods

3.4.1 Secondary DHS data analysis:

The KDHS is a national cross-sectional survey whose objective is to provide the country with reliable information and analyses useful for guiding informed policy choices. Standard demographic health surveys have large sample sizes and are therefore conducted about every five years, to allow comparisons over time. One of the questionnaires in the DHS, the woman's questionnaire includes information on characteristics for women aged 15-49 as well as questions for recording a recent birth history, pregnancy status, use of family planning among other key indicators. Through analysis of KDHS data from three surveys (2003, 2008/2009, and 2014), this thesis identifies trends in the prevalence of adolescent pregnancy as well as factors associated with adolescent pregnancy in Kenya. In doing so, it demonstrates how DHS data can be used to generate additional information using quantitative analysis methods not applied in the DHS final reports.

3.4.2 Exploration of barriers and facilitators of access to ASRH services

A cross-sectional qualitative study design was utilized for the formative assessment to establish the barriers, facilitators, preferences, and experiences by adolescents while using information and ASRH services. This was achieved through Focus Group Discussions (FGD) and In-depth interviews (IDIs) with adolescent boys and girls, ASRH service providers (both public and private sector), Teachers and Community Health Representatives. Key informant interviews (KIIs) were used to collect information from county level leaders and decision makers on ASRH issues. Findings from this study were used to inform the ASRH intervention described below.

3.4.3 Description of the combined ASRH intervention model

The combined ASRH service delivery approach was implemented in the intervention wards only. A defined set of activities were implemented at population-level to address challenges faced by adolescent in need of SRH services focusing on primary prevention of pregnancy. The ASRH service package targeting adolescent both boys and girls were delivered using a multisectoral lens and composed of provision of SRH services including contraceptives and age-appropriate comprehensive sexual education for

social behavior change. The ASRH services package was delivered across the intervention arm of the study using various platforms as described below.

The community element

Using a targeted approach, services were designed and planned for adolescents and offered in settings that meet only the needs of the adolescents and do not include other groups. These included parental dialogues, community outreaches, dialogue sessions that can positively contribute to adolescents' reproductive health e.g., drop-in centers, sports facilities, social halls etc. Community Health workers and other resource persons such as adolescent counsellors & peer educators were oriented on AFS and other innovative facilitation techniques such as Education through Listening (ETL) and Counselling for Choice (C4C). The CHVs and peer educators were supported to carry out household visits, small group sessions and organize events targeting this cohort such as: adolescent camps, symposia, dialogue days, thematic talks, sports days and facility open days where SRH topics were discussed. Social Behavior Change (SBC) was integrated across all service delivery points - i.e., facilities and communities.

The health facility element

Health providers were oriented to provide adolescent sensitive services (where adolescents are treated with respect and their confidentiality maintained) including the Value Clarification and Attitude Transformation approach VCAT approach to remove barriers to ASRH services access stemming from misinformation, stigmatization and negative attitudes towards adolescents seeking services. In health facilities, services providers at the facilities in intervention sub-counties were oriented on recommended ASRH topics and the ground-breaking "Counselling for Choice" (C4C) technique in a bid to transform their attitude and prepare them for the provision of Adolescent Friendly Services (AFS).

The school element

Rolling out this element was going to involve engagement and advocacy sessions targeting the Ministry of Education (MOE) and County leadership to create buy-in on ASRH rollout. In preparation for this, requisite approvals to operate in schools and engage the guidance and counselling teachers was

obtained. The intervention plan was to have teachers carry out weekly ASRH engagements with students in interactive challenges that build on the new knowledge and skills acquired through the ASRH sessions. A key approach to achieving this was to focus on context specific evidence-based school based ASRH interventions using the Comprehensive Sexuality Education (CSE) model. However, because of COVID-19 pandemic, schools were closed, and implementation of the school intervention was not undertaken. In the comparison group, implementation of ASRH services were continued in the same manner as they are routinely or currently being implemented through health facilities, whereby ASRH services are part of routine services.

3.5 Data Collection, Management and Analysis

The data management and analysis approach for this doctoral research is specific to each study objective. For each objective, data was collected by researchers who held a bachelor's degree in a health field and were experienced in qualitative and/or quantitative data collection. Additional training was provided on the study procedures, ethical conduct of research involving human subjects, and identifying and addressing problems during data collection. The recruitment, consent and survey tools were translated to Swahili, Dholuo and Luhya for use when study team interacts with individuals who do not understand English. A scribe, an assistant to the moderator, participated in each interview to ensure that the conversations were properly recorded. The scribes also took handwritten notes of the interview and generated summaries at the end of the discussion. Table 3 below shows the data collection approaches that were utilized to answer each of the specific aims:

3.5.1 Formative assessment

Sample size for formative assessment participants is shown in Table 3.

Table 3: Formative assessment sample sizes

Participant group	Approach/ Method	Description of participants	Frequency	Total number of participants
Adolescents aged 15-19 years	IDI	3 boys and 3 girls	2	12
	FGD	Girls FGD (10) Boys FGD (10) Mixed FGD (5 boys and 5 girls)	2	60
Teachers	IDI	3 male and 3 females (primary school secondary)	2	12
Community representatives	IDI	Chief, Village elder, parent, youth champion, religious leader, ward administrator, Police OCPD, community health worker	2	12
Health care workers	IDI	Public health facility (dispensary or health center), private facility, chemist/pharmacy attendant, public facility (sub county hospital)	2	10
County leadership	KII (10)	County directors - health, youth, education, Reproductive health coordinator, High school head teacher, primary school head teacher	2	10
Total number of participants				116

Data collected from IDIS, FGDs, and KIIs were transcribed, translated from the local languages (Lwanga, Dholuo, and Swahili), and back translated to English, then entered in qualitative data software (N-Vivo 12). A coding frame was developed using a theoretical framework by Braun and Clarke, which entails searching across a data set to identify, analyze, and report repeated patterns. Independent analysis was conducted by six different analysts, and subsequent comparison between the developed coding matrices was used to facilitate cross-referencing. The trends from the emerging themes were iteratively developed by repeatedly analyzing data collected at different time points. All 62 transcripts were analyzed with the use of NVivo 12 software. The study included six phases of thematic analysis, which included: 1)

becoming familiar with the data; 2) generating initial codes across the dataset and grouping coded data; 3) searching for themes by collating identified codes into themes and gathering data that was relevant to each theme; 4) reviewing themes and creating a map of the analysis; 5) defining and naming themes; and 6) producing an analysis report and selecting appropriate, vivid quotes in support of described themes. Deductive and inductive analysis approaches were used. Inductive analyses involved condensing the raw data into and comparing the emerging themes. Deductive analysis involved the examination and comparison of the findings to what is already known. In presentation of findings from this study, the socio-ecological framework was used to organize barriers and facilitators to ASRH services at individual, relationship, organization, community, and policy levels.

3.5.2 DHS secondary data

A secondary analysis of the 2003, 2008/9 and 2014 Kenya Demographic Health Survey data was undertaken to describe the trends and determinants of adolescent pregnancy in Kenya. This study used data collected from the women's questionnaire in the DHS and analysis was limited to women aged 20–24 years (2003: n=1,691; 2008/2009: n=1,715; and 2014: n=5,735). The 20–24-year-old women are the subpopulation of women who had most recently completed adolescence since they were past the age at which adolescent pregnancy was possible. The DHS secondary analysis covered descriptive statistics, trend analysis, multivariate regression analysis and pooled regression analysis.

3.5.3 Household Survey Data from the Quasi Experiment

A quasi-experiment evaluation design was used to evaluate the ASRH program intervention rollout, on the effectiveness of a combined model towards improving utilization of ASRH services. The indicator used to compute the sample size was the Family Planning Services utilization rate among adolescents aged 15-19 years, using the most current data from the study areas obtained from the District Health Information System (DHIS). The lower value for either evaluation group was used in each county. The FP utilization for both groups was computed, and the lowest prevalence between the two used in computing the sample size to guarantee the maximum possible sample size. An intra-class correlation of 0.03 was

assumed, resulting into a design effect of 1.87. The study is powered to detect a 15-percentage point difference between the two groups in each county, with a 95% confidence interval (CI), and the sample size was determined to be 264 per arm (total 528) and 231 per arm (total 462) per arm (total) in Kisumu and Kakamega counties, respectively, at each data collection period. Using the stratified cluster sampling approach, a power of 80%. Furthermore, we accounted for 10% of non-responses and incomplete data. Using these parameters, two cross-sectional household surveys were conducted in the two groups of sub-counties targeting adolescents at baseline and endline (after a 15-month implementation period). The baseline and endline assessments were independently sampled. The sample size is presented on table 4 below:

Table 4: Sample sizes for the two study arms stratified by county.

County	Total 15-19 years in the population	*FP utilization among 15-19 yrs	# Clusters per arm	Cluster sample size	sample size per period (baseline/end-line)	Total (Baseline & End-line)
Program Intervention	3600	16%	8	33	264	528
Kobura Ward (Nyando sub county)						
Comparison	4888	9%	8	33	264	528
Kajulu Ward (Kisumu East sub county)						
Program Intervention	2882	6%	7	33	231	462
Kholera ward (Matungu sub county)						
Comparison	2212	15%	7	33	231	462
Total - 1,980						

*Indicator used for sample size calculation

For the household survey data, descriptive analysis of quantitative variables was done using measures of central tendency (mean, median) and measures

of dispersion (range, standard deviation) as appropriate. Analysis of the primary outcome was undertaken to establish the difference-in-difference between the program intervention and comparison group, before and after the implementation. The effect size of the ASRH combined model was measured using the adjusted Prevalence Rates and 95% (aPR). The adjusted prevalence rates were calculated as the exponential of the interaction between the study arm (intervention =1, comparison=0) and period (end-line=1, baseline=0) by a robust Poisson model using Generalized Estimating Equation (GEE) accounting for clustering at the ward level. The outcomes of interest for this study included knowledge, behavior, comfort towards and utilization of ASRH services.

3.6 Ethical considerations

3.6.1 Ethical approvals

This doctoral thesis was guided by a protocol approved by the Kenya Medical Research Institute research ethics reviews committee (IRB 651) and the Johns Hopkins School of Public Health Institutional Review Board (IRB 9227).

3.6.2 Informed consent

During each DHS data collection, an informed consent statement is read to the respondents, and the interview continues for only those who accept to participate. The data analyzed in this study was collected from women who had already provided informed consent as per DHS procedures. The formative assessment and household survey research teams had research ethics certification and adhered to the study protocol provisions, including ensuring informed consent, ensuring privacy during data collection and protection of data confidentiality. For the household survey, Research assistants (RAs) visited the adolescents at their homes and sought informed consent for adolescent girls aged 18-19 years. The RAs also sought parental consent for girls aged 15 -17 years after which they also sought assent from the girls. The RAs explained the study to the parents and allowed the parents to ask questions in case they needed clarification after which the parents could provide permission for the adolescent minor to participate in the studies. For the formative assessment, RAs also obtained written consent from

participants of KIIs and IDIs. Consent was obtained at the selected places where the interviews were conducted.

3.6.3 County approvals

Approval to conduct the study was provided by the County Governments of Kisumu and Kakamega.

3.6.4 Author position statement

In this section, I reflect on how my own personal history, values and experiences have shaped this doctoral research.

I was born in Makueni County in Kenya, grew up in a Christian family and later attended a catholic high school. Like in most communities in rural Kenya, sexuality and sexual reproductive health was not discussed at home or at school. During my high school and college years, I observed that societal expectations on sexual behavior for adolescents and young people, and the realities were often disconnected. The fear of parents or religious beliefs did not sustain abstinence from sexual activity among young people, and with limited information on safe sex, there were many occurrences of STIs, pregnancy and consequently some girls would get pregnant and/or drop out of school, while others would choose to get married. This formative experience has shaped the objective of my study, and informed the questions about whether adolescents were sexually active, if they were using contraception, where they sought services from etc. My goal is to inform others, that empowering adolescents with information, and availing SRH services is key to promoting healthy sexual behaviors, preventing unplanned pregnancy and ensuring that girls stay and complete their education. My experience also indicated that in conservative communities, such as my own, cultural and religious issues hinder discussions about SRH, and that adolescents are unlikely to form trusting relationships with parents, that would allow free expression of their SRH needs. In the qualitative assessment, I was keen to understand who adolescents spoke to about SRH. I expanded the respondents to include others in the community (such as parents, teachers, health workers) to understand whether adolescents were supported to seek SRH services etc.

Professionally, I currently serve as a deputy office director, in the office of Health, Population and Nutrition (HPN), at USAID Kenya and East Africa, providing leadership to the Reproductive Maternal, Newborn, Child and Adolescent health (RMNCAH) as well as Health Systems Strengthening (HSS) portfolios. My experience whilst working with international organizations, such as USAID and UNICEF, provided me with exposure to an in-depth understanding of the SRH and rights of young people. This experience also revealed the existing and emerging political influences on reproductive health, on key issues such as abortion and use of contraception among adolescents. For instance, the US federal law prohibits use of its foreign assistance to support abortion. Consequently, the ASRH intervention in this thesis (funded by USAID), supported the use of the majority of ASRH services, but did not include abortion. Related, there is a strong push by politicians in Kenya to increase the number of births as an approach towards advancing economic development, a narrative that is likely to reverse the gains made in family planning over the last two decades. As I discuss the findings of my studies, I have provided a reflection of a summary of key policy and legislative SRH issues facing Kenya, and suggestions of what needs to be done to advance the SRH and rights of girls.

As a feminist, who believes in equal rights and opportunities for all genders, my take is that women and girls have a right to comprehensive sexual reproductive health, including the right to abortion when faced with an unplanned pregnancy. My studies focused on empowering adolescents with information, and increasing access to SRH services, including contraceptives (rather than promoting abstinence), as a more practical approach to improving adolescents SRH. In the discussions section of my dissertation, I make suggestions that the requirement for parental consent to use of contraception, in the new policy and legislation needs to be reconsidered. When young people have better access to sexual and reproductive health care, there are fewer unintended pregnancies and a likelihood to remain in school, towards attainment of their full potential. Availing SRH information and services in communities, schools and facilities will empower adolescents, increase utilization of SRH information and services and is likely to improve SRH outcomes for adolescents and youth.

4 RESULTS

This chapter describes the main findings from this research. It is divided into subsections which addresses findings around each specific aim.

- Article 1: Trends and Determinants of Adolescent Pregnancy: Results from Kenya Demographic Health Surveys 2003–2014.
- Article 2: Access to information and use of adolescent sexual reproductive health services: Qualitative exploration of barriers and facilitators in Kisumu and Kakamega, Kenya.
- Article 3: Evaluating the effectiveness of a combined approach to improve utilization of adolescent sexual reproductive health services in Kenya: a quasi-experimental design study protocol.
- Article 4: The effectiveness of a combined approach towards improving utilization of Adolescent Sexual Reproductive Health Services: Results from a quasi-experimental study in Kenya.

4.1 Article 1: Trends and Determinants of Adolescent Pregnancy: Results from Kenya Demographic Health Surveys 2003–2014

Lilian Mutea, Vincent Were, Susan Ontiri, Kristien Michielsen and Peter Gichangi

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This article presents findings from a secondary analysis of data from three Demographic Health Surveys 2003, 2008/9 and 2014. It addresses objective one of the doctoral thesis. Findings show a decreasing trend in adolescent pregnancy between 2003 and 2014. This analysis also established that education status, marital status, religion, and wealth quintile were associated with adolescent pregnancy. The study concludes that although Kenya has made strides in reducing the prevalence of adolescent pregnancy in the last decade, much more needs to be done to further reduce the burden, which remains unacceptable. In January 2023, Kenya released new findings from the 2022 DHS. Findings from the 2022 DHS are referenced in some parts of this thesis but were not included in the secondary DHS data analysis.

RESEARCH

Open Access



Trends and determinants of adolescent pregnancy: Results from Kenya demographic health surveys 2003–2014

Lilian Mutea^{1,2*}, Vincent Were³, Susan Ontiri⁴, Kristien Michiels¹ and Peter Gichangi^{1,5}

Abstract

Background Adolescent pregnancy increases the risk of disability and death due to unsafe abortion, prolonged labour and delivery, and complications after birth. Availability of accurate data is important to guide decision-making related to adolescent sexual reproductive health (ASRH). This study analyses the trends in prevalence and factors associated with adolescent pregnancy in Kenya using data from three national Demographic Health Surveys (2003, 2008/2009, 2014).

Methods Our analysis focused on a subsample of data collected from women aged 20 to 24 years. A trend analysis was performed to establish a change in the rate of adolescent pregnancy in 2003, 2008/2009, and 2014 survey data points. Binary Logistic regression and pooled regression analysis were used to explore factors associated with adolescent pregnancy.

Results The percentage of women aged 20 to 24 years who reported their first pregnancy between ages 15 and 19 years was 42% in 2003 and 42.2% in 2009 but declined to 38.9% in 2014. Using regression analyses, we established that education status, marital status, religion and wealth quintile were associated with adolescent pregnancy. Trend analysis shows that there was an overall decreasing trend in adolescent pregnancy between 2003 and 2014.

Conclusion Although Kenya has made strides in reducing the prevalence of adolescent pregnancy in the last decade, much more needs to be done to further reduce the burden, which remains high.

Definition Adolescents: Although WHO defines the adolescence period as being 10–19 years, this paper focuses on the late adolescent period, 15–19 years, here in referred to as adolescents.

*Correspondence:

Lilian Mutea

Lmutea@gmail.com; Lilian.Mutea@UGent.be

¹Department of Public Health and Primary Care, Faculty of Medicine and Health Sciences, Ghent University, Ghent, Belgium

²U.S. Agency for International Development (USAID) Kenya and East Africa, Washington, DC, USA

³Kenya Medical Research Institute (KEMRI), Nairobi, Kenya

⁴Population Services International, Washington, DC, USA

⁵Technical University of Mombasa, Mombasa, Kenya



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Background

Globally, complications during pregnancy and childbirth are the leading cause of death among women aged 15 to 19 years [1]. Adolescent pregnancy increases the risk of complications of unsafe abortion, prolonged labour, delivery, and the postnatal period [2, 3]. Babies born to adolescent mothers face higher risks of low birth weight, preterm delivery, and severe neonatal conditions [4].

Adolescent pregnancy is more likely to occur in marginalized communities, commonly associated with low socioeconomic status, lack of education, and limited employment opportunities [5]. Adolescent pregnancy is also strongly associated with poor access to health services, non-use of contraception, and early sexual initiation [5]. The early adolescent sexual activity contributes to unintended adolescent pregnancy and increases young people's risk of infection with HIV and other sexually transmitted diseases (STIs) [6]. Sexual activity among adolescents is highest across sub-Saharan Africa compared with other regions, a reflection which is linked to the higher rates of child marriage in the region [7]. Findings from the Performance Monitoring and Accountability Framework (PMA 2020) show that in 2018, 48.2% of women aged 18–24 years had their first sexual encounter before 18 years [8]. Some possible explanation is that child marriage is a common practice in many regions of Kenya which contributes to the high adolescent pregnancy rates.[9].

Although very early childbearing (giving birth before age 15 years) declined globally between 2006 and 2015, childbearing among older adolescents (between 15 and 19 years) has remained stagnant, especially in sub-Saharan Africa [10].

Based on data from the late 1990s from Burkina Faso, Cameroon, Côte d'Ivoire, Guinea, and Togo, pregnancy among girls in school contributes to school dropout and/or child marriage [11]. Using data from the late 1990s, Lloyd and Mensch found that for girls aged 15 to 24, child marriage and early pregnancy directly account for between 5% and 33% of dropouts, depending on the country [12]. Based on their subsequent lower education attainment, many girls who marry early have fewer employment opportunities, often perpetuating a cycle of poverty. Increasing the age at first birth is therefore important as it both positively impacts the health status of the young mother and baby and improves the young girl's future—socially, emotionally, and economically [13].

Kenya's 2015 adolescent sexual and reproductive health (ASRH) policy provides an enabling legal and socio-cultural environment to ensure that adolescents have access to SRH information and services through strengthened intersectoral coordination, partnership and community participation, improved data collection and analysis, and generation of age- and sex-disaggregated data

on adolescents [14]. From 2003 to 2008/2009, Kenya recorded a reduction in its adolescent pregnancy rate from 23 to 18%; it remained at 18% in 2014 [15–17]. These figures are likely an underestimation as they omit the number of pregnant adolescents who may not have carried the pregnancy to term.

Comprehensive data on trends, patterns, and prevalence of adolescent pregnancy are required to design evidence-based interventions and target them effectively. Country-specific estimates of pregnancy and birth among adolescents can also motivate policy and programmatic responses to teen pregnancies and help monitor progress toward reducing their incidence [18]. Even where incidence is low, evidence shows that data on adolescent pregnancies can highlight the unmet need for information and services to help adolescents prevent unintended pregnancies [18]. Kenya has a target to reduce the pregnancy rate among adolescent girls aged 15–19 years to 10% in 2025. Regular monitoring of progress is important to establish if the country is on track to achieve this target [14]. To meet this need, we undertook a secondary analysis of data from Kenya Demographic Health Surveys (KDHS) conducted at three points: 2003, 2008/2009, and 2014 using data from young women aged 20–24 years. The data points align with key policy milestones for ASRH programming in Kenya that began with development of the first ASRH policy in 2003. The policy marked the beginning point for ASRH programs and recommendations from this study would be relevant for future ASRH programming in Kenya. This study aims to establish trends in adolescent pregnancy, as well as the factors associated with pregnancy among adolescents aged 15–19 years old.

Methodology

Study design

The KDHS is a national cross-sectional survey whose objective is to provide the country with reliable information and analyses useful for guiding informed policy choices. Through analysis of KDHS data from three surveys (2003, 2008/2009, and 2014), this study identifies trends in the prevalence of adolescent pregnancy as well as factors associated with adolescent pregnancy in Kenya. In doing so, it demonstrates how DHS data can be used to generate additional information using quantitative analysis methods not applied in the DHS final reports.

Study variables

The outcome of the study was pregnancies which occurred between ages 15 and 19. The independent variables included in the analysis were the social demographic factors collected in the DHS, which are also determinants of adolescent pregnancy identified in other similar studies [19, 20] (REF). which include highest

education level attained (no education, incomplete primary level, primary, secondary, and higher) residence (urban and rural), religion (Catholic, Protestant, Muslim, others, and none), marital status (single, married, previously married), and household wealth which was calculated using the DHS five wealth quintile that uses the household asset data collected in the Household Questionnaire. The quintiles are then generated through a principal components analysis.

Study population

In each DHS, the subpopulation of women aged 15–19 is composed of respondents who may not have experienced a pregnancy at the time of their interview but could still experience this outcome as adolescents at a later date since they were still within the adolescent years. Therefore, the analysis focused on the subpopulation of women who most recently completed adolescence (i.e., women aged 20–24), since all women in this subpopulation were past the age at which adolescent pregnancy was possible. Although WHO defines the adolescence period as being 10–19 years, this paper focuses on the late adolescent period, 15–19 years, here in referred to as adolescents. Data on pregnancy levels during the early adolescent stage, 10–14 years was omitted due to the extended recall period and to be consistent with other similar studies that have used this approach of restricting analysis to women to pregnancy levels of 15–19 years [19, 20]. However, we have presented early pregnancy data as a supplemental file number one. This analysis, focusing on prior experiences of women during adolescence and focus on older adolescents are both limitations of this study.

Sample size

DHS data were collected from 8561 household in 2003 (96% response rate), 8195 females aged 15–49 (94% response rate); in 2008/9, 9057 households (98% response rate), 8444 females (96% response rate), and in 2014, 17,409 households were included (99% response rate), 14,741 females (96% response rate). This study uses data collected from the women's questionnaire in the DHS and analysis was limited to women aged 20–24 years (2003: n=1,691; 2008/2009: n=1,715; and 2014: n=5,735).

Data source

The KDHS data sets used in this study are available at <https://dhsprogram.com/data/available-datasets.cfm>. KDHS data are collected through the administration of structured questionnaires by trained enumerators at the household level. Data entry is done using the Census and Survey Processing System (CSPRO) software (<https://www.census.gov/data/software/cspro.html>). Through a collaboration of the Kenya Bureau of Statistics (KNBS)

and the DHS Program, the data are cleaned, coded, and made publicly available.

Data analysis

The DHS data was stratified, a process by which the sampling frame was divided into subgroups or strata that are as homogeneous as possible using certain criteria. The weighted analysis was conducted in the three DHS surveys to correct for over-sampling in certain strata and other non-sampling error. The weights were obtained by dividing the woman's sample weight by 1,000,000. The sampling and weighting techniques were similar for all the three years. The analysis accounted for stratification, clustering, and weighting. The three KDHS data sets were analysed using Stata version 14 [21]. The secondary analysis covered the following aspects:

- **Descriptive statistics:** Adolescent pregnancies were tabulated against sociodemographic characteristics for the survey years 2003, 2008/2009, and 2014. To achieve this, the variables, education, residency, marital status, religion, and household wealth quintile were tabulated to obtain the frequency and percentage of women in each category. Wealth quintile was already pre-assigned in the DHS data.
- **Trends analysis:** A multivariable logistic regression was used to check for trend across the three survey years. An odds ratio of less than 1 indicated decreasing trend while an odds ratio of greater than 1 indicated an increasing trend. 95% Confidence interval was also reported. Adolescent pregnancy was coded 1 if the respondent reported pregnancy and 0 if the respondent did not. Age of pregnancy was cross tabulated against sociodemographic characteristics and prevalence was obtained and reported at a 95% confidence interval (CI).
- **Multivariate regression analysis:** The outcome of interest of our regression analysis was a pregnancy in adolescents, which was coded 1 if the respondent reported a pregnancy between ages 15 and 19 years and 0 if they had not. Bivariate and multivariate regression analysis was performed to establish factors associated with adolescent pregnancy. The study used backward regression, whereby the outcome variable was regressed against the independent variables. Factor variables whose odds ratio did not overlap 1.0 were considered to be significant.
- **Pooled regression analysis:** For pooled analysis, data from 2003, 2008/2009, and 2014 were appended to form one data set (N=9,141) and the survey year was treated as an independent variable. The outcome variable remained pregnant during adolescence years. Bivariate and multivariate regression was applied as described previously.

Table 1 Sociodemographic characteristics of women aged 20–24 years

Sociodemographic	2003		2008/2009		2014	
	n	%	N	%	n	%
Residence						
Urban	524	31	539	31.4	2,769	48.3
Rural	1,168	69	1,176	68.6	2,966	51.7
Education						
No education	124	7.3	124	7.2	301	5.2
Primary incomplete	468	27.7	426	24.9	1,015	17.7
Primary complete	521	30.8	504	29.4	1,353	23.6
Secondary+	578	34.2	661	38.5	3,066	53.5
Marital status						
Never married	612	36.2	651	37.9	2,225	38.8
Married/living with partner	965	57	958	55.8	3,133	54.6
Widowed/divorced/separated	114	6.8	106	6.2	377	6.6
Household wealth quintile						
Lowest	220	13	253	14.7	809	14.1
Second	264	15.6	267	15.6	973	17
Middle	294	17.4	296	17.3	998	17.4
Fourth	363	21.5	353	20.6	1,290	22.5
Highest	550	32.5	546	31.8	1,665	29
Religion						
Catholic	411	24.3	359	20.9	1,187	20.7
Protestant	1,125	66.5	1,190	69.5	4,091	71.3
Muslim	115	6.8	122	7.1	351	6.1
No religion	33	1.9	38	2.2	89	1.6
Other (e.g., traditional)	7	0.4	3.4	0.3	17	0.3
Total	1,691	100	1,715	100	5,735	100

Table 2 Percentage of women aged 20–24 years by age

Age	2003 (N = 1,691)		2008/2009 (N = 1,715)		2014 (N = 5,735)		Trend 2003–2014
	n	% (95% CI)	n	% (95% CI)	n	% (95% CI)	
15	37	2.2(1.6–3.0)	66	3.8(3.0–4.9)	206	3.6(3.1–4.1)	0.84(0.73–0.98)
16	164	9.7(8.4–11.2)	181	10.5(9.2–12.1)	589	10.3(9.5–11.1)	
17	326	19.3(17.5–21.3)	366	21.4(19.5–23.4)	1,102	19.2(18.2–20.2)	
18	507	30.0(27.8–32.2)	564	32.9(30.7–35.2)	1,645	28.7(27.529.9)	
19	710	42.0(39.6–44.3)	724	42.2(39.9–44.6)	2,231	38.9(37.6–40.2)	

The variance inflation factor (VIF) was used to test for multicollinearity between education and wealth quintile. The mean VIF was 1.28 in 2003, 1.36 in 2008, and 1.35 in 2014. We conclude that there is no multicollinearity since the mean VIF across the three surveys is below the recommended threshold of 10 [22].

Ethical approval

The authors obtained permission from the DHS Program to access the data sets. DHS program already obtains approval at the point of data collection for each DHS. For this secondary analysis, the study was guided by a protocol approved by the Kenya Medical Research Institute research ethics review committee number 597.

Results

A total of 9151 women aged 20–24 years were included. Table 1 describes the sociodemographic characteristics of women aged 20–24 in 2003, 2008/2009, and 2014 KDHSs. As the Table 1 shows, the majority were from rural areas, had attained secondary or higher education, were married/living with their partner, were from the highest wealth quintile, and were Protestant/other Christian.

Adolescent pregnancy among women aged 20–24 years

Table 2 shows the percentage of women aged 20–24 years who were pregnant, got pregnant or experienced pregnancy during the adolescent period by age. Overall, there was a decreasing trend in adolescent pregnancy by age between 2003 and 2014 (AOR=0.84, 95% CI=0.73–0.98). Between 2003 and 2014, there was an increase of

Table 3 Percentage of women aged 20–24 years who experienced pregnancy during adolescence (ages 15–19 years)

	2003	2008/2009	2014			Trend 2003–2014	
	(N = 1,691)	(N = 1,715)	(N = 5,735)	N	% (95% CI)		
Prevalence of pregnancy (15–19)	710	42.0(39.6–44.3)	724	42.2(39.9–44.6)	2231	38.9(37.6–40.2)	0.88(0.76–1.02)
Residence							
Urban	163	31.2(27.4–35.3)	154	28.7(25.0–32.6)	867	31.3(29.6–33.1)	
Rural	547	46.8(43.9–49.7)	570	48.5(45.6–51.3)	1364	46.0(44.2–47.8)	
Education							
No education	65	52.5(43.7–61.2)	78	63.0(54.2–71.1)	165	54.7(49.1–60.3)	
Primary incomplete	303	64.7(60.2–68.9)	273	64.0(59.3–68.4)	678	66.8(63.9–69.6)	
Primary complete	216	41.5(37.4–45.8)	240	47.7(43.4–52.1)	694	51.3(48.6–53.9)	
Secondary+	126	21.7(18.5–25.2)	133	20.2(17.3–23.4)	694	22.6(21.2–24.1)	
Household wealth quintile							
Lowest	141	63.7(57.1–69.8)	151	59.5(53.3–65.4)	467	57.8(54.3–61.1)	
Second	140	53.2(47.1–59.2)	143	53.6(47.6–59.5)	506	52.0(48.8–55.1)	
Middle	138	46.9(41.2–52.6)	139	47.1(41.5–52.8)	440	44.1(41.0–47.2)	
Fourth	130	35.9(31.1–41.0)	140	39.6(34.6–44.8)	431	33.4(30.9–36.0)	
Highest	161	29.2(25.6–33.2)	151	27.7(24.1–31.6)	387	23.2(21.3–25.3)	
Religion							
Catholic	162	39.5(34.8–44.3)	152	42.3(37.3–47.5)	411	34.6(31.9–37.4)	
Protestant/Other Christian	465	41.3(38.5–44.2)	488	41.0(38.2–43.8)	1615	39.5(38.0–41.0)	
Muslim	58	50.6(41.5–59.6)	59	48.2(39.4–57.0)	138	39.5(34.5–44.7)	
No religion	22	66.0(48.2–80.2)	23	62.1(45.7–76.1)	60	67.0(56.5–76.0)	
Other	3	38.8(11.5–75.7)	2	38.5(8.6–80.6)	7	40.1(19.9–64.4)	
Marital status							
Never married	82	13.3(10.8–16.3)	97	15.0(12.5–18.0)	317	14.2(12.9–15.8)	
Married/living with partner	565	58.6(55.5–61.7)	555	57.9(54.8–61.0)	1670	53.9(52.2–55.7)	
Widowed/divorced/separated	63	54.7(45.5–63.6)	72	67.5(58.0–75.8)	224	59.4(54.3–64.2)	

1.4% points in the pregnancy rate among 15-year-olds. A decrease of 0.1%, 1.3% and 3.1 was noted in the percentage of women reporting adolescent pregnancy at ages 17, 18, and 19 years from 2003 to 2014.

Table 3 shows the overall trends in adolescent pregnancy rates based on the experiences of women aged 20–24 years who were interviewed during the three DHSs. Overall, there was a decreasing trend between 2003 and 2014 in adolescent pregnancy among women aged 20–24 years (AOR=0.88, 95% CI=0.76–1.02). Between 2003 and 2014, there was an increase of 9.8% points in women who had completed primary education and became pregnant during adolescence period 15–19 years. Adolescent pregnancy in the highest wealth quintile declined by 6% points between 2003 and 2014.

Factors associated with adolescent pregnancy among women aged 20–24 years

Using multivariate logistic regression, we analysed the factors associated with adolescent pregnancy and compared them over time (Table 4). Results showed that education level and marital status and wealth quintile were associated with adolescent pregnancy in 2003 and 2014 while in 2008/9 only education and marital status

was significant. In 2003, adolescent women who did not complete their primary education were almost twice as likely to become pregnant in the teenage years than those who never went to school (AOR=1.92, 95% CI=1.12–3.29). The odds were also much higher among married (AOR=6.53, 95% CI=4.85–8.80) and divorced/separated (AOR=4.89, 95% CI=2.87–8.33) adolescents than among the unmarried category. The odds for reporting pregnancy in adolescent years were highest among the lowest wealth quintile (AOR=2.49, 95% CI=1.46–4.22) followed by the second (AOR=1.80, 95% CI=1.13–2.88) and the middle quintiles (AOR=1.61, 95% CI=1.04–2.50) as compared to the highest wealth quintile.

In 2008/2009, women with a secondary school education were less likely to report pregnancy during adolescence (AOR=0.28, 95% CI=0.15–0.50). Once again, marital status was a factor; married (AOR=5.33, 95% CI=3.69–7.69) and divorced (AOR=8.67, 95% CI=4.30–17.48) women were more likely to report pregnancy during adolescence than unmarried women.

In 2014, women who had not completed primary education (AOR=1.88, 95% CI=1.33–2.66) had higher odds of reporting adolescent pregnancy, whereas those with secondary education (AOR=0.50, 95% CI=0.36–0.71)

Table 4 Regression analysis of socio-demographic characteristics for women aged 20–24 years who experienced pregnancy during adolescence in 2003, 2008–2009, and 2014

	2003 (N = 1,691)		2008/2009 (N = 1,715)		2014 (N = 5,735)	
	COR (95% CI)	AOR (95% CI)	COR (95% CI)	AOR (95% CI)	COR (95% CI)	AOR (95% CI)
Residence						
Urban	0.52(0.39–0.68)	1.24(0.85–1.82)	0.43(0.28–0.65)	0.73(0.44–1.20)	0.54(0.46–0.63)	1.01(0.83–1.24)
Rural	Ref	Ref	Ref	Ref	Ref	Ref
Education						
No education	Ref	Ref	Ref	Ref	Ref	Ref
Primary incomplete	1.66(1.08–2.54)	1.92(1.12–3.29)	1.04(0.63–1.73)	0.98(0.58–1.66)	1.67(1.27–2.19)	1.88(1.33–2.66)
Primary complete	0.64(0.41–0.99)	1.08(0.61–1.92)	0.53(0.35–0.82)	0.59(0.34–1.04)	0.87(0.67–1.13)	1.19(0.84–1.68)
Secondary +	0.25(0.16–0.39)	0.61(0.34–1.11)	0.15(0.09–0.23)	0.28(0.15–0.50)	0.24(0.19–0.31)	0.50(0.36–0.71)
Marital status						
Never married	Ref	Ref	Ref	Ref	Ref	Ref
Married/living together	9.22(6.88–12.36)	6.53(4.85–8.80)	7.79(5.35–11.36)	5.33(3.69–7.69)	7.05(5.81–8.55)	5.14(4.19–6.29)
Div/Sep/Widowed	7.86(4.66–13.27)	4.89(2.87–8.33)	11.76(5.98–23.12)	8.67(4.30–17.48)	8.80(6.18–12.53)	6.13(4.26–8.83)
Religion						
Roman catholic	0.34(0.15–0.74)	0.52(0.22–1.26)	0.45(0.21–0.96)	1.27(0.39–4.13)	0.26(0.14–0.47)	0.84(0.47–1.49)
Protestant	0.36(0.17–0.77)	0.63(0.27–1.44)	0.42(0.20–0.90)	1.23(0.39–3.94)	0.32(0.18–0.57)	0.81(0.47–1.40)
Muslim	0.53(0.22–1.24)	0.52(0.20–1.32)	0.57(0.26–1.26)	0.81(0.27–2.38)	0.32(0.18–0.59)	0.61(0.34–1.10)
No religion	Ref	Ref	Ref	Ref	Ref	Ref
Other	0.20(0.01–3.13)	0.23(0.01–5.57)	na	na		
Wealth quintile						
Lowest	4.24(2.90–6.21)	2.49(1.46–4.22)	3.83(2.37–6.20)	1.08(0.61–1.92)	4.52(3.56–5.74)	1.97(1.43–2.72)
Second	2.75(1.90–3.99)	1.80(1.13–2.88)	3.01(1.72–5.30)	1.42(0.73–2.76)	3.58(2.84–4.52)	1.86(1.39–2.50)
Middle	2.14(1.49–3.05)	1.61(1.04–2.50)	2.32(1.45–3.72)	1.08(0.61–1.88)	2.60(2.04–3.33)	1.90(1.42–2.55)
Fourth	1.36(0.97–1.90)	1.25(0.80–1.95)	1.71(1.03–2.85)	1.02(0.59–1.74)	1.66(1.29–2.14)	1.30(0.98–1.71)
Highest	Ref	Ref	Ref	Ref	Ref	Ref
Pseudo R2		0.205		0.212		0.186

Notes: AOR: adjusted odds ratio; OR: odds ratio

Adjusted for: Residence, education, marital status, religion and wealth quintile

Multicollinearity test was done between wealth and education, the variance inflation factor indicated no collinearity (variance inflation factor < 10)

Ref: Reference category

Div: Divorced

Sep: Separated

had lower odds. Compared to unmarried women, married (AOR=5.14, 95% CI=4.19–6.29) and divorced (AOR=6.13, 95% CI=4.26–8.83) women had higher odds. Women in the lowest (AOR=1.97, 95% CI=1.43–2.72), second (AOR=1.86, 95% CI=1.39–2.50), and middle (AOR=1.90, 95% CI=1.42–2.55) wealth quintiles all had higher odds of reporting pregnancy by age 19 years than women in the highest wealth quintile.

Pooled multivariate regression analysis of socio-demographic determinants of adolescent pregnancy

Table 5 shows factors associated with adolescent pregnancy for the years 2003, 2008/2009, and 2014 combined, with the year of study as one of the covariates. Compared to women with no education, women with incomplete primary education (AOR=1.66, 95% CI=1.29–2.14) had a higher likelihood of reporting adolescent pregnancy while those with secondary education (AOR=0.47, 95% CI=0.36–0.62) and above had lower odds of adolescent

pregnancy. The odds of adolescent pregnancy among married (AOR=5.38, 95% CI=4.60–6.30) and divorced (AOR=6.22, 95% CI=4.70–8.25) women was higher than those for women who were never married. Religion was also a factor, with Muslim women less likely to report adolescent pregnancy than those with no religion (AOR=0.62, 95% CI=0.39–0.98). The likelihood of adolescent pregnancy increased as the household wealth status decreased, with the fourth (AOR=1.22, 95% CI=1.01–1.49), middle (AOR=1.67, 95% CI=1.38–2.03), second (AOR=1.77, 95% CI=1.45–2.16), and first (AOR=1.83, 95% CI=1.47–2.27) household wealth quintiles all having higher odds than the highest household wealth quintile.

Discussion

The analysis presented here investigated adolescent pregnancy trends using retrospective data from 2003 to 2014 DHSs, thereby providing information from across a

Table 5 Pooled multivariate regression analysis of socio-demographic determinants of pregnancy during adolescence: (N = 9,141)

	COR(95% CI)	AOR(95% CI)
Year		
2003	Ref	Ref
2008/2009	1.01(0.81–1.27)	
2014	0.88(0.76–1.01)	
Residence		
Urban	0.51(0.45–0.58)	1.02(0.87–1.21)
Rural	Ref	Ref
Education		
No education	Ref	Ref
Primary incomplete	1.50(1.21–1.85)	1.66(1.29–2.14)
Primary complete	0.73(0.60–0.90)	1.03(0.80–1.34)
Secondary +	0.22(0.18–0.27)	0.47(0.36–0.62)
Marital status		
Never married	Ref	Ref
Married or living together	7.54(6.48–8.79)	5.38(4.60–6.30)
Divorced/Separated/Widowed	9.02(6.88–11.81)	6.22(4.70–8.25)
Religion		
Roman Catholic	0.31(0.20–0.47)	0.81(0.51–1.28)
Protestant/other Christian	0.35(0.24–0.52)	0.81(0.52–1.26)
Muslim	0.40(0.26–0.62)	0.62(0.39–0.98)
No religion	Ref	Ref
Other	0.20(0.01–2.92)	0.32(0.02–6.37)
Wealth quintile		
Lowest	4.27(3.53–5.16)	1.83(1.47–2.27)
Second	3.26(2.69–3.95)	1.77(1.45–2.16)
Middle	2.43(2.01–2.94)	1.67(1.38–2.03)
Fourth	1.58(1.30–1.93)	1.22(1.01–1.49)
Highest	Ref	Ref
Pseudo R² = 0.1928		

decade. In addition, we undertook a multivariate regression analysis for the three DHSs to establish the socio-economic factors associated with pregnancy among adolescents aged 15–19 years old.

There was no reduction in the prevalence of adolescent pregnancy between 2003 and 2008, however, a reduction occurred from 42.2% to 2008/2009 to 38.9% in 2014. The lack of progress in reducing adolescent pregnancy from

2003 to 2008 coincides with a period where the implementation of ASRH programs was not rife in Kenya. An assessment of the 2003 Adolescent Reproductive Health and Development Policy in 2013 revealed that there was limited dissemination of the policy and that it was not implemented equitably to all adolescents in society, especially the hardest to reach and most vulnerable populations [4]. The Performance Monitoring and Accountability (PMA) framework collects nationally representative data on family planning from women of reproductive age in Kenya, among other countries and its methodology is aligned to DHS to allow comparability. PMA 2020 findings shows that adolescent pregnancy in 2018 was 25.6% among women aged 14–18 [8]. These findings indicate a gradual decrease in prevalence from 38.9% to 2014 (our study findings) to 25.6% in 2018 (PMA data) [8]. The findings suggest that sexually active adolescents were using family planning to protect against pregnancy. The use of modern contraceptives among married adolescents rose from 15% to 2003 to 37% in 2014 [17]. The period under analysis also coincides with the launch by the Kenya Ministry of Health and development partners of various policy initiatives aimed at addressing adolescent health needs [4, 23]. Implementation of these policies is likely to have contributed to increased access to ASRH information and services, including the use of contraceptives. An analysis of trends and determinants of adolescent pregnancy and early motherhood in five East African countries using data from the DHS has shown greater improvements in some of the key determinants of adolescent sexual and reproductive health including educational attainment and knowledge and use of contraception [24]. Despite the decrease in adolescent pregnancy, more needs to be done to further reduce this burden, including reducing the unmet need for family planning among sexually active adolescents, which remains high at 23% [17].

The regression analysis indicates that adolescent pregnancy is associated with low education status, lower household wealth quintile, and marriage. Pooled regression analysis also indicated an association between low education status, lower wealth quintile, marriage, and religion (among Catholics and Protestants) and adolescent pregnancy. Systematic reviews have also showed that poverty, and lower educational attainment are consistently associated with adolescent pregnancy [25].

Overall, several factors remained constant over the three years. The odds of reporting adolescent pregnancy remained low among the urban population and high among women who were married or divorced across the three surveys. In addition, education remained a factor among the categories of women with no education and those with secondary education. Education at the primary complete category was a protective factor in 2003

and 2008 but not in 2014. Similar analyses have showed that as adolescents get greater access to education, the opportunities for avoiding early childbearing may improve due to increased knowledge to prevent unintended pregnancies, delayed sexual debut and Marriage [26].

The odds of reporting adolescent pregnancy were present among all wealth quintile categories in 2003 and 2014 and increased from the fourth wealth quintile to the lowest, from 1.71 to 3.73 (2003) and from 1.3 to 1.97 (2014). This relates to findings from an analysis of first births in East African whose findings revealed very high percentages of adolescent first births among the poorest quintiles for both rural and urban residents [27]. In addition, evidence across the world shows an association between adolescent pregnancy and poverty in both developed and developing countries [28]. While occupation was not investigated in this study, studies have shown that the risk of adolescent pregnancy is higher among adolescent girls in employment, perhaps because female adolescents who are not working may be in school which is a protective factor [29]. We however conducted a multicollinearity test between wealth quintile and occupation and found none.

The association between adolescent pregnancy and low education status is in line with findings from the trend analysis, which showed an increase in women with complete primary education from 41.5% to 2009 to 47.7% in 2014, while the percentage of child marriage decreased from 57.9% to 2003 to 53.9% in 2014. On the other hand, the trend in wealth quintile was not consistent with findings from the regression analysis; the percentage of those in the fourth and highest wealth quintiles, respectively, decreased from 39.6% to 2009 to 33.4% in 2014 and from 27.7% to 2009 to 23.2% in 2014.

Our findings add to the evidence from other studies on the association between education level and adolescent pregnancy [30]. Studies have shown that pregnancy among school-aged girls contributes to school dropout and/or child marriage; an estimated 5–33% of girls aged 15 to 19 years who drop out of school in some countries do so because of early pregnancy or marriage [1]. Increased educational attainment for adolescent girls could bring large poverty reduction benefits in addition to health benefits by avoiding early pregnancies and maternal deaths [31]. The school platform also provides an opportunity to provide ASRH messages and services that would increase the use of ASRH services among sexually active adolescents.

Pregnancy during adolescence was associated with low levels of household wealth, which has a ripple effect on many aspects of affected adolescents who often drop out of school, are forced into child marriage, start childbearing very early and thus end up with many children

living in poverty [1]. Increasing the age at first pregnancy is therefore important as it positively impacts the health status of the young mother and baby, but also improves girls' futures—socially, emotionally, and economically [13].

Our study shows that majority of the 20–24 years old women reported to have been living in rural areas over the three DHS surveys at 69% in 2003, 68.6% in 2008/9 and 51.7% in 2014. It however appears that more women were likely to have been living in urban areas in 2014 at 48.3% as compared to 31% in 2003 and 31.4% in 2008/9. This could be attributed to the devolved system of government enacted in 2010 through a new constitution that created new 47 lower-level county governments. Some of the causes of rural–urban migration includes inequalities, under employment and unemployment in rural areas and perceived income disparities between rural and urban areas among [32]. Devolution in Kenya strengthened urban towns located in rural counties, and where economic investments such as energy and natural resources are largely found [32]. This suggests that towns are attractive for young people in search of economic ventures or in pursuit of higher education opportunities. Various studies have established an association between residence and adolescent pregnancy. An analysis of the 2011 DHS in Uganda established that rural residence was associated with a larger proportion of adolescents (24.8%) either currently pregnant or having born a child, compared to 22% among those in urban areas [33]. A multi-country analysis on prevalence of first adolescent pregnancy and its associated factors in sub-Saharan Africa showed that the odds of having first pregnancy was high among adolescents who lived in rural areas as compared to those in urban areas [34].

Findings from the KDHS 2014 show that although there has been an increase in the modern contraceptive prevalence rate among married adolescents, from 15% to 2003 to 27% in 2008/2009 to 37% in 2014, the unmet need for family planning among adolescents remains high at over 50% [17]. High prevalence of adolescent pregnancy was associated with child marriage, which is likely due to legal, sociocultural, and religious factors. Although 18-year-olds are considered adolescents under the World Health Organization (WHO) definition, the Kenyan constitution states the legal age for adulthood as 18 years, allowing for consent to sex and marriage [35]. This is also the age when the majority of adolescents' complete secondary education. Consequently, this contributes to a high percentage of adolescents marrying and engaging in sex and becoming pregnant during the adolescence period. Studies have shown that early pregnancy and child marriage, in addition to playing an important part in school dropout rates, are often linked with socioeconomic inequalities and unequal gender norms [36].

Furthermore, child marriage has an economic cost, with countries losing out on the annual income that young women would have earned over their lifetimes if they had not had early pregnancies [1]. Our findings on the factors associated with adolescent pregnancy are consistent with those reported by other studies on adolescent pregnancy in Kenya [2, 14]. Increasing utilization of ASRH information and services among married adolescents is therefore important to delay childbearing and enable birth spacing.

High prevalence of adolescent pregnancy calls for changes at the higher levels of government using a multisectoral approach (especially education), and at the community level where the family unit and community leaders can play a major role. Recent efforts to institutionalize gender equality, uphold the rights of girls, and promote their well-being are likely to bear fruit soon. Article 27 of Kenya's 2010 Constitution guarantees equality, freedom from discrimination, and equal protection and equal benefit of the law. The 2022/2023 DHS is likely to show evidence of progress made toward achieving United Nations Sustainable Development Goal 5 for gender equality, specifically, elimination of all harmful practices, such as child, early and forced marriage, and female genital mutilations.

Although the enabling policy environment in Kenya provides a platform for ASRH services, the burden of adolescent pregnancy remains high, indicating that more needs to be done. Access to and use of ASRH services by adolescents have the potential to reduce unintended pregnancy and the numerous poor pregnancy outcomes among adolescents, such as preterm births, low-birth-weight babies, and complications during childbirth, including death [2, 3, 37]. Explanations for the non-use of contraceptives include limited knowledge of family planning methods, socio-cultural and religious factors prohibiting adolescents from accessing services, unfriendly health service providers, and limited access to family planning products [3, 38]. Since no one intervention can address all these factors, a multifaceted approach must be adopted. There is compelling evidence of effective interventions to improve access to and use of contraceptive information and services by different groups of adolescents in a variety of resource-constrained settings, e.g., incorporating adolescent-focused clinics in the existing health care delivery systems [39]. Studies from various parts of the world have shown that adolescent focused SRH programs are effective in reducing adolescent pregnancy and addressing the unmet need for family planning [1]. WHO also recommends that countries collect, analyse, and use accurate and up-to-date data on adolescent sexuality and health outcomes to inform the development of laws, policies, and strategies that are responsive to the needs of different groups of adolescents, based on their social and economic status [1].

Study limitations

Although the findings show a reduction in adolescent pregnancy from 2008 to 2014, DHSs are cross-sectional in design and therefore have an inherent inability to establish a causal relationship since data on exposure and outcome variables are collected at the same time. While there are other documented determinants of adolescent pregnancy, our study focused on selected socio-demographic characteristics. This study has most likely underestimated the prevalence of adolescent pregnancy, since data collected is limited to current pregnancies and previous live births, and do not capture adolescent pregnancies that end in miscarriage, abortion, or stillbirth. Furthermore, the correlates we used in the secondary data analysis are not likely to be comprehensive in analysing all factors relating to the health care systems or the attitude of adolescents toward SRH. In addition, although WHO defines adolescent pregnancy as any pregnancy before age 20, in the trend analysis and logistic regression, we used retrospective data from women who were 20–24 years old. We note that prior studies recommend caution in interpreting adolescent reproductive transitions based on retrospective survey data, due to possible recall and social desirability bias, and possible errors in imputation. In addition, the characteristics of interest included in the analysis may have been different at the actual time of pregnancy (when participants were 15–19 years) compared to the timing of the analysis (when participants are 20–24 years). Finally, this study purposely focused on adolescent's pregnancy at ages 15–19 years, leaving out girls aged 10–14 years. Further research on the sociocultural factors that fuel adolescent pregnancy is recommended. Analysis of adolescent pregnancy trends by geography is recommended for future studies.

Implication for policy and program

Findings from this study provide an opportunity to track past progress and therefore, inform Current and future programming. Since education status, marital status, and wealth quintile were associated with adolescent pregnancy, interventions to keep girls in school, alleviation of household poverty and elimination of child marriage need to be intensified. This calls for a multi-sectoral and multi-pronged approaches to addressing SRH issues among adolescents. Continuous data analyses will be key to monitor progress towards addressing the burden of adolescent pregnancy. To further reduce adolescent childbearing, provision of accurate ASRH information and services that can contribute to reducing the burden.

Conclusion

This study shows a reduction in adolescent pregnancy rates over a decade. Although marginal, the declining trend in adolescent pregnancy rates indicates a need for

concerted efforts to further reduce adolescent pregnancy. Understanding the socio-cultural and demographic factors that influence adolescent pregnancy is important in designing appropriate interventions to address these challenges. Strengthening reproductive health services and programs targeting adolescents throughout the continuum of care and using a multisectoral approach will likely contribute to better health outcomes for adolescents.

Abbreviations

AOR	Adjusted Odds Ratio.
ASRH	Adolescent Sexual Reproductive Health.
CI	Confidence Interval.
DHS	Demographic Health Survey.
OR	Odds Ratio.
VIF	Variation Inflation Factor.
WHO	World Health Organization.

Supplementary Information

The online version contains supplementary material available at <https://doi.org/10.1186/s12905-022-01986-6>.

Supplementary Material 1

Supplementary Material 2

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Authors' Contributions

LM: Led the conceptual design of the study, review of results, drafting and overall development of the manuscript. **VW:** Was involved in Conceptual design of the study, data analysis and revision of the manuscript. **SO:** Involved in conceptual design of the study and revision of the manuscript. **KM:** Conceptual design of the study and revision of the manuscript. **PG:** Conceptual design of the study and revision of the manuscript. All the authors have reviewed and approved the manuscript. In addition, authors are personally responsible for their contributions.

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Data Availability

The datasets used and/or analysed during the current study are available from the corresponding author on reasonable request. The KDHS data sets used in this study are also available at <https://dhsprogram.com/data/available-datasets.cfm>.

Declarations

Ethics Approval and consent to participate

The authors obtained permission from the DHS Program to access the data sets. DHS program already obtains approval at the point of data collection for each DHS.

Accordance

This study was based on secondary analysis of publicly available demographic health survey data hence did not touch on human subjects. Procedures and questionnaires for standard DHS surveys have been reviewed and approved by ICF Institutional Review Board (IRB). For this secondary analysis, the study was guided by a protocol approved by the Kenya Medical Research Institute research ethics review committee number 597.

Informed consent

This study was based on secondary analysis of publicly available demographic health survey data hence did not touch on human subjects. During DHS data collection, an informed consent statement is read to the respondent, who may accept or decline to participate. The data analysed in this study was collected from women aged 20–24 years, who are able to provide informed consent as per DHS procedures.

Consent for publication

Not applicable.

Disclaimer

The views and opinions expressed in this paper are those of the author and not necessarily the views and opinions of the US Agency for International Development (USAID).

Competing interests

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References

1. WHO. World Health Organization. Fact sheet: Adolescents: Health risks and solutions. Geneva: WHO. 2017;2017.
2. Banke-Thomas OE, Banke-Thomas AO, Ameh CA. Factors influencing utilisation of maternal health services by adolescent mothers in Low-and middle-income countries: a systematic review. *BMC Pregnancy Childbirth*. 2017;17(1):1–14.
3. Grønvik T, Fossgard Sandøy I. Complications associated with adolescent childbearing in Sub-Saharan Africa: A systematic literature review and meta-analysis. *PLoS ONE*. 2018;13(9):e0204327.
4. de Vienne CM, Creveuil C, Dreyfus M. Does young maternal age increase the risk of adverse obstetric, fetal and neonatal outcomes: a cohort study. *Eur J Obstet Gynecol Reproductive Biology*. 2009;147(2):151–6.
5. Blum RW, Gates WH. Girlhood, not motherhood: preventing adolescent pregnancy. *United Nations Population Fund (UNFPA)*; 2015.
6. Liang M, Simelane S, Fillo GF, Chalasani S, Weny K, Canelos PS, et al. The state of adolescent sexual and reproductive health. *J Adolesc Health*. 2019;65(6):3–15.
7. Williamson N. Motherhood in childhood: Facing the challenge of adolescent pregnancy. *UNFPA State of World Population 2013*. United Nations Population Fund. 2012;8.
8. Health ICFRHKlatBMGIpPaRHatJHBSop. Performance Monitoring and Accountability 2020 (PMA2020) Kenya Round 7: Household and Female Survey (Version #). Kenya and Baltimore, Maryland, USA.; 2020.
9. Gitau T, Kusters L, Kok M, van der Kwaak A. A baseline study on child marriage, teenage pregnancy, and female genital mutilation/cutting in Kenya. Amsterdam: Royal Tropical Institute; 2016.
10. UNICEF. Early Childbearing Data. UNICEF: Geneva, Switzerland; 2019.
11. Biddlecom A, Gregory R, Lloyd CB, Mensch BS. Associations between premarital sex and leaving school in four sub-Saharan African countries. *Stud Fam Plann*. 2008;39(4):337–50.
12. Wodon Q, Male C, Nayihouba A, Onagoruwa A, Savadogo A, Yedan A, et al. Economic impacts of child marriage: global synthesis report. 2017.
13. M. E. Evaluation. M. Age at first birth. 2017.; 2017.
14. Ministry of Health K. National Adolescent Sexual and Reproductive Health Policy. In: *Reproductive Maternal Health Services Unit R*. Nairobi, Kenya. 2015.; 2015.
15. CBS M. ORC-Macro. (2004). Kenya demographic and health survey. 2003.
16. Macro D. Kenya National Bureau of Statistics (KNBS), and ICF. Kenya demographic and health survey. 2008;9.
17. KDHS. Kenya Demographic and Health Survey, 2014 2014.
18. Sedgh G, Finer LB, Bankole A, Eilers MA, Singh S. Adolescent pregnancy, birth, and abortion rates across countries: levels and recent trends. *J Adolesc Health*. 2015;56(2):223–30.
19. Habito CM, Vaughan C, Morgan A. Adolescent sexual initiation and pregnancy: what more can be learned through further analysis of the demographic and health surveys in the Philippines? *BMC Public Health*. 2019;19(1):1–13.

20. Amongin D, Benova L, Nakimuli A, Nakafeero M, Kaharuza F, Atuyambe L, et al. Trends and determinants of adolescent childbirth in Uganda-analysis of rural and urban women using six demographic and health surveys, 1988–2016. *Reproductive Health*. 2020;17(1):1–12.
21. StataCorp L. *Stata base reference manual*. College Station: StataCorp LLC; 2005.
22. Alin A. Multicollinearity. *Wiley Interdisciplinary Reviews: Computational Statistics*. 2010;2(3):370–4.
23. Population NCF D. 2015 Kenya National Adolescents and Youth Survey (NAYS). NCPD Nairobi, Kenya; 2017.
24. Wado Y, Sully E, Mumah J. Pregnancy and early motherhood among adolescents in five East African countries: a. 2018.
25. Yakubu I, Salisu WJ. Determinants of adolescent pregnancy in sub-Saharan Africa: a systematic review. *Reproductive health*. 2018;15(1):1–11.
26. Wado YD, Sully EA, Mumah JN. Pregnancy and early motherhood among adolescents in five East African countries: a multi-level analysis of risk and protective factors. *BMC Pregnancy Childbirth*. 2019;19(1):1–11.
27. Neal SE, Chandra-Mouli V, Chou D. Adolescent first births in East Africa: disaggregating characteristics, trends and determinants. *Reproductive health*. 2015;12(1):1–13.
28. Rani M, Lule E. Exploring the socioeconomic dimension of adolescent reproductive health: a multicountry analysis. *International family planning perspectives*. 2004;110–7.
29. Maness SB, Buhi ER. Associations between social determinants of health and pregnancy among young people: a systematic review of research published during the past 25 years. *Public Health Rep*. 2016;131(1):86–99.
30. Petroni S, Steinhaus M, Fenn NS, Stoebenau K, Gregowski A. New findings on child marriage in sub-Saharan Africa. *Annals of global health*. 2017;83(5–6):781–90.
31. Verguet S, Nandi A, Filippi V, Bundy DA. Postponing adolescent parity in developing countries through education: an extended cost-effectiveness analysis. 2018.
32. Munya A, Hussain NHM, Njuguna MB. Can devolution and rural capacity trigger de-urbanization? Case studies in Kenya and Malaysia respectively. *GeoJournal*. 2015;80(3):427–43.
33. Gideon R. Factors associated with adolescent pregnancy and fertility in Uganda: analysis of the 2011 demographic and health survey data. *Am J Sociol Res*. 2013;3(2):30–5.
34. Ahinkorah BO, Kang M, Perry L, Brooks F, Hayen A. Prevalence of first adolescent pregnancy and its associated factors in sub-Saharan Africa: A multi-country analysis. *PLoS ONE*. 2021;16(2):e0246308.
35. Law K. *The Constitution of Kenya* (2010). Retrieved from. 2010.
36. Birchall J. Early marriage, pregnancy and girl child school dropout. 2018.
37. Ganchimeg T, Ota E, Morisaki N, Laopaiboon M, Lumbiganon P, Zhang J, et al. Pregnancy and childbirth outcomes among adolescent mothers: a World Health Organization multicountry study. *BJOG: An International Journal of Obstetrics & Gynaecology*. 2014;121:40–8.
38. Svanemyr J, Amin A, Robles OJ, Greene ME. Creating an enabling environment for adolescent sexual and reproductive health: a framework and promising approaches. *J Adolesc Health*. 2015;56(1):7–14.
39. Chandra-Mouli V, McCarraher DR, Phillips SJ, Williamson NE, Hainsworth G. Contraception for adolescents in low and middle income countries: needs, barriers, and access. *Reproductive health*. 2014;11(1):1–8.

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4.2 Article 2: Access to information and use of adolescent sexual reproductive health services: Qualitative exploration of barriers and facilitators in Kisumu and Kakamega, Kenya

Lilian Mutea, Susan Ontiri, Francis Kadiri, Kristien Michielesen and Peter Gichangi

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This article presents findings from a formative qualitative assessment of barriers to access and use of ASRH services. It addresses objective two of the doctoral thesis on access to information and use of adolescent sexual reproductive health services: Qualitative exploration of barriers and facilitators in Kisumu and Kakamega, Kenya. Findings show that the barriers of access to sexual reproductive health services and information were negative health workers' attitudes, distance to the health facility, unaffordable cost of services, negative social cultural influences, lack of privacy and confidentiality. Facilitators to adolescent sexual reproductive health services were few and included getting priority for school going adolescents and enabling environment for partnerships on adolescent health issues. The assessment concludes that counties should sensitize all stakeholders on adolescent SRH problems, and support development of multi-sectoral, sustainable solutions to adolescent health needs.

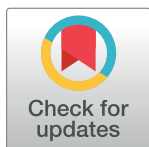
RESEARCH ARTICLE

Access to information and use of adolescent sexual reproductive health services: Qualitative exploration of barriers and facilitators in Kisumu and Kakamega, Kenya

Lilian Mutea^{1,2}, Susan Ontiri^{3*}, Francis Kadiri³, Kristien Michielesen², Peter Gichangi^{2,4}

1 U.S. Agency for International Development Kenya and East Africa, Nairobi, Kenya, **2** Faculty of Medicine and Health Sciences, Ghent University, Ghent, Belgium, **3** Jhpiego, John Hopkins University Affiliate, Nairobi, Kenya, **4** International Centre for Reproductive Health, Department of Public Health and Primary Care, Faculty of Medicine and Health Sciences, Ghent University, Ghent, Belgium

* susan.ontiri@jhpiego.org



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Data Availability Statement: All relevant data used in this paper have been included within the paper and the interview guides have been presented as [Supporting information](#) files. Access restrictions will apply to the interview transcripts, due to potentially sensitive information from the adolescents interviewed. Additional approvals will be required from the ethical review committees for applications to re-use the transcript data, and in keeping in line with informed consent and assent agreements. Applications can be submitted to the

Abstract

Background

Kenya has a high prevalence of adolescent pregnancy and low access to and use of adolescent sexual reproductive health services. Despite the enactment of evidence-based policies to address this problem, adolescents continue to face health problems and barriers to adolescent sexual reproductive health information and services.

Main objective

This study describes barriers to and facilitators of access to adolescent sexual and reproductive health services in Kisumu and Kakamega counties, Kenya.

Methodology

We used a qualitative design. Through 61 data collection sessions, 113 participants were engaged in key informant interviews, in-depth interviews, and/or focus group discussions. Trained Research Assistants (RAs) engaged adolescents, health care workers, teachers, county leaders, and community representatives. Data were captured using audio recorders and field notes. Socio-demographic data were analyzed for descriptive statistics, while audio recordings were transcribed, translated, and coded. Thematic analysis was done with NVivo.

Results

Findings show that the barriers of access to sexual reproductive health services and information were negative health workers' attitudes, distance to the health facility, unaffordable cost of services, negative social cultural influences, lack of privacy and confidentiality. Facilitators to adolescent sexual reproductive health services were few and included getting

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priority for school going adolescents and enabling environment for partnerships on adolescent health issues.

Conclusions

Adolescents in Kakamega and Kisumu face a myriad of barriers when seeking sexual reproductive health information and/or health services. We recommend that counties sensitize all stakeholders on adolescent sexual reproductive health problems, and support development of multi-sectoral, sustainable solutions to adolescent health needs.

Introduction

Adolescents comprise 24.5% of Kenya's 47.6 million total population [1]. This segment of the population is at high risk of sexually transmitted infections (STIs), including HIV/AIDS while female adolescents face the additional risk of early pregnancy, unsafe abortion and female genital mutilation [2]. In Kenya, the age of sexual debut is low; 47% of young women and 55% of young men between the ages of 18–24 years reported sexual intercourse before the age of 18 years [3]. Consequently, pregnancy among adolescents aged 15–19 years continues to be a significant problem in Kenya, with a teenage pregnancy rate of 18% and an adolescent birth rate of 96 per 1,000 women [3]. Studies have documented that adolescent pregnancy, whether intended or unintended, increases the risk of maternal mortality and morbidity, including complications of unsafe abortion, prolonged labor and delivery, and sepsis during the postnatal period [4]. Furthermore, more than half (51%) of all new HIV infections in Kenya in 2015 occurred among adolescents and young people (aged 15–24 years), with young women accounting for 33% of the total number of new infections [5]. Studies have shown that women who become mothers in their teens are more likely to drop out of school and have reduced career progression and economic empowerment, perpetuating the cycle of poverty [6]. Adolescents also experience a high rate of violence, with the 2019 report of violence against children indicating that sexual violence was experienced by 15.6% of females and 6.4% of males before age 18 years in Kenya [7].

To address these challenges, Kenya developed a National Adolescent Sexual and Reproductive Health policy to guide implementation of interventions aimed at assisting the country to achieve the development goals [8]. Despite this legal framework, implementation of adolescent sexual and reproductive health (ASRH) services has been weak, and, consequently, barriers to access and use of SRH services among adolescents and youth continue to exist [9]. This may, for instance, explain the low (36.8%) contraceptive prevalence rate among married adolescent females (15–19 years), and among sexually active unmarried adolescents (49.3%); and the high unmet need for contraceptives, estimated at 23% as compared to 18% for older women [3]. Constitutionally, abortion is illegal unless, in the opinion of a qualified medical practitioner, the health or the life of the woman is at risk or unless permitted by any other law [10]. Despite this, unsafe abortion is rife among adolescents and youth and underreported [11]. The constitution also stipulates 18 years as the legal age of marriage and consent to sex [10]. However, 23% of Kenyan girls are married before their 18th birthday and 4% are married before the age of 15 [12].

To operationalize the 2015 National Adolescent Sexual and Reproductive Health Policy, the Ministry of Health allows health workers to provide SRH services to adolescents who are minor but are considered mature due to their experience, education, training/conduct, marital

status, and or involvement in making important decisions in their lives [8]. Additionally, Kenya's national guidelines on family planning recommend that mature minors be allowed to consent to receive health services. Mature minor are described as those who are married, have children, STIs or symptoms of STIs, are pregnant or have ever been pregnant [13]. While use of ASRH services, such as contraception is a key approach to prevent early pregnancy, all adolescents in lower- and middle-income countries, especially unmarried ones, face a number of barriers at the individual level and in their environment [14]. We aimed to identify these barriers for stakeholders to develop context-specific solutions to address the problems of poor access and low use ASRH services. This paper details an exploratory study of the barriers and facilitators to access SRH services by adolescents in Kakamega and Kisumu counties in Kenya. The work reported herein emanates from the ASRH interventions that were led by the U.S. Agency for international Development-funded Afya Halisi ("real health" in Swahili) project in Kenya. The ASRH component seeks to improve access and use of quality ASRH services and reduce the burden of adolescent pregnancy.

Materials and methods

Study site and design

This qualitative study was a formative phase of a larger study, whose findings were used as a baseline for an ASRH intervention [15], that was carried out in two wards that were purposively selected: Kobura ward within Nyando sub-county (Kisumu county) and Kholera ward within Matungu sub-county (Kakamega County). These two wards and sub-counties were among those with the highest burden of adolescent pregnancy and low use of ASRH services within the two counties. The study team conducted key informant interviews (KIIs), in-depth interviews (IDIs), and focus group discussions (FGDs). RAs conducted IDIs among teachers, health care workers (HCWs), community representatives, and adolescents. FGDs were conducted with adolescents only, as they were the main study informants and it was important to get their perspective on the issues. KIIs were done with county leadership. Study enrolment was done through catchment health facilities, surrounding schools, and the community within the participants' health facility catchment area—the surrounding geographic area from which a health facility attracts its clients.

Sampling and recruitment strategy

The study team engaged five categories of KII informants: reproductive health coordinators; county directors of youth, education, and health; and high school head teachers. IDI were conducted with adolescents males and females, community representatives consisting of chief, village elders, parents, youth champions, religious leaders, police officers commanding the police division, and community health workers; primary and secondary school teachers; and HCWs from the following categories: public health facilities (sub-county hospitals, health centers, and dispensaries), private health facilities, and chemist/pharmacy attendants. FGDs with adolescents were organized, into female only, male only, and mixed male and female. During the design stage, the study leaders contacted county health authorities, described the study, and sought permission to carry out the study activities. Before implementation, the research teams approached community leaders and local administrative authorities and described the study to them after permission had been granted by the County Health Management Team (CHMT). The study team used a recruitment script to introduce the study and explain the purpose, study procedures, and rights of participants. Participants enrolled in the study at the nearest health facility, surrounding school, or community within the facility catchment area.

We used purposive sampling to select adolescents (male and female) aged 15–19 years. While the World Health Organization (WHO) classifies adolescents as those aged 10–19-year-old, our study focused on 15–19-year-olds because adolescents aged 10–14 are considered very young and interventions targeting this group were likely to be met with resistance by county governments and stakeholders. In Kenya, strong cultural and religious narratives have been instrumental in blocking implementation of ASRH interventions outlined in global commitments [16]. In addition, this study was a formative assessment for an intervention study designed to use a community, facility, and school approach and the school approach was designed to target secondary schools, which enroll adolescents above 14 years.

The study team mapped youth social networks based on the information shared by the local administration and the respective youth leaders were identified. The youth and church leaders collaborated with HCWs in the catchment area to select adolescent participants. Adolescents were selected based on their previous interaction with youth leaders and HCWs and those who met the inclusion criteria.

After participants were identified, RAs visited the adolescents to seek informed consent from those aged 18–19 years and from mature minors. They also sought parental permission and adolescent assent for adolescents aged 15–17 years. RAs provided a detailed explanation of the study to parents and, consequently, they provided their permission for their adolescent minors to participate. During the FGDs, RAs identified adolescents to take part in an IDI based on their engagement and ability to communicate verbally in the FGD. They were approached at the end of the session and asked to participate in an IDI, which provided an opportunity to further explain the process.

Health care providers were drawn from public and private health facilities, including pharmacies and local chemists who provide ASRH services in Kisumu and Kakamega counties. RAs obtained a list of all ASRH providers in the participating facilities from the sub-county reproductive health coordinator. The purposively selected providers were those with more years of experience providing ASRH services and were invited to participate through a phone call or a face-to-face meeting with the interviewer. If a provider declined, a new invitation was sent to a provider from the same or similar site. The IDI recruitment aimed to include a balance of cadres and genders of health providers, levels of care (dispensary, health centers, and sub-county hospital), and both the public and private sectors. Teachers were recruited from both primary and secondary schools in the study areas and were those responsible for guidance and counseling of adolescents. Investigators obtained a list of all guidance and counseling teachers from schools in the study area, then invited them individually to participate through a face-to-face meeting. If a teacher declined, a new invitation for a face-to-face meeting was sent to a teacher from the same or another participating school.

For the community representatives, investigators generated a list of key community influencers in the study area and selected men and women who had influence on ASRH services, including those who could pose barriers or create an enabling environment. The nine KIIs were similarly purposively identified and invited for face-to-face interviews.

All the study participants except for the adolescents were invited through telephone calls. For all study participants, we provided invitations that included details of the venue, date, and time for the activity. The study's inclusion and exclusion criteria are presented in [Table 1](#).

Fieldwork team recruitment and training

A total of six qualitative RAs were recruited to help facilitate our study based on their prior understanding of ASRH issues and proven skills in conducting qualitative interviews. They

Table 1. Inclusion and exclusion criteria.

Participant category	Inclusion criteria	Exclusion criteria
Adolescents: FGD and IDI	<ul style="list-style-type: none"> • 15–19-year-old males and females who are residents of the selected study region • Adolescents 18–19 years who provide informed consent • 15–17 years* whose parents provide permission the minors provide assent • Informed consent provided by mature minors aged 15–17 years 	<ul style="list-style-type: none"> • Adolescents in foster care • Adolescents with mental disability
Community Representatives–IDI	<ul style="list-style-type: none"> • Resident of the community • Influencer in the community 	
Health workers–IDI	<ul style="list-style-type: none"> • ASRH provider in a public/private health facility or chemist 	
Teachers–IDI	<ul style="list-style-type: none"> • Responsible for guidance and counseling in a school within the study area 	
Decision makers–KII	<ul style="list-style-type: none"> • In leadership position on adolescent and youth matters in the county 	

*A mature minor is defined as a “minor 15 years of age or older; living separate and apart from their parents or guardian, whether with or without the consent of a parent or guardian and regardless of the duration of the separate residence, and managing their own financial affairs, regardless of the source of income” [17]. In this study, adolescents aged 15–17 years who fit the definition of “mature minors” and could provide informed consent on their own behalf were included.

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had bachelor’s degree qualification in social sciences with significant experience conducting qualitative interviews and knew the local language (Dholuo and Lwanga). Two highly skilled and experienced supervisors with masters’ degree in public health managed the RAs and associated fieldwork activities. RAs attended a central, four-day training to receive background information on the study, familiarize themselves with the study tools and consent documents, and refresh their skills on effective interviewing. The training included overview lectures, small group discussions and role plays.

Study variables

Our study used interview guides that had several domains which included issues affecting adolescents’ health, barriers and facilitators to access and use of SRH services by adolescents. Interview guides also included questions about myths, misconceptions, perceptions, and experiences participants had accessing and using SRH information and services; policies related to ASRH and questions about opportunities to increase access and use of ASRH services. The interview guides are provided in the [S1 File](#).

Data collection and management

The tools used for the study were translated into local languages and pretested in April 2019, prior to data collection. The pretesting was conducted in Nyakach sub-county and Matungu sub-county in Kisumu and Kakamega respectively. Challenges with pretest tools and methods were addressed prior to the data collection that was carried out in June 2019. During fieldwork, supervisors kept in constant communication with the RAs to ensure smooth flow of field activities. Prior to any data collection event, written consent (and assent as appropriate) was obtained. RAs obtained consent individually for each participant before the FGD and IDI, based on the age of the adolescent and according to study procedures. A moderator and a note taker facilitated each FGD session, while an interviewer conducted the IDIs and KIIs. All data collection sessions were conducted in safe spaces that were in use by the counties and the Afya Halisi project. These spaces were within easy reach of participants and located away from schools, health facilities, and homes. All sessions were captured through audio recording and note taking with consent of study participants.

Data analysis

Data analysis was conducted in English. All data collection tools were developed in English and translated into Swahili (national language) and two local languages (Dholuo and Lwanga). All FGDs; IDIs and KII were conducted in English except the IDIs with community representatives, which were conducted in Swahili, Lwanga, and Dholuo. Following fieldwork, audio files from IDIs, FGDs, and KIIs were transcribed from the data files in the language in which they were recorded. Those in Swahili, Lwanga, or Dholuo were translated into English language and back translated to ensure that the original meaning was maintained, then entered into qualitative data software. Information from the handwritten notes was used to supplement information gaps from the audio-recorded transcripts. All 61 transcripts were analyzed with the use of NVivo 12 software. The study included six phases of thematic analysis as described by Braun and Clarke, which included: 1) becoming familiar with the data; 2) generating initial codes across the dataset and grouping coded data; 3) searching for themes by collating identified codes into themes and gathering data that was relevant to each theme; 4) reviewing themes and creating a map of the analysis; 5) defining and naming themes; and 6) producing an analysis report and selecting appropriate, vivid quotes in support of described themes [18]. We used both deductive and inductive analysis approaches. To ensure timely coding and validation of the coding frame, six coders were paired to facilitate cross-referencing of codes and data analysis.

In this study, we used the ecological framework to organize barriers and facilitators to ASRH services as this framework is useful in studying determinants of health behaviors, outcomes and outlines elements needed to provide an enabling environment that would enhance uptake of services [19]. The elements are at individual, relationship, organization, community, and policy levels (Fig 1).

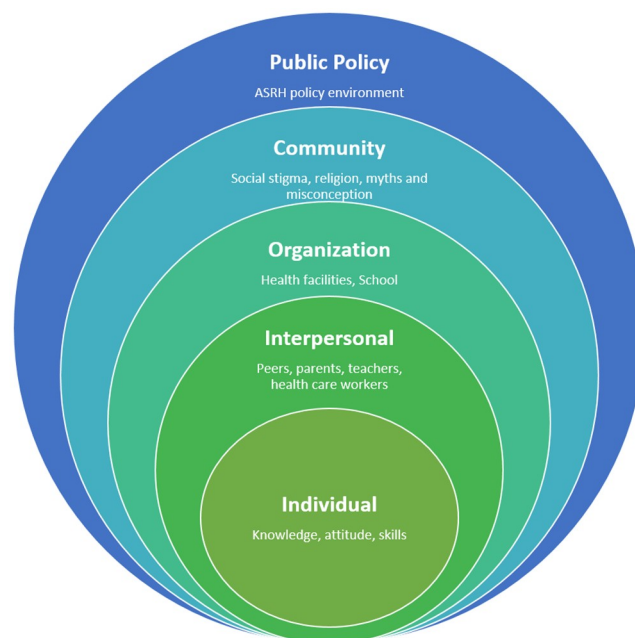


Fig 1. Ecological model showing levels of factors affecting access to ASRH information and services in Kisumu and Kakamega, Kenya.

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Ethical considerations

The Kenya Medical Research Institute research ethics reviews committee and the Johns Hopkins School of Public Health Institutional Review Board approved our study protocol. The research team had research ethics certification and adhered to the study protocol provisions, including ensuring informed consent, protection, and confidentiality of participants during data collection sessions, maintaining the confidentiality of all materials and information, limiting access to study information to only authorized personnel, and ensuring no identifying information on individual participants was included in the data analysis and reporting.

Results

Study participants' demographics

The study conducted a total of 61 data collection sessions involving 113 participants; 30 were carried out in Kisumu and 31 in Kakamega. There was a nearly equal number of males and females engaged; 62% of participants were aged 15–19 years. All participants had some education, with 53% and 34% reporting secondary and tertiary levels, respectively. The demographic characteristics are summarized in Table 2.

Common issues perceived to affect the health of adolescents in the community

Adolescents reported facing issues such as lack of access to contraceptives services and methods, particularly condoms. Participants mentioned child marriage was a challenge; as a result of poverty, parents offered their daughters for marriage in exchange for dowry. Adolescents, largely male also reported using bhang (marijuana) and alcohol due to pressure and social problems at home.

“When they are peer pressured, they can take alcohol and that can lead to drop out of school.”

(Kisumu, FGD 1, Girls)

“[One of the] things that causes rapes are the use of drugs. You may find that even an old grandmother may be raped by young people because drugs have destroyed their brains. Drugs use may also cause raping a child who is underage.”

(Kisumu, FGD 1, Boys)

Table 2. Demographic characteristics of participants in the ASRH study.

Variables		Adolescents (n = 70)	Community representatives* (n = 12)	Teachers (n = 14)	HCWs (n = 10)	County leaders* (n = 7)	Total (n = 113)	
							n	%
Type and number of Session		FGD-6	IDI-12	IDI-12	IDI-10	KII-7		
		IDI-12		KII-2				
Sex	Female	33	2	11	7	3	56	49.6
	Male	37	10	3	3	4	57	50.4
Age (years)	15–19	70					70	62.0
	20–34		4	6	4		14	12.4
	35+		8	8	6	7	29	25.6
Education level	Primary	14	1				15	13.3
	Secondary	56	4				60	53.1
	Tertiary		7	14	10	7	38	33.6

*These include County Directors of Health, Youth and Education and Country Reproductive Health Coordinator.

<https://doi.org/10.1371/journal.pone.0241985.t002>

Some adolescent females who were orphaned by HIV/AIDS and living with grandmothers were vulnerable due to poverty and lack of parental care; and were therefore susceptible to early pregnancies and school dropout. Adolescent females from poor families also reported consenting to sex in exchange for money and sanitary towels, but in the process were raped. In addition, Adolescents reported STIs, such as HIV, gonorrhoea, and syphilis.

“You can get a young girl being convinced by an older person who has got money to indulge them in sex.”

(Kakamega, FGD 1, Girls)

Barriers to access and use of SRH information and services by adolescents. Barriers to use of ASRH information and services were reported at all five levels of the ecological model: individual, relationship, organization, community, and policy. Both adolescent and adults reported these barriers, which are described below.

Individual-level barriers. The most common barrier among adolescent participants that mentioned in all FGDs and IDIs was the lack of money to access services, including for transport to the health facility, consultation and medicine fees. This was especially important for management of STIs because an adolescent who has a referral needs fare and money to buy prescription drugs that are not available for free at the health facility.

“When someone wants to go to the hospital, they may lack the fare to take them there, or say it’s at night, getting a vehicle that takes them may be hard.”

(Kakamega, FGD 1, Girls)

The second most common barrier mentioned by majority of the adolescent respondents was the negative attitude of HCWs, which discouraged many adolescents from visiting health facilities even when they needed care.

“Some go to the hospital for the first time and find that the doctor is not friendly. They start fearing the doctor because he is harsh. They become afraid to go back for treatment.”

(Kakamega, FGD 1, Boys and Girls)

Some opted to travel to distant facilities to avoid encountering their social networks.

“Those who are in adolescence choose places where they are not known so that when they are diagnosed with certain illness, it will be a secret, and no one will know.”

(Kisumu, FGD 1, Girls)

Maybe when you go to the hospital, you know that somebody from your clan is there. So, you fear going there because they might find out and tell your parents.”

(Kakamega, FGD 1, Boys and Girls)

Some adolescents also had fears about disclosure of their SRH condition or concerns. They worried about the pain of injections and were apprehensive about side effects of contraceptives. Others were uninformed about SRH services and support available in their communities, while others believed in lay theories of illness, home births, and use of herbal medicine.

Relationship-level barriers. Some respondents reported that the absence of parental teachings on ASRH discouraged use of care services. SRH matters were rarely discussed at home; culturally, SRH is not a topic discussed much because adolescents are perceived as children and not as young adults with an active sexual life.

“I have parents at home, but maybe I’m afraid to talk to them. So, if someone else’s parent is discussing it, I could ask questions and they are ready to answer. Asking my father, he might have trouble talking to me about such things.”

(Kakamega, IDI, Boy 3)

“Parents do not want to give their children time to access this information, maybe because they feel it is not the right time. . . , but generally somebody who is 15 years, that one to me needs lots of counseling and guidance from both home and outside home.”

(Kisumu, IDI, Community Representative 4)

Almost all teachers interviewed reported filling a gap created when parents avoid addressing ASRH issues at home. A Kakamega teacher illustrated this well:

“To some, discussing sexual activities, they don’t have the guts. To some, they fear. They cannot even discuss with their kids, their families. So, we (teachers) are supposed to have a syllabus, an area where everybody just goes through that thing, they do an exam, they read it properly. . . . But it is not enough.”

(Kakamega, IDI, Teacher 2)

There are some parents who are very harsh, and we know them. We have interacted with them. Whenever you go to them with a particular issue, they will not respond to you well, so you will fear to go to them with the same issue next time, you just go talk to a friend.”

(Kisumu, FGD 3, Boys and Girls)

A few adolescents mentioned being uncomfortable with getting service from HCWs of the opposite gender. Many adolescents indicated HCWs did not observe confidentiality and privacy. Male adolescents from the two counties reported this barrier well:

“People might overhear. . . I felt that the place was not very private. Getting out of there was a big problem because I felt like everyone had heard what we talked about with the doctor.”

(Kakamega, IDI, Boy 3)

“. . . the doctor reads your name out loudly in public and what you are suffering from. This may make you even leave and go back home.”

(Kisumu, FGD 1, Boys)

Organization-level barriers. Were related to health facilities and schools; a long distance to SRH services, shortage of staff and long queues, health facility costs, and supply stock-outs were reported as organizational barriers to use of SRH care services.

“The number of people in the facility can make you stay there until evening.”

(Kakamega, FGD 1, Boys)

In addition, inflexible timings of SRH services, HCWs who were untrained on family planning methods, absence during services hours deterred use of services. All adolescents interviewed also wished for more youth-friendly spaces, which were not available in the health facilities.

“In this community I have not seen [youth-friendly spaces] because when you go to the hospitals, they just treat you like any regular patient.”

(Kisumu, FGD 2, Boys)

“Sometimes you got to the facility and they tell you that they don’t have medication or oral syringes.”

(Kakamega, IDI, Boy 3)

Adolescents who were in school encountered unique problems. They needed to confide in a teacher to get formal approval to go for care. Sometimes, they were afraid to disclose their condition and would, consequently, miss necessary health care. Where schools were far from health facilities, long distances coupled with unaccommodating timing of health services were a barrier. In addition, teachers were not fully trained to handle SRH matters and schools lacked well stocked dispensaries.

“Teachers are specialized in teaching but not generally in health, so as much we want to talk to them about such issues, what we give them is not enough.”

(Kisumu, IDI 4, Teacher)

“Whenever they are supposed to be going to take the medicine, their ARVs [antiretrovirals], they come and ask for permission.”

(Kisumu, IDI, Teacher 3)

Community-level barriers. Social stigma was reported as a barrier because adolescents did not want anyone, they knew to see them at the health facility receiving SRH services due to association of ASRH services with sexual activities, which were sometimes labeled as “bad manners.”

“Stigma, if you are seen going to the hospital, it’s like you’re engaging in sex. So, society will have a particular perception of you.”

(Kisumu, IDI, County leader 1)

“They [community members] will just see her and say, ‘She involved herself in unsafe sex, that is why she is pregnant.’ Could be maybe she is also exposed to other infections.”

(Kisumu, IDI, Girl 3)

Religious beliefs about adolescent SRH were a barrier to access to services, with many Christian leaders expecting adolescents to abstain from sex. The following excerpt from Kisumu portrays this finding:

“I think the church also thinks family planning is killing. . . . The Catholic church believes that when you use family planning, you are killing the children that God wanted you to give birth to.”

(Kisumu, IDI, County leader 2)

“A number of religious sects within the county really don’t advocate for the use of contraception and use of reproductive health services. For example, the Legion Maria sect, these exist within the county. Their attitude is that adolescents should abstain. Even the mainstream churches, like Catholics, are pro-life churches and so issues of use of contraception are really prohibited within.”

(Kisumu, IDI, County leader 3)

Policy level barriers. Participants mentioned lack of knowledge of ASRH policy as a barrier to ASRH services. This meant that health service providers and teachers were not fully aware of what information and services adolescents were entitled to. Implementation of ASRH policies was lacking in some areas. In addition, the education sector had limitation on health workers’ engagement with adolescents in school settings:

“There is also the lack of awareness on the existence of these policies. How many people know that this policy is in place? Very few people know that these policies exist, and these weakens the enforcement structures.”

(Kisumu, IDI, County leader 1)

“The sooner the national government comes up and rolls out comprehensive sex education in schools, it will give us leverage because now we can go there. And because the education system already allows them, we can get access to the students. But right now, you go and the principal will tell you, ‘No! It is not allowed in schools.’”

(Kisumu, IDI, County leader 4)

A lack of resource allocation in county budgets for ASRH meant that program managers and county leaders were limited in the extent to which they could support roll-out of information and services to reach intended beneficiaries

“And I also know that finances are a challenge. As much as we are having the good policies, we know that at times, we need financial assistance to be able to implement this policy, which becomes a challenge.”

(Kakamega, IDI, County leader 1).

“County did not budget enough for the young people in the county budget. This time we have tried again to at least raise the budget. And every year, we have a plan to keep on raising it to enable young people to have a proper allocation on their support.”

(Kisumu, IDI, County leader 1)

Facilitators to access and use of ASRH information and services. In this study, there were few ecological model factors that facilitated access to ASRH services.

Relationship-level facilitators. Included supportive attitudes by some health workers in some facilities enabled use of ASRH services. For instance, a few adolescent females reported positive experiences with the friendly providers who paid attention to the client-specific needs:

“They are friendly because if you visit them, they handle you according to your sickness...”

(Kisumu, FGD 2, Girls)

Furthermore, interviews with HCWs illustrated a supportive environment and user-centered approach:

“We [HCWs] allow them to talk freely . . . to open up. ‘What actually do you want and why do you want it?’ So, we give them an opportunity to make an informed choice. After telling them the consequences and side effects, they say when they are aware, ‘If I use this, this can happen.’”

(Kakamega, IDI, Health Worker 3)

Organizational-level facilitators. The organization of health care and its delivery can prompt individuals to seek care. At the health facility, adolescent-reported motivators included short distance to the health facility, availability of free services and supplies, and privacy during service delivery. Some adolescents appreciated when they were given priority in the service queues. This meant that they had shorter waiting time and could get back to school or other chores quickly.

“If you go to the hospital dressed in a [school] uniform, you are attended to first because you are a student and you should go back to class as soon as possible. . . .”

(Kakamega, FGD 3, Boys and Girls)

“There is privacy because anytime you enter the facility, there is a [waiting] room also inside.”

(Kakamega, IDI, Girl 1)

Similarly, at school level, an enabling environment included provision of health insurance to support adolescents to seek health care services was reported. The school reentry policy that allows pregnant girls to continue with their studies until they are due to deliver and are readmitted after giving birth was mentioned as a facilitator, as shown by the quotations below:

“The education act now allows for the pregnant girls to be in school until when they feel they cannot stay longer. So, we allow them to go and deliver and come back after giving birth.”

(Kisumu, IDI, Teacher 2)

“The government is covering students’ health [insurance], so whenever they report to the school that they are unwell, they are given permission to go and seek treatment in the government facilities.”

(Kisumu, IDI, Teacher 3)

Policy-level facilitators. Key informants noted that political goodwill had improved, which enabled implementation of ASRH programs and creation of partnerships with other implementing organizations.

“We are seeing that with time, they are beginning to accept that adolescents and sexual reproductive health issues are important and, therefore, when we try to put budget items, we are seeing there is that reduced resistance.”

(Kakamega, IDI, County leader 1)

“The combined efforts of all organizations working with those issues . . . makes it easy. When the government wants to go slow, the civil society organizations come in.

(Kisumu, IDI, County leader 2)”

Discussion

In this study, we aimed to describe the barriers to and facilitators of access to ASRH services in Kisumu and Kakamega counties, Kenya. We found barriers at all five levels of the ecological model: individual, relationship organization, community, and policy; facilitating factors were found at relationships, organization, and policy. Our findings also show that adolescents in the study areas experienced many health challenges, including sexual and gender-based violence, unprotected sex, drug abuse, girls engaging in sex for money due to poverty, and lack of information and services. Globally, many young people experience violence, which harms their health and dignity and erodes their well-being; for females, much of that violence is perpetuated by intimate partners [20]. These issues have long-term health and social implications for adolescents, including unplanned pregnancy, STIs, and dropping out of school. Progress has been made in the 25 years since the International Conference on Population and Development, which has led to expanded public knowledge about adolescents, their needs and concerns, and ways to help them overcome barriers to SRH services and well-being, and support for fulfilling their aspirations [20]. Despite overall progress in adolescents, progress in many ASRH outcomes has been uneven, both within and between countries, and in some regions, adolescents' lives have worsened [21]. Kenya has 47 independent counties and the magnitude of ASRH problems varies from one to the other. But Kenya, and other countries, must not only accelerate progress to addressing ASRH challenges that continue to exist, but also create solutions that reduce disparity.

Key barriers at individual level were identified as high cost of services mainly transport costs, consultation fees and medication. Studies in other countries have found similar barriers to access to ASRH services and information. A study in Rwanda on availability, accessibility, and quality of ASRH services found that a majority of adolescents had to travel more than 30 minutes to access SRH services and that only half of the facilities offered low-cost services for adolescents [22]. In Nepal, adolescents were unwilling to visit health facilities because of the lack of availability of SRH items and medicines that are free of cost but are often out of stock, which required adolescents to purchase supplies from private pharmacies [23]. Cost was also a factor in a study conducted in Ethiopia, where adolescents who received drugs during their visit to the health facility were 2.7 times more satisfied and willing to seek services than those who did not [24]. Including cost of ASRH services in county budgets and universal health care packages could help address these individual and organizational barriers.

At the relationship level, studies suggest attitudes of parents are important; a parent who closely participates in their adolescent's health seeking endeavors can ease the care journey, especially when parental consent is required by law [25]. In addition, our study's findings imply that health providers with negative attitudes impact uptake of ASRH services. This indicates that more work needs to be done in this area to promote youth-friendly services. This is despite Kenya's Adolescent Reproductive Health and Development Policy Implementation Assessment, which suggested that government initiatives have resulted in improved attitudes toward ASRH services [26]. Negative and/or judgmental attitudes of health facility staff seem to be a predominant hindrance to uptake of ASRH services in many settings, as reported by a number of research studies [20, 26, 27]. Conversely, we found that supportive health workers facilitated use of ASRH services. Lack of privacy and confidentiality among HCWs was also noted in this and other studies. In a systematic review of 30 studies, eight found that adolescent clients had issues with the lack of privacy and/or confidentiality provided by HCWs [28]. A WHO policy brief on standards for quality ASRH explicitly lists non-judgmental attitudes of staff as part of competency requirements for care providers [29]. Facilities need to provide ASRH services at adolescent-friendly times and set up of youth-friendly corners to minimize

missed opportunities for reaching fearful and shy adolescents. There should also be ongoing refresher training to sensitize HCWs on the importance of a positive and friendly attitude, especially for those serving adolescent clients.

At the organization level, availability, accessibility, acceptability, and quality of the ASRH workforce is key in facilitating uptake of services [30]. The shortage of staff (availability) can lead to long queues at the facilities that can hinder uptake of ASRH service, which has been reported by other studies [30]. The most common accessibility barriers identified in past studies were cost of services, the hours the services are offered, and waiting times [31]. Facilitators in this category are convenient opening hours and priority for adolescents in school uniforms when they visited the health facilities. A study of ASRH in Ghana found that adolescents' concerns are focused on staff friendliness, availability of medication, confidentiality and privacy, and convenient hours of operation [32]. These gaps indicate that Kenya needs to increase access to SRH information to meet global standards for ASRH that were propagated by the WHO on adolescent health literacy [32]. Counties need to ensure availability of an adequate number of trained HCWs, private consultation and testing rooms, and sustained availability of medicines to avoid stock-outs.

In our study, community-level barriers included stigma, religion, myths and misconceptions. Communities shamed adolescents for seeking ASRH services, stigmatizing them for being sexually active while religious leaders believed that if young girls use family planning methods it will negatively affect their reproductive abilities in the future. The disapproval of adolescent sexual activity by community members was also guided by lack of knowledge and their own moral values. Our findings support those from other studies that socio-cultural practices contribute to low levels of use of SRH services. A qualitative systematic review found that low acceptability of ASRH was the most commonly reported barrier to uptake of services in low- and middle-income countries [33]. Stakeholders need to appreciate the realities of adolescents' lives, including their socio-cultural beliefs and SRH knowledge, and adopt a realistic life-stage approach to providing information and services that are packaged according to the needs within different adolescent age groups. Communities are critical in shaping individual's behavior and must be involved in ASRH interventions [34].

While key informants noted an improvement in political goodwill, our study revealed that existing policies and legislative frameworks are not adequate to enable ASRH uptake. In addition, these policies were not applied across all levels of care, which creates inequity in access and use of ASRH services [35]. Other countries also face this situation; Shilton et al. reported that although existing laws and policies support the creation of national-level ASRH strategies in Ethiopia, there was a lack of vigorous enforcement and uneven implementation of laws, policies, and strategies [36]. Stakeholders need to ensure that the gap between finalizing and implementing relevant legislation is closed.

Study strengths and limitations

This study had various strengths. We gained in-depth insights into the experiences of adolescents on seeking SRH services in two counties in Kenya. In addition, the inclusion of a mix of various respondents provided rich information from different stakeholders, which is critical to addressing barriers to ASRH services. Various limitations were also noted. The selection criteria for study participants was purposive and information was self-reported. Both factors may have contributed to over or under reporting and consequently led to information bias. The focus group environment may have introduced social desirability bias and prevented some participants from expressing perspectives that would not be well-accepted by the rest of the group. Data on actual levels of service use were not collected. While Kisumu and Kakamega

counties are among those with the high adolescent pregnancy rates in Kenya, the two counties were selected because there was an existing health program in place. Finally, as we selected various participants for FGDs, KIIs, and IDIs, the important category of parents of adolescents as study participants was missed.

Conclusions and recommendations

We conclude that adolescents continue to face many barriers to access ASRH information and services and recommend that local administration, teachers, parents, and other care providers be sensitized to help adolescents meet their health needs. The school platform is important for delivery of ASRH information and should be strengthened. Counties should strengthen their political will and support dissemination and implementation of existing ASRH policies. Finally, we hope that our findings will enrich project implementation strategies, county planning and positively inform the county leadership teams on ASRH decision-making.

Supporting information

S1 File.
(PDF)

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Author Contributions

Conceptualization: Lilian Mutea, Susan Ontiri, Kristien Michielesen, Peter Gichangi.

Data curation: Lilian Mutea, Susan Ontiri.

Formal analysis: Lilian Mutea, Susan Ontiri.

Funding acquisition: Susan Ontiri.

Investigation: Lilian Mutea, Susan Ontiri, Peter Gichangi.

Methodology: Lilian Mutea, Susan Ontiri.

Project administration: Susan Ontiri, Francis Kadiri.

Resources: Susan Ontiri.

Software: Susan Ontiri.

Supervision: Lilian Mutea, Susan Ontiri, Kristien Michielesen, Peter Gichangi.

Validation: Lilian Mutea, Susan Ontiri, Francis Kadiri.

Visualization: Lilian Mutea, Susan Ontiri.

Writing – original draft: Lilian Mutea.

Writing – review & editing: Susan Ontiri, Kristien Michielesen, Peter Gichangi.

References

1. Kenya National Bureau of Statistics. 2019 Kenya Population and Housing Census Volume: Population by County and Sub-County. 2019.

2. Starrs AM, Ezeh AC, Barker G, Basu A, Bertrand JT, Blum R, et al. Accelerate progress—sexual and reproductive health and rights for all: report of the Guttmacher–Lancet Commission. *The Lancet*. 2018; 391(10140):2642–92. [https://doi.org/10.1016/S0140-6736\(18\)30293-9](https://doi.org/10.1016/S0140-6736(18)30293-9) PMID: 29753597
3. Kenya National Bureau of Statistics, Ministry of Health/Kenya, National AIDS Control Council/Kenya, Kenya Medical Research Institute, Population NCF, Development/Kenya. Kenya Demographic and Health Survey 2014. Rockville, MD, USA: 2015.
4. Nove A, Matthews Z, Neal S, Camacho AV. Maternal mortality in adolescents compared with women of other ages: evidence from 144 countries. *The Lancet Global Health*. 2014; 2(3):e155–e64. [https://doi.org/10.1016/S2214-109X\(13\)70179-7](https://doi.org/10.1016/S2214-109X(13)70179-7) PMID: 25102848
5. National AIDS Control Council (Kenya). Kenya AIDS Response Progress Report 2016. NACC Nairobi; 2016.
6. Kasen S, Cohen P, Brook JS. Adolescent School Experiences and Dropout, Adolescent Pregnancy, and Young Adult Deviant Behavior. *Journal of Adolescent Research*. 1998; 13(1):49–72. <https://doi.org/10.1177/0743554898131004> PMID: 12348538
7. Ministry of Labour and Social Protection of Kenya, Department of Children's Services. Violence against Children in Kenya: Findings from a National Survey, 2019. Nairobi, Kenya: 2019.
8. MOH/Kenya MoH. National Adolescent Sexual and Reproductive Health Policy. In: Reproductive Maternal Health Services Unit R, editor. Kenya; 2015.
9. Graff M. Kenya's Adolescent Reproductive Health and Development Policy: Implementation Progress and Barriers. Washington DC Population Reference Bureau [PRB] 2013. <https://www.prb.org/kenya-policy-assessment-report/>
10. Kenya Law. The Constitution of Kenya (2010). <http://kenyalaw.org:8181/exist/kenyalex/actview.xql?actid=Const2010>.
11. Hussain R. Abortion and unintended pregnancy in Kenya. *Issues in brief (Alan Guttmacher Institute)*. 2012;(2):1–4. PMID: 22734165
12. Warri A. Child Marriages, Child Protection and Sustainable Development in Kenya: Is Legislation Sufficient? *African journal of reproductive health*. 2019; 23(2):121–33. <https://doi.org/10.29063/ajrh2019/v23i2.12> PMID: 31433600
13. Ministry of Health, Division of Family Health, Family Planning Program. National Family Planning Guidelines for Service Providers 6th Edition. Nairobi, Kenya: RMHSU; 2018.
14. Chandra-Mouli V, McCarraher DR, Phillips SJ, Williamson NE, Hainsworth G. Contraception for adolescents in low- and middle-income countries: needs, barriers, and access. *Reproductive health*. 2014; 11(1):1. <https://doi.org/10.1186/1742-4755-11-1> PMID: 24383405
15. Mutea L, Ontiri S, Macharia S, Tzobotaro M, Ajema C, Odiara V, et al. Evaluating the effectiveness of a combined approach to improve utilization of adolescent sexual reproductive health services in Kenya: a quasi-experimental design study protocol. *Reproductive Health*. 2019; 16(1):153. <https://doi.org/10.1186/s12978-019-0825-3> PMID: 31665033
16. Akwara E, Idele P. The moral and social narratives of sexual and reproductive health in Kenya: a case of adolescents and young people pre-and within the MDG era. *Reproductive Health*. 2020; 17(1):1–12.
17. National AIDS and STI Control Programme (NASCOP). Kenya AIDS indicator survey 2012. NASCOP Nairobi; 2014.
18. Braun V, Clarke V. Using thematic analysis in psychology. *Qual Res Psychol*. 2006; 3(2): 77–101.
19. Svanemyr J, Amin A, Robles OJ, Greene ME. Creating an enabling environment for adolescent sexual and reproductive health: a framework and promising approaches. *Journal of Adolescent Health*. 2015; 56(1):S7–S14. <https://doi.org/10.1016/j.jadohealth.2014.09.011> PMID: 25528980
20. Nair M, Baltag V, Bose K, Boschi-Pinto C, Lambrechts T, Mathai M. Improving the quality of health care services for adolescents, globally: a standards-driven approach. *Journal of Adolescent Health*. 2015; 57(3):288–98. <https://doi.org/10.1016/j.jadohealth.2015.05.011> PMID: 26299556
21. Liang M, Simelane S, Fillo GF, Chalasani S, Weny K, Canelos PS, et al. The state of adolescent sexual and reproductive health. *Journal of Adolescent Health*. 2019; 65(6):S3–S15. <https://doi.org/10.1016/j.jadohealth.2019.09.015> PMID: 31761002
22. Ndayishimiye P, Uwase R, Kubwimana I, de la Croix Niyonzima J, Dine RD, Nyandwi JB, et al. Availability, accessibility, and quality of adolescent Sexual and Reproductive Health (SRH) services in urban health facilities of Rwanda: a survey among social and healthcare providers. *BMC Health Services Research*. 2020; 20(1):1–11.
23. Pandey PL, Seale H, Razee H. Exploring the factors impacting on access and acceptance of sexual and reproductive health services provided by adolescent-friendly health services in Nepal. *PloS one*. 2019; 14(8):e0220855. <https://doi.org/10.1371/journal.pone.0220855> PMID: 31393927

24. Dagne T, Tessema F, Hiko D. Health service utilization and reported satisfaction among adolescents in Dejen District, Ethiopia: a cross-sectional study. *Ethiopian Journal of Health Sciences*. 2015; 25(1):17–28. <https://doi.org/10.4314/ejhs.v25i1.4> PMID: 25733781
25. Oronje RN. The Kenyan national response to internationally agreed sexual and reproductive health and rights goals: a case study of three policies. *Reproductive Health Matters*. 2013; 21(42):151–60. [https://doi.org/10.1016/S0968-8080\(13\)42749-0](https://doi.org/10.1016/S0968-8080(13)42749-0) PMID: 24315071
26. Graff M. Kenya's Adolescent Reproductive Health and Development Policy: Implementation Progress and Barriers. Washington DC Population Reference Bureau [PRB] 2013 May.; 2013.26.
27. Homer CS, Lopes SC, Nove A, Michel-Schuldt M, McConville F, Moyo NT, et al. Barriers to and strategies for addressing the availability, accessibility, acceptability and quality of the sexual, reproductive, maternal, newborn and adolescent health workforce: addressing the post-2015 agenda. *BMC pregnancy and childbirth*. 2018; 18(1):55. <https://doi.org/10.1186/s12884-018-1686-4> PMID: 29463210
28. Chandra-Mouli V, Lenz C, Adebayo E, Lang Lundgren I, Gomez Garbero L, Chatterjee S. A systematic review of the use of adolescent mystery clients in assessing the adolescent friendliness of health services in high, middle, and low-income countries. *Global Health Action*. 2018; 11(1):1536412. <https://doi.org/10.1080/16549716.2018.1536412> PMID: 30482103
29. World Health Organization. Global standards for quality health-care services for adolescents: a guide to implement a standards-driven approach to improve the quality of health care services for adolescents. Geneva: WHO: 2015.
30. Landa NM, Fushai K. Exploring discourses of sexual and reproductive health taboos/silences among youth in Zimbabwe. *Cogent Medicine*. 2018; 5(1):1501188.
31. Chandra-Mouli V, Lane C, Wong S. What does not work in adolescent sexual and reproductive health: a review of evidence on interventions commonly accepted as best practices. *Global Health: Science and Practice*. 2015; 3(3):333–40.
32. Aninanya GA, Debuur CY, Awine T, Williams JE, Hodgson A, Howard N. Effects of an adolescent sexual and reproductive health intervention on health service usage by young people in northern Ghana: a community-randomised trial. *PloS One*. 2015; 10(4):e0125267. <https://doi.org/10.1371/journal.pone.0125267> PMID: 25928562
33. Newton-Levinson A, Leichter JS, Chandra-Mouli V. Sexually transmitted infection services for adolescents and youth in low-and middle-income countries: perceived and experienced barriers to accessing care. *Journal of Adolescent Health*. 2016; 59(1):7–16. <https://doi.org/10.1016/j.jadohealth.2016.03.014> PMID: 27338664
34. Pozo KC, Chandra-Mouli V, Decat P, Nelson E, De Meyer S, Jaruseviciene L, et al. Improving adolescent sexual and reproductive health in Latin America: reflections from an International Congress. *Reproductive Health*. 2015; 12(1):11.
35. Ssewanyana D, Mwangala PN, Marsh V, Jao I, van Baar A, Newton CR, et al. Young people's and stakeholders' perspectives of adolescent sexual risk behavior in Kilifi County, Kenya: a qualitative study. *Journal of Health Psychology*. 2018; 23(2):188–205. <https://doi.org/10.1177/1359105317736783> PMID: 29076401
36. Shilton S, Chandra-Mouli V, Paul S, Denno DM. Facilitators and barriers in the utilization of World Health Organization's Preventing Early Pregnancy Guidelines in formulating laws, policies and strategies: what do stakeholders in Ethiopia say? *International Journal of Adolescent Medicine and Health*. 2019; 1(ahead-of-print). <https://doi.org/10.1515/ijamh-2019-0028> PMID: 31271553

4.3 Article 3: Evaluating the effectiveness of a combined approach to improve utilization of adolescent sexual reproductive health services in Kenya: a quasi-experimental design study protocol.

Lilian Mutea, Susan Ontiri, Sheila Macharia, Meital Tzobotaro, Carolyne Ajema, Vincent Odiara, Francis Kadiri, Solomon Orero, Mark Kabue, Kristien Michielsen and Peter Gichangi

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This article is a registered study protocol describing the methodology of study intervention. It lays the framework to addressing objective 4 which aims to determine the effectiveness of a customized combined ASRH intervention model in improving utilization of ASRH services. The protocol describes the combined school, facility, and community to deliver and increase use of ASRH services

STUDY PROTOCOL

Open Access

Evaluating the effectiveness of a combined approach to improve utilization of adolescent sexual reproductive health services in Kenya: a quasi-experimental design study protocol



Lilian Mutea^{1,2}, Susan Ontiri^{3*} , Sheila Macharia¹, Meital Tzobotaro¹, Carolyne Ajema³, Vincent Odiara⁴, Francis Kadiri³, Solomon Orero³, Mark Kabue³, Kristien Michielsen² and Peter Gichangi²

Abstract

Background: Access to and utilization of adolescent sexual and reproductive health (ASRH) services remains poor. ASRH services in Kenya are primarily offered in health facilities and include counselling, information, and services on family planning, sexually transmitted infections, and HIV and basic life skills. The Ministry of Education also provides age-appropriate sexual and reproductive health information in schools. This paper presents a study protocol that will evaluate the effectiveness of a combined approach toward improving utilization of ASRH services.

Methods: This will be a quasi-experimental study utilizing qualitative and quantitative methods. During the formative phase, data will be collected through focus group discussions, in-depth interviews, and key informant interviews to explore the barriers and facilitators of provision and utilization of ASRH services. A quantitative design will be used to obtain baseline and endline data through household surveys and client exit interviews. Following the formative and baseline household and client exit assessments, an intervention focusing on provision of ASRH service package targeting boys and girls will be implemented for 18 months. The package will include contextualized ASRH services, including counselling and age-appropriate, comprehensive sexual education for behavior change with an aim to increase utilization of ASRH services. An analysis of the primary outcome (utilization of ASRH services) will be undertaken to establish the difference in difference between the control and intervention arm, before the intervention (using the baseline survey data) and after the intervention (using the endline survey data).

Discussion: Adolescents have now been included in the World Health Organization's *Global strategy for women's, children's and adolescents' health (2016–2030)*, acknowledging the unique health challenges facing young people and their pivotal role as drivers of change in the post-2015 era. This study will generate evidence on whether a combined school, facility, and community approach works toward improving utilization of ASRH services. The information generated from the study will be beneficial for programming as it will identify underlying reasons for low utilization of ASRH services. Results will help to shape ASRH programs and reduce teenage pregnancy within Kenya and other similar low middle-income countries.

Trial registration: The study is registered at <http://www.pactr.org/>, registration number PACTR201906738029948.

Keywords: Adolescent, Sexual and reproductive health, Contraception, Family planning, Approach

* Correspondence: susan.ontiri@jhpigo.org

³Jhpigo, An affiliate of John Hopkins University, Nairobi, Kenya
Full list of author information is available at the end of the article



Plain English summary

Pregnancy among girls aged 10–19 years is a problem in Kenya. While there are sexual and reproductive health services in place, adolescents' access and use of these services remain very low. The Ministry of Health has developed four ways to promote the delivery of sexual and reproductive health services to adolescents. These include promoting adolescent access to services within community settings, health facilities, schools, and through digital platforms. We present a study protocol that will establish how this model can best reach the adolescents in two districts with a high burden of teenage pregnancies. The 18-month study will be implemented in two phases. The first phase will be to find out how aware adolescent boys and girls are of the available sexual and reproductive health services, what makes it difficult for them to use these services, and what needs to be done to improve their ability to use the services. Based on the information gathered, we will implement an intervention for 18 months that will establish the effectiveness of the model developed by the Ministry of Health in increasing adolescents' utilization of sexual and reproductive health services. The information gathered from this study will be useful in shaping programs that aim to address adolescent sexual and reproductive health in Kenya and other developing countries.

Background

The World Health Organization defines “adolescents” as individuals in 10–19 years old and “youth” as 15–24 years old [1]. Together, adolescents and youth are referred to as young people, encompassing the ages of 10–24 years. There is a gap in adolescents' access to sexual and reproductive health (SRH) services and information, which has not been fully addressed. Several studies have assessed what works to increase access and utilization for SRH among young people. There is, however, a lack of scientifically sound data on the effectiveness of services that target young people in sub-Saharan Africa, especially in comparison to the magnitude of adolescent SRH (ASRH) challenges in the region [2]. Systematic reviews of available published literature suggest that current interventions targeting youth tend to have significant positive effects on improving their knowledge, and sometimes attitudes, regarding sexual behavior, but are less effective in demonstrating change in sexual behavior outcomes [3]. A review of best practices used in ASRH programs established that many ASRH interventions are implemented in an uncoordinated and piecemeal fashion, hence, they do not result in positive outcomes for adolescents [3].

Kenya has poor ASRH indicators. Adolescent pregnancy is a major problem in Kenya, with a teenage pregnancy rate of 18%, and an unmet need of family planning (FP)—as measured by the contraceptive prevalence rate among

sexually active, unmarried girls aged 15–19 years—of 49% [4]. It is estimated that about 13,000 girls drop out of school annually in Kenya due to early and unintended pregnancy [5]. Adolescent pregnancy also increases the risk of maternal and newborn deaths and disability, including from complications from unsafe abortion, prolonged labor, childbirth, and the postnatal period [6].

To address the poor indicators, in 2015, Kenya launched a National Adolescent Sexual and Reproductive Health Policy, which provides guidance to government ministries and partners on how to respond to ASRH needs [7]. The policy advocates for the ministries of education and health, other line ministries, the political administration, and other stakeholders for successful ASRH programs and to ensure participation of young people. In addition, it recognizes the importance of addressing ASRH needs to achieve Kenya's development goals. Despite this legal framework, implementation of ASRH services has been weak and uncoordinated. The absence of reinforcement of ASRH policies enables administrators and service providers to impose restrictions based on their personal beliefs that prohibit youth from gaining access to essential information and services. In addition, there is limited evidence to support the effectiveness of initiatives that simply provide “adolescent friendliness” training for health workers [2]. A study of young people's perception of ASRH services in Kenya showed that young people wished to see an increase in ASRH services, especially in rural areas, including the use of mobile clinics [8]. The study also suggested the need to increase awareness of available ASRH services among young people and the community in general through outreach activities in the community, schools, and churches.

The Kenyan Ministry of Health has outlined four service delivery models for ASRH interventions: a) *community based (outreach services)*: services and information are offered to adolescents within the community/non-medical settings; b) *clinic based*: services and information are offered to adolescent within/based in health facilities c) *school based*: services and information are offered to adolescents within the school setting; and d) *virtual based*: services and information are offered to adolescents within the virtual space or on digital platforms [4]. Implementation of this combined model has not been fully implemented and its effectiveness has not yet been established in Kenya. We present a protocol to evaluate the effectiveness of this model in Kisumu and Kakamega counties, which have some of the highest burden of teen pregnancy in Kenya, at 22 and 15% consecutively [9].

Objectives

The primary objective of this outcome evaluation is to establish the effectiveness of a customized combined

model in improving utilization of SRH services among adolescents aged 15–19 years.

The specific objectives are to:

1. Establish the barriers to and facilitators of ASRH use by consulting adolescents, health workers, communities, and decision makers
2. Assess the level of knowledge, attitude, practices, and healthcare seeking behavior of adolescents toward ASRH services
3. Determine the effectiveness of a customized combined ASRH intervention model in improving utilization of ASRH services

Methods

Study setting

The study will be conducted in Kisumu and Kakamega counties, which are neighboring counties in western Kenya. Kisumu County is 342 km from Nairobi, Kenya's capital city while Kakamega is 360 km from Nairobi. The total population of Kakamega is estimated to be 1,975,603 and Kisumu 1,212,956 with one in four people being an adolescent in both counties. Kakamega is the second most populous county in Kenya, with a high burden of teen pregnancy at 19%; Kisumu's teenage pregnancy rate stands at 15%, the national average is 18% [9].

Study design

This will be an 18-month mixed method, quasi-experimental study designed to evaluate the ASRH program's interventions on the effectiveness of the combined model to improve utilization of ASRH services. Using a qualitative design, data will be collected through focus group discussions (FGDs), in-depth interviews, and key informant interviews. The participants will be purposively selected. Further, we will use exit interviews to study satisfaction among males and females 15–19 years of age who have received ASRH services from health facilities and outreaches (quantitative design). A quasi-experimental design with intervention and control groups will be employed, using a quantitative design to evaluate the effectiveness of the intervention on utilization of ASRH services.

Study unit inclusion criteria and selection

Kisumu and Kakamega counties were selected as project areas in part because they are among the counties with the highest burden of teen pregnancy in Kenya—at 15 and 19%, respectively [9]. The study will focus on two sub-counties within Kisumu County (Nyando and Kisumu East) and two sub-counties within Kakamega County (Matungu and Navakholo). Within the identified four sub-counties, two wards have been selected in each sub-county, one as intervention (Kobura in Kisumu and

Kholera in Kakamega) and the others as control (Bunyala West in Kisumu and Kajulu in Kakamega). The selection of the intervention ward is based on the poor reproductive and maternal health indicators coupled with low utilization of FP services among adolescents [9]. The wards were selected by the study team in collaboration with Ministry of Health officials after reviewing the wards' service statistics. The intervention-comparison wards were selected to be similar with respect to sociodemographic characteristics and low utilization of FP services.

Study population

Participants for the qualitative phase of the study will be drawn among adolescents, community members, teachers, healthcare workers, and county health managers in the two counties in the intervention area only, as the findings will be used to shape the intervention. Study participants for the quantitative phase of the study will be adolescents aged 15–19 years. The client exit interviews will target boys and girls aged 15–19 years, who have received any ASRH service at a facility or outreach point. The household survey will target girls aged 15–19 years old who haven't had their first birth. This is because the unit of measure will be utilization of ASRH services, specifically the use of FP services for primary prevention of pregnancy.

Sampling

Qualitative study

In-depth interviews will be done among adolescents, teachers, healthcare workers, and community representatives while key informant interviews will be done with the county leadership. FGDs, comprising of sessions with only boys, only girls, and a mix of both will also be held. A total of 116 participants will be selected purposefully to participate in the study (Table 1).

Client exit interviews

The survey will be powered to provide estimates of clients exit among females 15–19 years of age at the ward level, who will have received ASRH services from health facilities and outreaches. For the purposes of sample size computation, we shall assume a satisfaction level with services of 50% given the lack of a priori indicators in the two counties. The assumed 50% prevalence proportion will give the maximum sample size and any satisfaction level above or below 50% will be overpowered, implying that there will be more precision in the estimates for any other levels of satisfaction. Powering the sample to detect a 15-percentage point difference between the two arms at 85% power, a 95% confidence interval, and a design effect of 1.5, will require a base sample size of 154 in each arm. After accounting for a 20% non-response and incomplete questionnaires, the

Table 1 Formative assessment sample sizes in the ASRH intervention group, Kisumu and Kakamega counties

Participant group	Approach/ Method	Description of participants	# per ward	Fre- quency	Total	Focus of the interview/FGD
Adolescents age 15–19 years	IDI (12)	3 boys and 3 girls	6	2	12	To assess adolescents' barriers, experiences, and preferences around use of ASRH services
	FGD (6)	Girls FGD (10) Boys FGD (10) Mixed FGD (5 boys and 5 girls)	30	2	60	To assess adolescents' barriers, experiences, and preferences around use of ASRH services
Teachers	IDI (12)	3 male and 3 female	6	2	12	To explore teachers attitudes toward providing ASRH information and services to adolescents within school; personal beliefs, policy direction toward ASRH service provision in schools, and school re-entry post pregnancy; and adaptability to meet adolescent's health needs
Community representatives	IDI (12)	Chief, Village elder, parent, youth champion, religious leader, ward administrator, police (Officer Commanding Police Division—OCPD), community health worker	6	2	12	To explore the decision-making processes around adolescent's sexuality and use of ASRH services, gender roles, and personal beliefs, gender-based violence against adolescents, legal issues (if any)
Health workers	IDI (10)	Representatives from public health facilities: dispensary or health center and sub-county hospital; chemist/pharmacy attendant; and private facility	5	2	10	To explore health workers experiences in providing ASRH services to adolescents
County leadership	KII (10)	County directors— health, youth, education, reproductive health coordinator; high school head teacher, primary school head teacher	5	2	10	To establish the existence of policies supporting provision of ASRH information and services in various settings and level of implementation
Transcripts	62	Total participants			116	

IDI in-depth interview, FGD focus group discussion, KII key informant interview

sample size at recruitment will be 185 per arm in each county. The combined sample size will be 372 respondents at baseline and endline in the two counties, thus a total of 744 (372 baseline and 372 endline). In each of the sub-county where the study will be implemented, the sample size will be allocated proportionate to the number of health facilities and outreaches available.

Quasi-experimental design

We will conduct a cross-sectional household survey to collect quantitative data to measure knowledge, attitudes, practices, and uptake of ASRH services. The indicator used to compute the sample size was the FP services utilization rate among adolescents aged 15–19 years, using the most current data from the study areas obtained from the Kenya health information system. The FP utilization for both groups was computed and the lowest prevalence of the two was used in computing the sample size to guarantee the maximum possible sample size. An intra-class correlation of 0.03 was assumed resulting in a design effect of 1.87. The study is powered to detect a 15-percentage point difference between the two groups in each county, 95% confidence interval, with power of 80%. Furthermore, we account for a 10% loss due to possible non-responses and incomplete data. Using the parameters described, the sample size was

determined to be 264 per arm (total 528) and 231 per arm (total 462) per arm in Kisumu and Kakamega counties, respectively, at each data collection period. A sample size of 990 participants will therefore be interviewed at baseline, and a similar number at endline. Community units are made up of villages, which, for the purpose of sampling, will be “cluster units.” Since the total number of units in each cluster unit and ward is known, villages will be randomly selected; eight villages in Kobura ward and eight from Kajulu ward in Kisumu County. In Kakamega, seven villages in Kholera ward and seven villages in Bunyala West ward. The sample size will be equally distributed among the selected villages in each ward. Households will be selected through systematic random sampling at an interval of 100–200 m from a particular landmark, until the required sample size is achieved for each ward. In households with multiple adolescents, the Kish method will be used to randomly select one individual from each household [10].

Study eligibility criteria

Adolescent boys and girls aged 15–19 years:

- Living, at the time of the survey, in the study sites
- Voluntarily provides informed consent (emancipated minors/adolescents aged 18 and 19 years)

- Voluntarily provides assent coupled with parental permission for minors

Study implementation

The study is designed to employ two design methods: a cross-sectional formative assessment (Phase 1) and a quasi-experimental study design (Phase 2).

Phase 1: formative assessment

A qualitative cross-sectional study design will be utilized for the formative assessment to establish the barriers, preferences, and experiences of adolescents while seeking and using ASRH only. In addition, a pre-intervention and post-intervention client exit interviews will be conducted with both boys and girls receiving ASRH services in health facilities and outreach camps in the intervention and control arms. The aim of the client exit interview will be to establish the quality of ASRH services offered at facilities and outreach points. Information gathered in both formative assessments will be used to develop interventions that will improve access to and quality of ASRH services.

Phase 2: quasi-experimental design

A quasi-experimental evaluation design is proposed to evaluate the rollout of the ASRH program intervention to determine the effectiveness of a combined model to improve utilization of ASRH services. In both counties, program intervention and comparison groups will be selected, while taking measures to ensure that the comparison group matches the program intervention group in general composition, such as possession of similar sociodemographic characteristics. Using the stratified cluster sampling approach, a pre-intervention and post-intervention household survey will be conducted in the two study arms targeting adolescent girls at baseline and endline. The aim of the survey will be to establish the status of adolescents' knowledge, attitude, and utilization of ASRH services, primarily FP. Implementation of the program intervention will be population-based, targeting adolescent boys and girls aged 15–19 years in the intervention areas. An analysis of the primary outcome (utilization of FP services) will be undertaken to establish the difference in difference between the control and intervention arm, before the intervention (using the baseline survey data) and after the intervention (using the endline survey data).

Description of intervention

The ASRH service package, which will target both boys and girls, will include provision of ASRH services, including counselling and age-appropriate, comprehensive sexual education for behavior change using a multi-sectoral approach with an aim to increase utilization of

ASRH services. The intervention will be anchored on the findings of the formative assessment that will seek to explore the ASRH context in the intervention wards. In the comparison group, adolescents will continue to receive the routine ASRH activities provided at facility level. Health facility data quality improvement processes will be implemented in both groups to ensure that ASRH activities are accurately documented. Standard ASRH interventions to be provided are those approved by Ministry of Health and include FP counselling, information and services, HIV counselling, testing and treatment, and screening and treatment for sexually transmitted infections (STIs). The conceptual framework for these interventions is outlined in Fig. 1.

The quality of ASRH services at health facilities at endline will also be assessed through client exit interviews. ASRH service implementation will be through three platforms.

The community-based component will involve community health workers and other relevant Community Own Resource Persons (CORPs), such as adolescent counsellors and peer educators, who will be oriented on adolescent-friendly services and other innovative facilitation techniques, such as Education through Listening and Counselling for Choice. The community health workers and CORPs will be supported to carry out household visits and small group sessions and to organize events targeting this cohort such as adolescent camps, symposia, dialogue days, thematic talks, sports days, and monthly facility open days where SRH topics shall be discussed. The sessions will use a targeted approach where services are designed and planned for adolescents alone, are offered in settings that meet the needs of the adolescents, and do not include other groups. During the monthly sessions, health workers will provide ASRH services to willing adolescents after comprehensive counselling. Community resources that are available for adolescents and that can positively contribute to their reproductive health—e.g., drop-in centers, sports facilities, social halls, and bursary funds—will be mapped by the study team led by the Ministry of Interior in collaboration with the Ministry of Health officials.

The facility-based component will involve orientation of health workers to provide adolescent-sensitive services. Health workers will be oriented on the values clarification and attitude transformation approach to remove barriers to ASRH services access stemming from misinformation, stigmatization, and negative attitudes toward adolescents seeking services.

The school-based component will entail engagement and advocacy sessions targeting the Ministry of Education and county leadership to create buy-in on ASRH rollout in schools. This is critical for schools to allow health workers to train teachers and students on ASRH,

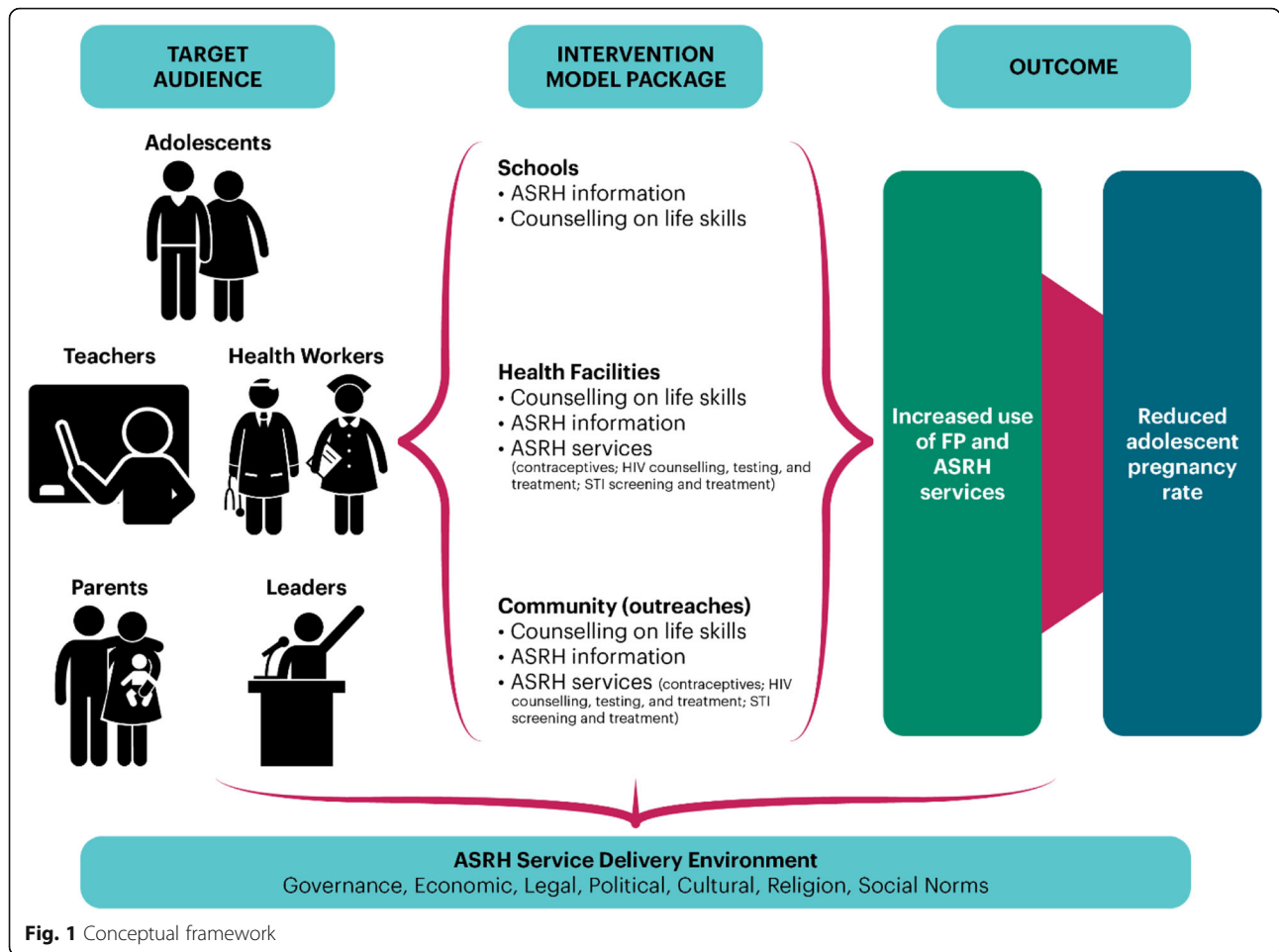


Fig. 1 Conceptual framework

offer information, and refer students for services. Thereafter, the intervention schools will be mapped out and teachers trained on selected ASRH modules as recommended by national guidelines. The teachers will then carry out regular (weekly) ASRH sessions in schools and engage students in interactive challenges that build on the new knowledge and skills acquired through the ASRH sessions.

A social behavior change communication approach will be integrated across all service delivery points—i.e., in schools, facilities, and communities. ASRH interventions in schools will include sessions to engage students in interactive challenges that build on their new knowledge and skills acquired through the ASRH sessions. This can be through drama, club meetings, drama debate, music, and sports that will be organized using ASRH themes. Social behavior change communication at health facilities will include whole-site orientation targeting all workers within the participating facilities with information of the package of intervention. Services providers at these facilities will be oriented on recommended ASRH topics, transformation of attitudes, and the provision of adolescent-friendly services. Service

providers will also be supported to carry out other interpersonal communication activities, such as facility open days for adolescents and formation of social support structures/groups for this cohort. Participating facilities will be assisted to draft a charter in support of adolescent-friendly services that will provide for, among other things, flexible hours to accommodate the timid, health-seeking behavior of adolescents.

The virtual platform is one of the approaches for delivery of ASRH services, but it is not included in this study as the study targets adolescents aged 15–19 years who are primarily in school, living in rural areas, and may not have access to technology platforms. The platform is likely to have more impact among the older youth (19–24 years).

In the comparison group, implementation of ASRH services will continue in the same manner as they are routinely or currently being implemented through health facilities. Health workers will be trained to provide adolescent-friendly services. An endline assessment will be done at the end of the 18 months' implementation period. The table below presents a summary of the package of interventions that will be done in the two study arms.

The Table 2 presents a summary of the package of interventions that will be carried out in the two study arms.

Study outcomes

Our primary outcome will be FP utilization among adolescents as defined as follows:

- *Number of sexually active girls reporting use of modern contraceptive methods*
- *Number of sexually active adolescents aged 15–19 years sampled*

Sexually active girls will be defined as those who report ever having sexual intercourse. Other secondary outcomes will be knowledge and attitude on the use of modern contraception, among others as outlined in Table 3.

Data analysis

Data from in-depth interviews, FGDs, and key informant interviews will be transcribed, translated, and back translated then entered in qualitative data software (Atlas ti.8). We will then develop a coding frame using a grounded theoretical framework. Independent analysis will be conducted by different analysts and subsequent comparison between the developed coding matrices will be used to develop a reliability factor for the analysis. The trends from the emerging themes will be iteratively developed by repeatedly analyzing data collected at different time points. Verbatim generated alongside the code matrix will be used to support the emerging thematic framework.

Descriptive analysis of quantitative variables will be done using measures of central tendency (mean, median) and measures of dispersion (range, standard deviation), as appropriate. The inter cluster correlation will be computed. We will then conduct an exploratory analysis to compare outcomes by the sociodemographic, cultural, and economic characteristics (age, education, religion, marital status, life skills, wealth quintile, place of residence [urban or rural]) using the Rao-Scott chi-square test to see if there is any association. To determine the relative importance of these factors on the outcomes, generalized estimating equations, univariate, and multivariate logistic regressions will be used to adjust for

Table 2 Summary of package of activities by evaluation group

	Program intervention group	Comparison group
ASRH service delivery at facility level	✓	✓
ASRH service delivery at community level	✓	✗
ASRH service delivery in schools	✓	✗
Targeted social behavior change communication	✓	✗

Table 3 Study outcomes

Other study outcomes among 15–19 years		
Knowledge	Attitude	Practice/utilization
Risks faced by adolescents in pregnancy/childbirth	Toward contraceptives	Utilization of FP services
Available methods of FP	Toward ASRH services offered in facilities/communities/schools	Sexual experience – delay in age at first sex
Secondary study outcomes among 15–19 years: Reduced teenage pregnancy rates in intervention group		

clustering within the clusters. Results from the regression analysis will be reported as odds ratio and 95% confidence intervals.

For the quasi-experimental design, our hypothesis is that adolescent girls in the intervention study arm will have greater increases in FP utilization and improved knowledge and attitudes than girls in the control arm. We will estimate the intervention effect by subtracting the baseline FP utilization rate from the estimates at endline then calculating the difference between the comparison and intervention sub-counties (the difference-in-difference analysis). The difference-in-differences analysis assumes a common trend in the outcome in both the intervention and comparison area. We will measure potential confounders at baseline and endline and adjust our analysis for any compositional changes over time in these confounders. All statistical analysis will be considered statistically significant for p -values less than 0.05.

Ethical considerations

In accordance with the principles governing research involving human participants, this study will ensure that respondents' ethical rights are upheld. Ethical approval has been granted by the Kenya Medical Research Institute (number 651) and the Johns Hopkins University School of Public Health number (9227) institutional review boards. Approval by the county health management team and the health facility in-charges has also been granted. All adult participants will be required to give an informed written consent prior to participating in the study. Consent will be indicated by a signature or thumb print on the form. Parental permission for adolescents aged 15–17 years will be sought first, before the minor's assent is sought. No minor will participate in the study until permission is provided by a parent/guardian and informed assent obtained from the minor. In addition, the data collectors and qualitative researchers will be experienced research staff who have a minimum of post-secondary education (college diploma) and who will undergo training on basic research ethics and study procedures, including maintaining confidentiality.

Table 4 Study timeline

Activity	April 2019	May–Jun 2019	July–Aug 2019	Sep 2019–Mar 2021	April 2021
Qualitative study (formative assessment)					
Baseline household survey (pre-intervention)					
Baseline client exit Interview (pre-intervention)					
Roll out of the program intervention					
Household survey (post-intervention)					
Client exit interview (post-intervention)					

Study status

Table 4 outlines the timeline for the study.

Dissemination of study findings

Dissemination will target multi-sectoral stakeholders and will be done at sub-county, county, and national level. This will include ministries of health, education, gender, and children's services. The Ministry of Interior and Co-ordination of National Government, which is responsible for the police and administration, will also be involved. The results will be published in peer-reviewed journals and presented at national and international conferences.

Discussion

Adolescent sexual reproductive health has gained traction in recent years. Sustainable Development Goal 3 aims to ensure universal access to SRH services by 2030, including FP, information and education, and the integration of reproductive health into national strategies and programs [11]. In addition, adolescents have now been included in the World Health Organization's *Global strategy for women's, children's and adolescents' health* (2016–2030), acknowledging the unique health challenges facing young people and their pivotal role, alongside women and children, as key drivers of change in the post-2015 era [12]. In Kenya, there have been milestones in policy regarding ASRH, however, a 2013 assessment of the 2003 policy revealed that there was limited dissemination of the policy and that it was not implemented equitably to all adolescents, especially the hardest to reach and most vulnerable populations [13]. In addition, barriers continued to exist that affect access to adolescent-friendly SRH services. As such, access to and utilization of ASRH services remains a challenge.

This study will evaluate the effectiveness of a combined approach to increase utilization of ASRH services. Results of the qualitative analysis and discussions with various stakeholder—such as teachers, health workers, and community representatives—will provide information on barriers to and enablers of use of ASRH services and the study team will develop recommendations on

how to address the barriers and support enabling factors. The study will also provide information on the quality of ASRH services offered at health facilities, schools, and communities (outreaches) and provide recommendations on how services can be improved. Implementation of the study and results obtained from this study will be of direct benefit to the study sites and will contribute to improved utilization of ASRH services and reduction of teenage pregnancy in Kisumu and Kakamega counties. In addition, the study will generate evidence on whether a combined approach that targets several sectors—health, education, youth, and administration—works to improve utilization of ASRH services. The information generated from the study will also be beneficial for programming as it will identify underlying reasons as to why access to and utilization of ASRH services is low. Results will be helpful in improving programs that aim to address ASRH and reduce teenage pregnancy within the Kenyan context and in other similar low middle-income countries.

Abbreviations

ASRH: Adolescent sexual and reproductive health; CORPS: Community Own Resource Persons; FGD: Focus group discussion; FP: Family Planning; IDI: In-depth interview; KI: Key informant interview; MOH: Ministry of Health; SRH: Sexual and reproductive health; STI: Sexually transmitted infections

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Disclaimer

The views and opinions expressed in this paper are those of the authors and not necessarily the views and opinions of the United States Agency for International Development." Disclaimer.

Authors' contributions

All authors participated in the design of the proposed study and development of the protocol and agreed the final version of the manuscript.

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Availability of data and materials

Not applicable.

Ethics approval and consent to participate

Ethical approval was obtained from John Hopkins University IRB (No 651) and Kenya Medical Research Institute (IRB No.9227). Written informed assent and consent will be obtained for all study participants.

Consent for publication

Not applicable.

Competing interests

The authors declare that they have no competing interests.

Author details

¹US Agency for International Development (USAID), Nairobi, Kenya.

²International Centre for Reproductive Health, department of Public Health and Primary Care, faculty of Medicine and Health Sciences, Ghent University, Ghent, Belgium. ³Jhpiego, An affiliate of John Hopkins University, Nairobi, Kenya. ⁴Population Services Kenya, Nairobi, Kenya.

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References

1. World Health Organization: Adolescent health and development: http://www.searo.who.int/entity/child_adolescent/topics/adolescent_health/en (2017). Accessed September 20, 2019.
2. Denno DM, Hoopes AJ, Chandra-Mouli V. Effective strategies to provide adolescent sexual and reproductive health services and to increase demand and community support. *J Adolesc Health*. 2015;56:522–41.
3. Chandra-Mouli V, McCarraher DR, Phillips SJ, Williamson NE, Hainsworth G. Contraception for adolescents in low and middle income countries: needs, barriers, and access. *Reprod Health J*. 2014;11:1.
4. Kenya MOH. National Guidelines for provision of adolescent and youth friendly Services in Kenya, second edition. Nairobi: MOH; 2016.
5. Muganda-Onyando R, Omondi M. Down the drain: counting the costs of teenage pregnancy and school drop out in Kenya: Centre for the Study of adolescence; 2008.
6. Banke-Thomas OE, Banke-Thomas AO, Ameh CA. Factors influencing utilisation of maternal health services by adolescent mothers in low-and middle-income countries: a systematic review. *BMC Pregnancy Childbirth*. 2017;17:65.
7. Ministry of Health (MOH), Kenya. National Adolescent Sexual and Reproductive Health Policy. Nairobi: MOH; 2015.
8. Godia PM, Olenja JM, Hofman JJ, Van Den Broek N. Young people's perception of sexual and reproductive health services in Kenya. *BMC Health Serv Res*. 2014;14(1):172.
9. Kenya National Bureau of Statistics, Ministry of Health/Kenya, National AIDS Control Council/Kenya, Kenya Medical Research Institute, National Council for Population and Development/Kenya. Kenya Demographic and Health Survey 2014. Rockville: Kenyan National Bureau of Statistics and ICF; 2015.
10. Kish L. Survey sampling. New York: Wiley; 1965.
11. World Health Organization: Adolescents: health risks and solutions. <https://www.who.int/en/news-room/fact-sheets/detail/adolescents-health-risks-and-solutions> (2018). Accessed 13 Sep 2019.
12. United Nations Secretary-General. The global strategy for women's, children's and adolescents' health (2016–2030). New York: United Nations; 2016.
13. Ministry of Health National Council for Population and Development, Ministry of Planning and National Development, USAID, and Division of Reproductive Health. Kenya Adolescent Reproductive Health And Development Policy Implementation Assessment Report. Washington, DC: Population Reference Bureau; 2013.

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4.4 Article 4: The effectiveness of a combined approach towards improving utilization of Adolescent Sexual Reproductive Health Services in Kenya: Results from a quasi-experimental study.

Lilian Mutea, Justinah Maluni, Mark Kabue, Vincent Were, Susan Ontiri, Kristien Michielsen and Peter Gichangi

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This article presents findings from a quasi-experimental study. It addresses objective 3 which aims to establish the effectiveness of a combined approach towards improving utilization of Adolescent Sexual Reproductive Health Services. The combined ASRH model was defined to deliver ASRH interventions in schools, health facilities and communities under a population-based intervention. Due to the closure of schools during the COVID19 pandemic, the school component was not implemented. Descriptive results from the study showed that there was a net increase in knowledge of misconceptions on sex, pregnancy, and contraception and of knowledge of ASRH services offered in health facilities. In the multivariate regression analysis, two outcomes remained significant: a decrease in the proportion of adolescents whose fear of parents made them uncomfortable in seeking ASRH services and those whose lack of support from their partner made them uncomfortable when seeking ASRH services. The multivariate analysis however did not demonstrate an increase in utilization of ASRH services.

The effectiveness of combined approaches towards improving utilization of adolescent sexual and reproductive health services in Kenya: A quasi-experimental evaluation

Authors and Institutional affiliations

1. Lilian Mutea (Corresponding author):
 - a. Department of Public Health and Primary Care, Faculty of Medicine and Health Sciences, Ghent University, Belgium: Lilian.Mutea@ugent.be; Lmutea@gmail.com
 - b. USAID Kenya & East Africa, P.O. Box 629 – 00621, Village Market, Nairobi, Kenya
2. Justinah Maluni: KEMRI-Wellcome Trust, Nairobi, Kenya
3. Mark Kabue: Jhpiego USA, Baltimore MD, US
4. Vincent Were: KEMRI-Wellcome Trust, Nairobi, Kenya
5. Susan Ontiri: Jhpiego Kenya, Nairobi, Kenya
 - a. Kristien Michielsens: International Centre for Reproductive Health, Department of Public Health and Primary Care, Faculty of Medicine and Health Sciences, Ghent University, Belgium
6. Peter Gichangi:
 - a. Technical University of Mombasa, Kenya
 - b. Department of Public Health and Primary Care, Faculty of Medicine and Health Sciences, Ghent University, Belgium

ABSTRACT

Introduction: Increasing access to utilization adolescent sexual and reproductive health (ASRH) services is key to improving the health of adolescents. This study aimed to establish the effectiveness of an intervention that combined activities in health facilities and communities in Kenya to increase utilization of ASRH services.

Methods: A quasi-experiment evaluation design was used to assess the effectiveness of the intervention. Using a stratified cluster sampling approach, two cross-sectional household surveys targeting girls aged 15–19 were conducted in intervention and comparison sites at baseline (September 2019) and endline (December 2020). We combined the difference-in-difference approach to analyze the net change in outcomes between intervention and comparison arms of the study at baseline and endline and coarsened exact matching for variables that were significantly different for

pre-intervention groups and between baseline and endline to address the imbalance. The effect size was estimated as adjusted prevalence ratios with 95% confidence intervals of the exponentiated coefficients of interaction between the study arm the and study period.

Results: There was a total of 1011 participants in the intervention arm (479 at baseline vs 532 at endline) and 889 in the comparison arm (469 at baseline vs 420 at comparison arm). Descriptive results showed a net increase of 12.7% in intervention sites in the knowledge of misconceptions about sex, pregnancy, and contraception, compared to 10.4% in the control site. In the multivariate regression analysis, there were no significant differences noted on key variables such as currently using a method to delay/avoid pregnancy and adolescents' comfort in seeking ASRH services. Two outcomes remained significant: a decrease in adolescents whose fear of parents made them uncomfortable in seeking ASRH services (aPR=0.58, 95% CI=0.42-0.79, P=0.001) and a lack of support from their partner made them uncomfortable when seeking ASRH services (aPR=0.25, 95% CI=0.08-0.82, P=0.023).

Discussion: The intervention combining a facility and community approach was not effective in increasing the use of ASRH information and services. Possible reasons for this are explored.

Keywords: ASRH, Effectiveness, ASRH intervention, Utilization, Adolescent pregnancy

The study protocol was registered at <http://www.pactr.org/>, registration number PACTR201906738029948.

Plain English Summary

Use of Sexual Reproductive Health (SRH) services helps young people improve their health and achieve their full potential. The goal of this research was to measure whether providing SRH services at both hospitals and community spaces would get more adolescents using them. A household assessment for girls aged 15–19 was done in regions where SRH services were supported by the study team and where they weren't at the beginning of the research (September 2019) and at the end of the research (December 2020). The support provided by the study team included training of health workers and peer educators, community health volunteers and parents, as well as provision of ASRH services in facilities. Health system-level interventions were also provided. We compared the differences in use of SRH services between the two groups at the beginning and at the end of the research. A total of 1011 girls were involved in the region where SRH services were supported by the research team (479 at the beginning vs 532 at the end) and 889 in the region where SRH services were not supported (469 at the start and vs 420 at the end). Basic results showed an increase of 12.7% in regions where the research team provided support; young people knew more about myths around sex, pregnancy, and contraception, compared to 10.4% in the areas where there was no support from the research team. After making a deeper comparison of all factors, the research showed a reduction in the proportion of young people who feared parents when finding SRH services and a reduction in those who relied on partner support to seek SRH services. The deeper comparison however concluded that this research, combining use of hospitals and community spaces did not lead to more adolescents using SRH services. Some of the key challenges contributing to this finding include lack of identifiers linking the individuals interviewed at baseline with those interviewed at endline. Additionally, other implementing partners in the study area provided services in both intervention and comparison areas, therefore interfering with the results. Finally, due to the effect of the COVID-19 pandemic, schools were closed, hence the implementation of the school arm of the study was not done.

INTRODUCTION

Girls aged 15-19 years are twice as likely to die during childbirth as women 20 years and above (1). Coupled with HIV, complications during pregnancy and childbirth are the leading cause of death for young women aged 15-19 years, with 26 per cent of all maternal deaths occurring among adolescents (1). As of 2019, adolescent women aged 15–19 in LMICs have an estimated 21 million pregnancies each year (4). One-half of pregnancies are unintended, and 55% of unintended pregnancies end in abortions, which are often unsafe (4). Adolescent pregnancies and deliveries among girls aged 15–19 years increase the risk of severe preeclampsia, eclampsia, postpartum hemorrhage, fetal distress, and poor fetal growth (5). In addition, the proportion of stillbirths and preterm babies, underweight babies, and neonatal deaths of children of teen mothers are approximately 50% higher than for older women (6,7). Moreover, approximately 3.9 million unsafe abortions are conducted annually among girls aged 15–19 years, contributing to maternal mortality, morbidity, and lasting health problems (8,9).

Over the last two decades, adolescent sexual and reproductive health (ASRH) outcomes have improved significantly in sub-Saharan Africa. The adolescent fertility rate declined from 126 per 1,000 live births in 2000 to 103 in 2020 (10). Child marriage (defined as a marriage or a union before the age of 18 years) is also declining (11). Additionally, contraceptive prevalence among single adolescent girls and young women aged 15–24 years rose from 23% to 33% between 1996 and 2015 (12). However, in Kenya, adolescent pregnancy remains a major problem; the teenage pregnancy rate was 18% nationally as per the 2014 DHS survey. (13). Findings from the latest DHS survey 2022 show that adolescent pregnancy rate has slightly reduced to 15% (14). Despite this improvement, huge disparities between counties remain on adolescent pregnancy rates as well as access to and use of ASRH services (14). Several factors reported as being associated with adolescent pregnancies include child marriage and child sexual abuse, which are linked to human rights violation (15). Socio-economic factors like poverty, lack of education, and limited economic opportunities among girls may also contribute to adolescent pregnancy rates (16). Despite progress, a review of published literature using Demographic and Health Survey data from 33 sub-Saharan African countries revealed inequalities and uneven progress in key ASRH

indicators (10). In addition, there was little evidence of change in gaps in age at sexual debut and first marriage, which contributes to adolescent girls remaining vulnerable to poor sexual health outcomes (10). The high rates of adolescent pregnancy and unmet need of contraceptives are also a reflection of the barriers that adolescents in sub-Saharan Africa continue to face in accessing ASRH services, even when the services are available (17). Barriers include a lack of youth-friendly and comprehensive sexual and reproductive health (SRH) services in many health facilities, societal stigma, and taboos around seeking SRH services, a lack of trained personnel and favorable environments for adolescents, scarcity of information on services delivered, and unfriendly provider attitudes towards adolescents (18,19). In addition, in sub-Saharan Africa women face other ASRH inequalities, which are rooted in the socio-cultural and economic domains that impact their decision-making power in seeking health services (20).

Evidence suggests that multi-sectoral approaches are key to addressing structural issues that can lead to poor ASRH, such as lack of education and economic opportunities, sexual and gender-based violence (SGBV), and poverty (17,21). The Kenyan ASRH policy and strategy enacted in 2015 advocates for the ministries of health, education, and other sectors to work together and include young people and other stakeholders for the success of ASRH programs (22). The strategy proposes combining community, clinical, and school-based approaches to reach all adolescents with ASRH information and services. Implementation of this model has not been fully implemented and its effectiveness has not yet been established in Kenya. Evidence shows that routine monitoring data from many ASRH projects do not provide sufficient information to draw out lessons learned (23). Our ASRH program intervention study aimed to establish the effectiveness of the combined health facility and community approach to increase utilization of ASRH services in Kisumu and Kakamega counties in Kenya.

METHODOLOGY

Study Area

The study was conducted in Kisumu and Kakamega counties, which are neighboring counties in western Kenya. Kisumu County is 342 km from

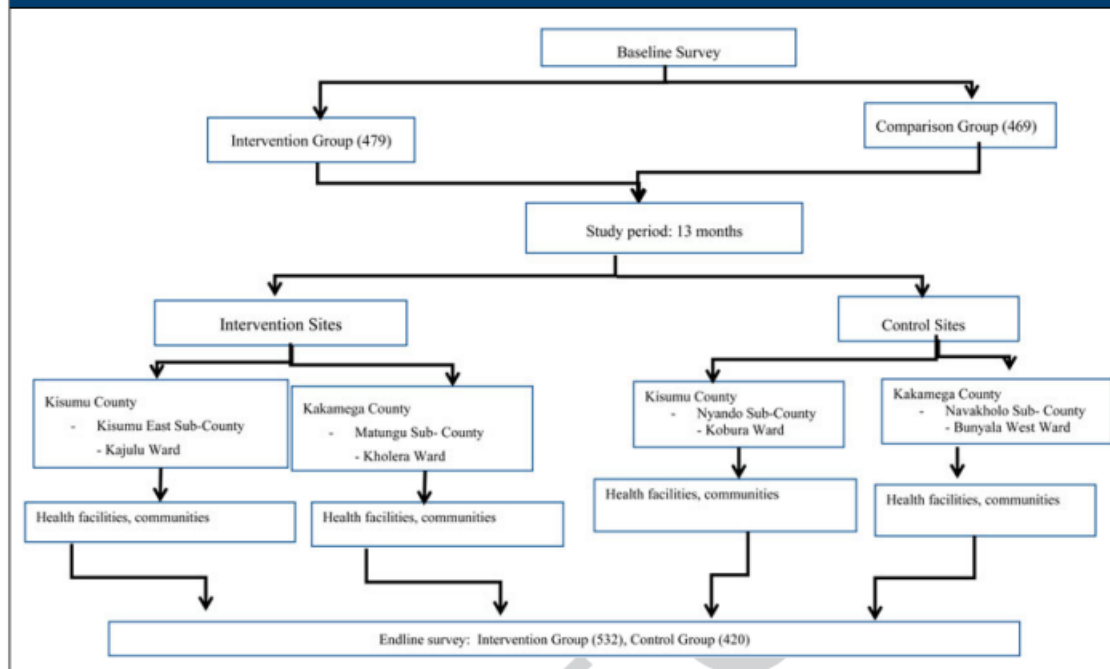
Nairobi, Kenya's capital city; Kakamega is 360 km from Nairobi. The total population of Kakamega is estimated to be nearly 2 million and 1.2 million in Kisumu. According to the Kenya Demographic Health Survey of 2014, adolescents account for one in four people in both counties (12). Kakamega is the second most populous county in Kenya, with a high burden of teen pregnancy at 19%; Kisumu's teenage pregnancy rate stands at 15%, the national average is 18%. (12) Two sub-counties within Kisumu (Nyando and Kisumu East) and two sub-counties within Kakamega (Matungu and Navakholo) were focus sub-counties for this study. These four sub-counties have a high burden of teenage pregnancy. Within the identified four sub-counties, one ward with the highest teen pregnancy rates and low utilization of contraception services was identified, forming a total of two wards per evaluation group.

Study Design

The study used a quasi-experimental evaluation design with two cross-sectional surveys conducted (pre and post intervention) in intervention and comparison groups. In both counties, program intervention and comparison groups were selected in a non-random manner based on high prevalence of pregnancy and low utilization of family planning (FP) services among adolescent girls based on the family planning data reported in the health management information system. The study team made efforts to ensure that the comparison group matched the program intervention group by looking at characteristics such as number and type of facilities, presence of partners supporting ASRH activities, reproductive health indicators such as similar trends in FP uptake. An endline assessment was conducted at the end of the 13-month implementation period. The use of two independent cross-sectional studies in this quasi experiment means that there were no identifiers in the dataset to show if those interviewed in the endline were part of the baseline survey or they were exposed to the intervention. This is one of the main limitations of the study. The intervention is briefly described below; a detailed description is available in the published study protocol. (24).

The study design and is shown on figure 1:

Figure 1: Study design



Program Description

The ASRH intervention was implemented in two wards in Kakamega and in Kisumu counties from October 2019 to December 2020 in the intervention counties through the support of U.S. Agency for International Development under the Afya Halisi project (25). The intervention was aimed at improving access and utilization of quality ASRH services through implementation of a combined model. Its design was based on a formative assessment that unearthed barriers and challenges faced by adolescents in accessing ASRH services and provided contextual information that was helpful in identifying interventions. Details of the formative assessment have been published elsewhere (26). Following the formative phase of the study, stakeholders (health care workers, teachers, local administration, adolescents, and project staff) designed a combined multi-sectoral intervention, comprising activities at health facilities, schools, and community level (Table 1 shows facility and community level interventions). The ASRH service package was adapted to deliver services through various platforms to target boys and girls using a multi-sectoral approach. The intervention package comprised of a biomedical approach, specifically the provision of ASRH services (HIV counselling and testing, contraceptives, etc.) and a behavioral approach. The focus of the latter was counselling and provision of age-appropriate comprehensive sexuality education using the school platform for social behavior change towards seeking ASRH information and services. However, due to the COVID-19 pandemic, schools were closed, and the behavioral component was not implemented.

Table 1: Approaches used to deliver ASRH interventions.

Intervention sites		Comparison Sites
Community-Level Interventions	Facility-Level Intervention	Facility-Level Intervention
<ul style="list-style-type: none"> ● Training of community health volunteers on ASRH topics, including methods to prevent pregnancy and HIV, referral for ASRH services, etc. ● Adolescent mapping (to determine where they are and how to reach them): <ul style="list-style-type: none"> ○ Pregnant and postpartum adolescents ○ Adolescent mothers ○ Out-of-school adolescents ○ Married adolescents ● SGBV-counseling, referral ● Back-to-school linkages ● Community dialogue to discuss barriers to ASRH services by adolescents and how to address them. ● Parental dialogue sessions among adolescents, parents and community volunteers 	<ul style="list-style-type: none"> ● Health workers capacity building on adolescent-health-centered service provision <ul style="list-style-type: none"> ○ Counselling on HIV, FP ○ Change in sexual behavior—safe sex. (Use of condoms) ● Provision of ASRH services <ul style="list-style-type: none"> ○ HIV and sexually transmitted infection counselling and testing ○ Contraception counselling and service ○ SGBV counselling and treatment ● Distribution of the national ASRH guidelines outlining standards for care. ● Weekend clinics for adolescent <ul style="list-style-type: none"> ○ Extended working hours ○ Service charter indicating the adolescent services available in the seven intervention facilities. ○ Establishment of peer-educator desk for adolescents 	<p>Provision of adolescent friendly SRH information and services to adolescents who come to health facilities:</p> <ul style="list-style-type: none"> ○ HIV and sexually transmitted infection counselling and testing ○ Contraception counselling and services ○ SGBV counselling and treatment <p>FP interventions by other implementing partners</p>
<p>Health-System Level Interventions</p> <p>These included institutionalizing multi-sectoral committees with membership from health, education, gender, and children services; local administration to discuss issues facing adolescents in accessing SRH; protection and reporting of sexual violence; community support and return to school for girls who get pregnant; and coordination of ASRH activities across sectors. These were convened at ward, sub-county, and county levels.</p>		

Intervention Implementation Process

The interventions at facility and community level were implemented in the two purposely selected study intervention sites (Kobura ward in Kisumu County and Kholera ward in Kakamega County). These interventions were implemented by the study team in collaboration with Ministry of Health officials at county and sub-county level. Provision of ASRH services at the comparison sites (Kajulu ward, Kisumu County and Bunyala West ward, Kakamega) continued routinely at facility level only and were run entirely by the Ministry of Health team. Implementation of the study, which began before the COVID-19 pandemic, ran in to several difficulties. In response to the pandemic, the Government of Kenya put in place prevention measures that negatively impacted uptake of essential health services, including ASRH services that were the core of this study. The number of people in any gathering were limited to 15 and social distancing was also practiced, which made it hard to reach larger numbers of adolescents in communities. In addition, clients were worried about contracting COVID-19 from health facilities, hence, they stayed away, which reduced uptake of preventive services such as FP. Health workers also prioritized care of COVID-19 patients leading to an observed decrease in utilization of essential health services in Kenya (27). Supply chain disruptions led to contraceptive commodity stockouts, especially for long-term methods such as implants. Health worker strikes involving different cadres of staff in different locations occurred between 2019 and 2020 due to pay disputes, contracts, and COVID-19 safety concerns, including availability of personal protective equipment (28). In Kisumu County, an intermittent industrial strike in 2020 lasted four months and resulted in suboptimal operations at health facilities, hence, facility-level ASRH services were not offered (27). Additionally, other implementing partners providing similar health services were introduced in the intervention and comparison sites, contributing to duplication of efforts and potential contamination of the comparison sites. This may be related to the mixed findings, and a lack of statistically significant differences between the intervention and comparison groups and is therefore described as a key limitation in the study.

Study Population and Recruitment Techniques

Participants in the study were drawn from among adolescent girls 15–19 years in the four selected wards, in intervention and comparison sites. A stratified cluster sampling approach was used to select the study participants. Stratification was done by county; the villages (also referred to as clusters) in the study wards were randomly selected; eight villages in Kobura ward and eight from Kajulu ward in Kisumu County. In Kakamega, seven villages in Kholera ward and seven villages in Bunyala West ward were included. The sample size was equally distributed among the selected villages in each ward. Households were selected through systematic random sampling at an interval of 100–200 meters from a particular landmark until the required sample size was achieved for each ward. In households with multiple adolescents, the eldest one was interviewed. Study participants were adolescent girls aged 15–19 years who did not have children and were not pregnant. This population was selected because adolescent girls' use of ASRH services, especially contraceptives was more likely to provide a more accurate picture on the effectiveness of the combined activities in health facilities and communities towards increasing the utilization of ASRH services.

Sample Size Calculation

The indicator used to compute the sample size was the FP services utilization rate among adolescents aged 15–19 years, using the most current data from the study areas obtained from the district health information system. An intra-class correlation of 0.03 was assumed resulting in a design effect of 1.87. The study is powered to detect a 15-percentage point difference between the two groups in each county, 95% confidence interval (CI), with power of 80% for effect. Furthermore, 10% was accounted for due to possible non-responses, and incomplete data were factored into the sample size adjustment. Using the parameters described, the sample size was determined to be 264 per arm per round of survey (total 528 for baseline and endline) and 231 per arm (total 462) in Kisumu and Kakamega counties respectively, resulting in a total of 1,980 participants in the study.

Recruitment and Training of Research Assistants

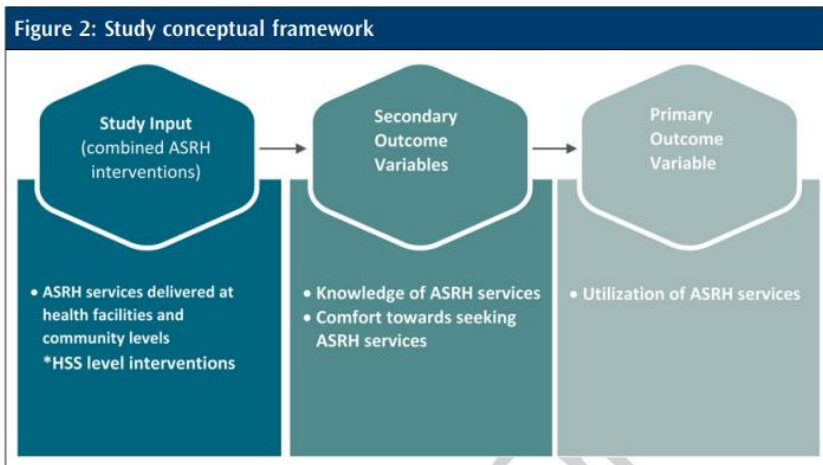
A total of 18 Research Assistants (RAs), nine from each county were recruited. The RAs were holders of diplomas and/or bachelor's degrees in public health, sociology or development studies and had prior experiences of conducting health surveys. In preparation for the household survey the RAs were trained for two days, provided with background information on the study, familiarized themselves with the study tools and consent and assent forms, and received refresher details on quality data collection and effective interviewing skills.

Study Variables

The study intervention assumed that implementing a combined facility and community ASRH intervention is likely to increase adolescents' knowledge of SRH (sex, pregnancy, and contraception) and comfort towards seeking SRH services, contributing to increased utilization of ASRH services. Our assumption is based on findings from previous studies and aligned to relevant Behaviour Change (BCT) theories. A study on perceived barriers to ASRH services in Lao showed that cognitive accessibility barriers to ASRH services included a lack of sexual knowledge and awareness of services (29). Further, a study on factors associated with use of ASRH services in Ethiopia showed that factors significantly associated with utilization of SRH services included exposure to SRH information, awareness of SRH services, and distance from service providing facilities (30). BCTs explore the relationship of how a person's behavior can be influenced and changed by external and internal factors, and what is likely to motivate the person to sustain the change. The Information-Motivation-Behaviour Skills Model, developed by Fisher, J. D., and Fisher, W. has been applied to its effectiveness in modifying risky sexual behaviors in adolescent and adult populations (31). The model states that a combination of information, motivation and behavioral skills are key to behaviour change and/or risk reduction. The Health Belief Model (HBM) hypothesizes that health-related behavior depends on the combination of several factors, namely, perceived susceptibility, perceived severity, perceived benefits, perceived barriers, cues to action, and self-efficacy (32). Self-efficacy, or confidence in one's ability to act can be related to comfort in seeking ASRH services which can consequently be related to utilization of

ASRH services. The study variables are illustrated in the in figure 2: study conceptual framework.

The dependent variable, which is also the primary outcome variable of the study was utilization of ASRH services, was measured by: ASRH services sought from a health facility; a) HIV and sexually transmitted infections (STIs), counselling and testing; b) tested for pregnancy; c) received post-abortion care; d) was counselled on sex; e) received counselling on contraceptives; f) received information and counselling on other reproductive health services (SGBV, ANC) and g) whether the participant was currently using a modern method to delay/avoid pregnancy. These variables were binary (0–No,1–Yes).



We had two secondary outcome variables. The first secondary outcome variable, comfort in seeking ASRH services, was measured using the following question: Are you comfortable seeking ASRH services, which was binary (0–No,1–Yes). The second was knowledge of ASRH. We assessed knowledge of ASRH services by asking adolescents about the following topics: knowledge of misconceptions on sex, pregnancy, and contraception. A score was created from the indicator questions, therefore creating a binary variable (good knowledge of misconceptions, poor knowledge of misconceptions). A score greater than median score was considered good knowledge while less than the median was considered poor knowledge. Other variables used to measure

knowledge included: heard of youth friendly services which was also binary (0–No, 1–Yes), Knowledge of ASRH services offered in health facilities (FP/contraception, Antenatal care, HIV counselling, testing and treatment, STI counselling and Postabortion care); Knowledge of common place to seek ASRH services (public, private, community) and knowledge of ways in which adolescents prevent pregnancy (abstinence, use of contraceptives).

The study also included socio-demographic and socio-economic characteristics: age (in years), ever had sex (yes or no), education level (primary, post primary, secondary, tertiary), employment status (unemployed, employed, student), religion (Protestant, Catholic, Muslim, traditional) and marital status (married, unmarried). In the descriptive statistics (above), percentages and 95% CIs were obtained. Difference-indifference (DID) approach was used to determine the net change in outcomes between intervention and comparison arms of the study at baseline and endline. The effectiveness of the combined intervention towards increasing utilization of ASRH services was measured using the adjusted prevalence rates (aPR) 95%. The aPRs were calculated as the exponentiated estimate of the interaction between study arm (intervention=1, comparison=0) and period (endline=1, baseline=0) by a robust Poisson model using generalized estimating equation accounting for clustering at ward level.

Data Analysis and Management

Data cleaning and analysis was done using STATA version 14. The data were checked for duplicates, missing values, and outliers. After data clean-up, the final sample size was 1900, a response rate of 98.1% accounting for 1011 participants in the intervention arm (479 at baseline vs 532 at endline) and 889 in the comparison arm (469 at baseline vs 420 at comparison arm). In the descriptive statistics, percentages and 95% CIs were obtained. Difference-in-difference (DID) approaches was used to determine the net change in outcomes between intervention and comparison arms of the study at baseline and endline. The DID approach has been recommended where two cross-sectional surveys are pooled to form panel data (33). The pooled data included additional variables representing the study arm, study period (time), and interaction term (represents the net differences between study groups).

Effect size of the ASRH combined model was measured using the adjusted prevalence rates (aPR) 95%. The aPRs were calculated as the exponentiated estimate of the interaction between study arm (intervention=1, comparison=0) and period (endline=1, baseline=0) by a robust Poisson model using generalized estimating equation accounting for clustering at ward level (33)). The general structure of the model was as follows:

$$Y=B1(\text{study arm}) +B2(\text{period})+B3(\text{interaction}=\text{study arm}*\text{period}) +B4 (\text{xin})$$

Where: Y=study arm (intervention=1, comparison=0); period (endline=1, baseline=0); interaction=study arm*period; B3=the exponentiated value is the estimated effect size reported as adjusted prevalence rat, with 95% CI xin=the confounding variables that were accounted for between the four study groups.

To account for confounding factors and to address the potential imbalance of these factors between the study groups (variables established to be significantly different at pre-intervention study groups), a coarsened exact matching was done, and a matching score generated for the following variables: age, ever had sex, employment status, distance from health facility and religion. Dummy variables that represented each of these factors were created to represent the four study groups. Coarsened exact matching is a method for improving the estimation of causal effects by reducing imbalance in covariates between and within treated and comparison groups (34). The coarsened exact matching generated matching scores that provide cluster weights. In the multivariate regression model, the matching scores were included in the weighted analysis. For cross-sectional surveys where the outcome is binary and more prevalent (>10%), a prevalence ratio provides more accurate estimates compared to odds ratios, which is recommended for rare outcomes (33). However, estimating prevalence ratios for pooled cross-sectional survey data requires a robust variance adjustment of the distribution of the outcome, such as applying a log binomial, robust possession, or Cox proportional hazard model (assuming construct follow-up of each participant). In this study, we applied Poisson regression with a robust error variance to estimate prevalence rate, where the aPR and 95% CI of the interaction term was >1 (if the goal was to increase the outcome) or <1 (if the

goal was to reduce the outcome) and statistically significant (p -value <0.05), then the intervention was considered effective.

Ethical Considerations

The study protocol was approved by the Kenya Medical Research Institute research ethics reviews committees (IRB No. 597) on February 20, 2019, and the Johns Hopkins Bloomberg School of Public Health Institutional Review Board (IRB00008364) on May 3, 2019. The research team was provided with the research ethics approval letter and adhered to the study protocol. They ensured that informed consent was obtained from adolescent girls aged 18–19 years; parental permission and adolescent assent was sought for girls aged 15–17 years. In addition, privacy was maintained during the data collection process and voluntary participation was emphasized. Maintaining confidentiality of data collection materials and information after data collection was done by limiting access of study information to only authorized personnel and excluding personal identifying information during data analysis and reporting.

Patient and Public involvement

Adolescents, their parents, and communities were involved in the design and conduct of the research. This was done through consultative forums at county, sub-county, ward, and community levels held prior to the data collection processes. In addition, we received permission from the county health office and community leaders to undertake the study. The setting of research questions and methods of recruitment were informed by a formative assessment that involved focus group sessions with adolescents. Adolescents were invited and participated in dissemination of key findings from the study where they validated the findings, hence providing input to ASRH programming within their context. The published article will also be shared with study participants through the county coordination forums where adolescents are represented.

RESULTS

Socio-Demographic Characteristics of Respondents

The total number of respondents interviewed in each arm of the study was 948 at baseline and 952 at endline. The mean age of respondents was 16.9 at

baseline and 16.8 at endline for the intervention group, while for the comparison group, the mean was 17.2 at baseline and 16.8 at endline. The proportion of adolescents who reported to have ever had sex was 27.1% at baseline and 24.3% at endline in intervention sites, and 27.3% at baseline vs 27.6% at endline in comparison sites. In the intervention sites, 23.6% of adolescents had completed primary education at baseline vs 29.3% at endline; in comparison sites, the percent of adolescents who had completed primary education was 9.8% at baseline vs. 31.7% at end line. The proportion of unemployed adolescents at intervention sites was 12.9% at baseline and 3.8% at endline; in the comparison sites was 9.8% at baseline and 3.6% at endline. At both baseline and endline, 99.8% vs 98.5% (intervention sites) and 99.4% and vs 99.1% (comparison sites) of adolescents were unmarried. Catholics accounted for 20% at baseline vs 15.4% at endline in intervention sites and 31.1% at baseline vs 20.0% at endline in the comparison sites. Regarding distance to the health facility with ASRH services, the proportion of adolescents who reported that health facilities offering ASRH services were near (<5km) were 72.7% at baseline vs 58.8% at endline for intervention sites and 77.8% at baseline vs 66.4% at endline for comparison sites. There was a significant difference in intervention respondents between baseline and endline in terms of education status, employment status, religion, and distance to health facility. Significant differences for the same variables were noted for comparison sites at baseline and endline (Table 2). The differences between baseline and endline on distance to health facility can be attributed to interpretation of the question, because the endline survey was conducted during the COVID-19 pandemic during which a number of health facilities were not providing ASRH services. A coarsened exact matching was applied in the regression analysis to address this imbalance.

Table 2: Socio-demographic characteristics of respondents at baseline and end line

Variables	Intervention (n=1011)				*P-value	Control (n=889)				†P-value	Baseline Difference	Endline Difference
	Baseline (n=479)		Endline (n=532)			Baseline(n=469)		End -line (n=420)				
	n	% (95% CI)	n	% (95% CI)	n	% (95% CI)	n	% (95% CI)				
Mean Age	16.9	16.8-17.1	16.8	16.7-16.9	0.047	17.2	17.1-17.3	16.8	16.6-16.9	<0.001		
Ever had sex												
Yes	130	27.1(23.3-31.3)	129	24.3(20.8-28.1)	0.958	128	27.3(23.4-31.5)	116	27.6(23.5-32.1)	0.567	-0.2	-3.3
No	349	72.9(68.7-76.7)	397	74.6(70.7-78.1)		341	72.7(68.5-76.6)	303	72.1(67.6-76.2)		0.2	2.5
Missing						0	0.0	1	0.2(0.0-1.7)			
Education level												
Primary/post primary	113	23.6(20.0-27.6)	156	29.3(25.6-33.3)	0.007	46	9.8(7.4-12.9)	133	31.7(27.4-36.2)	<0.001	13.8	-2.4
Secondary	354	73.9(69.8-77.6)	349	65.6(61.5-69.5)		412	87.9(84.6-90.5)	277	66(61.3-70.3)		-14	-0.4
Tertiary	11	2.3(1.3-4.1)	18	3.4(2.1-5.3)		7	1.5(0.7-3.1)	7	1.7(0.8-3.5)		0.8	1.7
Missing	1	0.2(0.03-1.5)	9	1.7(0.9-3.2)		4	0.9(0.3-2.3)	3	0.7(0.2-2.2)			
Employment status												
Unemployed	62	12.9(10.2-16.3)	20	3.8(2.4-5.8)	<0.001	46	9.8(7.4-12.9)	15	3.6(2.2-5.8)	<0.001	3.1	2.6
Employed	9	1.9(1.0-3.6)	6	1.1(0.5-2.5)		18	3.8(2.4-6.0)	5	1.2(0.5-2.8)		-1.9	-2.5
Student	408	85.2(81.7-88.1)	500	94(91.6-95.7)		405	86.4(82.9-89.2)	399	95(92.4-96.7)		-1.2	-1

Missing	0	0.0	6	1.1(0.5-2.5)		0	0.0	1	0.2(0.0-1.7)			
Marital Status												
Married/living together	1	0.2(0.03-1.5)	1	0.2(0.03-1.3)	0.948	3	0.6(0.2-2.0)	3	0.7(0.2-2.2)	0.566	-0.4	-0.5
Unmarried	478	99.8(98.5-99.9)	524	98.5(97.0-99.2)		466	99.4(98.0-99.8)	416	99.1(97.5-99.6)		0.4	-0.6
Missing	0	0.0	7	1.3(0.6-2.7)		0	0.0	1	0.2(0.0-1.7)			
Religion												
Catholic	96	20.0(16.7-23.9)	82	15.4(12.6-18.7)	0.009	146	31.1(27.1-35.5)	84	20(16.4-24.1)	<0.001	-11.1	-4.6
Protestant/other Christian	281	58.7(54.2-63.0)	327	61.5(57.2-65.5)		301	64.2(59.7-68.4)	289	68.8(64.2-73.1)		-5.5	-7.3
Muslim	89	18.6(15.3-22.3)	108	20.3(17.1-23.9)		13	2.8(1.6-4.7)	24	5.7(3.9-8.4)		15.8	14.6
Traditional	11	2.3(1.3-4.1)	2	0.4(0.09-1.5)		7	1.5(0.7-3.1)	20	4.8(3.1-7.3)		0.8	-4.4
No religion	2	0.4(0.1-1.7)	7	1.3(0.6-2.7)		2	0.4(0.1-1.7)	3	0.7(0.2-2.2)		0	0.6
Missing	0	0.0	6	1.1(0.5-2.5)								
Distant to health facility with ASRH service												
Near(<5km)	348	72.7(68.5-76.5)	313	58.8(54.6-63.0)	<0.001	365	77.8(73.8-81.4)	279	66.4(61.8-70.8)	0.001	-5.1	-7.6
Far(5-10km)	102	21.3(17.9-25.2)	152	28.6(24.9-32.6)		78	16.6(13.5-20.3)	115	27.4(23.3-31.9)		4.7	1.2
Very far(>10km)	10	2.1(1.1-3.8)	42	7.9(5.9-10.5)		19	4.1(2.6-6.3)	16	3.8(2.3-6.1)		-2	4.1

No facility offering ASRH	5	1.0(0.4-2.5)	1	0.2(0.03-1.3)		1	0.2(0.0-1.5)	0	0		0.8	0.2
Don't know	14	2.9(1.7-4.9)	18	3.4(2.1-5.3)		6	1.3(0.6-2.8)	10	2.4(1.3-4.4)		1.6	1
Missing	0	0.0	6	1.1(0.5-2.5)	-							

IQR, interquartile range; SD, standard deviation, *P-value comparing intervention arm baseline-endline; †P-value comparing control arm baseline-endline The Median age was 17 years across the intervention and comparison groups at baseline and endline.

Knowledge of ASRH Services

Findings show an increase in the percentage of adolescents who had good knowledge of misconception on pregnancy and contraception in both the intervention (29.4% at baseline to 42.1% at endline) and control arm (36.7% at baseline to 47.1% at endline) (Table 3). In both the intervention and control arm, there was an increase in the proportion of adolescents who knew of FP/contraception, antenatal care; HIV counselling, testing, and treatment; STI counselling and post abortion care. In terms of common places to seek ASRH services, adolescents in the intervention arm had an increase in knowledge while adolescents in the control arm experienced a decline in knowledge about where to seek ASRH service. There was also an increase from 60.3% to 62.6% in the intervention and 63.8% to 70.7% in the control in the proportion of adolescents who knew abstinence was a way of preventing pregnancy

Table 3: Knowledge of ASRH services and behaviour towards ASRH services

Characteristics	Intervention(n=1011)						Intervention difference	P-value*	Control(n=889)						Control difference	P-value+	% net change
	Baseline(n=479)			Endline(n=532)					Baseline(n=469)			Endline(n=420)					
	n	%	(95% CI)	n	%	(95% CI)	%	n	%	(95% CI)	n	%	(95% CI)	%			
Knowledge of misconceptions on sex, pregnancy and contraception																	
Poor knowledge	338	70.6	(66.3-74.5)	308	57.9	(53.6-62.0)	-12.7	<0.001	297	63.3	(58.9-67.6)	222	52.9	(48.1-57.6)	-10.4	0.002	-2.3
Good knowledge	141	29.4	(25.5-33.7)	224	42.1	(38.0-46.4)	12.7		172	36.7	(32.4-41.1)	198	47.1	(42.4-51.9)	10.4		2.3
Heard of youth-friendly services																	
Yes	119	24.8	(21.2-28.9)	210	39.5	(35.4-43.7)	14.7	<0.001	120	25.6	(21.8-29.7)	147	35.0	(30.6-39.7)	9.4	<0.001	5.3
No	360	75.2	(71.1-78.8)	308	57.9	(53.6-62.0)	-17.3		349	74.4	(70.3-78.2)	266	63.3	(58.6-67.8)	-11.1		-6.2
Missing	0	0.0		14	2.6				0	0.0		7	1.7				
Knowledge of ASRH services offered in facilities																	
FP/contraception	208	43.4	(39.0-47.9)	265	49.8	(45.6-54.1)	6.4	0.002	195	41.6	(37.2-46.1)	221	52.6	(47.8-57.4)	11.0	<0.001	-4.6
Antenatal care	28	5.9	(4.1-8.3)	36	6.8	(4.9-9.2)	0.9	0.021	38	8.1	(5.9-10.9)	37	8.8	(6.3-11.5)	0.7	0.097	0.2
HIV counseling, testing and treatment	203	42.4	(38.0-46.7)	293	55.1	(50.8-59.2)	12.7	<0.001	189	40.3	(35.9-44.8)	231	55.0	(50.2-59.7)	14.7	<0.001	-2.0

STI counselling	54	11.3	(8.7-14.4)	102	19.2	(16.0-22.7)	7.9	<0.001	60	12.8	(10.1-16.1)	106	25.2	(21.3-29.6)	12.4	<0.001	-4.5
Post-abortion care	27	5.6	(3.9-8.1)	35	6.6	(4.7-9.0)	1.0	0.021	32	6.8	(4.9-9.5)	29	6.9	(4.8-9.8)	0.1	0.106	0.9
Knowledge of common place to seek ASRH service																	
Public health facility	345	72.0	(67.8-75.9)	427	80.3	(76.7-83.4)	8.3	<0.001	331	70.6	(66.3-74.5)	317	75.5	(71.1-79.4)	4.9	0.018	3.4
Private health facility	166	34.7	(30.5-39.0)	218	41.0	(36.9-45.2)	6.3	<0.001	174	37.1	(32.8-41.6)	163	38.8	(34.3-43.6)	1.7	0.087	4.6
Community	31	6.5	(4.6-9.1)	50	9.4	(7.2-12.2)	2.9	0.005	34	7.3	(5.2-10.0)	23	5.5	(3.7-8.1)	-1.8	0.062	4.7
Knowledge of ways in which adolescents prevent pregnancy																	
Contraceptives	273	57.0	(52.5-61.4)	273	51.3	(47.1-55.6)	-5.7	<0.001	294	62.7	(58.2-67.0)	221	52.6	(47.8-57.4)	-10.1	0.002	4.4
Abstinence	289	60.3	(55.9-64.6)	333	62.6	(58.4-66.6)	2.3	<0.001	299	63.8	(59.3-68.0)	297	70.7	(66.2-74.9)	6.9	0.045	-4.6

Comfort Towards Seeking ASRH Services and ASRH Services Utilization

The percentage of adolescents who were comfortable seeking ASRH services increased from 42.2% to 42.9% and 46.7% to 55.7% in the intervention and control arm respectively (Table 4). Furthermore, there was a decrease in the percentage of adolescents who reported fear of parents as reason for not seeking ASRH services (29.2% to 22.9%) in the intervention arm while an increase from 25.4% to 33.8% was noted in the comparison sites. The proportion of adolescents who reported lack of support from partners as a reason for not being comfortable seeking ASRH services decreased from 3.1% to 2.3% in the intervention sites. There was an increase from 21.9% to 22.4% in the percentage of adolescents who reported stigma from peers as a reason for being uncomfortable while seeking ASRH services in the intervention sites. Provider bias as a reason for discomfort by adolescents seeking ASRH services increased in both intervention sites (4.8% to 19.9%) and comparison arm (6.4% to 23.3%). A decrease was observed in adolescents who sought HIV/STI counseling and other reproductive services at both the intervention and control sites. The utilization of ASRH services was measured by use of contraception. There was no significant change in the proportion of sexually active adolescents using contraception in the intervention arm (37.7% at baseline, 42.6% at endline) and in the comparison arm (36.7 at baseline vs 39.1% at endline).

Table 4: Comfort towards seeking ASRH services and ASRH service utilization.

Characteristics	Baseline (n=479)			Endline (n=532)			Intervention difference		Baseline(n=469)			Endline(n=420)			Control difference		
	n	%	(95% CI)	n	%	(95% CI)	%	P-value *	n	%	(95% CI)	n	%	(95% CI)	%	P-value+	% net change
Adolescents comfortable seeking ASRH services																	
Yes	20	4.2	(37.8-46.7)	22	4.1	(37.8-46.7)	0.7	<0.001	21	4.5	(42.2-51.2)	23	5.5	(50.9-60.4)	5.7	0.429	-5.0
No	27	5.7	(53.3-62.2)	26	4.9	(53.3-62.2)	-8.5		25	5.3	(48.8-57.8)	18	4.3	(39.4-48.8)	-9.2		0.7
Reasons adolescents are uncomfortable seeking ASRH services																	
Stigma from peers	10	2.1	(18.4-25.9)	11	2.1	(19.0-26.1)	0.5	<0.001	10	2.1	(18.0-25.5)	10	2.4	(21.3-29.6)	2.2	0.238	-1.7
Fear of parents	14	2.9	(25.3-33.5)	12	2.3	(19.5-26.7)	-6.3	<0.001	11	2.4	(21.6-29.5)	14	3.3	(29.4-38.5)	6.2	0.012	-12.5
Lack of support from partner /boyfriend	15	3.1	(1.9-5.1)	12	2.3	(1.3-3.9)	-0.8	<0.001	9	1.9	(1.0-3.7)	11	2.6	(2.5-6.4)	1.8	0.096	-2.6
Provider bias	23	4.8	(3.2-7.1)	20	3.8	(16.7-23.5)	15.1	<0.001	30	6.4	(4.5-9.0)	21	5.0	(19.5-27.6)	15.5	<0.001	-0.4

Currently using a method to delay/avoid pregnancy (Intervention: Baseline=130, Endline=129),(Control: Baseline=128, Endline=127)

Yes	49	3 7. 7	(29.7- 46.4)	5 5	4 2. 6	(34.3 - 51.4)	4.9	0.135	4 7	3 6. 7	(28.8 - 45.5)	4 5	3 9. 1	(30.6 - 48.4)	2. 4	0.69 9	2.5
No	81	6 2. 3	(53.6- 70.3)	7 1	5 5	(10.7 - 16.5)	- 7.3		8 1	6 3. 3	(54.5 - 71.2)	7 0	6 0. 9	(51.6 - 69.4)	- 2. 4		-4.9
ASRH services sought in health facilities																	
Counseling on sex	20	2 2. 7	(15.1- 32.8)	2 1	3 1. 8	(21.6 - 44.2)	9.1	0.207	2 4	2 7. 3	(18.9 - 37.6)	6	1 4. 0	(6.3- 28.1)	- 13 .3	0.08 8	22.4
Pregnancy testing	7	8. 0	(3.8- 15.9)	8	1 2. 1	(6.1- 22.7)	4.1	0.388	9	1 0. 2	(5.4- 18.6)	6	1 4. 0	(6.3- 28.1)	3. 8	0.52 9	0.3
HIV/STI counseling, testing, treatment	56	6 3. 6	(53.0- 73.1)	3 3	5 0. 0	(38.0 - 62.0)	- 13. 6	0.090	5 0	5 6. 8	(46.2 - 66.9)	2 8	6 5. 1	(49.6 - 78.0)	8. 3	0.36 4	-21.9
Contraceptive counseling	10	1 1. 4	(6.2- 20.0)	1 5	2 2. 7	(14.1 - 34.6)	11. 3	0.058	8	9. 1	(4.6- 17.3)	4	9. 3	(3.5- 22.7)	0. 2	0.96 9	11.1
Other reproductive health services	13	2. 7	(1.6-4.6)	7	1. 3	(0.6- 2.7)	- 1.4	<0.00 1	1 5	3. 2	(1.9- 5.2)	3	7. 0	(2.2- 19.9)	3. 8	0.20 1	-5.2

*Comparing intervention arm at baseline and endline; †Comparing comparison arm at baseline and endline

Multivariate Analysis of the Effect of Combined ASRH Intervention on knowledge, comfort, and utilization of ASRH Services

The effect of the intervention is the adjusted prevalence ratio of the interaction between study arm and survey periods. A significant decrease was observed in adolescents whose fear of parents made them uncomfortable in seeking ASRH services (aPR=0.58, 95% CI=0.42-0.79, P=0.001) and those who lack of support from partner made them uncomfortable in seeking ASRH services (aPR=0.25, 95% CI=0.08-0.82, P=0.023). There was no significant difference noted on other variables listed: currently using method to delay/avoid pregnancy, adolescents comfortable seeking ASRH service, provider bias, stigma from peers, knowledge of misconceptions on sex, pregnancy, and contraception, knowledge of FP/contraception, knowledge of ANC, knowledge of HIV counselling, testing and treatment; knowledge of STI counseling, knowledge of post-abortion care and heard of youth friendly room or service (Table 5).

Table 5: Multivariate Analysis of the Effect of Combined ASRH Intervention on Knowledge, Comfort and Utilization of ASRH Services

Characteristics	Study Arm*		Period†		Interaction‡	
	IRR (95% CI)	P-value	IRR (95% CI)	Pvalue	IRR (95% CI)	Pvalue
Currently using method to delay/avoid pregnancy	0.92(0.61-1.38)	0.672	1.29(0.89-1.86)	0.175	1.15(0.68-1.94)	0.608
Adolescent comfortable seeking family planning service	0.92(0.78-1.09)	0.332	0.97(0.83-1.14)	0.710	1.19(0.95-1.49)	0.125
Fear of parents made adolescent uncomfortable in seeking ASRH services	1.18(0.94-1.48)	0.153	1.32(1.06-1.65)	0.012	0.58(0.42-0.79)	0.001
Lack of support from partners made adolescent uncomfortable in seeking ASRH service	1.80(0.78-4.17)	0.171	1.97(0.85-4.57)	0.114	0.25(0.08-0.82)	0.023
Provider bias made adolescents uncomfortable in	0.60(0.34-1.07)	0.082	3.22(2.16-4.79)	<0.001	1.48(0.79-2.78)	0.219

seeking ASRH services						
Stigma from peers made adolescents uncomfortable in seeking ASRH services	0.99(0.96-1.02)	0.607	0.98(0.94-1.01)	0.216	1.02(0.97-1.07)	0.381
Knowledge of sex, misconception on pregnancy and contraception	0.73(0.59-0.90)	0.003	1.29(1.09-1.52)	0.003	1.20(0.93-1.56)	0.161
Knowledge of FP/contraception	0.98(0.87-1.10)	0.750	0.76(0.66-0.87)	<0.001	1.16(0.96-1.41)	0.116
Knowledge of ANC	0.99(0.96-1.04)	0.914	0.98(0.94-1.02)	0.264	1.02(0.97-1.08)	0.451
Knowledge of HIV counselling, testing and treatment	0.95(0.85-1.07)	0.440	0.75(0.66-0.87)	<0.001	1.01(0.83-1.23)	0.890
Knowledge of STI counselling	1.03(0.97-1.08)	0.338	0.86(0.80-0.93)	<0.001	1.07(0.97-1.17)	0.175
Knowledge of post-abortion care	1.01(0.97-1.04)	0.667	1.00(0.96-1.03)	0.832	1.01(0.96-1.06)	0.786
Heard of youth friendly room or service			0.92(0.72-1.18)	0.513	1.37 (1.10-1.72)	0.006
	1.25(0.92-1.71)				0.156	

aPR-Adjusted Prevalence Rates, *Study arm–intervention, control, †Period–baseline, endline, ‡Interaction–study arm, period
IRR- Incidence Rate Ratio. Matched variables at baseline and endline- Age, ever had sex, employment status, distance from health facility, religion.

DISCUSSION

We undertook this evaluation study based on the expectation that the implementation of a combined set of ASRH interventions using a combined facility, community and school model would result in synergies of the interventions and improve ASRH outcomes in intervention areas. This intervention was aligned to Kenya's 2015 ASRH policy guidelines, which recommend use of multiple approaches to reach adolescents with SRH information and services. The measure of effectiveness of the combined ASRH intervention model on utilization of ASRH services is the adjusted prevalence rate of the interaction between study arm and survey periods. Our findings, however, did not show a significant change in utilization of ASRH services. This can be attributed to the fact that implementation of the school arm was not done, which may have weakened the outcome of the study as designed. Implementation of the study was severely affected by the COVID 19 pandemic which began in March 2020 and whose control was achieved from April 2021 when vaccines were introduced. The key element was that the pandemic prohibited implementation of the school arm of the study because schools were closed. Consequently, the comprehensive sexuality education model which is key to delivering ASRH information was not implemented.

The facility arm of the study was also affected because COVID-19 kept clients from seeking care at health facilities, which negatively impacted uptake of ASRH services. While our package of intervention incorporated provider sensitization and engagement on provision of ASRH services, some health facilities were not able to provide services such as SRH, which were deemed not essential during the height of the pandemic (8,35,36). This could probably be the reason why adolescents believed that providers were biased in offering SRH services, as shown in the descriptive results, where a net increase was noted in percent of adolescents who reported provider bias as reason for not being comfortable in seeking ASRH services safety concerns and shortage of protective equipment may also have negatively affected health worker attitude during the pandemic. A study on needs, barriers, and access to contraception for adolescents in LMICs suggests that provider bias can manifest in many forms, e.g., providers may refuse to provide unmarried adolescents with contraceptive information and services because they do not

approve of premarital sexual activity due to personal or moral reasons (37). Health workers' bias can also be manifested by not providing adolescent-friendly services to those in need. (16) Consequently, young people may choose to not seek services if they feel they will be judged, or that their confidentiality and privacy will not be maintained (38). An analysis of global ASRH challenges cites disrespect and judgmental attitudes by health workers as factors that discourage adolescents from using SRH services (39). While other research shows the existence of provider bias on ASRH use, a multivariate regression analysis in this study showed that provider bias had no effect on utilization of ASRH services.

Despite the negative effects of the COVID-19 pandemic, our multivariate regression analysis showed a significant net decrease in percentage of adolescents who reported that fear of parents and lack of support from partner would make them uncomfortable to seek SRH services, suggesting an improvement in adolescents' comfort towards seeking ASRH services. We attribute this to parental dialogue sessions instituted among parents, adolescents, and communities in the intervention areas. A range of people have an influence on adolescents' access to information and services, including peers, parents, family members, teachers, and health workers. This is key in especially in African settings where parents are the ultimate authority on important issues, such as SRH. Parents and family members play an important role in the sexual and reproductive knowledge and development of adolescents and youth (40). A review of literature from LMICs shows that when community participatory approaches were used within the family, adolescents were more likely to discuss SRH with parents, as well as take charge of their own SRH (41). Systematic reviews on the factors influencing access to and utilization SRH service in sub-Saharan Africa also provide recommendations from various studies on factors that improve adolescents comfort to seeking ASRH services which include provision of prompt services, privacy, sufficient time, and patience when dealing with adolescents (42).

The challenges experienced in health facilities with regards to access to ASRH services, such as provider bias and lack of privacy call for use of other avenues such as schools and communities, to offer SRH services to adolescents. The closure of schools due to COVID-19 also reduced opportunities for peer interactions among adolescents and therefore missed opportunities to

discuss SRH matters. This effect is also noted in the descriptive results which showed a net increase in the percent of adolescents who reported stigma from peers as reason for not being comfortable in seeking ASRH services. The opinion of peers can promote or deter seeking information and decision-making on ASRH services. Reliance on peers could contribute to risky sexual behavior and poor outcomes because adolescent's peers may not have accurate information on ASRH services. A study conducted in Malawi showed that peer influence remains a strong factor and that peers are a major source of information; peers can be supportive or unhelpful to those they know want to use FP (43). Therefore, provision of accurate, comprehensive information while building skills for negotiating sexual behaviors among adolescents is likely to reduce negative peer influence (39). Trained peer educators, who were used in the intervention areas, can be an important entry to provide SRH information and counselling to adolescents. A systematic review of adolescent behavior change interventions for HIV/AIDS prevention in Sub-Saharan Africa suggest that interventions using peer education registered positive outcomes in risk reduction (44). A multivariate regression analysis however showed that stigma from peers had no significant effect on utilization of ASRH services.

The lack of improvement in use of ASRH information and services can also be attributed to the requirement for parental consent to use ASRH services, especially contraceptives. Although not formal, various pronouncements were made by highly placed political leaders, requiring health workers not to issue contraceptives to adolescents. This created fear among health workers, and resulted to adolescents being denied SRH services, unless they were accompanied by parents. Although MOH policy supports provision of SRH services to adolescents, statements by political leaders can lead to non-adherence of policy, as it happened in this case. Other studies suggest that power and politics influence policy making process as well as implementation and evidence generation (45,46). Additional negative COVID 19 related effects included stigma associated with health facilities for fear of contracting COVID-19, closure of some health facilities, and health workers being redirected to manage COVID-19 patients at the expense of preventive health services (27). At the height of the pandemic (between march – December 2020), there was limited movement of people due to Government of Kenya

imposed curfews, and widespread fear among the population, with many people shunning health facilities to seek services. The negative effect of COVID-19 on health services has been documented in the World Health Organization (WHO) pulse surveys of 105 countries in 2020 and 2021 (47,48). In addition, a mini review of SRH services in Africa concludes that COVID-19 pandemic measures reduced access to ASRH services and contraceptives, hence contributing to increased reported cases of sexual violence and adolescent pregnancy (49). Additionally, a systematic review of the impact of the COVID-19 Pandemic on ASRH in LMICs established that the pandemic contributed to missing ASRH services such as contraceptives and ARV refills, increased child marriage (due to closure of schools), increased sexual violence and increased sexual exploitation for girls due to economic constraints (50).

Despite these negative effects of COVID-19, our descriptive results showed a net improvement in some indicators. A net increase was seen in knowledge of ASRH services (FP/contraception; antenatal care; HIV/STI counselling, testing, and treatment; and post-abortion care), and knowledge of misconceptions around sex, pregnancy, and contraception. We also observed a net increase in the percentage of adolescents who heard of youth-friendly services. We attribute this to health information sessions conducted by peer educators and community health volunteers who had been trained on appropriate messaging. Adolescents were also at home for prolonged period hence were more likely to be exposed to the health education events that were done through door to door and community small group events. These efforts were also enhanced with the full realization that by staying home for prolonged period, adolescents were more likely to be at increased risk for pregnancy. A review on what works and what does not work in ASRH indicated that communities are an important entry for adolescents/ and information and counselling by community resource persons can improve adolescents' health, adjust risky behaviors, and promote healthy habits (21).

Improving adolescents' knowledge can contribute to their understanding of risky sexual behavior and consequently to making safe choices to avoid adverse outcomes such as unplanned pregnancy. Studies show that lack of accurate information, myths and misconceptions on contraceptive use negatively impacts use of ASRH services. An exploratory study on contraception among young people in Kwale County, Kenya showed that

misconceptions around future fertility later in life, uncertainty about side effects and level of effectiveness seemed to create fear on use of contraceptives (51). Improved knowledge of myths and misconceptions is therefore likely to reduce misinformation and increase uptake of contraception and ASRH services. Misconceptions about risky sexual behavior can also increase the risk of adverse outcomes such as adolescent pregnancy. A study on determinants of sexual activity and pregnancy among unmarried young women in urban Kenya established higher risks of pregnancy among women who had early sexual debut and did not use contraception at first sexual encounter (52). Improving adolescent's awareness to misconceptions on sex, pregnancy and contraception that expose them to risky sexual behavior is likely to reduce negative SRH outcomes. However, a multivariate regression analysis showed that improved knowledge of ASRH services and misconceptions around sex, pregnancy, and contraception did not have a positive effect to an improvement in comfort or utilization of ASRH services. Additionally, having heard about youth friendly services was not related to improved knowledge, comfort, or utilization of ASRH services. Findings from a systematic review on prevention of STI among young people in LMICs have shown that imparting knowledge can reduce the prevalence of STIs and multiple sexual partners and increases health service utilization (53). Other studies have, however, shown that understanding the consequences of sexual behavior was not enough; young people had to gain the related skills and knowledge to change risky behaviors (54). This implies that additional interventions are needed to translate knowledge to practice, increase access to SRH commodities, change adolescents' sexual behavior and consequently improve adolescent health outcomes.

A review on what works and what does not work in ASRH interventions showed that many African countries have been implementing related stand-alone strategies at community and facility levels such as peer education, mass media campaigns, and youth-friendly centers to increase access to health information for adolescents and young people (21). Our study, however, combined multiple strategies and focused on improving knowledge, improving comfort, and increasing utilization of ASRH services. Due to the reasons described above, the findings from this study were mixed. Other studies evaluating the effectiveness of ASRH strategies to date have also

produced mixed results in low- and middle-income countries. A descriptive review of the outcomes of ASRH strategies indicates that most studies showed varied effectiveness-based mode of delivery of the intervention (facility, community), acceptance and reach of various adolescent populations (55). From this review, there was limited evidence to support the effectiveness of interventions that focus on training for health workers on adolescent friendly services only while approaches that combine improvements in adolescent-friendly services, training health workers, and information dissemination through various channels and communities contributed to improved SRH outcomes (55). An evaluation of the impact of the ASRH strategy on service utilization and health outcomes in Zimbabwe found no impact on STI prevalence and condom use (56). A Community randomized trial in Ghana on the effects of an ASRH intervention on use of services by young people showed improved adolescent usage of STI, antenatal and perinatal services, but had no significant effect on adolescent usage of HIV counselling and testing services (57). A systematic review of interventions for preventing unintended pregnancies among adolescents concluded that programs that included a combination of education and additional interventions promoting contraception use contributed to reducing unintended pregnancies among adolescents (58).

These studies showed improvement in some elements of ASRH interventions and no significant change in others, indicating the need to further explore SRH approaches that improve key outcomes for adolescents. This also indicates the need for continued redesign and implementation of various delivery models to effectively reach adolescents with SRH information and services. Additional testing to establish the impact of various ASRH service delivery models is also needed. In addition, WHO stipulates several elements that stimulate adolescents to seek healthcare. These include: confidentiality, provision of required information and services, accepting adolescents as they are, considering and respecting adolescents' opinions, allowing adolescents to make their own decisions, ensuring that adolescents feel welcome and comfortable, being non-judgmental, and provision of services at a time that adolescents are able to come (59). Designing approaches that incorporate these elements is key to improving ASRH services utilization.

Strengths and Limitations

The main limitation of this study was that two cross-sectional surveys were done at baseline and at endline. As such, there is no identifier in the datasets linking individuals sampled in the endline to the baseline and the study could also not establish whether the respondents were exposed to the intervention. Significant differences were noted between the socio-demographic and socioeconomic characteristics of the respondents at baseline and endline. This is attributed to independent sampling, different data collection time points and the effect of COVID-19 which impacted provision of ASRH services. To account for confounding factors and to address the imbalance of the factors between the four study groups (variables established to be significantly different are pre-intervention and post intervention study groups), a coarsened exact matching was done, and a matching score was generated for age, employment status, distance from health facility, religion and ever had sex. In the multivariate regression model, the matching scores were included in the weighted analysis. The study implementation period was shortened from the planned 18 months to 15 months due to funding constraints, hence limiting the exposure to the intervention. The study relied on self-reported information and information bias is likely to have occurred due to over or under reporting. Data on actual levels of ASRH service use were not collected. Another limitation is that implementation of the school arm of the study was not done because schools were closed due to the COVID-19 pandemic. Specific issues described kept clients away from health facilities, which may have impacted uptake of ASRH services. This included stigma associated with health facilities for fear of contracting COVID-19, closure of some health facilities, and health workers being re-directed to manage COVID-19 patients at the expense of preventive health services. Under the national government directive, health facilities were modified to provide room for COVID-19 facilities, such as repurposing Maternal and Child Health and FP service delivery rooms into observation rooms for COVID 19 patients. The health system interventions were also affected; for instance, capacity building, mentorship, and supportive supervision by County leadership were limited due to restrictions in movement and gathering. Limited movement due to Government imposed curfews reduced access to ASRH services as communities were not allowed to move around unless there was an emergency. Additionally, similar net improvements between baseline and

endline was noted in both intervention and comparison sites, indicating possible contamination due to the present of other partners implementing ASRH interventions in the same regions. The implementation of programs is done under the leadership of MOH, who primarily rely on external partners to roll out ASRH interventions. Limited coordination among the various partners created an overlap and consequently implementation of similar interventions in the same regions.

CONCLUSIONS AND RECOMMENDATIONS

This study showed mixed results. While a net increase was observed in the proportion of adolescents' knowledge of ASRH information and services, provider bias towards ASRH was noted. We suggest that training health providers to respect adolescents' right to quality SRH information and services is key to addressing provider bias and negative health workers' attitude. Overall, the combined community and health facility model did not demonstrate a significant increase in utilization of ASRH services. This can be attributed to the incomplete implementation of the study model as designed because of the COVID-19 pandemic that led to closure of schools. Implementation of the intervention using a public health approach also implies the intervention was not targeted to adolescents who desire use of ASRH information and services, and this may have limited its reach. We recommend a synchronized approach of ASRH interventions from design to implementation to ensure systematic, distinct measurement of its effectiveness. Despite the mixed evidence from this study, a key lesson learned is that enhanced multi-sectoral collaboration among health, education, social services, and local administration is key to delivery of ASRH information and services. This approach is also recommended in Kenya's ASRH strategy and in universal access to SRH services as outlined in Sustainable Development Goal 3. Involvement of communities in the multi-sectoral committees provided ownership of the process and can reap positive benefits in future. Due to the complexity of ASRH, the Lancet commission on adolescent health and well-being, which stated that different actions are needed in different places and other researchers have suggested implementation of multi-interventions to complement each other to improve ASRH outcomes (60). Further studies are needed to establish the effectiveness of the complete ASRH model covering facilities, communities,

schools to increase utilization of ASRH services and improvement of ASRH outcomes.

Author Contribution

<i>Research Component</i>	<i>Contribution</i>
<i>Conceptualization</i>	Lilian Mutea, Susan Ontiri, Solomon Orero, Mark Kabue, Kristien Michielsen, Peter Gichangi
<i>Data curation</i>	Vincent Were, Susan Ontiri
<i>Formal analysis</i>	Vincent Were
<i>Funding acquisition</i>	Susan Ontiri
<i>Investigation</i>	Lilian Mutea, Susan Ontiri, Justinah Maluni
<i>Methodology</i>	Lilian Mutea, Susan Ontiri, Kristien Michielsen, Peter Gichangi
<i>Project administration</i>	Justinah Maluni, Solomon Orero, Solomon Orero
<i>Resources</i>	Susan Ontiri
<i>Software</i>	Susan Ontiri
<i>Supervision</i>	Lilian Mutea, Susan Ontiri, Solomon Orero
<i>Validation</i>	Lilian Mutea, Susan Ontiri
<i>Visualization</i>	Lilian Mutea, Justinah Maluni
<i>Writing – original draft</i>	Lilian Mutea, Justinah Maluni
<i>Writing – review & editing</i>	Lilian Mutea, Justinah Maluni, Vincent Were, Mark Kabue, Elizabeth Thompson, Kristien Michielsen, Gichangi Peter

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Competing Interests

The authors of this paper have no conflicts of interest to report. Authors had intellectual freedom to include feedback as needed.

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REFERENCES

1. UNFPA. Adolescent Pregnancy [Internet]. 2022. Available from: Accessed January 8, 2023: <https://esaro.unfpa.org/en/topics/adolescent>. UNFPA 2022
2. Neal S, Matthews Z, Frost M, Fogstad H, Camacho AV, Laski L. Childbearing in adolescents aged 12– 15 years in low resource countries: a neglected issue. New estimates from demographic and household surveys in 42 countries. *Acta Obstet Gynecol Scand*. 2012;91(9):1114–8.
3. WHO. Maternal Mortality - Key facts [Internet]. 2019. Available from: Accessed January 8, 2023: <https://www.who.int/news-room/fact-sheets/detail/maternal-mortality>
4. Sully EA, Biddlecom A, Darroch JE, Riley T, Ashford LS, Lince-Deroche N, et al. Adding it up: investing in sexual and reproductive health 2019. 2020
5. Cavazos-Rehg PA, Krauss MJ, Spitznagel EL, Bommarito K, Madden T, Olsen MA, et al. Maternal age and risk of labor and delivery complications. *Matern Child Health J*. 2015;19(6):1202–11. WHO. Adolescent pregnancy [Internet]. 2020. <https://www.who.int/news-room/fact-sheets/detail/adolescent-pregnancy>. Available from: Accessed August 20, 2023
6. Blum RW, Gates WH. Girlhood, not motherhood: preventing adolescent pregnancy. United Nations Population Fund (UNFPA); 2015.
7. Pandey PL, Seale H, Razee H. Exploring the factors impacting on access and acceptance of sexual and reproductive health services provided by adolescent-friendly health services in Nepal. *PloS One*. 2019;14(8):e0220855.
8. Darroch JE, Woog V, Bankole A, Ashford LS. Adding it up: costs and benefits of meeting the contraceptive needs of adolescents. 2016
9. Melesse DY, Mutua MK, Choudhury A, Wado YD, Faye CM, Neal S, et al. Adolescent sexual and reproductive health in sub-Saharan Africa: who is left behind? *BMJ Glob Health*. 2020;5(1):e002231.
10. UNICEF. Child Marriage: Latest trends and future prospects. Newyork; 2018.
11. Ali MM, Cleland J. Long term trends in behaviour to protect against adverse reproductive and sexual health outcomes among young single African women. *Reprod Health*. 2018;15(1):1–10.
12. Kenya National Bureau of Statistics, Ministry of Health/Kenya, National AIDS Control Council/Kenya, Kenya Medical Research Institute, National Council for Population and Development/Kenya. Kenya Demographic and Health Survey 2014 [Internet]. Rockville, MD, USA; 2015. Available from: <http://dhsprogram.com/pubs/pdf/FR308/FR308.pdf>
13. KNBS and ICF. Kenya Demographic and Health Survey 2022. Key Indicators Report. Nairobi, Kenya, and Rockville, Maryland, USA: KNBS and ICF.; 2023.

14. Noll JG, Shenk CE, Putnam KT. Childhood sexual abuse and adolescent pregnancy: A meta-analytic update. *J Pediatr Psychol*. 2009;34(4):366–78.
15. Yakubu I, Salisu WJ. Determinants of adolescent pregnancy in sub-Saharan Africa: a systematic review. *Reprod Health*. 2018;15(1):1–11.
16. Sidze EM, Lardoux S, Speizer IS, Faye CM, Mutua MM, Badji F. Young women access and use of contraception: the role of providers' restrictions in urban Senegal. *Int Perspect Sex Reprod Health*. 2014;40(4):176.
17. Samuels AM, Odero NA, Odongo W, Otieno K, Were V, Shi YP, et al. Impact of community-based mass testing and treatment on malaria infection prevalence in a high-transmission area of western Kenya: a cluster randomized controlled trial. *Clin Infect Dis*. 2021;72(11):1927–35.
18. Emermitia RL, Livhuwani M, N Rambelani M, Maria MT. Views of Adolescent Girls on the Use of Implanon in a Public Primary Health Care Clinic in Limpopo Province, South Africa. *Open Public Health J*. 2019;12(1).
19. Ochako R, Mbondo M, Aloo S, Kaimenyi S, Thompson R, Temmerman M, et al. Barriers to modern contraceptive methods uptake among young women in Kenya: a qualitative study. *BMC Public Health*. 2015;15(1):1–9.
20. Chandra-Mouli V, Lane C, Wong S. What does not work in adolescent sexual and reproductive health: a review of evidence on interventions commonly accepted as best practices. *Glob Health Sci Pract*. 2015;3(3):333–40.
21. Ministry of Health. National Adolescent and Reproductive Health Policy. MOH Kenya; 2015.
22. World Health Organization. The project has ended but we can still learn from it! Practical guidance for conducting post-project evaluations of adolescent sexual and reproductive health projects. 2019; Available from: Accessed August 22, 2022: <https://www.who.int/publications/i/item/9789241516563>
23. Mutea L, Ontiri S, Macharia S, Tzobotaro M, Ajema C, Odiara V, et al. Evaluating the effectiveness of a combined approach to improve utilization of adolescent sexual reproductive health services in Kenya: a quasi-experimental design study protocol. *Reprod Health*. 2019;16(1):1–9.
24. USAID Kenya. Increasing the availability and quality of FP/RMNCAH services. AFYA Halisi factsheet [Internet]. USAID Kenya; 2021. Available from: https://www.usaid.gov/sites/default/files/documents/Afya_Halisi_factsheet.pdf
25. Mutea L, Ontiri S, Kadiri F, Michielesen K, Gichangi P. Access to information and use of adolescent sexual reproductive health services: Qualitative exploration of barriers and facilitators in Kisumu and Kakamega, Kenya. *Plos One*. 2020;15(11): e0241985.

26. Barasa E, Kazungu J, Orangi S, Kabia E, Ogero M, Kasera K. Indirect health effects of the COVID-19 pandemic in Kenya: a mixed methods assessment. *BMC Health Serv Res.* 2021;21(1):1–16.
27. Suiyanka L, Alegana VA, Snow RW. Insecticide-treated net distribution in Western Kenya: impacts related to COVID-19 and health worker strikes. *Int Health.* 2021.
28. Thongmixay S, Essink DR, Greeuw T de, Vongxay V, Sychareun V, Broerse JEW. Perceived barriers in accessing sexual and reproductive health services for youth in Lao People’s Democratic Republic. *PLoS One.* 2019;14(10): e0218296.
29. Gebreyesus H, Teweldemedhin M, Mamo A. Determinants of reproductive health services utilization among rural female adolescents in Asgede-Tsimbla district Northern Ethiopia: a community based cross-sectional study. *Reprod Health.* 2019 Jan 11;16(1):4.
30. Fisher JD, Fisher WA. Changing AIDS-risk behavior. *Psychol Bull.* 1992;111(3):455–74.
31. Rosenstock IM. The health belief model: Explaining health behavior through expectancies. In: *Health behavior and health education: Theory, research, and practice.* Hoboken, NJ, US: JosseyBass/Wiley; 1990. p. 39–62. (The Jossey-Bass health series.).
32. Martinez BAF, Leotti VB, Silva G de S e, Nunes LN, Machado G, Corbellini LG. Odds ratio or prevalence ratio? An overview of reported statistical methods and appropriateness of interpretations in cross-sectional studies with dichotomous outcomes in veterinary medicine. *Front Vet Sci.* 2017; 4:193.
33. Blackwell M, Iacus S, King G, Porro G. cem: Coarsened exact matching in Stata. *Stata J.* 2009;9(4):524–46.
34. Munea AM, Alene GD, Debelew GT. Quality of youth friendly sexual and reproductive health Services in West Gojjam Zone, north West Ethiopia: with special reference to the application of the Donabedian model. *BMC Health Serv Res.* 2020;20(1):1–12.
35. Nalwadda G, Mirembe F, Tumwesigye NM, Byamugisha J, Fanelid E. Constraints and prospects for contraceptive service provision to young people in Uganda: providers’ perspectives. *BMC Health Serv Res.* 2011 Sep 17;11(1):220.
36. Chandra-Mouli V, McCarragher DR, Phillips SJ, Williamson NE, Hainsworth G. Contraception for adolescents in low- and middle-income countries: needs, barriers, and access. *Reprod Health.* 2014;11(1):1–8

37. Woog V, Kågesten A. The sexual and reproductive health needs of very young adolescents aged 10–14 in developing countries: what does the evidence show? 2017.
38. Morris JL, Rushwan H. Adolescent sexual and reproductive health: The global challenges. *Int J Gynecol Obstet.* 2015;131: S40–2.
39. Svanemyr J, Amin A, Robles OJ, Greene ME. Creating an enabling environment for adolescent sexual and reproductive health: a framework and promising approaches. *J Adolesc Health.* 2015;56(1): S7– 14.
40. Kesterton AJ, Cabral de Mello M. Generating demand and community support for sexual and reproductive health services for young people: A review of the Literature and Programs. *Reprod Health.* 2010;7(1):1–12.
41. Ninsiima LR, Chiumia IK, Ndejjo R. Factors influencing access to and utilisation of youth-friendly sexual and reproductive health services in sub-Saharan Africa: a systematic review. *Reprod Health.* 2021;18(1):1–17. ‘
42. Self A, Chipokosa S, Misomali A, Aung T, Harvey SA, Chimchere M, et al. Youth accessing reproductive health services in Malawi: drivers, barriers, and suggestions from the perspectives of youth and parents. *Reprod Health.* 2018;15(1):1–10.
43. Mwale M, Muula AS. Systematic review: a review of adolescent behavior change interventions [BCI] and their effectiveness in HIV and AIDS prevention in sub-Saharan Africa. *BMC Public Health.* 2017 Sep 18;17(1):718.
44. Dube K, Van der Putten M, Vajanapoom N. Adolescent health, global guidelines versus local realities: the Sub-Saharan Africa experience. *J Public Health Afr.* 2013;4(2).
45. Belaid L, Bayo P, Kamau L, Nakimuli E, Omoro E, Lobor R, et al. Health policy mapping and system gaps impeding the implementation of reproductive, maternal, neonatal, child, and adolescent health programs in South Sudan: a scoping review. *Confl Health.* 2020;14(1):1–16.
46. World Health Organization. Pulse survey on continuity of essential health services during the COVID19 pandemic: interim report, 27 August 2020 [Internet]. World Health Organization; 2020. Available from: Accessed October 23, 2022: https://www.who.int/publications/i/item/WHO-2019-nCoV-EHS_continuity-survey-2020.1
47. World Health Organization. Second round of the national pulse survey on continuity of essential health services during the COVID-19 pandemic: January-March 2021: interim report, 22 April 2021. World Health Organization; 2021.

48. Groenewald C, Isaacs N, Isaacs D. Adolescent sexual and reproductive health during the COVID-19 pandemic: a mini review. 2022.
49. Meherali S, Adewale B, Ali S, Kennedy M, Salami B, Richter S, et al. Impact of the COVID-19 Pandemic on Adolescents' Sexual and Reproductive Health in Low-and Middle-Income Countries. *Int J Environ Res Public Health*. 2021;18(24):13221.
50. Mwaisaka J, Gonsalves L, Thiongo M, Waithaka M, Sidha H, Agwanda A, et al. Exploring contraception myths and misconceptions among young men and women in Kwale County, Kenya. *BMC Public Health*. 2020;20(1):1–10.
51. Okigbo CC, Speizer IS. Determinants of sexual activity and pregnancy among unmarried young women in urban Kenya: a cross-sectional study. *PLoS One*. 2015;10(6):e0129286.
52. Kalamar AM, Bayer AM, Hindin MJ. Interventions to prevent sexually transmitted infections, including HIV, among young people in low-and middle-income countries: a systematic review of the published and gray literature. *J Adolesc Health*. 2016;59(3): S22–31.
53. Marston C, King E. Factors that shape young people's sexual behaviour: a systematic review. *The Lancet*. 2006;368(9547):1581–6.
54. Denno DM, Hoopes AJ, Chandra-Mouli V. Effective strategies to provide adolescent sexual and reproductive health services and to increase demand and community support. *J Adolesc Health*. 2015;56(1): S22–41.
55. Muchabaiwa L, Mbonigaba J. Impact of the adolescent and youth sexual and reproductive health strategy on service utilisation and health outcomes in Zimbabwe. *PLoS One*. 2019;14(6):e0218588.
56. Aninanya GA, Debpuur CY, Awine T, Williams JE, Hodgson A, Howard N. Effects of an adolescent sexual and reproductive health intervention on health service usage by young people in northern Ghana: a community-randomised trial. *PLoS One*. 2015;10(4):e0125267.
57. Oringanje C, Meremikwu MM, Eko H, Esu E, Meremikwu A, Ehiri JE. Interventions for preventing unintended pregnancies among adolescents. *Cochrane Database Syst Rev*. 2016;(2).
58. WHO. Making health services adolescent-friendly: Developing national quality standards for adolescent-friendly health services [Internet]. WHO, Department of Maternal, Newborn, Child and Adolescent Health; 2001. Available from: Accessed August 23, 2022: https://apps.who.int/iris/bitstream/handle/10665/75217/9789241503594_eng.pdf

59. Patton GC, Sawyer SM, Santelli JS, Ross DA, Afifi R, Allen NB, et al. Our future: a Lancet commission on adolescent health and wellbeing. *The Lancet*. 2016;387(10036):2423–7

5 DISCUSSION

This chapter provides a summary and interpretation of key findings from this doctoral research, which is based on one nationally representative study sample, and two studies undertaken in the counties of Kakamega and Kisumu counties. The discussion starts with an overview of the main findings (5.1) followed by a presentation of insights into factors affecting access to and use of ASRH services and adolescent pregnancies (5.2). I also discuss the combined ASRH intervention model and as I am a practitioner, implementing large-scale complex adolescent SRH interventions, I have included a reflection on lessons learnt from this perspective (5.3). Finally, I describe the study limitations (5.4).

5.1 Overview of main findings

The first objective of this thesis was to describe the trends and determinants of pregnancy among adolescents aged 15-19 years in Kenya. To respond to this objective, we conducted a secondary data analysis of DHS data. Results showed that the percentage of women aged 20 to 24 years who reported their first pregnancy between ages 15-19 years was 42% in 2003 and 42.2% in 2009 but declined significantly to 38.9% in 2014. Regression analyses established that low education status, lower wealth quintile, and child marriage were associated with adolescent pregnancy. Trend analysis shows an increase in pregnancy rates among those whose highest education was completing primary education from 41.5% in 2009 to 47.7% in 2014.

For the second objective - to analyze the barriers, facilitators, preferences, and experiences towards uptake of ASRH services among adolescents in Kenya - we undertook a formative assessment to establish the barriers to access and use of ASRH services in Kakamega and Kisumu counties. Results from the formative assessment showed that barriers continue to hinder adolescents' access to SRH information and services. Some of the key barriers were negative health workers' attitudes, distance to the health facility, unaffordable cost of services, negative social cultural influences, lack of privacy and confidentiality. Facilitators to adolescent sexual reproductive health services were few and included getting priority for school going adolescents and enabling environment for partnerships on adolescent health

issues. New insights in factors affecting access to and use of ASRH services will be discussed in section 5.2.

Finally, this thesis set out to conceptualize and test the effectiveness of a customized combined ASRH program intervention model towards improving utilization of ASRH services. To this end, we undertook an evaluation to test the effectiveness of a combined ASRH model in increasing use of ASRH services in Kakamega and Kisumu Counties in Kenya. Descriptive results showed a net increase in adolescents' knowledge of sex, pregnancy, and contraception. The multivariate regression analysis showed a significant decrease in adolescents whose fear of parents made them uncomfortable in seeking ASRH services and those whose lack of support from their partner made them uncomfortable when seeking ASRH services. However, the intervention combining a facility and community approach as implemented did not contribute to an increase in the use of ASRH information and services. The primary theoretical framework used to describe findings in this study is the socio-ecological framework. The discussion also recognizes other theoretical frameworks that can illustrate factors influencing ASRH and determinants of adolescent health outcomes such as pregnancy. The various theoretical frameworks are described below:

5.1.1 The socio-ecological model (Bronfenbrenner, 1979).

The ecological model is the main one used in this doctoral thesis and provides a comprehensive framework for understanding the multiple and interacting determinants of SRH behaviors and health outcomes for adolescents (Garbarino et al., 1985). The model has also been used to describe barriers to ASRH services in our formative qualitative study (Mutea et al., 2020), as well as in other analyses (Garbarino et al., 1985; Svanemyr et al., 2015).

5.1.2 The conceptual framework on social and gender norms, and power, for ASRH

Also known as the social norms theory, this is an adaptation of the ecological model and puts the social and gender norms in the inner circle where the four domains of the ecological model intersect (Pulerwitz et al., 2019). The four elements of the social norms theoretical framework include a) the role of power in decisions to adhere to (or not to adhere to) existing norms b) gender

norms (shared beliefs about the behaviors and related roles and responsibilities as deemed appropriate for boys/men compared with girls/women) as essential to understanding gender dynamics and SRH outcomes c) an emphasis on the multiple relationships between domains (individual, social, resources, and institutional) d) social norms at the center of the model because of their powerful influence on SRH outcomes.

5.1.3 A framework and promising Approaches:

Creating an Enabling Environment for Adolescent Sexual and Reproductive Health (Svanemyr et al., 2015). This framework utilizes the ecological model to describe elements and intervention examples of enabling environments, the indicators and variables that measure progress either as outcomes of interest as well as independent variables or determinants of SRH outcomes. Along each level of the ecological model, the framework provides a list of promising approaches that can be used to improve an enabling environment and interventions that can potentially influence a range of SRH outcomes such as pregnancy, STIs, HIV/AIDs among others.

5.1.4 The community pathway to ASRH framework (Inter-Agency Working Group, 2008)

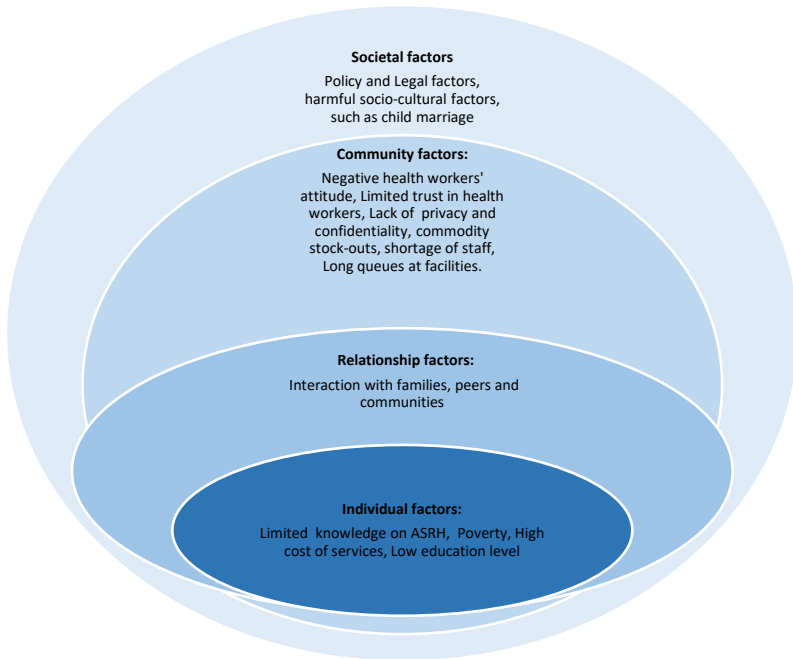
This is a framework which specifically links community involvement interventions to desired adolescent health outcomes. The framework also captures community involvement processes with regards to an enabling environment that influences the choices available to youth and related decision making.

5.2 Factors affecting access to and use of ASRH services and adolescent pregnancies.

The factors affecting access to and use of ASRH services and adolescent pregnancies as identified in the studies in this thesis are presented using the socio-ecological model which recognizes that individuals affect, and are affected by a complex range of social and environmental interactions (Bronfenbrenner, 1979). Figure 6 illustrates the socio-ecological model as it relates to this study. At each level of the socio-ecological model (individual,

relationship, community, and societal levels), possible interventions will be described.

Figure 6: Socio-ecological model: Factors affecting use of ASRH services and the outcome of pregnancy.



5.2.1 Individual factors

Personal factors influencing the use of ASRH information and services, and the outcome of pregnancy during the adolescent period were low education status, limited knowledge on ASRH, and poverty which included the high cost of ASRH services. Our study on trends and determinants of adolescent pregnancy showed that **low education status** was associated with adolescent pregnancy. The birth rates among women with low education were higher than for those with secondary or tertiary education which suggests that education is a protective factor for early pregnancy. Kenya's DHS 2022 report shows that education level, age and wealth quantile of women aged 15-19 are key determinants of teenage pregnancy. While only 5% of women 15-19 years with more than secondary education have ever been pregnant, nearly 40% of women 15-19 years with no education have ever been pregnant (KNBS

and ICF, 2023). Kenya has made investments towards improving school enrollment and retention, through the introduction of free primary education (2002) and free secondary education (2007). Despite the expansion in schooling and high rates of participation in basic education, there are various challenges affecting the education sector, key ones being; inequalities, unsatisfactory levels of education quality, and poor access to post primary education for low-income groups (NCPD, 2017). Our findings suggest that, despite the progress in improving education for girls, more effort is still needed to retain girls in school. Our findings are aligned with existing literature of the linkage of low education levels to adolescent pregnancy (Chung et al., 2018; Kassa et al., 2018; Yakubu & Salisu, 2018). Kenya's MOH guidelines on ASRH indicate that limited access to age-appropriate comprehensive SRH information and low education status are individual level factors affecting the use of ASRH services and the outcome of adolescent pregnancy (Ministry of Health, 2015). Related, a systematic review of prevalence and determinants of adolescent pregnancy in Africa showed that educational status of adolescents was a key determinant of pregnancy among adolescents (Kassa et al., 2018).

The realization of the goal of Kenya's free primary and secondary education policy is challenged by gender disparities in performance, access, retention, transition, and achievement at all levels of education, disproportionately affecting girls (Syomwene & Kindiki, 2015). The poor transition from primary to secondary school for girls translates to gender imbalances at higher educational institutions and reduces social and economic mobility for women (Syomwene & Kindiki, 2015). A review of the education sector response to early and unintended pregnancy in Saharan Africa shows that majority of the ever-pregnant girls remain out of school in Kenya (Birungi et al., 2015). To improve school retention, Kenya has instituted a school re-entry policy to guarantee that teen mothers could re-enroll and complete their studies free of stigma (Ministry of Education, Kenya, 2020). If well implemented, the educational re-entry policy is critical to ensuring teenage mothers do not get a repeat pregnancy and can therefore achieve their full potential. Evidence, however, shows that the implementation has been less promising. This is due to low parental support, little awareness of the policy among key stakeholders including teachers, school administrators, guardians, and teen

mothers, stigmatization, and social marginalization of teen mothers within school environments (Mwenje-Macharia & Kessio, 2015).

Our results from the formative assessment showed that adolescents had **limited knowledge on SRH** which negatively affected the utilization of ASRH services. This can be attributed to lack of limited opportunities to provide and receive ASRH information because some health facilities were closed, while others were not providing ASRH services during the COVID-19 pandemic. Lack of adequate knowledge can also be attributed to low education, a factor also associated with adolescent pregnancy. Our findings also show that adolescents' myths and misconceptions about ASRH and fears hindered their uptake of ASRH services. Other studies have shown that limited knowledge among adolescents about SRH services, and adolescents' negative attitudes towards the use of contraceptives created barriers to their use of SRH services (Ooms et al., 2020). Literature shows that adolescents' behaviors including shyness, lack of comfort with a health provider of the opposite sex, and delay in seeking care all present barriers to use of SRH services (Ooms et al., 2020). Studies show that misconceptions about the immediate and long-term side effects of contraceptive methods and future ability to bear children are likely to impact adolescents' decisions on SRH (Mwaisaka et al., 2020). Approaches towards increasing knowledge about SRH among adolescents include Comprehensive Sexuality Education (CSE), use of community influencers and digital platforms. CSE was a key approach in the study design, whose goal was promotion of health education among students using age-appropriate comprehensive sexual education. The COVID-19 pandemic, however, led to closure of schools and the school element of the ASRH intervention was not implemented.

Findings from the evaluation of the ASRH intervention model showed an increase in knowledge of misconceptions towards sex, pregnancy, and contraception. Our findings suggest that **peer educators** and **community health volunteers** carried out health education in community settings. Literature shows mixed results on the effectiveness of the peer education approach. Some studies show that peer education can assist young people in developing the knowledge, attitudes and skills that are necessary for positive behavior towards SRH issues such as prevention of STIs like HIV and unplanned pregnancy (Abdi & Simbar, 2013). A 2020 study on the impact of

peer education on sexual health knowledge among adolescents showed that peer education seemed to improve peer's knowledge of HIV/AIDS, their knowledge of STI symptoms and knowledge of the different contraceptive options available (Akuiyibo et al., 2021). On the other hand, a review of evidence on interventions commonly accepted as best practices in ASRH showed limited effectiveness of peer educators in promoting healthy behaviors and improving health outcomes among adolescents (Chandra-Mouli et al., 2015).

Our findings from the formative assessment showed that **high cost of services** was a barrier to the use of ASRH services by adolescents. This includes costs related to transport, consultation fees and medication because adolescents are not financially independent, and their parents may not have resources to facilitate them. Other studies support these findings; in Nepal, adolescents reported unwillingness to visit health facilities because of the poor availability of Government issued free commodities which are often out of stock, hence requiring them to purchase from private pharmacies, therefore incurring additional costs (Pandey et al., 2019). A study in LMICs showed that poverty contributed to low use of modern contraception, which predisposes adolescents to the risk of unplanned pregnancy (Bellizzi et al., 2019).

Results from the DHS data secondary analysis also suggest that lower wealth quintile was associated with adolescent pregnancy, further exacerbating the effects of **poverty** on ASRH. This suggests that girls living in poor resource settings are more likely to get pregnant, an outcome which also consequently contributes to school dropout. A systematic review of the determinants of adolescent pregnancy in SSA showed that low socio-economic status is one of the predisposing factors consistently associated with adolescent pregnancy (Yakubu & Salisu, 2018). Low socio-economic status within families also makes adolescents vulnerable to unintended pregnancies because they cannot afford basic needs including food, school fees and sanitary pads (Mumah et al., 2020). They are therefore likely to engage in unprotected and sometimes transactional sex and marriage which further contributes to unplanned pregnancy. Such adolescents are also unlikely to complete school and get gainful employment which often perpetuates the cycle of poverty and negative ASRH outcomes such as pregnancy.

Interventions at individual level

To address factors at individual level that hinder the realization of adolescents SRH, our findings from the formative assessment indicate the need to empower them with information to make the right choices on key ASRH interventions. Although not implemented in the intervention study, a key approach to reaching adolescents with SRH information is by rolling out Comprehensive Sexual Education (CSE) in schools and communities. The CSE approach has been recommended as it promotes human rights; gender equality; and equips young people with the skills necessary for HIV prevention and improved sexual health. In the year 2013, Kenya, signed a declaration with a commitment to scaling up comprehensive rights-based sexuality education beginning in primary school. (Ministries of Education and Health, 2013). Subsequently in 2021, Kenya was among the 20 countries who signed a renewal of the East and Southern African Ministerial Commitment on CSE and Adolescent SRHR, a critical moment for political leaders across the region to safeguard adolescents and young people's health (LVCT, 2021). Kenya is however, yet to make this commitment legally binding, an action which would enhance accountability at political level. Additionally, evaluations of CSE programs have reviewed gaps that should be addressed for the desired outcomes to be achieved. A systematic review on effectiveness of CSE programs showed success of sexual risk reduction interventions, but limited evidence to link sexuality education to adolescent outcomes such as a reduction in STIs and unintended pregnancy (Haberland & Rogow, 2015). Also, evidence from a review of CSE in three counties in Kenya established that messages were conservative and focused on abstinence and very few students were exposed to topics related to contraception, gender and SRH rights (Sidze et al., 2017). Additionally, countries in SSA struggle to have culture sensitive topics, including masturbation, abortion and sexual needs of the Lesbian, Gay, Bisexual, transgender Queer and Intersex (LGBTQI) populations included in CSE curriculums. The key barriers include political, socio cultural legal and religion among others. Socio cultural issues include opposition by parents, religious leaders, and teachers due to moral and personal beliefs. Legal challenges include criminalizing homosexuality, and denial of contraceptives to adolescents. Due to the challenges in implementing CSE in SSA, it's important that countries examine their context

to define specific approaches to implementing CSE. Considerations could include engaging parents, teachers and the community when establishing CSE programs, adapting messages on gender and sexuality to be culture sensitive as well as advocacy on legal issues regarding contraception and abortion. A critical recommendation is to develop an implementation framework, making considerations for in school and out of school approaches towards CSE.

Efforts towards school completion and retention are critical to protecting girls from the risk of pregnancy. Additionally, empowering households with economic assets is also key to removing financial barriers to ASRH services. Both education and poverty are linked, and in the long term, education of girls could contribute to breaking the cycle of poverty, further reducing adolescent pregnancy for future generations. Studies show that addressing poverty within countries economically empowers families to educate and protect girls therefore contributing to a reduction in unplanned pregnancy (Edilberto Loaiza & Mengjia Liang, 2013). The framework on promising approaches to ASRH indicates that Poverty and lack of resources for key needs and expenses are linked to greater vulnerability to poor SRH outcomes of adolescents, especially girls (Svanemyr et al., 2015). Proven interventions targeting economic empowerment of girls include: education, vocational training, access to credit, improved communication skills which builds their self-esteem (Svanemyr et al., 2015).

5.2.2 Relationship factors

Relationship factors included interactions with families, peers, and community members. Our findings from the formative assessment suggest that **opinions from peers'** influence decision making in seeking ASRH services. Feedback from peers about real or perceived side effects of contraceptives negatively adolescent's uptake of contraceptives. Studies also show that adolescents and young people attach a high importance to friendship and social networks for ASRH information and companionship during service utilization (Bam et al., 2015). In Kilifi County, Kenya, peer influence was perceived as an important additional influence on adolescents' behavior, including negative peer social norms surrounding the use of contraceptives (Ssewanyana et al., 2018). Findings from our intervention study showed a decrease in the proportion of adolescents whose lack of support from their

partner made them uncomfortable when seeking ASRH services. This suggests that the intervention contributed to improved support from sexual partners in making SRH choices. A systematic review of risks and protective factors of adolescent pregnancy in LMICs showed that partner factors could be risks or protective factors. These included being in a stable relationship, being able to discuss sexual matters or pregnancy, number of sexual partners, partner pressure to have sex and not to use contraceptives, sexual coercion, intimate partner abuse, boyfriend's refusal to use condoms etc. (Chung et al., 2018).

Our findings from the formative assessment show that **parents** had difficulty accepting that adolescents are sexually active, and many were not comfortable discussing sexuality with their children. This is primarily due to personal morals, religious and cultural values. Further interactions with adolescents in these studies revealed that they would not discuss SRH-related aspects with parents or members of the communities they live in for fear of being judged, lack of confidentiality, or support. In many Kenyan communities, issues related to gender and sexuality prevent discussions on sexual related matters between parents, communities, and adolescent girls, which negatively affects access to SHR services and increases risk to unplanned pregnancy (Were, 2007). Parents are the first point of contact for adolescents when seeking information about sexuality and SRH services. As a result of being shunned, adolescents are likely to seek information outside of the family, including from peers, social media, and other platforms. The lack of open discussion about sex at family level creates missed opportunities for providing accurate information from trusted sources. Findings from the ASRH intervention model showed a significant decrease in adolescents whose fear of parents made them uncomfortable in seeking services. This suggests that the intervention contributed to improving relations between adolescents and parents, which could contribute to family support towards seeking ASRH services.

Interventions at relationship level

Interventions at relationship level could include building the capacity of community influencers who can reach adolescents with accurate information and support positive health care seeking behavior. These include parents,

community health volunteers and peer educators. Understanding peer influence on sexual and reproductive decision-making is therefore important to increasing ASRH service utilization. Systematic review in LMICs showed that supportive parents and peers that adolescents could discuss sexual matters with, were protective factors related to adolescent pregnancy (Chung et al., 2018). The social norms theory illustrates how power on decision making, social norms and gender norms (with regards to roles and responsibilities for men and women) present different risks and opportunities for seeking ASRH interventions (Pulerwitz et al., 2019). For instance, a young person may concurrently be influenced by peer group norms supporting use of contraception and prohibitions on such use put forth by faith or community leaders. This calls for a broader examination of the multiple relationships between domains and use of multilevel approaches that target these intersecting opportunities to change these norms and relationships, and subsequently ASRH outcomes (Pulerwitz et al., 2019).

Given the critical role of parents, targeting parents with ASRH information can contribute to demystifying myths and providing support to adolescents in seeking utilization of ASRH services. An exploratory study in Uganda, of care givers on SRH communication with adolescents highlighted positive parenting as a key attribute of SRH communication, as well as improved knowledge and attitudes towards the SRH of young adolescents (Akaturukwasa et al., 2023). Gender norms were also found to have an influence on the content of SRH discussions, with positive results when men, who are not traditional caregivers, were involved. This is key, because of the patriarchal nature of most African societies, and calls for the need to explore how fathers may be key to influencing communication on SRH matters, and consequently utilizing use of ASRH services. The community pathways framework suggests that ASRH programs can build awareness of SRH issues, facilitate community dialogue and collective action, and build the capacity of local actors and individuals to play catalytic and support roles, which will allow the community to take action on ASRH issues (Inter-Agency Working Group, 2008).

5.2.3 Community factors

At the community level, our studies identified the following as factors influencing ASRH: negative health worker's attitude, limited trust in health

workers, discomfort when visiting health facilities, lack of privacy and confidentiality at health facilities. Others included health system related challenges such as shortage of staff, commodity stock outs, long queues at facilities and the effect of the COVID-19 pandemic. Our findings from the formative assessment showed that **negative attitudes of health providers** negatively impacted uptake of ASRH services. Results from the formative assessment showed that some health workers disapproved of adolescents who sought ASRH services for being sexually active, especially when not married. Additionally, our findings from the evaluation of effectiveness of the combined facility and community ASRH model also showed a net increase in percent of adolescents who reported provider bias as a reason for not being comfortable in seeking ASRH services. We attribute this to health workers personal and moral beliefs, and lack of understanding and acceptance of the SRH needs of adolescents. Studies have shown that health providers may refuse to provide unmarried adolescents with contraceptive information and services because they do not approve of premarital sexual activity (Chandra-Mouli et al., 2014). Some health workers are quick to judge unmarried adolescents and refrained from disseminating SRH information and providing SRH services to them due to their own moral frameworks (Nmadu et al., 2020). This denies adolescents the right to health services as guaranteed by various policy and legal instruments. An exploratory study in Nigeria on barriers to adolescents' access to and utilization of ASRH services established barriers at the health system's level as being poor attitudes of service providers and inconvenient health facility opening hours, hence hindering adolescents from utilizing SRH services (Ezenwaka et al., 2020). Other studies have also confirmed that negative health workers attitudes, stigma and discrimination, and lack of confidentiality by health providers discourages adolescents from seeking SRH services at health facilities (Mbeba et al., 2012).

Results from the qualitative formative assessment also showed that adolescents have **limited trust** in health workers and are **not comfortable** to visit health facilities for SRH services. This contributed to limited opportunities for interaction with health workers, hence fewer opportunities to receive accurate ASRH information. Some key reasons for lack of trust and discomfort in seeking SRH services from health facilities include insufficient knowledge of healthcare providers regarding SRH of adolescents, and their

strong personal, religious and cultural beliefs about sexual activity among adolescents (Nawaz & Manan, 2022). In many settings, health workers are the primary providers of ASRH services. In Kenya, Long term and Reversible Contraceptive (LARC) methods such as implants are only provided by skilled health workers. The reduced visits to health facilities is likely to have negatively impacted uptake of ASRH services, as witnessed in findings from the intervention study.

Our findings from the formative assessment suggest that adolescents feared that **privacy and confidentiality** at health facilities was not guaranteed. This suggests that health facilities have not re-organized ASRH service delivery points for privacy and confidentiality, a key element of adolescent friendly services. Kenya's ASRH policy recognizes gaps in the health system that include inadequate capacity to offer comprehensive SRH services to adolescents and limited implementation of the youth friendly health services model (Ministry of Health, 2015). In several studies, lack of confidentiality and privacy have been found to be contributing factors associated with low utilization of sexual and reproductive health services among the youth (Mbeba et al., 2012). An exploratory study in Nepal about the use of ASRH services established that lack of privacy and confidentiality was a major reason for adolescents' reluctance to utilize ASRH services (Pandey et al., 2019). A systematic review of factors influencing access to and utilization of youth-friendly SRH services in sub-Saharan Africa showed that health provider bias, inconvenient opening hours and lack of privacy were structural barriers to adolescents' use of SRH services (Ninsiima et al., 2021).

Other community level barriers to ASRH services as shown in the results from the formative assessment are **organizational barriers**: shortage of staff, commodity stock outs and long queues at the facilities. Adolescents who may be in school may also be inconvenienced by regular opening hours of health facilities. These barriers create missed opportunities for SRH services hence increasing the risk of pregnancy among adolescents. Availability of health commodities ensures adolescents receive comprehensive SRH services. Following devolution in 2010, county governments in Kenya are responsible for procurement of medicines and supplies. Unfortunately, most health facilities continue to experience commodity stock outs, including contraceptives. A 2020 assessment of access to SRH commodities shows that

availability of essential medicines in Kenya was low at less than 50% with a mean availability in public facilities of 46.6% (Ooms et al., 2020). Lack of commodities forces patients to seek care in the private sector where there are affordability challenges (Ooms et al., 2020). This brings a compounded effect of barriers related to commodity stock-outs and cost of ASRH services.

The **COVID-19 pandemic** negatively impacted access to ASRH services. Specific issues that kept clients from health facilities included stigma associated with health facilities for fear of contracting COVID-19, closure of some health facilities and health workers efforts re-directed to manage COVID-19 patients (Barasa et al., 2021). The COVID-19 pandemic also exposed adolescent girls to risks. Schools and community based SRH programs usually provide girls with safe spaces away from perpetrators of sexual violence as well as guidance and counselling on how to avoid risky situations and behaviors (John et al., 2021). A study on the effects of COVID-19 on ASRH services in Kenya observed that closure of schools exposed girls to the risk of sexual violence, and reduced access to essentials such as menstrual hygiene products, contraceptive methods, and other SRH services (John et al., 2021). In addition, the general uptake of essential health services, including ASRH were negatively affected by COVID-19.

Interventions at community level

Key interventions to address community level barriers could include setting a flexible health system that provides adolescent sensitive services. An adolescent-sensitive services model is centered around respectful, friendly, and confidential services to adolescents. We suggest that capacity building for health workers to improve their technical skills in ASRH as well as communication approaches with adolescents is key to improving adolescents trust and comfort in health workers. Enhancing health commodity security is also important to improving ASRH services quality and utilization. Strengthening the health system to absorb shocks from public health emergencies (such COVID-19) is key to protecting the gains made in ASRH and other essential health services. The framework of promising approaches to ASRH also recommends the need to create positive social norms and community support for adolescents to practice safer behaviors and access SRH information and services. This involves implementing interventions

aimed at broader community members and institutions outside the family such as health facilities, schools, and workplaces (Svanemyr et al., 2015).

5.2.4 Societal factors

Societal factors described in this thesis are socio-cultural, policy and legal elements affecting ASRH. Our findings from the formative assessment show that **harmful socio-cultural practices** such as early or forced marriages contribute to pregnancy among adolescents. In the Dholuo and Luhya communities where these studies were undertaken, fertility is highly valued, and consequently upon marriage, a girl is expected to start bearing children. Studies have shown that cultural norms that value fertility contribute to low rates of contraceptive use and high rates of pregnancy among adolescents and youth, particularly among married youth (Phillips & Mbizvo, 2016). A study in Tanzania showed that cultural factors such as initiation ceremonies, misconception on the use of contraceptives among adolescents, stigma and discrimination of young mothers underpin negative gender inequities, leading to disparities in access to, and quality of health services (Mbeba et al., 2012).

Our findings from the DHS data secondary analysis showed that **child marriage** was associated with pregnancy among adolescents. The odds of pregnancy among married adolescents were higher than those for girls who were never married. This implies that being in union signified sexual activity which also contributes to an increase in the occurrence of pregnancy. Our findings align with Kenya's 2015 national ASRH policy which recognizes that the main cultural practices that are linked to poor adolescent SRH outcomes including adolescent pregnancy are early marriage and female genital mutilation (FGM/C) (Ministry of Health, 2015). Despite worldwide efforts to end child marriage, 28% of young women in developing regions marry before age 18 years, the internationally recognized age of adulthood (WHO, 2014). In LMICs, over 30% of girls marry before they are 18 years of age; around 14% before the age of 15 years (WHO, 2014). A case study review on addressing child marriage and adolescent pregnancy in four countries – Bangladesh, Kenya, Ethiopia and Guatemala indicates child marriage and low education as underlying causes of pregnancy among adolescents (Psaki, 2016). The review also cites lack of rigorous interventions and poor implementation of policies

on child marriage and adolescent pregnancy as an unfinished agenda (Psaki, 2016).

In Kenya, 23% of Kenyan girls are married before their 18th birthday and 4% are married before the age of 15 years (Kenya National Bureau of Statistics et al., 2015). In absolute numbers this amounts to 580,000 every year, the number of women married or in a union, before the age of 18, which is the 18th highest absolute number in the world (Iris Group, 2020). According to UNICEF, child marriage is fueled by poverty, low levels of education, harmful traditional practices including FGM, adolescent pregnancy and poor law enforcement for perpetrators (UNICEF, 2016). In many cases, married adolescents are expected to get pregnant and give birth in accordance with social norms which signals the onset of exposure to the risk of pregnancy for most women. Studies show that the countries with the highest levels of adolescent pregnancy are also those with the highest levels of child marriage, and therefore reducing child marriage is a key intervention to address pregnancy among adolescents (Psaki, 2016). Studies also show that adolescents affected by early marriages are deprived of economic empowerment and self-efficacy and are at risk of early pregnancies (Phillips & Mbizvo, 2016). Child marriage and adolescent pregnancy are also interrelated with Female Genital Mutilation/Cutting (FGM/C) and in some communities, child marriage is often preceded by FGM/C (Gitau et al., 2016). The three have common root causes and social drivers such as gender inequality, social and cultural norms, poverty, and inadequate access to education and SRH information and services (Gitau et al., 2016).

Our findings from the formative assessment shows that there is **limited implementation of existing ASRH policies and legislative frameworks**. After the devolution of Kenya's governance system in the year 2013, the national government took the responsibility for development of policies and standards, however there is no formal structure to reinforce policy implementation at County level. This has contributed to variation across counties in dissemination and implementation of MOH's national policies that guide provision of ASRH services. On the other hand, some counties may be willing to implement ASRH approaches as guided but have limited resources to get this done. Kenya's ASRH program is therefore challenged by lack of resources to implement the ASRH legislation, policies, and strategies across

all 47 counties. This gap contributes to inequities and a limited understanding of the country's framework by the county leadership, ministry of health workers and communities, hence reducing opportunities to offer quality ASRH services. The framework for promising approaches suggests that laws and policies provide a framework for ASRH programming including specifying accountabilities for recourse and redress, hence the need to strengthen implementation of laws and policies through youth participation (Svanemyr et al., 2015). Unfortunately, However, many laws and policies may not always be in line with international human rights norms and standards. Additionally, even where good laws exist, challenges to implementation include lack of political commitment, adequate resource allocation, capacity building, and lack systems of accountability.

Limited implementation of ASRH policy guidelines increases barriers to ASRH services, which could slow down progress to achieving key goals. Our findings from the further analysis of DHS data show that there was no reduction in the prevalence of adolescent pregnancy between 2003 and 2008 in Kenya. However, there was a slight reduction in adolescent pregnancy prevalence between 2008/2008 (42.2%) and 2014 (38.9%). This shows that even though marginal, considerable efforts have been made towards addressing the burden of adolescent pregnancy in Kenya. The 2014 Kenya Demographic and Health Survey (DHS) also showed that 47% of births among adolescents were either mistimed or unwanted, indicating that a lot more effort is needed to address the burden. Kenya has signed international commitments to enhance progress towards realization of SRH and rights of adolescents. These instruments provide frameworks to address key drivers of adolescent pregnancy such as child marriage, sexual and gender-based violence and child protection. However, frameworks for monitoring implementation and reinforcement structures are weak. For instance, child marriage has been illegal in Kenya since 2001 when the Children's act became law, and after passing the 2013 Marriage Act (Unicef, 2018). Unfortunately, implementation of this law remains a challenge and perpetrators of child marriage often get away with this violation. Reinforcing the law on legal age of marriage would protect children, contribute to abandonment of harmful practices such as FGM and contribute to retaining girls in school and to preventing pregnancy among adolescent girls.

Globally, several countries have set forth legislation and comprehensive adolescent reproductive health policies and demonstrated a strong political commitment. These may have contributed to the global reduction in the percentage of adolescents who are getting pregnant. According to the latest United Nations Population Division estimates in almost all countries, early childbearing has become less common since the early 1990s (UN economic social affairs, 2019). It decreased by one-third (34.4%) from 1990 - 1995 to 2015-2020 and now stands at 42.5 births per 1,000 women aged 15-19 years. This global decline could be explained by the fact that as of 2019, globally more than 21% of adolescent girls, married or in union, were using a modern contraceptive, double the rate of 10 years ago (Liang et al., 2019). Other factors contributing to the decline include rising school enrollments among girls and increases in the average age at first marriage, and increased demand for and use of contraceptives (Darroch et al., 2016).

Developed countries are making a step in the right direction on creating an enabling environment, however this is not the case for developing countries, where legal, political will and policies to improve ASRH are limited or lacking. Adolescent birth rates remain high in most of the developing world, especially in the poorest countries and in the poorest communities within countries (Darroch et al., 2016). In many countries, national laws and policies do not always align with international human rights, norms and standards (Svanemyr et al., 2015). Studies also show that even when contraceptive methods are available, laws and policies may prevent their provision to unmarried adolescents or to those under a certain age (Chandra-Mouli et al., 2014). As a result, adolescents, and young people continue to face legal and policy barriers in accessing sexual and reproductive health services. The slow phase and unequal decrease in adolescent pregnancy in sub-Saharan Africa suggests that many adolescents lack access to and use of ASRH information and services which are necessary to reduce adolescent pregnancy.

Kenya is currently witnessing barriers to the use of contraceptives among adolescents as implied in the national reproductive health policy 2022-2032. A key issue is a new requirement for parental consent to use ASRH services by minors. Since the legal age of consent in Kenya is 18 years, this implies that adolescents below this age need parental consent to access ASRH services. This requirement is likely to reduce access to and utilization of contraceptives

by adolescents who are considered mature minors by virtue of marriage, pregnancy and/or childbirth, hence slowing down progress towards realizing SRH rights of adolescents. According to Kenya's FP guidelines, adolescents with STI's or symptoms of STI's are considered mature minors and can time be treated without parental consent. Kenya's constitution also guarantees the right to health for all, and hence the new policy, requiring parental consent by all adolescents seeking SRH services is in conflict with the law. The disconnect between policy and legislation has contributed to mixed interpretation and varied decisions by stakeholders regarding provision of ASRH services. Literature shows that key policy and legal issues that affect ASRH include age of consent to sexual intercourse, age of marriage, parental consent to access ASRH services including contraceptives and abortion services (Kangaude et al., 2020). Additional studies also show that even when contraceptive methods are available, laws and policies may prevent their provision to unmarried adolescents or to those under a certain age (Chandra-Mouli et al., 2014).

Interventions at societal level

Policy and legal barriers deter adolescents from access to and use of ASRH services, predisposing them to adolescent pregnancy. We suggest standardized implementation of ASRH policies across all counties for equity in delivery of quality ASRH information and services. Efforts to reinforce policies and laws that protect girls, such as reinforcing the law on legal marriage is key to reducing adolescent pregnancy. Legal measures should be coupled with sensitizing communities to address socio-cultural issues that normalize child marriage and other harmful practices. Our findings suggest the need for harmonization of policies and legislation that guide ASRH programming. Development of international treaties should include specific structures and frameworks to track progress and reinforce implementation of commitments at country level. Reviews from multiple country ASRH status shows that it's important to create institutional accountabilities to ASRH programming, laws and policies that promote and protect the human rights of adolescents in relation to their SRH (Svanemyr et al., 2015).

5.3 Discussion of the combined ASRH intervention model

5.3.1 Main findings

Findings from the evaluation of the effectiveness of the combined community and facility model were not as hypothesized. The combined model is based on Kenya's ASRH approach outlined in the 2015 policy which recommends use of multiple approaches to effectively reach adolescents with information and services. Our hypothesis was that a combined approach to deliver ASRH interventions in facilities and community settings would result in increased use of ASRH services. A multivariate regression analysis showed a significant decrease in adolescents whose fear of parents made them uncomfortable in seeking ASRH services (aPR=0.58, 95% CI=0.42-0.79, P=0.001) and those whose lack of support from their partner made them uncomfortable when seeking ASRH services (aPR=0.25, 95% CI=0.08-0.82, P=0.023). However, there was no significant change towards increasing the use of ASRH information and services. We attribute this result to various reasons. Whilst our design was conceptualized to deliver ASRH interventions in schools, health facilities and communities, implementation of the school element was not done because schools were closed due to the COVID-19 pandemic. Lack of implementation of the school element means that SRH interventions planned under this model were not delivered to adolescents, hence reducing the reach of the intervention. This consequently affected the effectiveness of the model towards achieving the primary outcome of the study. The COVID-19 pandemic also negatively impacted uptake of ASRH services because of uncertainty, and fear of contracting the disease, as well as stay at home orders that restricted movement. Adolescents' movement were further limited because as minors they would require consent to leave their homes. Methodological issues that affected the study outcomes have been described under the limitations section.

Many ASRH interventions have produced mixed results; a study in Ghana on effects of an ASRH intervention on health service usage by young people showed that interventions resulted in increases in usage of STI, antenatal and perinatal services but had had no significant effect on adolescent usage of HIV counseling and testing services attributing these results to stigma and discrimination on use of ASRH services (Aninanya et al., 2015). Similarly, an

assessment of the impact of implementation Zimbabwe's ASRH strategy on service utilization and outcomes showed uneven increase in HIV testing and no evidence of impact on condom use and STI prevalence (Muchabaiwa & Mbonigaba, 2019). While there has been success in ASRH programming, a reflection on status of Adolescent Sexual Reproductive Health and Rights (ASRHR) at 20 years post ICPD suggests that many programs and projects aiming to improve ASRHR were often small in scale, short lived, generally poorly monitored, evaluated, and documented (Chandra-Mouli et al., 2015). Similarly, a 2014 review of promising approaches for delivering ASRH information and services showed that an enabling ecosystem is necessary for adolescents to realize their SRH and human right (Svanemyr et al., 2015). This includes increasing their access to information and services, their rights, family support and improved capacity to make decisions, healthy relationships, and supportive communities (Svanemyr et al., 2015). Our findings indicate that there is need for different evaluation approaches to test the effectiveness of ASRH service delivery models.

5.3.2 Reflections from a practitioner on implementing a complex ASRH intervention.

The studies in this doctoral thesis contribute to the body of knowledge in ASRH and adolescent pregnancy. Additionally, below is a description of lessons learnt from an implementer's perspective, that can form a basis for consideration by ASRH program managers.

Coordination of programs and intervention studies

A key lesson learnt is the importance of coordination of research and programs. Studies embedded in ongoing programs have limited flexibility on choice of implementation sites. The ASRH implementation study was designed as part of a larger family planning and maternal health program, implemented across the two study counties. Execution of the intervention study was led by a steering committee composed of the principal investigator, co-investigators, the study team, MoH leadership and representatives from other sectors. The mandate of the study steering committee was to ensure a broader understanding of the research methodology, maintain the fidelity of the study and guide its implementation.

While efforts were made to limit other ASRH activities in the intervention sites, the broader effect of the larger family planning and maternal health program may have influenced the study outcomes, since these were the same communities, households, and health facilities. This calls for consideration for alternative evaluation methods such as cohort studies that would test relevance and effectiveness towards achieving the intended outcome. Another form of a quasi-experimental study design, the Interrupted time series (ITS) can also be considered, whereby outcomes are measured at different time points before and after implementing an intervention, allowing the change in level and trend of outcomes to be compared, to evaluate intervention effects. The realistic evaluation design is also recommended, as it brings out the relationships between various underlying factors and the effect that context has on the operationalization and outcome of a study. It yields information that indicates how the intervention works and the conditions that are needed for a particular mechanism to work (i.e., specification of contexts). In addition, there is a need to have a coordination forum where research activities and routine public health interventions can be undertaken simultaneously without compromising each other since both are needed. The element of coordination is even more critical as global health programs are now facing a reduction in budgets. Efforts to reduce duplication and improve efficiencies in programs would avail additional resources to reach more adolescents with services.

Requirements for studies targeting young adolescents.

Adolescent studies are faced with a higher responsibility on ethics due to involvement of minors. In the ASRH studies included here, the desire was to include adolescents aged 10-19 years. However, the threshold required by Institutional Review Boards (IRBs) to approve research for younger adolescents (10-14 years) is high for a public health intervention, and consequently the studies focused on adolescents aged 15-19 years. To address this, funding agencies should consider independent investments that avail legal and regulatory expertise on ASRH at IRBs to facilitate timely and appropriate review of protocols for research involving adolescents and sensitive topics such as SRH.

At grassroots level, communities in Kenya are very sensitive to SRH interventions targeting adolescents, and some parents may not provide parental consent for their children to participate in research. This could be related to the desire to preserve future fertility, which is highly valued in many African communities. Therefore, some communities may assume that ASRH services (such as contraceptives) are likely to render young people sterile in the future, which would impact the survival of the family and the community. This challenge has been experienced with vaccination and has negatively impacted uptake of the Human Papilloma Virus (HPV) vaccine which primarily targets girls. Careful sensitization of community gatekeepers beforehand is key to ensure a clear understanding of ASRH research and programs. If done beforehand, communities could better understand the benefits of the intervention and resistance at implementation will be reduced.

Sustainability of ASRH interventions

Discussions with leadership in both counties revealed that most county budget allocation to health was spent on recurrent expenditure, primarily payment of health worker salaries. Resources to pay stipends or allowances for CHVs were not availed consistently, leaving them unpaid for long periods of time. The lack of additional funding for ASRH services suggests that the MoH's main approach to reaching adolescents is health facilities, which is unlikely to reach all adolescents. This indicates a huge limitation in the governments' responsibility to deliver comprehensive SRH services to the adolescents in their jurisdiction. County governments rely primarily on development partners for financial support to deliver health services outside of health facilities (e.g., outreaches) and to offer training for health workers and CHVs. For instance, the studies in this thesis were implemented with USAID funding. Consequently, the end of the study project also signified the end of delivery of the ASRH interventions implemented outside health facilities. This brings into question the sustainability of ASRH interventions after the end of donor funding. Consideration for co-planning and co-financing of ASRH programs should be done at conceptual stages of projects. Continuous advocacy is needed for counties to prioritize and allocate budgets to expand access to ASRH services. Additionally, policies and legislation from funding entities directly impact the design and implementation strategies for ASRH programs. This is because donor resources are often earmarked for

certain interventions and geographical regions which leaves limited flexibility for county governments to prioritize programming based on need. Consequently, comprehensive programming may not be possible; in this case there were other key determinants of adolescent pregnancy such as unsafe abortion and HIV/AIDs relevant in the study areas, but they were not focus elements of the studies in this thesis. The studies herein were funded by USAID and the focus was to expand access to ASRH services and reduce the burden of adolescent pregnancy. Pooling resources among funding agencies is an approach that would allow governments to address multiple issues that contribute to adolescent pregnancy.

Policy dialogue on ASRH

The studies included in this thesis did not include a policy dialogue element. Policy dialogue involves consultations among stakeholders to raise significant issues, share perspectives, find common ground, and reach a consensus on policy solutions regarding a subject matter. Kenya's ongoing SRH policy development process however shows that policy dialogue is important in creating an understanding of the impact of policies on ASRH programming. During the study period, the development of SRH policies faced criticism due to lack of inclusivity and public participation. Consequently, Kenya's RH policy 2022 was challenged in a court of law as it is deemed not comprehensive in addressing SRH issues. Consideration for future ASRH studies and programs could include policy dialogue and advocacy sessions targeting change makers at political, policy, programmatic and service delivery levels.

Politics, and Reproductive Health and Rights

The Politics around SRH affect adolescents use of SRH services, especially contraceptives. An editorial analysis on SRHR shows that political power shifts in specific times and places have affected the capacity of people to access and realize their sexual and reproductive health and rights (Pugh, 2019). Conservative politics are also threatening the gains made in SRHR and this is happening globally, regionally, nationally and locally (Pugh, 2019). ASRH programming in Kenya has been faced with unique challenges such as lack of political support, opposition from religious and conservative groups and mixed messaging from mainstream and social media. During the study period (2017-2021), political utterances urging women to have more children to

increase the voting population were common. The reported surge in number of reported cases of adolescent pregnancy during the COVID-19 pandemic also elicited political declarations calling for abstinence among adolescents and for health workers to cease provision of contraceptives to adolescents. This may have created fear among health workers hence increasing barriers to accessing ASRH services. While opposition to adolescents' use of contraception is not rare, accurate messaging from the MoH leadership is critical to dispelling miscommunication. Messages from politicians have a wide reach and can influence behavior at individual level, as well as affect service provider practices. Interventions that design messages and target political leaders are critical as they command a wider reach and influence across the country. Independent leadership by MoH is needed to reinforce policy guidance and ensure progression to achieving SRH and rights for women and girls.

5.4 Study Limitations

The limitations of the individual studies are described in the articles. In this section, we focus on the main overall limitations of the thesis. The studies included in this doctoral thesis are cross-sectional in design and therefore have an inherent inability to establish a causal relationship since data on exposure and outcome variables were collected at the same time. For instance, baseline and endline samples of the quasi-experimental study were independently sampled hence the study could not establish whether the respondents were exposed to the intervention. The lack of causality also applies to the DHS data, though the methodology used has been tested extensively and found to be reliable. Additionally, the secondary DHS data analysis covered data sets from the 2003, 2008/9 and 2014 surveys. The DHS is undertaken every 5 years, however, collection of data for the 2019/2020 round was delayed due to the effect of the COVID-19 pandemic and was later undertaken in 2022. The preliminary report was released in February 2023, and although key findings are broadly referenced in the thesis, the data was not part of the secondary DHS data analysis.

The selection criteria for study participants in the formative assessment was purposive and information was self-reported, factors which may have

contributed to over- or under-reporting and consequently led to information bias. The formative study and quasi-experiment were conducted within Kisumu and Kakamega counties whose selection was due to an existing health program place. Results from the formative qualitative assessment are specific to the study setting and cannot be generalized to other settings.

Even though the digital platform is a recommended approach in the MoH ASRH policy guidelines, it was not included as a part of the study design. This is because the two counties are relatively rural and mobile phone reach is limited. In addition, the adolescents targeted were those aged 15-19 years who are primarily in school and the majority of whom do not own individual phones. Despite this consideration, we observe that this was a missed opportunity, and possible innovative ways to use online platforms would have been utilized. During the COVID-19 pandemic, adolescents were sequestered within communities, and shared digital options would have been a consideration to reach adolescents in their community spaces. Kenya's Ministry of Health recommends use of digital platforms as one of the key approaches to provide information and link adolescents to SRH services. In order to be effective, digital interventions should be designed at local levels based on context because adolescents face different type of barriers to accessing SRH information and services. Key issues include geographical location, distance to health facilities, economic factors that would enable them own phones, cultural sensitivities among others. Additionally, adolescents living in rural areas face different challenges from those in urban areas and will therefore require different approaches. Social media channels such as Instagram, Facebook and TikTok have relevance in urban where there are smart phones and internet, while text messaging is ideal for adolescents living in rural areas. Different segments of populations such as married vs unmarried adolescents, older (15-19) vs younger (10-14) adolescents, in school vs those out of school may require different types of technology systems for effective reach. Young adolescents are under the care of parents with limited or no access to phones. Married adolescents face economic challenges in accessing technology, and lack of support from sexual partners which may hinder their access to information and services.

Implementation of the school arm of the quasi-experimental intervention study was not done because schools were closed due to the COVID-19

pandemic. This may have affected the study fidelity and consequently the study outcomes. The impact of COVID-19 on research and programs was experienced across many studies, which calls for the need for adaptation of methodology and delivery approaches during public health emergencies and other related setbacks. Co-production of research is a joint approach between the study team and participants, an approach that can lead to evidence that responds to the needs of the users, one that they consider more credible and that they feel confident to utilize (Raven et al., 2018). Other adaptation methods could include changes to data-gathering-methods with vulnerable groups, utilizing the assistance of key informants and gatekeepers and changes to participant recruitment and sampling (Milosheva & Salzano, 2022).

We observed that adolescents in both Counties experienced different types of barriers to seeking and using ASRH information and services, despite the Counties being adjacent to each other. Since Kenya's health sector is devolved into 47 county governments, the barriers facing adolescents in seeking and using ASRH services varied across counties, and so did the environmental contexts within which ASRH interventions were implemented. The two counties are inhabited by two communities, the Luhya and Luo tribes, with different cultures. Results from the formative study showed that socio-cultural barriers were more prevalent in Kakamega County and less in Kisumu County. Other characteristics noted in Kakamega County included earlier sexual debut, reported cases of incest, and sexual violation of children. Girls having sex with older persons was not frowned upon, and families were less likely to report these cases to health facilities or the County administration but rather chose to settle them at family level. Kisumu County, on the other hand, is more peri-urban, and adolescents' health challenges were fueled by high prevalence of HIV, urbanization, and use of drugs and alcohol. The differences in socio-cultural context between the two study counties may have contributed to the significant differences noted in the socio-demographic characteristics of the populations in the intervention and comparison groups. Coarsened exact matching was used to address this limitation.

Improvements in the quasi-experiment study were realized in both the intervention and comparison groups, signifying a potential contamination of

the study in the comparison arm. This result could also indicate a gap in execution of the methodology and monitoring of the ASRH model, and the set of interventions. These results call for further reflection on future study designs, to ensure that the targeted population is reached with the intervention, for instance in cohort studies, the incidence of exposure and outcomes can be estimated. We conclude that a more accurate impact of the intervention is likely to be established with a more stringent methodology, implementation, and measurement approach.

6 CONCLUSION AND RECOMMENDATIONS

The final chapter of this thesis provides; the conclusion, the recommendations and dissemination of study findings. The recommendations are presented based on the expected actors, i.e., policy makers, program managers and researchers.

This doctoral thesis contributes to the field of ASRH through detailing the status of adolescent pregnancy globally, regionally, and describing the trends and determinations of adolescent pregnancy in Kenya. The findings from this doctoral research highlight the slow pace in reduction of adolescent pregnancies in Kenya and emphasize the need for concerted efforts towards reducing the burden. The findings also describe the barriers faced by adolescents in seeking and using ASRH services and demonstrate the importance of understanding local contexts to effectively delivery SRH services to adolescents. We suggest that Kenya needs to implement interventions that address the barriers to utilization of ASRH services in order to reduce the burden of pregnancy among adolescents. Findings from this doctorate research also demonstrate the complex nature of delivering ASRH information and services to adolescents, and the need for combining multiple approaches for higher impact. Finally, we describe lessons learned from designing and implementing complex ASRH interventions. Based on the key findings from this doctoral research, the following recommendations are proposed at policy, program, and research levels so as to increase utilization of ASRH information and services and contribute to a reduction of adolescent pregnancy in similar settings.

Recommendations for policy makers

- SRH stakeholders should support development of policies that advance the SRH and rights of women and girls. This involves challenging retrogressive policies such as those requiring consent for use of SRH services by adolescents.
- The government of Kenya should reinforce legislation and policies that improve economic empowerment of women, reduce poverty, and keep girls in school. These are key interventions that reduce adolescent girls' vulnerability to unplanned pregnancy.

- The Government of Kenya should reinforce the law protecting girls from child marriage. This should be coupled with sensitizing communities to address socio-cultural issues that normalize child marriage and other harmful practices such as FGM. Other key aspects include involving opinion leaders in community sensitization to address negative socio-cultural practices and contribute to school enrollment and retention for girls. This would also contribute to retaining girls in school and closing the gender disparity gap in education.
- The Ministry of Health should develop and disseminate policies, strategies and guidelines to counties, health workers and communities to improve understanding of ASRH programming. This would enable adolescents to obtain SRH services in a confidential and judgment-free adolescent friendly environment. This is key to enhancing an understanding that SRH services are a fundamental right for all women and girls as provided for in Kenya's 2010 constitution.
- In order to provide adolescent sensitive services, The Ministry of Health should increase the number of health workers, rationalize existing numbers, and deploy adequate numbers to essential health services delivery points, including ASRH clinics. This will alleviate the burden on the overworked health workers and improve the quality of ASRH services.
- Stakeholders should work with County governments to increase access to SRH services for girls, using context specific approaches, as per the approved county policies and strategies.

Recommendations for programming

Findings from this study provide an opportunity to track past progress and therefore, inform current and future programming.

- Stakeholders implementing ASRH interventions should work with communities to sensitize them about barriers at family and community level that hinder, and social norms that promote uptake of ASRH services. At family level, improving adolescent parental

communication on issues related to gender, sexuality, and SRH issues creates a safe zone for adolescents.

- The Ministry of Health should train health workers to provide adolescent-sensitive services. These include provision of services such as contraceptives without judgment, flexible opening hours, provision of privacy and confidentiality and comprehensive counseling on SRH options.
- Multisectoral collaboration is a key element for success in ASRH programming because it provides a platform to address other drivers of adolescent pregnancy, such as child marriage, poverty, education, and gender inequalities. This involves collaboration with Ministries of Education, Health, Gender, Children and Social services as well as Planning and Treasury. Findings from studies in this thesis showed that even though Kenya has institutionalized structures to coordinate adolescent health programs, their leadership remains weak. This is because each government entity has its core mandate, and there is no requirement for shared programming. A key consideration would be to anchor leadership for multisectoral coordination at a higher-level such as the ministry of interior or the office of the president. This would create accountability for a more efficient and coordinated effort in addressing social determinants of adverse SRH outcomes such as GBV, pregnancy, and HIV, among others.
- ASRH stakeholders should strengthen programs that empower adolescents with knowledge on SRH, which would enable them to know from whom and where to seek SRH services. Adolescents need to be equipped with accurate and comprehensive SRH information for informed decision-making.
- The school platform in Kenya should be repositioned for delivering the comprehensive sexual education model to reach adolescents with ASRH information and services per context. Comprehensive sexuality education (CSE) is key to ensuring healthy sexual and reproductive lives for adolescents. It involves the provision of age-appropriate SRH information and services using participatory, rights

based and gender-equal approach. This also includes the provision of contraceptives to sexually active adolescents. Barriers to implementing CSE in Kenya include moral code among teachers, opposition by religious and conservative groups and weak support from the Ministry of Education. Continuous advocacy with these groups is key to improving use of ASRH information and services and protecting girls from pregnancy.

- The government of Kenya and stakeholders should strengthen mechanisms for continuous data analyses to monitor progress towards addressing the burden of adolescent pregnancy. Provision of accurate ASRH information and services is key to inform evidence-based programming. This analysis will provide policy makers with details to understand the determinants of adolescent pregnancy in their context and to design practical interventions to increase use of ASRH services and to reduce unintended pregnancies amongst adolescents.
- Programmers should expand opportunities to provide ASRH services through the private sector, a platform that is highly preferred and utilized by adolescents and youth. Some key reasons why young people prefer the private sector include reassurance of privacy and the availability of personnel and commodities. The challenge is that private sector outlets have a business element, and health services are provided at a cost, which makes them unaffordable to many adolescents as they are not financially independent.

In pursuance of UHC, the government of Kenya has provided health insurance for all students, referred to 'Edu AFYA', which is executed by the National Hospital Insurance Fund (NHIF). The package of services under Edu AFYA however do not include SRH services. Future considerations could include inclusion of ASRH services in the essential package for services under the Universal Health Coverage (UHC), which is executed through the NHIF. Universal Health Coverage is achieved when "All people obtain the health services they need – prevention, promotion, treatment, rehabilitation, and palliation-without the risk of financial ruin or impoverishment, now and in the future". The ICPD program of action recognizes that realizing the right to

reproductive health for all, without discrimination, is critical towards achieving universal access to SRH. This therefore means that, UHC cannot be achieved if the SRH needs of the population are not met.

Recommendations for further research

- Further research on effective ASRH service delivery model should encompass health facilities, communities, schools, and use of the digital platform for ASRH, coupled with strengthening the health system. In order to optimize ASRH outcomes, an analysis of Kenya's ASRH policy and legislation and their impact on ASRH goals would be key. Effective advocacy requires evidence, therefore making ASRH research a critical element in shaping progressive ASRH policies and legislation.
- To effectively execute the intervention study, a prospective cohort study may have been more effective in establishing whether the desired outcome, use of ASRH services was achieved, and whether the outcome could be linked to the intervention. The Interrupted time series (ITS) is also recommended. With this design, outcomes are measured at different time points before and after implementing an intervention, allowing the change in level and trend of outcomes to be compared, to evaluate intervention effects. The realistic evaluation design is also recommended, as it brings out the relationships between various underlying factors and the effect that context has on the operationalization and outcome of a study. To address this, capacity building is needed for researchers on designs that measure the effectiveness of public health interventions. Additionally, advocacy is needed with funding agencies and research institutions to support the design and execution of more rigorous research methodologies.
- ASRH intervention studies should include younger adolescents aged 10-14 years, to inform evidence based SRH programming for this population. Capacity building for researchers in designing studies that involve minors is key.

- The drivers of pregnancy pregnancy are varied. In order to effectively target interventions, ASRH data should disaggregate the proportion of wanted versus forced and unwanted pregnancy occurring due to cultural practices such as marriage, and those occurring due to risky behaviors.

Dissemination of study findings

Findings from the studies in this thesis will be disseminated at the national level at the Inter-agency Coordinating Committee (ICC). The ICC is a ministry of health-led forum constituting of development organizations, civil society, and local organizations that support SRH programming. The findings will also be shared with ASRH technical working groups at the two counties where the localized studies were conducted. Policy briefs will be prepared and shared with policymakers at the national MOH as well as key influencers on ASRH.

7 REFERENCES

Abdi, F., & Simbar, M. (2013). The peer education approach in adolescents- narrative review article. *Iranian Journal of Public Health*, 42(11), 1200.

AFIDEP. (2016). *Adolescent Sexual Reproductive Health in Kakamega County, Fact sheet*. AFIDEP. Accessed August 20, 2022: <https://www.afidep.org/publication/adolescent-sexual-and-reproductive-health-in-kakamega-county/>.

Agu, C., Mbachu, C., Agu, I., Iloabachie, U., & Onwujekwe, O. (2022). An analysis on the roles and involvements of different stakeholders in the provision of adolescent sexual and reproductive health services in Southeast Nigeria. *BMC Public Health*, 22(1), 2161.

Ahanonu, E. L. (2014). Attitudes of healthcare providers towards providing contraceptives for unmarried adolescents in Ibadan, Nigeria. *Journal of Family & Reproductive Health*, 8(1), 33.

Ahinkorah, B. O. (2020). Predictors of modern contraceptive use among adolescent girls and young women in sub-Saharan Africa: A mixed effects multilevel analysis of data from 29 demographic and health surveys. *Contraception and Reproductive Medicine*, 5(1), 1–12.

Akatukwasa, C., Kemigisha, E., Achen, D., Fernandes, D., Namatovu, S., Mlahagwa, W., Ruzaaza, G. N., Coene, G., Rukundo, G. Z., Michielsen, K., & Nyakato, V. N. (2023). Narratives of most significant change to explore experiences of caregivers in a caregiver-young adolescent sexual and reproductive health communication intervention in rural south-western Uganda. *PloS One*, 18(5), e0286319. <https://doi.org/10.1371/journal.pone.0286319>.

Akuiyibo, S., Anyanti, J., Idogho, O., Piot, S., Amoo, B., Nwankwo, N., & Anosike, N. (2021). Impact of peer education on sexual health knowledge among adolescents and young persons in two North Western states of Nigeria. *Reproductive Health*, 18(1), 1–8.

Aninanya, G. A., Debpuur, C. Y., Awine, T., Williams, J. E., Hodgson, A., & Howard, N. (2015). Effects of an adolescent sexual and reproductive health

intervention on health service usage by young people in northern Ghana: A community-randomised trial. *PLoS One*, 10(4), e0125267.

Bam, K., Haseen, F., Bc, R., Newman, M. S., Chaudhary, A. H., Thapa, R., & Bhuyia, I. (2015). Perceived sexual and reproductive health needs and service utilization among higher secondary school students in urban Nepal. *American Journal of Public Health Research*, 3(2), 36–45.

Banke-Thomas, O. E., Banke-Thomas, A. O., & Ameh, C. A. (2017). Factors influencing utilisation of maternal health services by adolescent mothers in Low-and middle-income countries: A systematic review. *BMC Pregnancy and Childbirth*, 17(1), 1–14.

Barasa, E., Kazungu, J., Orangi, S., Kabia, E., Ogero, M., & Kasera, K. (2021). Indirect health effects of the COVID-19 pandemic in Kenya: A mixed methods assessment. *BMC Health Services Research*, 21(1), 1–16.

Batha, E. (2020, May 20). Coronavirus could put 4 million girls at risk of child marriage, World Economic forum. *Thompson Reuters Foundation Trust*.

Bearak, J., Popinchalk, A., Alkema, L., & Sedgh, G. (2018). Global, regional, and subregional trends in unintended pregnancy and its outcomes from 1990 to 2014: Estimates from a Bayesian hierarchical model. *The Lancet Global Health*, 6(4), e380–e389.

Bellizzi, S., Pichierri, G., Menchini, L., Barry, J., Sotgiu, G., & Bassat, Q. (2019). The impact of underuse of modern methods of contraception among adolescents with unintended pregnancies in 12 low-and middle-income countries. *Journal of Global Health*, 9(2).

Berglas, N. F., Constantine, N. A., & Ozer, E. J. (2014). A rights-based approach to sexuality education: Conceptualization, clarification, and challenges. *Perspectives on Sexual and Reproductive Health*, 46(2), 63–72.

Birungi, H., Undie, C.-C., MacKenzie, I., Katahoire, A., Obare, F., & Machawira, P. (2015). *Education sector response to early and unintended pregnancy: A review of country experiences in sub-Saharan Africa*.

Blanc, A. K., Tsui, A. O., Croft, T. N., & Trevitt, J. L. (2009). Patterns and trends in adolescents' contraceptive use and discontinuation in developing countries

and comparisons with adult women. *International Perspectives on Sexual and Reproductive Health*, 63–71.

Brittain, A. W., Steiner, R. J., Fasula, A. M., Hatfield-Timajchy, K., Kulkarni, A., & Koumans, E. H. (2022). Improving Access to and Quality of Sexual and Reproductive Health Services for Adolescents in the United States. *Journal of Women's Health*, 31(1), 7–12.

Bronfenbrenner, U. (1979). *The ecology of human development: Experiments by nature and design*. Harvard university press.

Chandra-Mouli, V., & Akwara, E. (2020). Improving access to and use of contraception by adolescents: What progress has been made, what lessons have been learnt, and what are the implications for action? *Best Practice & Research Clinical Obstetrics & Gynaecology*, 66, 107–118.

Chandra-Mouli, V., Camacho, A. V., & Michaud, P.-A. (2013). WHO guidelines on preventing early pregnancy and poor reproductive outcomes among adolescents in developing countries. *Journal of Adolescent Health*, 52(5), 517–522.

Chandra-Mouli, V., McCarraher, D. R., Phillips, S. J., Williamson, N. E., & Hainsworth, G. (2014). Contraception for adolescents in low- and middle-income countries: Needs, barriers, and access. *Reproductive Health*, 11(1), 1–8.

Chandra-Mouli, V., Svanemyr, J., Amin, A., Fogstad, H., Say, L., Girard, F., & Temmerman, M. (2015). Twenty years after International Conference on Population and Development: Where are we with adolescent sexual and reproductive health and rights? *Journal of Adolescent Health*, 56(1), S1–S6.

Chung, H. W., Kim, E. M., & Lee, J.-E. (2018). Comprehensive understanding of risk and protective factors related to adolescent pregnancy in low- and middle-income countries: A systematic review. *Journal of Adolescence*, 69, 180–188.

Darroch, J. E., Woog, V., Bankole, A., & Ashford, L. S. (2016). *Adding it up: Costs and benefits of meeting the contraceptive needs of adolescents*.

Denno, D. M., Hoopes, A. J., & Chandra-Mouli, V. (2015). Effective strategies to provide adolescent sexual and reproductive health services and to increase

demand and community support. *Journal of Adolescent Health*, 56(1), S22–S41.

Edilberto Loaiza & Mengjia Liang. (2013). *Adolescent Pregnancy, A review of the evidence*. UNFPA.

Ezenwaka, U., Mbachu, C., Ezumah, N., Eze, I., Agu, C., Agu, I., & Onwujekwe, O. (2020). Exploring factors constraining utilization of contraceptive services among adolescents in Southeast Nigeria: An application of the socio-ecological model. *BMC Public Health*, 20(1), 1–11.

Fiona Samuels, Carmen Leon-Himmelstine, Lilian Otiso, Maryline Mireku, & Beryl Oyier. (2020). *Unintended pregnancies and HIV among adolescents and young people A situation analysis of Homa Bay, Kenya*.

Fonner, V. A., Armstrong, K. S., Kennedy, C. E., O'Reilly, K. R., & Sweat, M. D. (2014). School based sex education and HIV prevention in low- and middle-income countries: A systematic review and meta-analysis. *PloS One*, 9(3), e89692. <https://doi.org/10.1371/journal.pone.0089692>.

Ganchimeg, T., Ota, E., Morisaki, N., Laopaiboon, M., Lumbiganon, P., Zhang, J., Yamdamsuren, B., Temmerman, M., Say, L., & Tunçalp, Ö. (2014). Pregnancy and childbirth outcomes among adolescent mothers: A World Health Organization multicountry study. *BJOG: An International Journal of Obstetrics & Gynaecology*, 121, 40–48.

Garbarino, J., Abramowitz, R., & Asp, E. (1985). Adolescent development. *An Ecological Perspective*. Columbus, Ohio: Charles Merrill.

García-Moreno, C., Pallitto, C., Devries, K., Stöckl, H., Watts, C., & Abrahams, N. (2013). *Global and regional estimates of violence against women: Prevalence and health effects of intimate partner violence and non-partner sexual violence*. World Health Organization.

Geary, R. S., Gómez-Olivé, F. X., Kahn, K., Tollman, S., & Norris, S. A. (2014). Barriers to and facilitators of the provision of a youth-friendly health services programme in rural South Africa. *BMC Health Services Research*, 14(1), 1–8.

Gitau, T., Kusters, L., Kok, M., & van der Kwaak, A. (2016). A baseline study on child marriage, teenage pregnancy, and female genital mutilation/cutting in Kenya. *Royal Tropical Institute, Amsterdam*.

Haberland, N., & Rogow, D. (2015). Sexuality education: Emerging trends in evidence and practice. *Journal of Adolescent Health, 56*(1), S15–S21.

Inter-Agency Working Group. (2008). *Community Pathways to Improved Adolescent Sexual and Reproductive Health: A Conceptual Framework and Suggested Outcome Indicators*.

Iris Group. (2020). *Political Economy Analysis of Child, Early, and Forced Marriage in Kenya*. Chapel Hill USA.

John, N., Roy, C., Mwangi, M., Raval, N., & McGovern, T. (2021). COVID-19 and gender-based violence (GBV): Hard-to-reach women and girls, services, and programmes in Kenya. *Gender & Development, 29*(1), 55–71.

Kangaude, G., Coast, E., & Fetters, T. (2020). Adolescent sexual and reproductive health and universal health coverage: A comparative policy and legal analysis of Ethiopia, Malawi, and Zambia. *Sexual and Reproductive Health Matters, 28*(2), 1832291.

Kassa, G. M., Arowojolu, A., Odukogbe, A., & Yalew, A. W. (2018). Prevalence and determinants of adolescent pregnancy in Africa: A systematic review and meta-analysis. *Reproductive Health, 15*(1), 1–17.

Kenya National Bureau of Statistics, Ministry of Health/Kenya, National AIDS Control Council/Kenya, Kenya Medical Research Institute, & National Council for Population and Development/Kenya. (2015). *Kenya Demographic and Health Survey 2014*. <http://dhsprogram.com/pubs/pdf/FR308/FR308.pdf>.

Ketting, E., & Winkelmann, C. (2013). New approaches to sexuality education and underlying paradigms. *Bundesgesundheitsblatt-Gesundheitsforschung-Gesundheitsschutz, 56*(2), 250–255.

KNBS and ICF. (2023). *Kenya Demographic and Health Survey 2022. Key Indicators Report*.

Kulczycki, A. (1999). *The abortion debate in the world arena*. Taylor & Francis.

Lassi, Z. S., Salam, R. A., Das, J. K., Wazny, K., & Bhutta, Z. A. (2015). *An unfinished agenda on adolescent health: Opportunities for interventions*. *39*(5), 353–360.

Liang, M., Simelane, S., Fillo, G. F., Chalasani, S., Weny, K., Canelos, P. S., Jenkins, L., Moller, A.-B., Chandra-Mouli, V., & Say, L. (2019). The state of adolescent sexual and reproductive health. *Journal of Adolescent Health, 65*(6), S3–S15.

LVCT. (2021). *A call-to-Action-ESA-Commitment-on-CSE-and-Adolescent-SRHR-2.pdf*.

Mbeba, R. M., Mkuye, M. S., Magembe, G. E., Yotham, W. L., obeidy Mellah, A., & Mkuwa, S. B. (2012). Barriers to sexual reproductive health services and rights among young people in Mtwara district, Tanzania: A qualitative study. *The Pan African Medical Journal, 13*(Suppl 1).

Milosheva, M., & Salzano, R. (2022). *Research In Times Of Crisis: Adaptations Of Research Due To The COVID-19 Pandemic*. <https://doi.org/10.5281/zenodo.6414398>.

Ministries of Education and Health. (2013). *Ministerial commitment on comprehensive sexuality education and sexual and reproductive health services for adolescents and young people in eastern and southern Africa (ESA). Angola, Botswana, Burundi, Democratic Republic of Congo, Ethiopia, Kenya....*

Ministry of Education, Kenya. (2020). *National Guidelines for School -Re-Entry in Early Learning and Basic Education 2020: Wwww.education.go.ke Nairobi Kenya 2020. Wwww.education.go.ke Nairobi Kenya*.

Ministry of Health. (2015). *National Adolescent and Reproductive Health Policy*. MOH Kenya.

Ministry of Health. (2022). *THE NATIONAL REPRODUCTIVE HEALTH POLICY 2022—2032. Towards the Highest Reproductive Health Status for all Kenyans. Government of Kenya*. <https://www.health.go.ke/wp-content/uploads/2022/07/The-National-Reproductive-Health-Policy-2022-2032.pdf>.

MOH, Kenya. (2018). *National Standard Operating Procedures for the Management of Sexual violence against Children*.

- Morris, J. L., & Rushwan, H. (2015). Adolescent sexual and reproductive health: The global challenges. *International Journal of Gynecology & Obstetrics*, *131*, S40–S42.
- Muchabaiwa, L., & Mbonigaba, J. (2019). Impact of the adolescent and youth sexual and reproductive health strategy on service utilisation and health outcomes in Zimbabwe. *PLoS One*, *14*(6), e0218588.
- Mumah, J. N., Mulupi, S., Wado, Y. D., Ushie, B. A., Nai, D., Kabiru, C. W., & Izugbara, C. O. (2020). Adolescents' narratives of coping with unintended pregnancy in Nairobi's informal settlements. *PLoS One*, *15*(10), e0240797.
- Munakampe, M. N., Zulu, J. M., & Michelo, C. (2018). Contraception and abortion knowledge, attitudes and practices among adolescents from low and middle-income countries: A systematic review. *BMC Health Services Research*, *18*(1), 1–13.
- Mutea, L., Ontiri, S., Kadiri, F., Michielesen, K., & Gichangi, P. (2020). Access to information and use of adolescent sexual reproductive health services: Qualitative exploration of barriers and facilitators in Kisumu and Kakamega, Kenya. *Plos One*, *15*(11), e0241985.
- Mwaisaka, J., Gonsalves, L., Thiongo, M., Waithaka, M., Sidha, H., Agwanda, A., Mukiira, C., & Gichangi, P. (2020). Exploring contraception myths and misconceptions among young men and women in Kwale County, Kenya. *BMC Public Health*, *20*(1), 1–10.
- Mwenje-Macharia, J. W., & Kessio, D. K. (2015). Investigation of re-entry of student mothers in secondary schools in Kenya. *International Journal of Humanities Social Sciences and Education*, *2*(12), 46–50.
- NACC & National AIDS Control Council/Kenya. (2016). *Kenya HIV County Profiles 2016*. National AIDs STIs Control Program.
- Nanda, P., Tandon, S., & Khanna, A. (2020). Virtual and essential–adolescent SRHR in the time of COVID-19. *Sexual and Reproductive Health Matters*, *28*(1), 1831136.
- Nawaz, I., & Manan, M. R. (2022). Challenges in Implementing Adolescent Sexual and Reproductive Health Programs: Are Healthcare Workers Part of

the Problem? *Journal of Primary Care & Community Health*, 13, 21501319221134864.

NCPD. (2017). *2015 Kenya National Adolescents and Youth Survey (NAYS)*. National Council for Population and Development. <https://books.google.co.ke/books?id=VJt-zQEACAAJ>.

NCPD. (2021). *Kenya's Demographic Dividend Roadmap 2020-2030, Harnessing the potential of young persons for development*. NCPD, Nairobi Kenya. Accessed August 20, 2022: <https://ncpd.go.ke/wp-content/uploads/2021/10/Kenya-Demographic-Dividend-Roadmap-2020-2030.pdf>.

NCPD. (2022). *ADDRESSING THE TRIPLE THREATS; ENDING NEW HIV INFECTIONS, ADOLESCENT PREGNANCIES AND GENDER BASED VIOLENCE IN KENYA*. Accessed February 2, 2023: <https://ncpd.go.ke/2022/04/13/ncpd-and-nacc-convene-the-regional-and-county-commissioners-to-address-the-triple-threats/>.

Ndung'u, N., Thugge, K., & Otieno, O. (2011). *Unlocking the future potential for Kenya: The Vision 2030*. Office of the Prime Minister Ministry of State for Planning, National Development and Vision, 2030.

Neal, S., Matthews, Z., Frost, M., Fogstad, H., Camacho, A. V., & Laski, L. (2012). Childbearing in adolescents aged 12–15 years in low resource countries: A neglected issue. New estimates from demographic and household surveys in 42 countries. *Acta Obstetrica et Gynecologica Scandinavica*, 91(9), 1114–1118.

Ninsiima, L. R., Chiumia, I. K., & Ndejjo, R. (2021). Factors influencing access to and utilisation of youth-friendly sexual and reproductive health services in sub-Saharan Africa: A systematic review. *Reproductive Health*, 18(1), 1–17.

Njue, C., Voeten, H. A., & Remes, P. (2009). Disco funerals, a risk situation for HIV infection among youth in Kisumu, Kenya. *AIDS (London, England)*, 23(4), 505.

Nmadu, A. G., Mohamed, S., & Usman, N. O. (2020). Barriers to adolescents' access and utilisation of reproductive health services in a community in north-

western Nigeria: A qualitative exploratory study in primary care. *African Journal of Primary Health Care and Family Medicine*, 12(1), 1–8.

Onyando, J. O., Olouch, M., & Njuguna, S. (2018). *Factors Influencing Effectiveness of Youth Friendly Centres in Kenya: A Case of Kisumu County*.

Ooms, G. I., Kibira, D., Reed, T., Van Den Ham, H. A., Mantel-Teeuwisse, A. K., & Buckland-Merrett, G. (2020). Access to sexual and reproductive health commodities in East and Southern Africa: A cross-country comparison of availability, affordability and stock-outs in Kenya, Tanzania, Uganda and Zambia. *BMC Public Health*, 20(1), 1–14.

Oronje, R. N., Crichton, J., Theobald, S., Lithur, N. O., & Ibisomi, L. (2011). Operationalising sexual and reproductive health and rights in sub-Saharan Africa: Constraints, dilemmas and strategies. *BMC International Health and Human Rights*, 11(3), S8. <https://doi.org/10.1186/1472-698X-11-S3-S8>.

Pandey, P. L., Seale, H., & Razeq, H. (2019). Exploring the factors impacting on access and acceptance of sexual and reproductive health services provided by adolescent-friendly health services in Nepal. *PLoS One*, 14(8), e0220855.

Phillips, S. J., & Mbizvo, M. T. (2016). Empowering adolescent girls in Sub-Saharan Africa to prevent unintended pregnancy and HIV: A critical research gap. *International Journal of Gynecology & Obstetrics*, 132(1), 1–3.

Presidential Policy and Strategy Unit (Kenya) and Population Council., S. (2021). *Promises to keep: Impact of COVID-19 on adolescents in Kenya*. https://knowledgecommons.popcouncil.org/cgi/viewcontent.cgi?article=2378&context=departments_sbsr-pgy.

Psaki, S. (2016). Addressing child marriage and adolescent pregnancy as barriers to gender parity and equality in education. *Prospects*, 46(1), 109–129.

Pugh, S. (2019). Politics, power, and sexual and reproductive health and rights: Impacts and opportunities. *Sexual and Reproductive Health Matters*, 27(2), 1–5. <https://doi.org/10.1080/26410397.2019.1662616>.

Pulerwitz, J., Blum, R., Cislaghi, B., Costenbader, E., Harper, C., Heise, L., Kohli, A., & Lundgren, R. (2019). Proposing a conceptual framework to address social norms that influence adolescent sexual and reproductive health. *Journal of Adolescent Health*, 64(4), S7–S9.

Raven, J., Baral, S., Wurie, H., Witter, S., Samai, M., Paudel, P., Subedi, H. N., Martineau, T., Elsey, H., & Theobald, S. (2018). What adaptation to research is needed following crises: A comparative, qualitative study of the health workforce in Sierra Leone and Nepal. *Health Research Policy and Systems, 16*, 1–11.

Roudi-Fahimi, F., & Ashford, L. (2008). Sexual and reproductive health in the Middle East and North Africa: A guide for reporters. *Washington DC: Population Reference Bureau.*

Salam, R. A., Faqqah, A., Sajjad, N., Lassi, Z. S., Das, J. K., Kaufman, M., & Bhutta, Z. A. (2016). Improving adolescent sexual and reproductive health: A systematic review of potential interventions. *Journal of Adolescent Health, 59*(4), S11–S28.

Sammy Mwibanda. (2020). Kakamega To Intensify Campaign Against Sexual Violence On Children. *Kenya News Agency*. Accessed on August 8, 2022, on <https://www.kenyanews.go.ke/kakamega-to-intensify-campaign-against-sexual-violence-on-children/>.

Sidze, E. M., Stillman, M., Keogh, S., Mulupi, S., Egesa, C. P., Leong, E., Mutua, M., Muga, W., Bankole, A., & Izugbara, C. (2017). *From paper to practice: Sexuality education policies and their implementation in Kenya.*

Singh, J. A., Siddiqi, M., Parameshwar, P., & Chandra-Mouli, V. (2019). World Health Organization guidance on ethical considerations in planning and reviewing research studies on sexual and reproductive health in adolescents. *Journal of Adolescent Health, 64*(4), 427–429.

Ssewanyana, D., Mwangala, P. N., Marsh, V., Jao, I., Van Baar, A., Newton, C. R., & Abubakar, A. (2018). Young people's and stakeholders' perspectives of adolescent sexual risk behavior in Kilifi County, Kenya: A qualitative study. *Journal of Health Psychology, 23*(2), 188–205.

Sully, E. A., Biddlecom, A., Darroch, J. E., Riley, T., Ashford, L. S., Lince-Deroche, N., Firestein, L., & Murro, R. (2020). *Adding it up: Investing in sexual and reproductive health 2019.*

Svanemyr, J., Amin, A., Robles, O. J., & Greene, M. E. (2015). Creating an enabling environment for adolescent sexual and reproductive health: A

framework and promising approaches. *Journal of Adolescent Health*, 56(1), S7–S14.

Syomwene, A., & Kindiki, J. N. (2015). Women education and economic development in Kenya: Implications for curriculum development and implementation processes. *Journal of Education and Practice*, 6(15), 38–43.

UN committee on rights of the child. (2003). 4: Adolescent health and development in the context of the Convention on the Rights of the Child. *New York: United Nations Committee on the Rights of the Child*.

UN economic social affairs. (2019). *World Population Prospects 2019: Vol. Data Booket. ST/ESA/SER. A/424*. United Nations, Department of Economic and Social Affairs, Population Division (2019). *World Population Prospects 2019*:

UN General Assembly. (1948). *Universal Declaration of Human Rights. General Assembly Resolution 217 A (III) of 10 December 1948*.

UNAIDs. (2021). *Trends in New HIV infections. Global HIV & AIDS statistics, 2021 Fact sheet*. <https://www.unaids.org/en/resources/fact-sheet>.

UNESCO. (2015). *Comprehensive sexuality education: A global review, 2015*.

UNICEF. (2016). *Harmful Practices: Accelerating abandonment of Female Genital Mutilation (FGM) and Child Marriage in Kenya*. Accessed August 21, 2023: <https://www.unicef.org/kenya/harmful-practices>.

UNICEF. (2018). *Child Marriage: Latest trends and future prospects*.

Unicef. (2018). *Situation Analysis of Children and Women in Kenya, 2017*. UNICEF, Nairobi Kenya. Accessed August 21, 2023: <https://www.unicef.org/kenya/reports/situation-analysis-children-and-women-kenya-2017>.

UNICEF. (2022). *Investing in a safe, healthy, and productive transition from childhood to adulthood is critical. Adolescents overview; 2018*. Accessed August 20, 2022: <https://data.unicef.org/topic/adolescents/overview/>.

UNICEF Kenya. (2020). *The 2019 Violence against Children Survey (VACS) (The Government of Kenya Launches the 2019 Violence Against Children (VAC)*

Survey Report and The National Prevention and Response Plan on Violence against Children 2019 – 2023).

United Nations. (2015). *The global strategy for women's, children's and adolescents' health (2016-2030)- Survive, thrive, transform*. Every Woman Every Child. Accessed on August 20, 2022: <https://globalstrategy.everywomaneverychild.org/>.

United Nations. (2016). *Sustainable Development Goals*. Department of Economic and Social Affairs Sustainable Development. Accessed August 20, 2022: <https://www.un.org/sustainabledevelopment/sustainable-development-goals/>.

USAID Kenya. (2021). *Increasing the availability and quality of FP/RMNCAH services. AFYA Halisi factsheet*. USAID Kenya. https://www.usaid.gov/sites/default/files/documents/Afya_Halisi_factsheet.pdf.

Wangamati, C. K. (2020). Comprehensive sexuality education in sub-Saharan Africa: Adaptation and implementation challenges in universal access for children and adolescents. *Sexual and Reproductive Health Matters*, 28(2), 1851346. <https://doi.org/10.1080/26410397.2020.1851346>.

Were, M. (2007). Determinants of teenage pregnancies: The case of Busia District in Kenya. *Economics & Human Biology*, 5(2), 322–339.

WHO. (2011). *WHO guidelines on preventing early pregnancy and poor reproductive health outcomes among adolescents in developing countries*. World Health Organization. Accessed on August 20, 2022: <https://www.who.int/publications/i/item/9789241502214>.

WHO. (2014). *Adolescent pregnancy: Adolescence is a time of opportunity during which a range of actions can be taken to set the stage for healthy adulthood: Factsheet* (p. 4 p.) [Technical documents]. World Health Organization. Accessed August 20, 2022: <https://apps.who.int/iris/handle/10665/112320>.

WHO. (2015). *Every woman, every child, every adolescent: Achievements and prospects: The final report of the independent Expert Review Group on*

Information and Accountability for Women's and Children's health. Accessed August 20, 2022: <https://apps.who.int/iris/handle/10665/183585>.

WHO. (2018a). *Adolescent Pregnancy fact sheet*. World Health Organization (WHO). Accessed August 20, 2022: https://apps.who.int/iris/bitstream/handle/10665/112320/WHO_RHR_14.08_eng.pdf.

WHO. (2018b). *WHO recommendations on adolescent sexual and reproductive health and rights*. World Health Organization (WHO). Accessed August 20, 2022: <https://apps.who.int/iris/bitstream/handle/10665/275374/9789241514606-eng.pdf>.

WHO. (2020). *Adolescent pregnancy*. Accessed August 20, 2023: <https://www.who.int/news-room/fact-sheets/detail/adolescent-pregnancy>.

WHO, W. (2007). *Unmet needs and undone deeds: A review of the literature and programmes*.

Wodon, Q., Male, C., Nayihouba, A., Onagoruwa, A., Savadogo, A., Yedan, A., Edmeades, J., Kes, A., John, N., & Murithi, L. (2017). *Economic impacts of child marriage: Global synthesis report*.

Woog, V., Susheela, S., Alyssa, B., & Jesse, P. (2015). *Adolescent womens need for and use of sexual and reproductive health services in developing countries*. Citeseer.

World Bank. (2018). *Poverty Incidence in Kenya Declined Significantly, but Unlikely to be Eradicated by 2030*. Accessed August 24, 2022: <https://www.worldbank.org/en/country/kenya/publication/kenya-economic-update-poverty-incidence-in-kenya-declined-significantly-but-unlikely-to-be-eradicated-by-2030>.

Yakubu, I., & Salisu, W. J. (2018). Determinants of adolescent pregnancy in sub-Saharan Africa: A systematic review. *Reproductive Health*, 15(1), 1–11.

Zolnikov, T. R. (2014). Let's talk about culture! Experiencing a disco funeral in Western Kenya. *Journal of Public Health*, 36(1), 2–4. <https://doi.org/10.1093/pubmed/fdt102>.

8 ANNEXES

8.1 Annex 1: Curriculum Vitae Lilian Mutea

Lilian Mutea

P.O. Box 5957 -00200,

Nairobi, Kenya

p: +254 (0) 722 676 753

e: lmutea@gmail.com



Lilian Mutea is a skilled development specialist with 18 years of experience and an expert in Reproductive, Maternal, and Child Health. She advises Governments and Partners on policies and strategies that expand Universal Health Care, reduce inequalities, and support women, girls, and youth to achieve their full potential. Lilian has wide experience in strategic leadership, Health care financing, policy development, private sector engagement, program management, and has extensive experience in creating partnerships, engaging, and collaborating with diverse partners towards common goals. In this regard, she's worked with in-country, regional and global partners in expanding access to Universal Health Coverage, towards reducing preventable deaths among women, girls, and Children. The partners include: PEPFAR, Global fund, GAVI, UNICEF, UNFPA, WHO, World Bank, Development Finance Corporation, FCDO, BMGF, IGAD, EAC, Private sector, civil society organizations and host governmentsPROFESSIONAL

EXPERIENCE

USAID Kenya and East Africa, Nairobi, Kenya: USAID is an international development agency driving development results in partner governments. USAID's work advances U.S. national security and economic prosperity, demonstrates American generosity, and promotes a path to recipient self-reliance and resilience.

- **2022- To date: Deputy Office Director, Health Population and Nutrition Office**
- **2020- 2022: Family Health Center of Excellence Director** – Reproductive Health, Family Planning, Maternal and Child Health (RH/FP/MCH), Nutrition and WASH
- **August 2010- February 2020 -Team Leader-** Reproductive, Family Planning, Maternal, Newborn, Adolescent and Child and Adolescent Health (RMNCAH), Health, Population & Nutrition Office
- **Specialization:** Development of policy & strategy; partnerships and collaboration: USG, in-country development partners, multilateral organizations (GAVI, Global Fund, UN), Private Sector & Ministry of Health; Strategic, Commodity Security and Supply chain management; Cross sectoral coordination, multi-sectoral collaboration, Research for development, Project design, planning & budgeting; Performance monitoring & Evaluation; Communication for results; Implementation science

UNICEF, Nairobi, Kenya, January 2007– February 2010 : UNICEF is a special program of the United Nations (UN) devoted to aiding national efforts to improve the health, nutrition, education, and general welfare of children. UNICEF works in over 190 countries and territories to save children's lives, to defend their rights, and to help them fulfil their potential, from early childhood through adolescence.

Safe Motherhood Specialist, Kenya : Specialization: Technical Assistance to the ministry of health, Program coordination; Planning, facilitating & disseminating health information; Management of local implementing partners, Collaboration & development of joint program of work & annual operations plans (AOPs) with partners & Ministry of Health; Provision of Humanitarian Support Monitoring & evaluation.

EDUCATION

Master of Public Health (2010) - Kenyatta University, Kenya

Bachelor of Science in Nursing (2002) - University of Nairobi, Kenya

SCIENTIFIC PUBLICATIONS AND PRESENTATIONS

- Mutea L., Ontiri S., Macharia S., Tzobotaro M., Ajema C., Odiara V., Kadiri F., Orero S., Kabue M., Michielsen K., Gichangi P: Evaluating the effectiveness of a combined approach to improve utilization of adolescent sexual reproductive health services in Kenya: a quasi-experimental design study protocol. *Reprod Health*. 2019;16(1):153. Epub 2019/10/31. doi: 10.1186/s12978-019-0825-3.
- Mutea L., Ontiri S., Kadiri F., Michielsen K., Gichangi P. Access to information and utilization of adolescent sexual reproductive health services: Qualitative exploration of barriers and facilitators in Kisumu and Kakamega. Published: November 12, 2020, <https://doi.org/10.1371/journal.pone.0241985>
- Mutea L., Were V., Ontiri S., Michielsen K., Gichangi P. Trends and Determinants of Adolescent Pregnancy: Results from Kenya Demographic Health Surveys 2003–2014: Published October 2022, *BMC Women's Health* (2022) 22:416; <https://doi.org/10.1186/s12905-022-01986-6>
- Mutea L., Kathure I., Kadengye D., Kimanzi S., Wacira D., Onyango N., Wao H. Determinants of contraceptive use among women 0–23 months postpartum in Kitui County, Kenya: A cross-sectional study. Published: June 2, 2022, <https://doi.org/10.1371/journal.pgph.000048>
- Mutea L., Maluni Justinah., Kabue M., Were V, Ontiri S., Michielsen K, Gichangi P. The effectiveness of a combined approach towards improving utilization of Adolescent Sexual Reproductive Health Services: Results from a quasi-experimental study in Kenya: Submitted to SRH matters, February 2023.
- Ontiri S., Mutea L., Muganda M., Mutanda P., Ajema C., Okoth S., Orero S, Odhiambo R., Biesma R., Stekelenburg J., Kabue M. Protocol for a prospective mixed-methods longitudinal study to evaluate the dynamics of contraceptive use, discontinuation, and switching in Kenya. *Reprod Health*. 2019;16(1):134
- Ontiri S, Mutea L, Naanyu V, Kabue M, Biesma R, Stekelenburg J. A qualitative exploration of contraceptive use and discontinuation among women with an unmet need for modern

contraception in Kenya. *Reprod Health*. 2021 Feb 9;18(1):33. doi: 10.1186/s12978-021-01094-y. PMID: 33563304; PMCID: PMC787161

- Parish E, Ajema C, Mutea L and Susan Ontiri: Determinants of contraceptive use among unmarried young women in Kakamega County, Kenya. *Adolescents* 2023, 3(3), 382-393; <https://doi.org/10.3390/adolescents3030026>
- Mutea L. Assessments of Factors Determining the choice of birth Attendants in Kisau Division, Makueni District Kenya: <https://ir-library.ku.ac.ke/bitstream/handle/123456789/610/lilian%20mutea%20.pdf?sequence>
- Population Council; Approaches of promoting dignified care during childbirth: Experiences from Kenya (2013). Presented by Mutea L at the ECSA Health conference, Dare salaam Tanzania.

8.2 Annex 2: Ethics

8.2.1 Ethics training certificate



Completion Date 29-Aug-2018
Expiration Date 28-Aug-2023
Record ID 28247559

This is to certify that:

Lilian Mutea

Has completed the following Citi Program course:

Human Research (Curriculum Group)
JHSPH BASIC HUMAN SUBJECTS RESEARCH COURSE (Course Learner Group)
1 - Basic Course (Stage)

Under requirements set by:

Johns Hopkins Bloomberg School of Public Health



8.2.2 Ethics approval: Kenya Medical Research Institute



KENYA MEDICAL RESEARCH INSTITUTE

P.O. Box 54840-00200, NAIROBI, Kenya
Tel: (254) (020) 2722541, 2713349, 0722-205901, 0733-400003, Fax: (254) (020) 2720030
E-mail: director@kemri.org, info@kemri.org, Website: www.kemri.org

KEMRI/RES/7/3/1

February 20, 2019

**TO: DR. MARK M. KABUE
JHPIEGO
PRINCIPAL INVESTIGATOR**

Dear Sir,

RE: NON-KEMRI PROTOCOL NO. 651 (RESUBMISSION OF INITIAL SUBMISSION): EFFECTIVENESS OF A COMBINED APPROACH TOWARDS IMPROVING UTILIZATION OF ADOLESCENT SEXUAL REPRODUCTIVE HEALTH SERVICES IN KISUMU AND KAKAMEGA COUNTIES, KENYA

Reference is made to your letter February 12, 2019. The KEMRI Scientific and Ethics Review Unit (SERU) acknowledges receipt of the revised study documents on February 14, 2019.

This is to inform you that the Committee notes that the following issues raised during the 283rd Committee A meeting of the KEMRI Scientific Ethics Review Unit (SERU) held on **January 15, 2019** have been adequately addressed.

Consequently, the study is **granted approval** for implementation effective this day, **February 20, 2019** for a period of one year. Please note that authorization to conduct this study will automatically expire on **February 19, 2020**. If you plan to continue data collection or analysis beyond this date, please submit an application for continuation approval by **January 08, 2020**.

You are required to submit any proposed changes to this study to SERU for review and the changes should not be initiated until a written approval from SERU is received. Please note that any unanticipated problems resulting from the implementation of this study should be brought to the attention of SERU and you should advise SERU when the study is completed or discontinued.

Yours faithfully,

**ENOCK KEBENEI
THE ACTING HEAD
KEMRI SCIENTIFIC AND ETHICS REVIEW UNIT**

8.2.3 Ethical approval: Johns Hopkins Bloomberg School of Public Health



FWA #00000287

JHSPH Institutional Review Board Office
615 N. Wolfe Street / Room E1100
Baltimore, Maryland 21205-2179
Phone: 410-955-3193
Toll Free: 1-888-262-3242
Fax: 410-502-0584
Email: jhsph.irboffice@jhu.edu
Website: www.jhsph.edu/irb

APPROVAL/DETERMINATION MEMO

New Application

Date: April 25, 2019

To: Mark Kabue, Dr.PH
Department of International Health

From: Luke C. Mullany, PHD, MHS
Chair, IRB- X

Study Title: Effectiveness of a combined approach towards Improving Utilization of Adolescent Sexual Reproductive Health Services in Kisumu and Kakamega Counties, Kenya

IRB No.: 00009227

<input type="checkbox"/> Approved	<input checked="" type="checkbox"/> Approval/Determination Date: January 24, 2019
<input type="checkbox"/> Approved, minor change (single reviewer)	<input checked="" type="checkbox"/> Approval Lapse Date: January 23, 2020
<input checked="" type="checkbox"/> Approved Expedited Cat: 5 & 7	
<input type="checkbox"/> Determined to be Exempt Cat:	

As Principal Investigator for this IRB approved study, you are responsible for conducting the study in accordance with the ethical principles of the Belmont Report, in compliance with all relevant laws and regulations, and in accordance with JHU institutional policy.

This approval is inclusive of the following documentation:

Research Plan/Sponsor's Protocol:

- Research Plan (Version #3, 2-25-19)

8.2.4 Registration of the clinical trial



11 June 2019

To Whom It May Concern:

RE: Effectiveness of a combined approach towards Improving Utilization of Adolescent Sexual Reproductive Health Services in Kisumu and Kakamega Counties, Kenya.

As project manager for the Pan African Clinical Trial Registry (www.pactr.org) database, it is my pleasure to inform you that your application to our registry has been accepted. Your unique identification number for the registry is **PACTR201906738029948**.

Please be advised that you are responsible for updating your trial, or for informing us of changes to your trial.

Additionally, please provide us with copies of your ethical clearance letters as we must have these on file (via email or post or by uploading online) at your earliest convenience if you have not already done so.

Please do not hesitate to contact us at +27 21 938 0835 or email epienaar@mrc.ac.za should you have any questions.

Yours faithfully,

Elizabeth D Pienaar

www.pactr.org Project Manager +27 021 938 0835

The South African Medical Research Council

Cochrane South Africa | PO Box 19070, Tygerberg, 7505

Tel: +27 (0)21 938 0438 | Email: cochrane@mrc.co.za | Web: www.southafrica.cochrane.org



8.2.5 Country government approval Kisumu

REPUBLIC OF KENYA
COUNTY GOVERNMENT OF KISUMU

Telegrams: "PRO (MED)"
Tel: 254-057-2020105
Fax: 254-057-2023176
E-mail: kisumcodh@gmail.com



County Director of Health and
Sanitation,
P.O. Box 721 – 40100,
Kisumu.

DEPARTMENT OF HEALTH AND SANITATION

Our Ref: ST/64/VOLIV/ (173)

Date: 1st April, 2019

To: **AIISCMOHs**

- Nyando Sub-County
- Kisumu East Sub-County

RE: Research Authorization – Effectiveness of a combined approach towards Improving Utilization of Adolescent Sexual Reproductive Health Services in Kisumu and Kakamega Counties, Kenya.

Afya Halisi Project is hereby approved by the County Department of Health Services to carry out the aforementioned Research. This is following authorization of KEMRI to undertake the same in Kisumu County.

The 2015 ASRH policy for Kenya advocates for working with ministries of Education and Health among other line ministries, inclusion and participation of young people, political arms and others stakeholders for the success of ASRH programs. To actualize the 2015 policy, the Ministry of Health outlined four service delivery models for ASRH in Kenya which include: a) Community based: Services and information are offered to adolescents within the community/non-medical settings b) Clinical based: Services and information are offered to adolescent within/based on health facility setting c) School based: Services and information are offered to adolescents within the school setting. d) Virtual based: Services and information are offered to adolescents within the virtual space or digital platforms. Implementation of this combined model has not been fully implemented, and its effectiveness has not yet been established in Kenya. The two-year study that is expected to run from April 2019 to May 2021 aims to assess the effectiveness of a combined model towards improving utilization of Adolescent Sexual Reproductive Health (ASRH) services in Kisumucounty, Kenya.


The study implementation will be in two phases;

- Phase one will entail formative assessment to establish the barriers, facilitators, preferences and experiences by adolescents while using information and ASRH services
- Phase two will involve a quasi-experiment evaluation design to evaluate the ASRH program intervention rollout, on the effectiveness of a combined model towards improving utilization of ASRH services. The intervention ward will be Kobura in Nyando sub county while the comparison ward will be Kajulu in Kisumu East sub county.

Afya Halisi project is further instructed to remain within the confines of the Research Protocol as has been underscored in the ethical approval. They are to submit an executive summary report within 90 days upon completion of the study.

For further information, please contact the lead in country investigator- Susan Ontiri susan.ontiri@jhpigo.org or Dr. Solomon Orero- Telephone 0711562131, Email address - Solomon.orero@afyahalisi.org

Kindly accord them assistance as they carry out the research.


Dr. Ochiango D. O
County Director for Health
Kisumu County



8.2.6 County government approval Kakamega

**REPUBLIC OF KENYA
COUNTY GOVERNMENT OF KAKAMEGA**



MINISTRY OF HEALTH SERVICES

E-mail: pdmswestern@gmail.com
Website : www.kakamega.go.ke
When replying please quote

**OFFICE OF CHIEF OFFICER
MEDICAL SERVICES
P O BOX 2309- 50100
KAKAMEGA**

Ref : CGK/MOH/OCO/IV/253

DATE: 3rd April, 2019

To All SCMOHs

- Matungu Sub-County
- Navakholo Sub-County

RE: Research Authorization – Effectiveness of a combined approach towards Improving Utilization of Adolescent Sexual Reproductive Health Services in Kisumu and Kakamega Counties, Kenya.

Afya Halisi Project is hereby approved by the County Department of Health Services to carry out the aforementioned Research. This is following authorization of KEMRI to undertake the same in Kakamega County.

The 2015 ASRH policy for Kenya advocates for working with ministries of Education and Health among other line ministries, inclusion and participation of young people, political arms and others stakeholders for the success of ASRH programs. To actualize the 2015 policy, the Ministry of Health outlined four service delivery models for ASRH in Kenya which include: a) Community based: Services and information are offered to adolescents within the community/non-medical settings b) Clinical based: Services and information are offered to adolescent within/based on health facility setting c) School based: Services and information are offered to adolescents within the school setting. d) Virtual based: Services and information are offered to adolescents within the virtual space or digital platforms. Implementation of this combined model has not been fully implemented, and its effectiveness has not yet been established in Kenya.

The two-year study that is expected to run from April 2019 to May 2021 aims to assess the effectiveness of a combined model towards improving utilization of Adolescent Sexual Reproductive Health (ASRH) services in Kakamega County, Kenya.

The study implementation will be in two phases;

- Phase one will entail formative assessment to establish the barriers, facilitators, preferences and experiences by adolescents while using information and ASRH

services

- Phase two will involve a quasi-experiment evaluation design to evaluate the ASRH program intervention rollout, on the effectiveness of a combined model towards improving utilization of ASRH services. The intervention ward will be Kholera in Matungu Sub County while the comparison ward will be Bunyala West in Navakholo Sub County.

Afya Halisi project is further instructed to remain within the confines of the Research Protocol as has been underscored in the ethical approval. They are to submit an executive summary report within 90 days upon completion of the study.

For further information, please contact the lead in country investigator- Susan Ontiri, susan.ontiri@jhpiego.org or Dr. Solomon Orero- Telephone 0711562131, Email address – Solomon.orero@afyahalisi.org

Kindly accord them assistance as they carry out the research.

Dr. Etemesi

Dr. Beatrice Etemesi
Chief Officer Medical Services



Cc: CEC Member Health Services.
Chief Officer Public Health

8.3 Annex 3: Research plan / Study protocol

A.1 John Hopkins School of Public Health (JHSPH) IRB Research Plan for New Data Collection

PI Name: Mark Kabue, Dr.PH

Co-Investigators: Lilian Mutea, Peter Gichangi, Sheila Macharia, Meital Tzobotaro, Carol Ajema, Susan Ontiri, Eunice Omanga, Francis Kadiri

Study Title: Effectiveness of a combined approach towards Improving Utilization of Adolescent Sexual Reproductive Health Services in Kisumu and Kakamega Counties, Kenya.

IRB No: 9227

PI Version No. / Date: May 03, 2019.v4

I. Aims of the Study: Describe the aims/objectives of the research and/or the project's research questions or hypotheses.

Main objective: To establish the effectiveness of a combined model towards improving utilization of Adolescent Sexual Reproductive Health (ASRH) services in Kisumu and Kakamega counties, Kenya.

Specific Objectives:

1. To analyze the barriers, facilitators, preferences, and experiences towards uptake of ASRH services among adolescents in Kenya
2. To assess the level of knowledge, attitude, practices, and healthcare seeking behavior of Adolescents towards ASRH services in Kisumu and Kakamega counties, Kenya.
3. To conceptualize and test the effectiveness of a customized combined ASRH program intervention model towards improving utilization of ASRH services in Kisumu and Kakamega Counties, Kenya.
4. To describe evidence-based approaches for delivery of Adolescent and Sexual Reproductive Health (ASRH) and through a systematic review
5. To describe the trends in coverage of reproductive health services for adolescents aged 15-19 years in Kenya, using 2003 – 2014 KDHS data.

II. Background and Rationale: Explain why this study is being done. Summarize briefly what is already known about the issue and reference previously published research, if relevant.

Background

Adolescent pregnancy continues to be a major problem in Kenya, with a teenage pregnancy rate of 18 % and an adolescent birth rate of 96 per 1,000 women (KNBS, 2015). Data from the 2014 Kenya Demographic Health Survey (KDHS) indicates that one in every five teenage girls between the ages of 15-19 have begun childbearing; contraceptive prevalence rate among sexually active unmarried girls aged 15-19 years is 49%; the age of sexual debut has decreased, with 12% of young women and 21% of young men aged 15-24 years having had sexual intercourse before the age of 15, while 47% of young women and 55% of young men between the ages of 18-24 years have had sexual intercourse before the age of 18. The estimated number of girls (15-19) years old who began childbearing grew from 755,000 in 2009 to 843,000 in 2014, which is in part attributed to the high unmet need for contraceptives among adolescents, currently estimated at 23% (KNBS, 2015).

Adolescent pregnancy, whether intended or unintended, increases the risk of maternal mortality and morbidity, including complications of unsafe abortion, prolonged labor, delivery, and post-natal period (Banke-Thomas, & Ameh, 2017). In addition, consequences of unintended

pregnancy among girls in Kenya include termination of education (dropping out of school), child marriage, and unsafe abortion (Rosemary & Martin, 2008). Evidence shows that among adolescent girls who had started childbearing by age 18 in Kenya, 98 percent were out of school (Rosemary & Martin, 2008). It is also estimated that about 13,000 girls drop out of school annually in Kenya due to early and unintended pregnancy (Rosemary & Martin, 2008). Women who become mothers in their teens are more likely to curtail education and have reduced career progression and economic empowerment, hence perpetuating the cycle of poverty (KNBS, 2015). Due to the social sensitivity surrounding ASRH issues, many countries lack formal policies regarding the provision of Reproductive Health (RH) information and services to adolescents. Kenya has developed a National Adolescent Sexual and Reproductive Health Policy (revised 2015), which provides guidance to government ministries and partners on how to respond to ASRH needs. This Policy recognizes the importance of addressing adolescent sexual and reproductive health needs for achieving the country's development goals. Despite this legal framework, implementation of ASRH services has been weak and uncoordinated (MOH, 2015). The absence of reinforcement of ASRH policies enables administrators and service providers to impose restrictions based on their personal beliefs that prohibit youth from gaining access to essential information and services. As such, contraceptive prevalence rate (CPR) among married adolescent girls (15-19) is low at 37% while the unmet need for FP among adolescents is high at 23% as compared with CPR of 56% among 15-49 with an unmet need for FP at 18% for the later (KNBS, 2015).

Rationale

Adolescents' access to sexual and reproductive health services and information, is a gap that is yet to be fully addressed. Several studies have been undertaken to assess what works to increase access and utilization for ASRH among young people. There is however lack of scientifically sound data on the effectiveness of services targeting young people in Sub-Saharan Africa, in comparison to the magnitude of ASRH challenges experienced in the region (Denno, Hoopes, & Chandra-Mouli, 2015). In addition, there is limited evidence to support the effectiveness of initiatives that simply provide adolescent friendliness training for health workers (Denno et al., 2015) Results show that interventions with multiple components such as a combination of health service provider training, multi-sectoral collaboration, and community wide health education activities and outreaches services are often reported to lead to increased ASRH service use by young people (Denno et al., 2015) Unfortunately, most studies have had methodological deficiencies and very few have been able to measure the effects of inventions using biological outcomes such as HIV, STIs and pregnancy rates (Denno et al., 2015)

Systematic reviews of available published literature suggest that current interventions targeting youth tend to have significant positive effects on improving young people's knowledge and sometimes attitudes regarding sexual behavior but are less effective in demonstrating change in sexual behavior outcomes (Chandra-Mouli et al., 2014). A review of Evidence on Interventions Commonly Accepted as Best Practices Chandra (Chandra-Mouli, Lane, & Wong, 2015) *What Does Not Work in Adolescent Sexual and Reproductive Health*, established that many ASRH interventions are implemented in an uncoordinated and piecemeal fashion, hence does not result in positive outcomes (Chandra-Mouli et al., 2014). A combination of multiple strategies is therefore likely to reach more adolescents as opposed to one standalone approach (Chandra-Mouli et al., 2014). A study on young people's perception of ASRH services in Kenya showed that young people wished to see an increase in ASRH services, especially in rural areas, including the use of mobile clinics. The study also suggested the need to increase awareness of available ASRH services among young people and the community in general through outreach activities in the community, schools, and churches (Godia et al; 2014). In certain instances, only make mention

of gender as a key influencer of reproductive health. However, there is very limited research that has been conducted to understand how boys and girls respond differently to existing RH needs and/or services. There is also limited research that has been undertaken with a focus on the adolescent boys. Some of the studies and programming limit their gender responsiveness only to data disaggregation by sex, but do not dig deeper to establish why boys and girls may respond differently to SRH services, and how/why the uptake of these services differs by gender.

The 2015 ASRH policy for Kenya advocates for working with ministries of Education and Health among other line ministries, inclusion and participation of young people, political arms, and other stakeholders for the success of ASRH programs (Kenya, 2015)). To actualize the 2015 policy, the Ministry of Health outlined four service delivery models for ASRH in Kenya which include: a) Community based: Services and information are offered to adolescents within the community/non-medical settings b) Clinical based: Services and information are offered to adolescent within/based on health facility setting c) School based: Services and information are offered to adolescents within the school setting. d) Virtual based: Services and information are offered to adolescents within the virtual space or digital platforms. Implementation of this combined model has not been fully implemented, and its effectiveness has not yet been established in Kenya.

The ASRH program intervention design and delivery will be led by the counties with support from Afya Halisi project, which is a Jhpiego-led consortium. Afya Halisi is a 5-year USAID-funded project that focuses on Family Planning/Reproductive, Maternal, Newborn, Child, and Adolescent Health project in four counties of Migori, Kisumu, Kakamega and Kitui. The ASRH component which will be implemented in Kisumu and Kakamega counties only seeks to improve access and utilization of quality ASRH services and consequently reduce the burden of teen pregnancy. Evaluation of the ASRH program rollout seeks to establish the barriers, facilitators, preferences, and experiences towards uptake of ASRH services. This will also establish effectiveness of a customized combined model towards improving utilization of ASRH services in the counties of **Kisumu and Kakamega** in Kenya. The two counties are also among those with the highest burden of teen pregnancy in Kenya at 22% and 15% consecutively (KNB, 2015), and the study will focus on the sub counties with the highest burden of teen pregnancy.

III. Study Design:

A. Provide an overview of your study design and methods.

Methodology

The study will employ two design methods: cross-sectional formative assessment (Phase 1), and quasi-experimental study design (Phase 2).

Phase 1: Formative assessment

1. Desk review, policy review and Secondary analysis
2. A systematic desk review of secondary published data on ASRH will be undertaken in the last 10 years. This review will be conducted on published literature databases (BIDS, Medline, PubMed, Hinari etc.) following key words or combinations: ASRH, adolescent, family planning, teen pregnancy, and contraceptives
3. A policy analysis for ASRH in Kenya will involve total coverage of all policies related to ASRH in Kenya. A policy matrix will be used to document data by themes: analysis of the strengths, suitability, limitations of policy implementation to improve access and utilization of ASRH.

4. A secondary analysis of the 2003, 2008/9 and 2014 Kenya Demographic Health Survey data will be undertaken to describe the trends and determinants of coverage and utilization of ASRH services among adolescents in Kenya
5. **Cross-sectional design:** A cross-sectional study design will be utilized for the formative assessment to establish the barriers, facilitators, preferences, and experiences by adolescents while using information and ASRH services. This will be achieved through Focus Group Discussions (FGD) and In-depth interviews (IDIs) with adolescent boys and girls, ASRH service providers (both public and private sector), Teachers and Community Health Representatives. Key informant interviews (KIIs) will be used to collect information from county level leaders and decision makers on ASRH issues. The formative assessment will also reference a gender analysis undertaken in 2018 in the study areas that aims to establish the barriers to uptake of contraception among adolescent girls and boys.

Phase 2: Quasi-experimental design

A quasi-experiment evaluation design is proposed to evaluate the ASRH program intervention rollout, on the effectiveness of a combined model towards improving utilization of ASRH services. In both counties, program intervention and comparison groups will be selected while taking measures to ensure that the comparison group matches the program intervention group in general composition, such as possession of similar socio demographic characteristics. Using the stratified cluster sampling approach, a household survey will be conducted in the two groups of sub counties targeting adolescents at baseline and end line. The aim of the survey will be to establish the status of adolescents’ knowledge, attitude, and utilization of ASRH services. Implementation of the program intervention will be population-based, targeting adolescent boys and girls aged 15-19 years in the intervention areas.

The ASRH package of services to be provided in the program intervention group will target both boys and girls and will be delivered through a multi-sectoral approach at health facility, communities, and school level. In the comparison group, adolescents will continue to receive the routine ASRH activities provided at facility level. An endline assessment will be done at the end of the 18 months implementation period. Health facility data quality improvement processes will be implemented in both groups to ensure that ASRH activities are accurately documented. In addition, the quality of ASRH services at health facilities at endline will also be assessed through client exit interviews. An analysis of the primary outcome will be undertaken to establish the difference in difference between the program intervention and comparison group, before and after the implementation. A data analysis plan is presented in section V. A detailed description of the activities is provided under the “study implementation section”. Table 1 shows a summary of the inputs for the intervention and control groups.

Table 1: Summary of Package of activities by evaluation group

	Program Intervention group	Comparison group
ASRH service delivery at facility level	✓	✓
ASRH service delivery at community	✓	X
ASRH service delivery in schools	✓	X
Targeted Social Behavior Change Communication (SBCC)	✓	X

B. Provide a sample size and a justification as to how you arrived at that number. If you use screening procedures to arrive at a final sample a table may be helpful.

Sample size determination for phase 1:

Sample size for formative assessment participants are shown in Table 2. Data for formative assessment will be collected through focus group discussions (FGDs) and IDIs from adolescents. In-depth interviews will be done among teachers, healthcare workers, and community representatives. Additionally, key informant interviews (KIIs) will be done with county leadership. The participants will be selected purposefully. The findings from the formative assessment will be used to inform the design of the ASRH package that will be offered to ensure context-specific strategies are put in place to address the needs of the target population. The ASRH rollout wards where data will be collected from Nyando Sub County (Kisumu County) and Matungu Sub County (Kakamega County)

c) Sampling Method: A multi stage cluster sampling methodology will be used:

Administratively, Kenya is divided into smaller units with the community unit being the lowest unit which has approximately 5,000 inhabitants. The hierarchy is as follows: Country >> County >> Sub- County >> Ward >> Community Unit (CU). Implementation of the intervention will be at ward level.

Kisumu and Kakamega counties were selected as project areas in part because the two are among counties those with the highest burden of teen pregnancy in Kenya at 22% and 15% respectively (KNB, 2015). Two sub counties within Kisumu County (Nyando and Kisumu East) and two sub counties within Kakamega County (Matungu and Navakholo) will be the focus sub counties for this study. These four sub counties are also among those with high burden of teenage pregnancy. Therefore, within the identified 4 sub counties, one ward with the highest teen pregnancy rates and low utilization of family planning services has been identified in each of the four sub counties, making a total of two wards per evaluation group. The evaluation wards have also been purposively selected based on the burden of the teenage pregnancy. Community units are made up of villages, which for the purpose of sampling will be “cluster units”. Since the total number of units in each CU and ward is known, villages will be randomly selected; 8 villages in Kobura ward and 8 from Kajulu ward in Kisumu County. In Kakamega, 7 villages in Kholera ward and 7 villages in Bunyala west ward. The sample size will be equally distributed among the selected villages in each ward (See table 5). The total number of villages and households in each ward is shown in table 6.

Table 6: Number of villages and Households in two evaluation areas

Ward	Number of villages	Total number of households
Kisumu County		
Kajulu Ward	96	8980
Kobura Ward	78	10884
Kakamega County		

Kholera Ward	38	4341
Bunyala west Ward	59	6001

Households will be selected through systematic random sampling at an interval of 100-200 meters from a particular landmark, until the required sample size is achieved for each ward. In households with multiple adolescents, the Kish method (Kish, L. (1965) will be used to randomly select one individual from each household (see table 7). The study will find out how many eligible adolescent girls are living in the household, aged 15-19 years who do not have children and are not pregnant. The eligible adolescents will be ranked by age, with the oldest female is number 1, the second oldest female is number 2, and so on. The first household where you do an interview is household 1, the second is household 2, and so on, up to household 8 - the last in the cluster. Look up the column for the household number, and the row for the number of eligible people. The number in the cell where the column and row meet is the person to interview. For example, if household 2 has 3 adults, interview the 2nd youngest (shown in bold type). If that person is not there when you call, arrange to come back later.

Table 7: Kish Grid

Eligible people	Household number [Last digit]							
	1	2	3	4	5	6	7	8 /9
1	1	1	1	1	1	1	1	1
2	1	2	1	2	1	2	1	2
3	1	2	3	1	2	3	1	2
4	1	2	3	4	1	2	3	4
5	1	2	3	4	5	3	4	5
6	1	2	3	4	5	6	3	6
7	1	2	3	4	5	6	7	4
8	1	2	3	4	5	6	7	8
9	1	2	3	4	5	6	7	8
10 or more	1	2	3	4	5	6	7	8

IV. Participants:

Describe the study participants and the population from which they will be drawn. Specify the inclusion and exclusion criteria. If you plan to include children, note their ages and whether you will include children in foster care. Note if the participants are particularly vulnerable in terms of cognitive limitations, education, legal migration status, incarceration, poverty, or some combination of factors.

Study participants for both study phases will be drawn from among the adolescents, community members, teachers, healthcare workers, and county health managers in the two counties. Each participant group is described in this section.

1. **Adolescents:** These participants will be selected from the community and from among those seeking services in the health facilities. Snowball methods will be used to select adolescents who are easy to reach and available. These adolescents will be reached through networks of youth organizations and health facilities participating in the study. Additionally, some participants will be selected from schools. For FGDs and IDIS, we will sample both male and female adolescents. FGDs and IDIS will be conducted with adolescent to assess their experiences and preferences around use of ASRH services. A household survey will be

conducted to establish adolescents' girl's knowledge, attitude, and use of ASRH services. Client exit interviews will also be conducted for adolescents' boys and girls to establish experience and satisfaction levels for ASRH services offered at the facilities and outreach points.

2. **Community Representatives:** This group will comprise of parents of adolescents – (not necessarily the ones participating in the study), community health workers/volunteers, community leaders like chiefs, and religious leaders and youth Champions. A Youth champion is a young person (below 24 years) involved in leadership, advocacy or ASRH service provision and may be a leader or member of an existing youth group in the community. IDIs will be conducted with each community representative to explore their decision-making processes around adolescent's sexuality and use of ASRH services, gender roles, and personal beliefs, Gender based violence against adolescents, legal issues (if any). The study will ensure equal gender representation within the Community Representatives selected to participate
3. **ASRH Health Service Providers** (public and private facilities): Services providers in the participating health facilities who routinely provide ASRH services to adolescents will be selected. IDIs will be conducted with each provider with an aim of exploring their experiences with providing ASRH services to young people. The specific topics/domains to explore with providers will include: attitudes towards providing ASRH services to adolescents; personal beliefs and adaptability to meet adolescents' health needs. The study will ensure equal gender representation within the Health Service Providers selected to participate
4. **Teachers:** Guidance and counselling teachers/counsellors from primary and secondary schools in the study sub counties will be selected to participate. IDIs will be conducted with an aim of exploring their experiences with providing ASRH information and services to adolescents in schools. The specific topics/domains to explore with providers will include: attitudes towards providing ASRH information and services to adolescents within school; personal beliefs, policy direction towards ASRH service provision in schools, policy on school re-entry post pregnancy and adaptability to meet adolescent's health needs. The study will ensure equal gender representation within the Teachers selected to participate.
5. **County Leadership:** six participants will be selected from county leadership in the each of the two counties. These will include County Directors in the Ministry of Education, Health and Youth, and Reproductive Health Coordinator, in each of the two counties. KIIs with these decision makers will be conducted with an aim of exploring their opinion of how to improve utilization of ASRH service and Information gathered will be useful in refining the proposed ASRH package.

Inclusion and exclusion criteria

The inclusion and exclusion criteria for each category of study participants is summarized in table 8.

Table 8: Summary of inclusion and exclusion criteria

Participant Category	Inclusion Criteria	Exclusion Criteria
Adolescent participants in FGD and IDIs	15-19-year-old boys and girls who are residents of the selected study region. Adolescents 18-19 years who provide informed consent	When either informed consent or parental permission and informed assent is not provided as applicable Adolescents who have already had a first birth or are pregnant Adolescents in foster care Adolescents with mental disability

	Non-emancipated minors 15-17 years* whose parents provide permission the minors provide assent	Individuals unable to consent on their own or unwilling to participate
KII- Community Representatives	Informed Consent provided by emancipated adolescents aged 15-17 18-19 boys' and girls' years who have received ASRH services and provide informed consent	When either informed consent (emancipated minors) or parental permission and informed assent (non-emancipated minors) is not provided as applicable
	Informed Consent provided by adolescents below 18 years who are emancipated	Adolescents in foster care
	Parental permission provided for minors (15-17) years and Assent t by provided by the minors	Adolescents with mental disability
Healthcare Workers- IDI	Influencers in the community	Individuals unable to consent on their own or unwilling to participate
	A resident of the selected study region	Unwilling to participate
Teachers - IDI	ASRH provider in a public or private health facility, or offering ASRH products and information in a chemist in the study area	Unwilling to participate
Decision makers (county leadership in education, health and youth ministries) – KII	Guidance and counselling teachers in school in the study area, who handle Adolescent health in school	Unwilling to consent Teachers not responsible for guidance and counselling
Phase two	In leadership position on ASRH and youth matters in the county	Unwilling to consent
Client exit survey		
Adolescent participants In the Household Survey	18-19 boys' and girls' years who have received ASRH services and provide informed consent	Adolescents in foster care When consent is not provided
	Informed Consent provided by adolescents below 18 years who are emancipated.	Those with intellectual/mental disability
	Parental permission provided for minors (15-17) and informed Assent provided by the minors	Individuals unable to consent on their own or unwilling to participate
	15-19 years girls	
	Committed to reside in study area for the entire duration of the study	When either informed consent (emancipated minors) or parental permission and informed assent (non-emancipated minors) is not provided as applicable
	Consent provided by adolescents over 18 years and emancipated adolescents	Adolescents who have already had a first birth or are pregnant
	Parental permission provided for minors (15-17) and informed assent by provided by the minors	Adolescents in foster care Adolescents with mental disability Individuals unable to consent on their own or unwilling to participate

**A mature minor will be defined as a "minor 15 years of age or older; living separate and apart from their parents or guardian, whether with or without the consent of a parent or guardian and regardless of the duration of the separate residence, and managing their own financial affairs, regardless of the source of income (NASCO, 2015). It also includes those who are mature due to their experience, education, training/conduct, marital status and or involvement in making*

important decisions in their lives. Additionally, Kenya's national guidelines on family planning recommend individual consent to provision of health services among mature minors described as those who are married, have children, STIs or symptoms of STIs, are pregnant or have ever been pregnant. *This will recruit adolescents aged 15-18 years who fit the definition of "mature minors" who can provide informed consent on their own behalf. A set of questions (test of understanding) will be administered to these populations to test their understanding of reproductive health, access to health services, and subsequent ability of participating in the project and their eligibility.*

Study Procedures: In this section, provide details of your procedures, particularly as they relate to human subjects. If this is a multi-center study, make the role of JHSPH clear. If the JHSPH will serve as **data coordinating center**, indicate in the sections below which procedures JHSPH will not be performing. Additional information regarding data coordinating centers is requested in a later section. If your study will develop in phases, address each item below by phase.

Recruitment Process

Describe how you will identify, approach, and inform potential participants about your study. Include details about who will perform these activities and what their qualifications are. At the design stage, the study lead will contact county health authorities, describe the study, and seek permission to carry out the study. During implementation, the research teams will approach community leaders and local administrative authorities and describe the study to them after permission has been granted at county level. Different recruitment procedures will vary between different sub-groups of the participants as described below. A recruitment script will be used at the different participant enrolment points (baseline and endline), to introduce the study, explain the purpose of the study and rights of participants among other things.

Phase I Enrollment

Enrolment of participants for the formative assessment will be through link health facilities, surrounding schools and the community within the facility catchment area.

FGD with adolescents

At baseline, a total of 6 FGDs with adolescents will be conducted as part of the formative research phase in the study area. Two will be girls only FGD, two will be boys only FGD and two will consist of 50% boys and 50% girls. A total of 10 adolescents will be invited by the research assistant to participate in each FGD. Purposive sampling will be used in the selection of adolescents (male and female) aged 15-19 years from the catchment area using leaders of existing youth social networks and church leaders, as well as from health facilities where ASRH services are offered. These adolescents will be selected based on their engagement and ability to communicate verbally in the focus group discussions. The youth and adolescent champions will be contacted and will help identify adolescents in their areas and privately explain to them why they have been selected. The adolescent FGDs will be conducted in safe spaces that are currently being used by the counties and Afya Halisi project to conduct group sessions with adolescents. These spaces are located away from schools, health facilities and homes from which these adolescents are come from. The locations will also be determined to allow for adolescents not to travel to far off places for the sessions to minimize any unforeseen risks while on transit to the venue. The invitation to the FGD will therefore include details of the venue, date, and time for the activity. Consent will be obtained individually for each participant before the FGD is executed, based on the age of the adolescent and as per the laid down procedures.

IDI with adolescents

During the FGDs, a total of 12 adolescents will be identified to individually take part in an IDI. During the FGD, the research assistant will identify the IDI adolescent participants based on their engagement and ability to communicate verbally in the focus group discussion. They will be approached at the end of the session and requested to participate in an IDI which will provide an opportunity to expound further on the topic. Consent will be obtained before the IDI is executed, based on the age of the adolescent and as per the laid down procedures. For those aged 15-17, the researcher will obtain parental contacts and obtain permission, and thereafter informed assent will be obtained from the adolescent. The adolescents will be interviewed in safe spaces that are currently being used by the counties and Afya Halisi project to conduct group sessions with adolescents. These spaces are located away from schools, health facilities and homes from which these adolescents are come from. The locations will also be determined to allow for adolescents not to travel to far off places for the sessions to minimize any unforeseen risks while on transit to the venue. These spaces will be proposed as venue for the IDIs, and the adolescent will confirm which venue is convenient for them, as well as a convenient date and time.

IDI with Health workers

A total of 12 IDI will be conducted as part of the formative assessment among health care providers. The participants will be drawn from public and private facilities providing ASRH services in Kisumu and Kakamega County. Participants will also be drawn from chemists and pharmacies providing ASRH information and products at pharmacies and chemists. Investigators will obtain a list of all ASRH providers in the participating facilities from the sub county reproductive health coordinator. The providers to participate will be purposely selected from the list, then be invited to participate through a phone call, or through a face-to-face meeting by the qualitative researcher. The facility in-charge will be notified so that if the provider accepts the invitation, they will have permission to be excused from duty during the IDI. If a provider declines, a new invitation will be sent to a provider from the same or similar site. The invitation will also include details of the venue, date, and time for the IDI. Reasons for refusal to participate will be collected by persuading the providers who decline to give their reason for declining. The IDI recruitment will ensure a balanced representation of cadres and gender of health providers, levels of care (dispensary, health centers, and Sub County hospital) as well as public and private sector. Detailed consenting procedures will be implemented before the IDI is executed.

IDI with Teachers

A total of 12 IDI will individually be conducted as part of the formative assessment among guidance and counselling teachers in both primary and secondary schools who handle ASRH. The teachers will be drawn from schools in the study areas and will be those responsible for guidance and counselling of adolescents. Investigators will obtain a list of all guidance and counselling teachers from schools in the study area, who will then individually be invited to participate through a face-to-face meeting by the qualitative researcher. The school head teacher will be notified so that if the teacher provider accepts the invitation, they will have permission to be excused from duty during the IDI. If a teacher declines, a new invitation will be sent to a teacher from the same or another participating school. The invitation will also include details of the venue, date, and time for the IDI. Reasons for refusal to participate will be collected by persuading the teachers who decline to give their reason for declining. IDI recruitment will ensure a balanced representation from primary and secondary schools and gender of teachers. Detailed consenting procedures will be implemented before the IDI is executed.

IDI with community representatives

A total of 12 IDI will individually be conducted as part of the formative assessment among community representatives who will include parents of adolescents, community health workers, religious leaders, ward administrators, peer educators, youth champions and other influencers within the community. Twenty people will be invited to individually participate in an IDI. Investigators will generate a list of key community influencers in the study wards and select the IDI participants. Selected participants will be those who have an influence on ASRH and may pose barriers or create an enabling environment. The participants will be invited to participate through a face-to-face meeting by the qualitative researcher. The invitation will also include details of the venue, date, and time for the IDI. Reasons for refusal to participate will be collected by persuading the participant who decline to give their reason for declining. IDI recruitment will ensure a balanced representation of gender for the community representatives. Detailed consenting procedures will be implemented before the IDI is executed.

KII with county leadership

A total of 10 KIIs will be conducted as part of the formative assessment among the health, education, and youth leadership of the two study counties. Participants will include county directors in the ministry of education, ministry of youth and ministry of education, reproductive health coordinators, head teachers in primary and secondary schools. The invitation will also include details of the venue, date, and time for the interview. Detailed consenting procedures will be implemented before the KIIs are executed.

Client exit interview study participants

To assess the quality of ASRH offered at baseline, client exit interviews will be conducted with adolescent boys and girls receiving ASRH services in health facilities and outreach camps. Research assistants will be recruited and trained to conduct exit interviews. The research assistants will inform the adolescents about the study after receiving ASRH services and seek informed consent for adolescent over 18 years, and adolescent aged 15-17 years who are emancipated. Parental permission will be sought for adolescent minors aged 15-17 years, and thereafter informed assent obtained from the adolescent. Minors who are not accompanied by a parent will not be interviewed since it will not be possible to obtain parental permission at the point of service delivery. Once consent has been provided, research assistants will walk with the client out of the facility compound or outreach site and identify a space with auditory and visual privacy where interviews will be conducted. A total of 372 will be interviewed in both counties combined at baseline and another 372 at endline for a total of 744 respondents.

Phase II Enrollment

The data collectors with the assistance of the local leaders will approach the sampled household and the local leader will introduce the data collector. The data collector will seek to speak to the head of the household or the partner. If the head of the household or partner is not available, the data collector will request to return another time when the head or the partner is available. If the head of the household or the partner or parent is available, then the data collector will introduce the study and seek permission to proceed with the study. Once the permission is obtained the data collector will proceed to screen the household members for eligibility. Potential participants will be guided by a brief recruitment script to confirm eligibility of the study, and if interested, perform a detailed consenting procedure. Qualified health workers will be trained to administer a consent form so potential participants know participation is voluntary and there will be no repercussions for opting not to participate. Data collectors will be recruited based on prior experience in administering questionnaires and will be required to attend a 2-day training. The training will cover topics in research ethics, e.g., the need for confidentiality, anonymity, consent, as well as their role as data collectors and how to complete the data collection tool.

1. Privacy

Adolescents

- The study anticipates there will be minimal risk on privacy by recruiting adolescent girls aged 15-17 years old for the household survey. Due to the increased vulnerabilities experienced by adolescents, the study team will be trained on how to best communicate the study objectives with the adolescent (and his or her parent, guardian, or caregiver, where appropriate) from the outset, and with whom the information obtained from this study will be shared. To address privacy the interviewers with the help of the respondents will identify a location within the house or homestead where visual and audio privacy can be guaranteed during the interview.
- The study anticipates there will be minimal risk on privacy by recruiting adolescents for the FGD and IDIs. To address this, the study will organize the meeting in a private, safe, and comfortable environment that is accessible to the participants. The study will also ensure that non-participants are not present or within hearing distance, particularly as this can give rise to protection risks.
- For the client exit interviews with adolescent boys and girls who have received ASRH services recruitment will be done after the service has been received. The interviews will be done out of the facilities and outreach camp environment to guarantee privacy and to ensure the adolescents are not intimidated to provide bias responses. The study recognizes client's participation in the study could be influenced by the total time they will have spent at the facility before receiving the service. As such, no participant will be coerced to participate in the exit interviews if they are not willing to. In instances where adolescents 15-17 years old will be accompanied to the facility by the parents/caregivers, permission will be sought from the caregivers before the adolescents provide assent.
- For the Quasi experimental evaluation: The researchers will ensure privacy by interviewing the adolescents in a private space after consent has been obtained.

Other study participants

The study will ensure privacy when recruiting health workers, community representatives and teachers to participate in IDIs by approaching each individual personally to participate. Furthermore, interviews will be held individually and in a private location where visual and audio privacy is guaranteed. Similarly, recruiting, and interviewing County leaders to participate in KIs will be handled in a similar manner.

2. **Confidentiality during recruitment:** The research team will ensure that all personal information collected during the recruitment of study participants is seen only by those in team authorized to view such data, e.g., supervisors. Links between personal identifiers and recruitment data captured electronically will be kept locked cabinets only accessible to the PI or his designees. These links will be destroyed after data entry and study IDs or codes used instead to identify respondents. Furthermore, personal identifiers or participants will NOT be retained for the 18-month period. This is because the baseline and endline surveys will be population-based utilizing two independent samples of participants at baseline and endline.

3. **Consent Process**

Describe the following details about obtaining informed consent from study participants. If a screening process precedes study enrollment, also describe the consent for screening.

- A. Who will obtain informed consent, and their qualifications:

Trained data collectors, qualitative researchers and health care providers from the study areas will obtain informed consent. Consent documents will be translated into languages that the participants can understand and detailing that data will not be shared beyond the study team. Research assistants will obtain informed consent from all study participants. The data collectors and qualitative researchers will be experienced research staff who have a minimum of post-secondary education (college diploma) and who will undergo training on basic research ethics and study procedures. The Johns Hopkins School of Public Health (JHSPH) Ethics Field Training Guide will be used during the Ethics training. For data collectors in FGDs, special emphasis will be laid on the importance of explaining to participants that they need to maintain confidentiality, especially and a disclaimer that that it cannot be guaranteed; some FGD members might share some information discussed outside the group.

B. How, where, and when the consent discussion(s) will occur: A deliberate consenting procedure will be implemented for each type of participants as summarized in the Table 9:

Table 9: Summary of consenting procedures

Study Group	Where and when consenting will occur	Who will perform the procedure	How the procedure will be done
FGD Adolescents (15-19 years)	In a designated private location (chosen by the participants) on the day when the FGDs will be conducted	A trained qualitative research assistant	This will be done individually before the FGD. The qualitative researcher will give a detailed explanation of the study, purpose, procedures of the FGD to the mothers of the 15-17 year old. Once they have provided written parental permission , the adolescents will be provided with information, then respond to questions and concerns and invite participants to confirm their participation through written assent . For the adolescents aged 18 and 19 years, an explanation of the study purpose and procedures will be provided and participant provided adequate time to raise questions and concerns, which will be adequately responded. They will then confirm their participation through written consent . Once consent is provided, some demographic questions will be administered at an individual level for each participant, and measures will be put in place to anonymize the data by ensuring that all the forms are coded. Thereafter the participant will proceed to the FGD session.
IDI: Adolescents (15-19 years)	In a designated private location (chosen by the participants) on the day when the IDI will be conducted.	A trained qualitative research assistant	This will be done individually before the IDI. The qualitative researcher will give a detailed explanation of the study, purpose, procedures of the IDI to the parent/s of the 15-17 year old. Once they have provided written parental permission , the adolescent will be provided with information, then respond to questions and concerns and confirm participation through written assent . For the adolescents aged 18 and 19 years, an explanation of the study purpose and procedures will be provided and participant provided adequate time to raise questions and concerns, which will be adequately responded. He/she will then confirm their participation through a written consent .
KIIs with County leadership IDI with Health Care Providers ID representatives	In a designated location on the premises where visual and audio privacy are guaranteed	A trained qualitative research assistant	This will be done individually. The qualitative researcher will give a detailed explanation of the study, purpose, respond to questions and concerns and invite participants to confirm their participation through Written consent and witness that all procedures were followed.

IDI with Teachers

Adolescent boys and participating in Client exit interview at baseline and endline

In a location in the facility at outreach camp with both auditory and visual privacy

A trained research assistant

This will be done individually to eligible clients who have received ASRH services and have expressed their interest to participate. For adolescents aged 18 and 19 years and emancipated minors, an explanation of the study purpose and procedures will be provided and participant provided adequate time to raise questions and concerns, which will be adequately responded. They will then confirm their participation through **written consent**. The consenting will be conducted away from the service provision area and away from the hearing/sight of the health provider.

Parental permission will be sought first for adolescents (15-17 years) who are not mature minors. If parental permission is granted, the researcher will thereafter invite the adolescent to provide **written assent**. The research assistant will witness that all procedures were followed.

Adolescents participating in household baseline and end-line assessment surveys

In a private location within the household selected by the participant where visual and audio privacy are guaranteed

This will be done individually to eligible clients within households that have been selected and visited. A detailed explanation of the study purpose and procedures will be provided and participant provided adequate time to raise questions and concerns, which will be adequately responded. Participation on the study will be through **written consent**. For adolescents aged 18 and 19 years and emancipated minors, an explanation of the study purpose and procedures will be provided and participant provided adequate time to raise questions and concerns, which will be adequately responded. They will then confirm their participation through **written consent**. The consenting will be conducted within the household in a spot identified by the participant or the parent in the case of minors. **Parental permission** will be sought first for adolescents (15-17 years) who are not mature minors. If parental permission is granted, the researcher will thereafter invite the adolescent to provide **written assent**. The research assistant will witness that all procedures were followed.

- c) The process you will use to determine whether a potential participant meets eligibility criteria: Details of eligibility have been included in Table 2 and selection for eligibility has been described under participant recruitment. For the qualitative interviews, a sampling frame will be used to increase richness of participants. The study will include young people aged 15-18 years. The Kenyan law states that minors need to have the consent of a parent or guardian. However, the law also recognizes “mature minors”, which includes children who fend for themselves, live apart from their parents/guardians, or have economic independence. It also includes those who are mature due to their experience, education, training/conduct, marital status and or involvement in making important decisions in their lives. Additionally, Kenya’s national guidelines on family planning recommend individual consent to provision of health services among mature minors described as those who are married, have children, STIs or symptoms of STIs, are pregnant or have ever been pregnant.
- d) Whether you will obtain a signature from the participant or will use an oral consent process
- e) Written consent will be obtained from the participants as per the requirements by the in-country IRB reviewing this application – KEMRI
- f) Whether you will obtain a legally authorized representative’s signature for adults lacking capacity: Not applicable.
- g) If children are included in the study, if and how you will obtain assent from them: In Kenya, persons aged below 18 years are considered to be children. For the purposes of this study, we shall reach out to adolescents aged 15-19 years, as such informed assent will be obtained from those aged 15-17 years, not married, or have never given birth. Assent will be obtained from the minor after permission has been granted by their legal guardian/parent.
- h) If children are included in the study, how you will obtain permission for them to participate from their parent, legal guardian, or other legal authority (if child is in foster care or under government supervision): Females aged 15-17 years who are married or have given birth will be considered emancipated/mature minors and eligible to give consent themselves.
- i) If you are seeking a waiver of informed consent or assent, the justification for this request: Not applicable
- j) Whether you will include a witness to the consent process and why: Not applicable.
- k) If the language is unwritten, explain how you will communicate accurate information to potential participants and whether you will use props or audio materials: Not applicable

Given these considerations and recommendations from national guidelines for conducting HIV research with adolescents in Kenya, it is generally suggested that minors can provide consent and participate in research and related interventions if the research or project question is (1) important to their health and well-being; (2) in best interest of the child; (3) indispensable because the information needed is necessary to make decisions and can only be obtained from them; (4) methods used are appropriate for children; (5) is conducted in circumstances that provide for the physical, emotional and psychological well-being of the child. This study will recruit adolescents aged 15-17 years who fit the definition of “mature minors” who can provide informed consent on their own behalf. A set of questions (test of understanding) will be administered to these populations to test their understanding of reproductive health, access to health services, and subsequent ability of participating in the project and their eligibility. Recruitment, consent, and survey tools will be translated to Swahili, Dholuo and Luhya for use when study team interacts with individuals who do not understand English (table 10)

Table 10: Counties and Language used for consent process.

<i>Country and County</i>	<i>Consent</i>	<i>Document(s);</i>	<i>Adult</i>	<i>Language</i>
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	Consent, Parental Permission, Youth Assent.)	
Kenya (Kakamega & Kisumu County)	Screening / recruitment script	Dholuo/Luhya/Swahili
Kenya (Kakamega and Kisumu County)	Written consent forms	Dholuo/Luhya/Swahili
Kenya (Kakamega and Kisumu County)	Adolescent assent forms	Dholuo/Luhya/Swahili
Kenya (Kakamega and Kisumu County)	Parental permission forms	Dholuo/Luhya/Swahili

Study Implementation:

1. Describe the procedures that participants will undergo. If complex, insert a table below to help the reviewer navigate.

Phase one

Qualitative Studies as part of formative assessment

The study participants will first be screened for eligibility using the eligibility criteria, and if found to be eligible, invited to participate in the study. The screening, consent, and interview procedures have been described in other sections of this protocol. The qualitative studies will constitute FGDs (with adolescents), In-depth interviews (health providers, teachers, and community representatives) and KII (county leaders). Participants will be invited separately, and data collection conducted in private spaces within the health facility, community halls or in their offices (for KIIS). Participants will be invited prior to the exact date of data collection and details of the venue and time communicated clearly. The interviews will be moderated by trained qualitative researchers and will be audio recorded. Additional notes will be taken by a scribe. Interview guides will be employed by the qualitative moderators to lead discussions in focused group discussions and in-depth interviews. All qualitative studies will be audio recorded. . A scribe, an assistant to the moderator, will ensure that the conversations are properly recorded. The scribe will also take handwritten notes of the interview, from which a summary will be generated at the end of the discussion. The handwritten notes will be typed thereafter. Both the soft and handwritten notes will be securely stored based on the data handling procedures described elsewhere in this plan. Audio-recorded data files after these interviews will be downloaded into to a secure, password protected computer, properly named and encrypted. The files will then be deleted from the recorder. Audio files will be transcribed from the data files in the language in which they were recorded. Those in Swahili, Luhya or Dholuo will then be translated into English language and back-translated to ensure that the original meaning is maintained. Comparisons will be done between the typed handwritten notes and the transcripts. The original transcripts translated, and the back-translated versions will be handled using the data management practices explained elsewhere.

Phase Two

Client exit interview as part of formative assessment and endline assessments

These will be with adolescents receiving ASRH services with an aim of assessing the quality of the services offered at facilities and outreach camps. An interviewer administered questionnaire will be administered to the survey participants. The questionnaire will contain variables on socio-demographic & economic background of the client; the type of ASRH services received, satisfaction with the service; whether the client received comprehensive sexual education and overall satisfaction with the ASRH provider and care that was received. The clients will be

recruited from health facilities and outreach camps. Trained data collectors with post-graduate training will administer the questionnaire once the clients have received the services, have exited from the facility, and have consented to participate in the interviews. A household survey will be conducted at baseline and endline. An interviewer-administered questionnaire will be completed by trained health care workers in both evaluation groups. The health care workers will have been trained on human subject research ethics and study procedures including the study tools. Majority of the health care workers have been trained at bachelors' or diploma level. The baseline questionnaire will contain questions on the client's socio-demographic & economic characteristics, knowledge, and attitude towards ASRH services, utilization levels, barriers, and facilitators to utilizing ASRH services. The questionnaire will be built in a secure mobile-based data collection device (phone or laptop) and data linked to a RedCap account hosted by Jhpiego. Detailed security procedures will be implemented in order to access the data.

Description of the program intervention that will be evaluated.

The combined ASRH service delivery approach which will be implemented in the program rollout wards only. This will be a set of activities implemented at population-level to address challenges faced by adolescent in need of sexual reproductive health services and will focus on primary prevention of pregnancy. The ASRH service package will be adapted to enable its delivery using various platforms as described below, targeting both boys and girls using a multisectoral approach, with an aim to increase utilization of ASRH services: The package will comprise of two main approaches:

- a) Biomedical approach – Provision of ASRH services: Family planning services
- b) Behavioral approach – Counselling and Provision of age-appropriate comprehensive sexual education for social behavior change. This will include targeted training to health providers to provide Adolescent sensitive services using the Value Clarification and Attitude Transformation approach (VCAT). The ASRH services package will be delivered across the intervention arm of the study using various platforms as described in the section that follows:
- c) **The community component** This will use a targeted approach where services are designed and planned for adolescents alone and are offered in settings that meet only the needs of the adolescents and do not include other groups. During the monthly sessions, health workers will provide ASRH services to willing adolescents after comprehensive counselling. Mapping of rollout community resources available for adolescents that can positively contribute to their reproductive health e.g., drop-in centers, sports facilities, social halls, and bursary funds, will be done.
- d) **The facility component** This will involve orientation of health providers to provide adolescent sensitive services. Health providers will be oriented on the VCAT approach to remove barriers to ASRH services access stemming from misinformation, stigmatization and negative attitudes towards adolescents seeking services.
- e) **The school component:** Engagement and advocacy sessions targeting the Ministry of Education (MOE) and County leadership in order to create buy-in on ASRH rollout will be done and get the requisite approvals to operate in schools and engage the guidance and counselling teachers. Thereafter, the intervention schools will be mapped out and teachers trained on selected ASRH modules as recommended by the national guidelines. The teachers will then carry out regular (weekly) ASRH sessions in schools and engage students in interactive challenges that build on the new knowledge and skills acquired through the ASRH sessions.

- f) **Social Behavior Change (SBC)**The SBC approach will be integrated across all service delivery points - i.e., in schools, facilities and communities.
- i In **health facilities**, services providers at the facilities in intervention sub counties will be oriented on recommended ASRH topics and also the groundbreaking “Counselling for Choice” (C4C) technique in a bid to transform their attitude and prepare them for the provision of AFS.
 - ii In **schools**, teachers will carry out regular (weekly) ASRH sessions and engage students in interactive challenges that build on the new knowledge and skills acquired through the ASRH sessions.
 - iii In **communities**, the Community Health workers, and other relevant Community Own Resource Persons (CORPs) such as adolescent counsellors & peer educators will be oriented on AFS and other innovative facilitation techniques such as Education through Listening (ETL) and Counselling for Choice (C4C). The CHVs and CORPs will be supported to carry out household visits, small group sessions and organize events targeting this cohort such as: adolescent camps, symposia, dialogue days, thematic talks, sports days, and facility open days where SRH topics shall be discussed.

The cross-cutting strategy to be used to enable delivery of the ASRH package of services in the intervention will be Capacity building: Training of health service providers and Teachers, Sensitization of Champions such as CHVs, religious leaders and youth champions; Sensitization of Opinion leaders such as ward Administrators, chiefs and village heads.

The comparison groups.

In the comparison group, implementation of ASRH services will continue in the same manner as they are routinely or currently being implemented through health facilities, whereby health workers are sensitized to provide youth friendly services.

Measurement of effectiveness

A baseline assessment will be undertaken at the start and end of the study implementation period. Since this is a population-based intervention, the baseline and endline assessments will be independently sampled. A comparison will be made between the control and intervention groups, before and after the intervention.

2. Describe the number and type of study visits and/or contacts between the study team and the participant, how long they will last, and where/how they will take place.

Phase 1: Participants will be contacted only once during the study. All interviews will be conducted in private venues convenient to the participants. Interviews will preferably be conducted in private spaces at the health facilities or in community halls.

Qualitative interviews

FGDs, IDIS and KIIs will be conducted based on availability of participants and anticipated richness of the collected data. FGDs will take a maximum of 90 minutes KIIs and IDIs will last 30-45 minutes including the consenting procedure. Qualitative researchers who will moderate qualitative studies will be experienced on qualitative data collection and will be social scientists. They will undergo additional training on the study procedures, ethical conduct of research involving human subjects and identifying and addressing problems during data collection. They will be recruited competitively. They will be required to have a good mastery of the language that will be used for the interviews they will conduct. This study is designed that as much as possible qualitative participants will only participate once.

Phase 2: Two household surveys targeting girls will be conducted in the study area in both evaluation group: One at **baseline and a second one at endline (after 18 months of**

implementation). The baseline will be independent of the endline, and participants will be contacted once for either of the two. A client exit interview targeting boys and girls who have received ASRH services will also be conducted at baseline and at endline. The participants at baseline are expected to be different from those at endline as there will be no individual client follow up. The end line results will be used to develop a causal analysis to determine the effectiveness of the ASRH package rolled out.

Baseline and Endline surveys

This will be undertaken among eligible adolescents residing in study area: There will be a baseline interview in sampled households at the start of the study and an end line at the study (18 months). The baseline interview will take 30 minutes and the clients will only be interviewed once they have consented, a process that will take a maximum of 10 minutes. At service delivery points, client exit interviews will be conducted with boys and girls who will have received ASRH services. This will be done after informed consent has been sought according to laid down procedures. A variety of data collection tools will be utilized in the study; table 11 shows a summary of these tools and the timing of when they will be used.

Table 11: Primary data collection tools

Data collection tool	Participant from whom data is collected	Who collects data	Number of times tool is administered
Tool 1: Adolescents FGD Guide	Adolescents selected for FGD	Qualitative researcher and scribe	Baseline
Tool 2: Adolescents IDI guide	Adolescents selected for IDI, youth and adolescent champions	Qualitative researcher and scribe	Baseline
Tool 3: Community representatives IDI Guide	Community influencers - Parents, CHWs, religious leaders, administrators)	Qualitative researcher and scribe	Baseline
Tool 4: IDI guide- Teachers	Teachers in primary and secondary schools within the study area who handle guidance and counselling among teenagers	Qualitative researcher and scribe	Baseline
Tool 5: Key Informant Interview Guide (county leadership)	County Directors of Health, education and youth, Reproductive Health Coordinators	Qualitative researcher and scribe	Baseline
Tool 6: Health provider IDI guide	Selected ASRH providers from study sites	Qualitative researcher and scribe	Baseline
Tool 7: Client exit interview checklist	Clients who have received ASRH services from a service delivery point in the study area	Research Assistants	Baseline and Endline
Tool 8: Baseline and Endline survey tool	Adolescents residing in study area who meet eligibility criteria	Trained health worker	Baseline and Endline

1. Describe the expected duration of the study from the perspective of the individual participant and duration overall. This study will start implementation in the second year of the five-year project. Timelines of this study are 15-18 months
2. Provide a brief data analysis plan and a description of variables to be derived.

a) Quantitative Data analysis

Client exit survey

Descriptive analysis of quantitative variables will be done using measures of central tendency (mean, median) and measures of dispersion (range, standard deviation) as appropriate. Data reduction techniques will be used to summarize the observed satisfaction variables into a few dimensions through latent variable modelling using the ltm R package (Rizopoulos, 2006). Component internal consistency and reliability used for computing the satisfaction score will be evaluated by calculating Cronbach's α . Pairwise associations between seven items corresponding to the two-by-two contingency tables for all possible pairs will be computed and variables with a low association with other items will be dropped leaving five variables with Cronbach's α of 0.78. Factor scores will then be generated by fitting the Rasch model (Rasch, 1960). Depending on the distribution of the factor scores, a new outcome variable will be generated which either will be dichotomous or ordinal. This new variable will be used in univariate and multivariate logistic regressions to establish determinants of client satisfaction. The independent variables in this model will be socio-demographic, cultural and economic characteristics (age, education, religion, marital status, etc., life planning, wealth quintile and place of residence (urban or rural)/ county/sub-county)

Household survey

The outcomes of interest for this study include client satisfaction, knowledge, attitude, and practice (utilization) of ASRH services which are primarily FP services. Teenage pregnancy will also be a secondary outcome of interest. Data reduction techniques will be used to summarize the observed variables from the client satisfaction, knowledge, and attitude questions into a few dimensions through latent variable modelling using the ltm R package (Rizopoulos, 2006). Component internal consistency and reliability used for computing the satisfaction score will be evaluated by calculating Cronbach's α . Pairwise associations corresponding to two-by-two contingency tables for all possible pairs will be computed and variables with a low association with other items will be dropped leaving variables with Cronbach's α of 0.78. Factor scores will then be generated by fitting the Rasch model (Rasch, 1960). Depending on the distribution of the factor scores, a new outcome variable will be generated which either will be dichotomous or ordinal which will be used in new analysis. Descriptive analysis of quantitative variables will be done using measures of central tendency (mean, median) and measures of dispersion (range, standard deviation) as appropriate. First, we will check the balance between the two study arms in terms of potential confounding factors, such as distance to health facility (or ASRH outreach point) and type of facility where adolescents seek ASRH services e.g., private/public), The inter cluster correlation will be computed. We will then conduct an exploratory analysis to compare outcomes by the sociodemographic, cultural and economic characteristics (age, education, religion, marital status, etc., life planning, wealth quintile, place of residence (urban or rural)) using the Rao-Scott chi-square test to see if there is any association. To determine the relative importance of these factors on the outcomes, Generalized Estimating Equations (GEEs) univariate and multivariate logistic regressions will be used to adjust for clustering within the clusters. Results from the regression analysis will be reported as odds ratio (OR) and 95% Confidence Intervals. All statistical analysis will be considered statistically significant if P-Value is less than 0.05.

Study outcomes among 15-19 years

Knowledge	Attitude	Practice/utilization
Risks faced by adolescents in pregnancy/child birth	Attitude towards contraceptives	Utilization of FP services
Available methods of family planning	Towards ASRH services offered in facilities/communities/schools	Sexual experience – Delay in age at first sex

a) Qualitative data analysis

Data from IDIS, FGDs and KIIs will be transcribed, translated, and back translated then entered in qualitative data software (Atlas ti.8). A coding frame will then be developed using a grounded theoretical framework. Independent analysis will be conducted by different analysts and subsequent comparison between the developed coding matrices will be used for developing a reliability factor for the analysis. The trends from the emerging themes will be iteratively developed by repeatedly analyzing data collected at different time points. Verbatim generated alongside the code matrix will be used to support the emerging thematic framework. A theoretical framework for the underlying reasons for contraceptive discontinuation among various population segments will then be developed.

5. Answer the following if they are relevant to your study design:

If the study has different arms, explain the process for assigning participants (intervention/control, case/control), including the sequence and timing of the assignment.

The program intervention and comparison areas will be sub counties in Kisumu and Kakamega counties, and will be those with the highest burden of teenage pregnancies

1. *If human biospecimens (blood, urine, saliva, etc.) will be collected, provide details about who will collect the specimen, the volume (ml) and frequency of collection, how the specimen will be used, stored, identified, and disposed of when the study is over. If specimens will be collected for use in future research (beyond this study), complete the "Biospecimen Repository" section below. N/A*
2. *If genetic/genomic analyses are planned, address whether the data will be contributed to a GWAS or another large dataset. Address returning unanticipated incidental genetic findings to study participants N/A*
3. *If clinical or laboratory work will be performed at JHU/JHH, provide the JH Biosafety Registration Number- N/A*
4. *If you will perform investigational or standard diagnostic laboratory tests using human samples or data, clarify whether the tests are validated and/or the lab is certified (for example is CLIA certified in the U.S.). Explain the failure rate and under what circumstances you will repeat a test. For all human testing (biomedical, psychological, educational, etc.), clarify your plans for reporting test results to participants and/or to their families or clinicians. Address returning unanticipated incidental findings to study participants- N/A*
5. *If your study involves medical, pharmaceutical, or other therapeutic intervention, provide the following information:*
6. *Will the study staff be blind to participant intervention status N/A?*
7. *Will participants receive standard care or have current therapy stopped? N/A*
8. *Will you use a placebo or non-treatment group, and is that justifiable? N/A*
9. *Explain when you may remove a participant from the study N/A*
10. *What happens to participants on study intervention when the study ends? N/A*
11. *Describe the process for referring participants to care outside the study, if needed.*

During the Monthly ASRH sessions, participants who require HIV services will be referred and follow up will be done to ensure they receive appropriate support. Participants who require FP methods that may not be available at outreach sessions will also be referred to link facility and follow up will be made.

VI. Data Security and Confidentiality Protections: Personally Identifiable Information (PII)

1. Please identify the Personally Identifiable Information (PII) that you may be collecting and using at any of the following stages of your study: **Recruitment, Consent, and Study Implementation.**

Name, signature, initials, or other identifiable code	<input checked="" type="checkbox"/>
Geographic identifier: address, GPS location, etc.	<input type="checkbox"/>
Dates: birth, death, clinical service, discharge, etc.	<input checked="" type="checkbox"/>
Contact information: phone numbers, email address, etc.	<input checked="" type="checkbox"/>
ID: Social Security Number, driver's license number, etc.	<input type="checkbox"/>
Health record identifiers: medical record, insurance plan number, etc.	<input checked="" type="checkbox"/>
Account numbers	<input type="checkbox"/>
Device identifiers: e.g., implants	<input type="checkbox"/>
Internet identifiers: IP address, social media accounts	<input type="checkbox"/>
Biometric identifiers, including finger and voice prints	<input type="checkbox"/>
Audio recordings	<input checked="" type="checkbox"/>
Video or full face photographic images	<input type="checkbox"/>
Genomic/genetic data	<input type="checkbox"/>
Any other unique identifying number, characteristic, or code (note: this does not mean the unique code assigned by the investigator to code the data)	<input type="checkbox"/>
Other: Click here to enter text.	<input type="checkbox"/>

b) Recruitment:

Will you collect identifiers for the purpose of contacting potential participants? Yes No

If **yes**, will you retain the identifiers after the recruitment contact has been made? Yes No

Data Collection: Collection of data for a research study can take on many forms. It can be as simple as gathering the data with pen and paper or developing an on-line adaptive survey that changes based on the participant's answers. Regardless of the method, PII for the purposes of identifying the participants will most likely be collected. Once collected, the raw data should go through a de-identification process to further protect PII.

In what form will you collect and store PII? When you respond, think of PI collected for recruitment, consent, and other study purposes.

Hard Copy/Paper: Yes No

If yes, please answer the following: How will the data be kept secure during transfer from study collection site to storage site?

The PII sheets will be stored in lockable boxes on a daily basis at the Jhpiego- Kenya offices in cabinets with keys securely kept by the PI. Only the members of the research team upon being granted authority by the PI will authorize access during the designated follow-up dates.

Will the data be secured in a locked cabinet or room? Yes No

If study IDs/Codes are used, will they be stored separately from the study data? Yes No

Will the hard copy/paper be destroyed after data abstraction and cleaning are complete? Yes No

If No, when do you plan to destroy the hard copies?

Electronic: Yes No If yes, please answer the following:

- Will the data be collected/stored on a portable device (laptop, mobile phone, tablet, PDA) protected by encryption? Yes No
- Will study participants use personally owned devices or study-provided devices?
Personally owned Study provided
- Is the application/website used for data collection being developed in-house (Hopkins) or by a 3rd party vendor?
In-house 3rd party
- If 3rd party, provide the name of vendor and URL: Identify Mobile Ecosystem (check all that apply)
Apple Google Website
- Will the data be stored on a secure server (@JHSPH/on-site)? Yes No
- Will the data be stored in the Cloud/Web? Yes No
- Will it be encrypted? Yes No
- Will you be backing up your data? Yes No

Audio Recording: Yes No

If yes, please answer the following:

- Will you store the audio recording securely in a locked cabinet/room until transcription is complete? Yes No
- Will you use a transcription service? Yes No
- If yes, if the PII comes from JHH/JHHS, you must use an approved vendor; otherwise, be aware of the data security protections that the transcription service provides.
- Will the audio recording be destroyed after transcription? Yes No If no, why not?

Photograph/Video: Yes No

If yes, please answer the following:

- Will the photographs/videos be stored securely in a locked cabinet or room? Yes No
- Will the photograph/video be destroyed? Yes No

If yes, when?

PII De-Identification of Data Used for this Study:

- When will you destroy the PII and/or the code linking the PII with the study ID?
- What is the method you will use to de-identify the data?
- Is your research data governed by HIPAA (U.S. clinical data remaining within the covered entity)?
Yes No
- If yes, who is doing the de-identification?

If yes, what level of de-identification will you achieve (Limited data set? De-identified?)

Data Storage and Analysis:

One of the keys to protecting PII is the proper use of tools to share and conduct your analysis. JH and JHSPH offers several options for you to consider. Please select the system that you plan to use to protect your study data by clicking the box. Consult JHSPH IT for assistance if needed.

JH Virtual Desktop: The Hopkins Institute for Clinical and Translational Research (ICTR) provides a virtual Windows desktop (SAFE Desktop). It includes productivity software such as Microsoft Word and Excel, as well as statistical software, including SAS, Stata, R, R Studio, and Python. 100 GB of storage space is provided.

JHSPH SharePoint and File Shares: These systems provide a managed and secure platform for your research project. They also provide a built-in encrypted backup solution.

JHSPH RedCAP: These are departmentally managed applications. RedCAP is an application designed for collaborative research projects.

JHSPH HPCC: High Performance Computing Cluster (HPCC: <https://jhpce.jhu.edu/>) can provide the high-capacity computing required for very large data sets.

JHBox: Johns Hopkins Box (JHBox) is a secure cloud-based file sharing service which enables people to collaborate and share information and may be accessed through any device: desktop, laptop, phone, or tablet with appropriate permissions. JHSPH, IT recommends that investigators not use JHBox as a primary storage location, but use it instead for initial data collection, sharing results, and other collaborative information with the research team.

Independent Departmental Servers and Systems: These servers are typically managed by departmental or research team IT staff. Because these servers are not centrally managed by JHSPH IT, all documentation regarding data security protections will need to be provided by the owner/administrator of the server. This responsibility may fall to the data owners (PI).

Other: Please provide details regarding any other systems being utilized. Examples may include servers and applications located at another university participating in your study or a 3rd party web-based application. All study databases will be set up in REDCap (Research Electronic Data Capture) at Jhpiego Nairobi, allowing online entry of questionnaires. REDCap

system is an institutionally implemented research service initiated by the South Carolina Clinical and Translational Research Institute (SCTR). It allows researchers to set up secure databases, with data entry accessible over the internet. All data will be stored on a secure Jhpiego Kenya server and accessible only by the study personnel with password protection. Server data is backed up weekly. Data will be stored in a secure online database, password protected, behind an internet firewall. Authorized study staff will enter data encrypted over a secure internet connection. Only authorized study staff will have access to data. Any paper records especially the logs with personal identifiers (used only for participant tracking purposes), will be stored in a locked cabinet at Jhpiego Kenya and only the respective PIs and their designees will have access to this cabinet. Another database without personal identifiers will be maintained to capture the implementation phase study data.

Other Data Security Measures: In addition to the details regarding data collection, please review the following questions. This additional information will be utilized to assist in the development of a comprehensive Data Security plan. This would include the systems used to analyze the data, data security contacts and additional requirements.

- a. During the analysis phase, do you plan to use computer systems that are not managed by JHSPH or JH? Yes No If yes, please explain:
- b. Do you have a designated person on your research team other than the PI who is the technical contact for a Data Security plan? Yes No If yes, please provide a contact name: Soudie Okwaro, Afya Halisi Project Data Manager, Contact details Soudie.okwaro@jhpigo.org, +254 710 648100.
- c. Does your sponsor have other specific data security requirements for the study data? Yes No If possible, please explain:
- d. Please add any other information that you believe is relevant to data security- Possession during transport and will not be left unattended in a vehicle. Other stakeholders will only have access to aggregate or analyzed data and not the primary data. The PI will be responsible for the stewardship of data and protecting data confidentiality. This will include protecting physical custody of the data, storage and sharing with appropriate data use agreements that contain the appropriate security provisions. Data obtained from the research participants will be treated as confidential and will not be disclosed to any staff apart from those directly involved in the study. This includes all electronic and paper-based data. Further, all the data collected will be located within Jhpiego protected system. Personal identifiers will not be included in the dataset but instead we will use codes (where necessary). Names of clients seeking family planning services at the different service delivery sites who respond to the questionnaire (s) will not be used in the report and only name of service delivery point will be retained. The confidentiality of any information will be emphasized. The names of participants will only be collected for tracking purposes and will not be divulged.
- e. **Certificate of Confidentiality:**

All NIH studies include Certificate of Confidentiality protections with the grant; the consent form must include the C of C language provided in our template. Other funders may obtain C of C protections through NIH. (<https://humansubjects.nih.gov/coc/index>)

Does the study have Certificate of Confidentiality protections? Yes No

JHM Clinical Records

- Will you use clinical data of 500 records or more from Johns Hopkins Hospital and its affiliates? Yes No
- If yes, please complete the JHM Data Security Checklist available on the JHSPH IRB website: www.jhsph.edu/irb and upload a copy of the checklist to the "Miscellaneous" section.

VII. Risks of the Study:

1. *Describe the risks, discomforts, and inconveniences associated with the study and its procedures, including physical, psychological, emotional, social, legal, or economic risks, and the risk of a breach of confidentiality. These risks should be described in the consent documents.*
 - a. There is possible risk of loss of privacy for adolescent participants during the household baseline and endline assessments. The research team will identify a private space within the household so that the discussion is not overheard by other family members.
 - b. There is possible risk of loss of privacy for FGD participants, as they may find it uncomfortable talking about reproductive health in the presence of a stranger or other participant. Participants will be informed that they can choose what to share and decline to answer any questions that feel uncomfortable or, for any other reason.
 - c. There is a minimal risk of a breach of confidentiality associated with the FGDs. The entire interview will be audio-recorded, but participants will not be identified by name on the recording. The audio-recorder will be safely kept under lock and key and only the research team will be allowed to listen to the recordings, which will be destroyed after they have been transcribed. The notes will be shared only with the members of the study team, to help analyze the results from the interviews.
 - d. The FGD participants will be asked to keep the information shared confidential and not share participant's identity outside the group, but there is a risk that a participant could share information outside the group.

Describe the anticipated frequency and severity of the harms associated with the risks identified above; for example, if you are performing "x" test/assessment, or dispensing "y" drug, how often do you expect an "anticipated" adverse reaction to occur in a study participant, and how severe do you expect that reaction to be? There is no anticipated harm to participants.

Describe steps to be taken to minimize risks. Include a description of your efforts to arrange for care or referral for participants who may need it

- e. Given the increased vulnerabilities experienced by adolescents, the study team will be trained on how to best communicate the study objectives with the adolescent (and his or her parent, guardian, or caregiver, where appropriate) from the outset, and with whom information the information obtained from this study will be shared. They will also honestly communicate to the adolescent's instances where they will be need for mandatory disclosure to a third party, e.g., health provider, parents, children's department instances where the life of the adolescent could be at a risk or where the adolescent might require a medical or psychosocial intervention/referral. This information will be communicating during consenting in an aim to minimize any risks. For adolescents aged 18-19, and emancipated minors 15-17, only those who provide informed consent will be recruited into the study. For adolescent minors aged 15-17, only those whose parents provide permission, and they themselves provide informed assent, will be recruited in the study. The study team will not share any information obtained from the adolescents without their assent.
- f. To mitigate the risk of breach of confidentiality related to FGDs, participants will be instructed by the qualitative researchers not to use their real names during FGDs, but instead to use fake names. In addition, consent forms will also emphasize that information from other participants should not be shared outside the group. Participants

will however be informed that confidentiality is not guaranteed since some of the participants could share information outside the group. An explanation will also be provided to participants that they don't have to share information which they are not comfortable during FGDs. The study team will be very clear from the onset that participants could opt-out of answering questions or withdraw as soon as they are uncomfortable

- g.** Since the IDI and KII participants have been specifically identified and they will be interviewed alone, their names will not be concealed, but their identities will be delinked from the interview document and summary data. An explanation will also be provided to participants that they don't have to share information which they are not comfortable during KIIs or IDIs.
- h.** It will be very clear from the onset that participants could opt-out of answering questions or withdraw as soon as they are uncomfortable. Furthermore, we will encourage participants to share with the interviewer any of the negative experiences. Additional support will be provided by the clinical team at the facility level to those who express significant psychological disturbance out of the study processes. Participants who test HIV positive during ASRH outreaches will be referred for treatment, support and follow up made.
- i.** In the event that during the study it is realized a child has had sex with a relative, the Kenyan law provisions will be followed. According to the Sexual Offences Act, 2006, this type of offence is defined as INCEST. The law provides for
- j.** The parent/guardian who committed the act be stripped of the authority or guardianship over the child
- k.** The court may appoint any person or persons to be the guardian(s) of the child.
- l.** Where appropriate the court may refer the matter of guardianship to the Children's Court.

In the event that during the study it is realized a child has been sexually abused, the Kenyan law provisions will be followed. The Children's Act, 2012(Sec 119) provides various situations that may warrant child protection, one of them being a child who has been sexually abused or is likely to be exposed to sexual abuse, a report should be made to the nearest authorized officer in case there is a concern of a child's safety. The authorized officer undertakes the following:

- m.** The child will be removed from the environment where the abuse occurred. in case the abuse was perpetrated by a sibling, both children are removed from their family environment and placed in state institutions, while the parents/caregivers are charged with neglect
- n.** The placement of the child will be made with focus on best interest of the child
- o.** In the event that during the study it is realized a child is at risk of being sexually abused, the Children's Act, 2012 (119) will be used to evaluate the nature of threat and an appropriate decision made by an authorized officer. The children's officer or social worker will be called in to offer counselling to the child in addition to explaining to them why they are being moved from their family environment. The child will be given information on: The legal process of handling the case, The need for their physical and emotional healing in a space where they will not be seeing the perpetrator (especially before a case determination is made). They will not be seeing their parents/ guardians for a while.

Describe the research burden for participants, including time, inconvenience, out of pocket costs, etc. Study participants will not be expected to incur any costs in order to participate in the study since the researchers will interact with them in the localities where they reside. However, participants will be requested to volunteer their time to participate in the KIIs and FGDs or surveys. FGDs will last maximum duration of 90 minutes while KIIs and IDIs will last 30-45 minutes, inclusive of the consenting procedure. Requisite compensatory mechanisms for participant's transport, based on local mileage regulations, will be provided. Refreshments will be provided during the IDI, FGDs and KII at a cost to the study

Describe how participant privacy will be protected during data collection if sensitive questions are included in interviews. The research assistants will be trained on the process of recruitment of participants and how to contact them through "safe" mechanisms that won't expose the adolescent girls and boys to harm; the time and place for an interview should be in environments where the researcher and the interviewee feel safe; Interviews may be undertaken in a public place, the location should be known to the researcher and interviewee prior to the interview and where possible the exits clearly accessible. In addition, the interviewers will be trained on how to ask sensitive questions; this will be done during the 5-day training when each of the data collection tools will be reviewed. Additionally, the participants will be informed during the consent process that they are free to participate at any time or can decline to answer any sensitive questions, without being penalized. A detailed description of the rationale and purpose of collecting the sensitive information will be provided at the appropriate point in the data collection process. The layout of the study tools will be designed in a way that more sensitive questions are asked only when the interviewer ascertains that the participant is ready to continue with the sensitive set of questions. A detailed introduction will be provided before reaching any section with sensitive questions

VIII. Direct Personal and Social Benefits:

2. *Describe any potential direct benefits the study offers to participants ("payment" for participation is not a direct personal benefit):* Participants in this study will not have direct benefits from participating in this study.
3. *Describe potential societal benefits likely to derive from the research, including value of knowledge learned:* The information generated from the study will be beneficial for programming as it identifies underlying reasons as to why access to and utilization of ASRH services is low. Results will be helpful in shaping up programs that aim to address ASRH and reduce teenage pregnancy.

IX. Payment:

4. *Describe the form, amount, and schedule of payment to participants. Reimbursement for travel or other expenses is not "payment," and if the study will reimburse, explain.* Participants will not receive any payment for taking part in this study. Transport reimbursements not exceeding Ksh. 1000 (\$10) in a day will be provided to all IDI, FGD and IDI participants who are asked to meet the study team at a location away from his/her home/workstation.
5. Include the possible total remuneration and any consequences for not completing all phases of the research. N/A

X. Study Management:

A. Oversight Plan:

6. *Describe how the study will be managed* - The study will be coordinated by a Principal Investigator assisted by several Co-Investigators. Their roles and qualifications are described in table 13.

Table 13: Roles and responsibility of the investigators

Investigator	Qualification and responsibilities in the study	Role in study
Mark Kabue, DrPH	Senior M&E Advisor will be responsible for providing oversight over all the aspects of evaluation activities including the design, coordinating the investigator meetings, data collection, management and coordinate correspondence with local and JHSPH IRBs	Principal Investigator
Lilian Mutea, MPH	USAID Activity Manager of the Afya Halisi Project - She will provide technical support and oversight on design and write up of the evaluation, report writing and dissemination of findings. She will also provide direction on implementation of the intervention, training data collectors, data analysis, and report writing	Co-Investigator
Peter Gichangi, DrPH	Associate Professor, University of Nairobi, Visiting Professor University of Ghent. He will provide technical input into the design and implementation of the study, data analysis and report writing	Co-Investigator
Sheila Macharia, MPH	Senior Health Manager, USAID - She will provide technical input into the design of the of the study	Co-Investigator
Meital Tzobotaro, MSC	M&E Specialist, USAID - She will provide technical input in design of the of the study	Co-Investigator
Susan Ontiri, MPH	M&E Specialist (AFYA Halisi) She will provide technical support in the study methodology, data management processes, training of research assistants and analysis of data.	Co-Investigator
Francis Kadiri	Senior Service Delivery Officer. As the study county coordinator, he will work closes with the counties and provide oversight in the delivery of the ASRH in Kisumu and Kakamega Counties. He will also oversee day to day operations of the study	Co-Investigator
Carolyn Ajema	Gender Specialist - She will provide technical direction into designing the evaluation and qualitative analysis.	Co- Investigator
Eunice Omanga	Monitoring, Evaluation and Research Deputy Director, Jhpiego – will provide oversight on the training of data collectors and lead qualitative data analysis.	
Vincent Odiara	SBCC coordinator, AFYA Halisi - Will provide input into implementation of the study	Technical reviewer
Solomon Orero	Deputy COP, AFYA Halisi: He will provide technical input and oversight in design and the implementation of the study	Technical reviewer
Janet Omyonga	FP Technical Advisor of the Afya Halisi Project. She will provide technical review in the refining of the evaluation.	Technical reviewer
Erika Martin	Senior Implementation Science Advisor (USAID)- will provide technical review into refining the evaluation and final report	Technical reviewer
Baker Maggwa	FP Technical Advisor (USAID) will provide technical review into refining the evaluation and final report	Technical reviewer

- *How will personnel involved with the data collection and analysis be trained in human subjects' research protections? (Use the JHSPH Ethics Field Training Guide available on the JHSPH IRB website: www.jhsph.edu/irb.)* The study staff and research assistants (RAs) who will be involved in the data collection, transcription, and analysis will be required to have recently taken or undertake human subjects' protection training and Good Clinical Practice (GCP) courses with Collaborative Institutional Training Initiative (CITI) or other IRB-recognized course providers. The team will undergo a 5-day training to orient them on the study protocol, standard operating procedures (SOPs), the study tools and a review of the ethics training. The Team will also be

trained on electronic data collection using tablets. The JHSPH Ethics Field Training Guide will be used during the training among other documents.

- *If the PI will not personally be on-site throughout the data collection process, provide details about PI site visits, the supervision over consent and data collection, and the communication plan between the PI and study team.* The PI will lead the training of study staff, will be in country throughout the various phases of the study and he will travel to the study sites to monitor data collection. In case the PI is not available, he will designate one or more co-investigators to oversee specific aspects of the study activities. The county study coordinators will send weekly reports to the PI or his designee. Since data will be collected and submitted electronically, the data manager will review the data on daily basis and update the PI on the progress at least twice a week.

B. Recordkeeping:

- *Describe how you plan to ensure that the study team follows the protocol and properly records and stores study data collection forms, IRB regulatory correspondence, and other study documentation. For assistance, contact housecall@jhu.edu.*

The study team will follow the SOPs for the study which will have been distributed to the team during the 5-day training. These SOPs will provide clear guidance on selection and recruitment of participants, consenting procedures, data collection, handling of study records and reporting adverse events related to this study. The PI will maintain an updated and secure regulatory binder for all IRB correspondence and relevant study documentation

C. Safety Monitoring:

1. *Describe how participant safety will be monitored as the study progresses, by whom, and how often. Will there be a medical monitor on site? If yes, who will serve in that role?* Not Applicable
2. *If a Data Safety Monitoring Board (DSMB), or equivalent will be established, describe the following:*
 - a. *The DSMB membership, affiliation, and expertise.* Not Applicable
 - b. *The charge or charter to the DSMB.* Not Applicable
 - c. *Plans for providing DSMB reports to the IRB.* Not Applicable
 - d. *Describe plans for interim analysis and stopping rules, if any.* Not Applicable

D. Reporting Unanticipated Problems/Adverse Events (AEs) to the IRB (*all studies must complete this section*):

Describe your plan for reporting to the IRB and (if applicable) to the sponsor. Include your plan for government-mandated reporting of abuse or illegal activity. All adverse events will be reported to the investigators and documented. An adverse events (AE) reporting form will be printed and placed in all sites where data is being collected. This form will be completed by the interviewer within 24 hours after the occurrence of a reportable adverse event. The event will also be escalated to the PI within the same day. The PI will open an investigation within a day after the event is reported to his desk and lead a team that will generate a report of the AE within 2 days after it was reported. Unanticipated AEs related to the study will be reported to the IRB within a week of its occurrence.

NOTE: The IRB does not require PROMPT reporting of all AEs, only those that are **unanticipated, pose risk of harm to participants or others, and are related to the study**. Anticipated AEs may be reported with the Progress Report.

E. Other IRBs/Ethics Review Boards:

If other IRBs will review the research, provide the name and contact information for each IRB/ethics review board and its Federal Wide Assurance, if it has one (available on OHRP's website at <http://www.hhs.gov/ohrp/assurances>).

This research proposal has been submitted to the Kenya Medical Research Institute (KEMRI). The contact information of Kenya Medical Research Institute’s Ethics & Scientific Review Committee (ESRC) is:

The Secretary
 KEMRI Scientific Ethics Review Unit
 P.O Box 54840-00200, Nairobi.
 Phone: 020-2722541, 0717-719477
 Email: seru@kemri.org

F. Collaborations with non-JHSPH Institutions:

For studies that involve collaboration with non-JHSPH institutions, complete the chart below by describing the collaboration and the roles and responsibilities of each partner, including the JHSPH investigator. This information helps us determine what IRB oversight is required for each party. Complete the chart for all multi-collaborator studies.

Insert Name of Institutions in Partner column(s); add additional columns if necessary.

	JHSPH	Partner 1 - Jhpiego	Partner 2
Primary Grant Recipient		P	
Collaborator		P	

For the following, indicate “P” for “Primary”, “S” for “Secondary” (as appropriate to role and level of responsibility.) Add additional items if useful.

1.	Human subjects research ethics training for data collectors	P
2.	Day to day management and supervision of data collection	P
3.	Reporting unanticipated problems to the JHSPH IRB/Sponsor	P
4.	Hiring/supervising people obtaining informed consent and/or collecting data	P
5.	Execution of plan for data security/protection of participant data confidentiality, as described in the Data Security and Confidentiality Protections section above	P
6.	Biospecimen processing, storage, management, access, and/or making decisions about future use	N/A

COMPLETE THE FOLLOWING SECTIONS WHEN RELEVANT TO YOUR STUDY:

XI. Secondary Data Analysis of Existing Data:

Study Design:

1. Describe your study design and methods. The study design must relate to your stated aims/objectives.

A. DHS Trend analysis on determinants of ASRH services utilization

This will be a cross-sectional study as part of the formative assessment and will involve a trend analysis of determinations of coverage and utilization of ASRH services among adolescents from KDHS data of 2003, 2008/9 and 2014. The study will examine.

- Age at sexual debut among adolescents aged 15-19 yea
- Age at first pregnancy among adolescents
- Adolescents aged 15-19 years who know of any family planning method
- Teenage pregnancy rate
- Contraceptive prevalence rate among adolescents aged 15-19 year
- Unmet need for family planning among adolescents aged 15-19 years
- School completion levels among adolescents 15-19 years

- C. Systematic review of ASRH evidence A systematic desk review of secondary published data on ASRH will be undertaken- covering the last 10 years. This review will be conducted on published literature databases (BIDS, Medline, PubMed, Hinari)

Provide an estimated sample size and an explanation for that number. The study will analyze all the records from the women’s questionnaire.

Sample size of women’s questionnaire	
KDHS 2003	1691
KDHS 2008/9	1715
KDHS 2014	5735

Provide a brief data analysis plan and a description of variables to be derived.

KDHS trend analysis

- Age at sexual debut among adolescents aged 15-19 years disaggregated by gender.
- Age at first birth among adolescents disaggregated by socio-demographic factors.
- Teenage pregnancy rates among adolescents aged 15-19 years disaggregated by socio-demographic factors
- Percentage of adolescents aged 15-19 years “Who Know of Any Family planning Method” disaggregated by socio-demographic factors.
- Contraceptive prevalence rate among adolescents aged 15-19 years disaggregated by socio-demographic factors.
- Unmet need of family planning disaggregated by socio-demographic factor
- School completion/retention among adolescents disaggregated by socio-demographic factors.

Systematic review

The key words or combinations to be used in search criteria will include: ASRH, adolescent, family planning, teen pregnancy, and contraceptives. The data regenerated from the systematic review will be analyzed thematically in relation to themes of ASR Participants

Describe the subjects who provided the original data and the population from which they were drawn.

- The Woman’s Questionnaires were used to collect information from women aged 15-1
- Systematic review will review published data showing evidence based ASRH approaches.

If you are receiving, accessing, or using data from a U.S. health care provider, the need for HIPAA review is likely. If you plan to bring identifiable health information from a foreign country to a U.S. covered entity (e.g., lab at the Hopkins SOM), HIPAA may be triggered. If either of these conditions is met, check “yes” to the HIPAA question in the PHIRST application. Not Applicable

If you plan to analyze human specimens or genetic/genomic data, provide details about the source of those specimens and whether they were collected using an informed consent document. If yes, explain whether your proposed use is “consistent with” the scope of the original consent, if it potentially introduces new analyses beyond the scope of the original consent, and/or if it introduces new sensitive topics (HIV/STDs, mental health, addiction) or cultural/community issues that may be controversial. Not Applicable

XII. Oversight Plan for Student-Initiated Studies:

1. For student-initiated studies, explain how the PI will monitor the student's adherence to the IRB-approved research plan, such as communication frequency and form, training, reporting requirements, and anticipated time frame for the research. Describe who will have direct oversight of the student for international studies if the PI will not personally be located at the study site, and their qualifications - Not Applicable
2. What is the data custody plan for student-initiated research? (Note: Students may not take identifiable information with them when they leave the institution- Not Applicable

XIII. Creation of a Biospecimen Repository:

Explain the source of the biospecimens, if not described above, what kinds of specimens will be retained over time. Clarify whether the specimens will be obtained specifically for repository purposes or will be obtained as part of the core study and then retained in a repository.

1. Describe where the biospecimens will be stored and who will be responsible - Not Applicable
2. Describe how long the biospecimens will be stored, and what will happen at the end of that period- Not Applicable
3. Explain whether the biospecimens will be shared with other investigators, inside and outside of JHU, how the decision to share will be made, and by whom. Include your plans, if any, for commercial use. Also explain how downstream use of the specimen will be managed, and what will happen to left-over specimens- Not Applicable
4. Describe whether future research using the biospecimens will include specimen derivation and processing (cell lines, DNA/RNA, etc.), genomic analyses, or any other work which could increase risk to participants. Explain what additional protections will be provided to participants. Not Applicable
5. If future research could yield unanticipated incidental findings (e.g., an unexpected finding with potential health importance that is not one of the aims of the study) for a participant, do you intend to disclose those findings to the study participant? Please explain your position Not Applicable
6. Explain whether the specimens will be identifiable, and if so, how they will be coded, who will have access to the code, and whether the biospecimens will be shared in linked (identifiable) form- Not Applicable
7. Explain whether the repository will have Certificate of Confidentiality protections- Not Applicable
8. Explain whether a participant will be able to withdraw consent to use a biospecimen, and how the repository will handle a consent withdrawal request - Not Applicable
9. Describe data and/or specimen use agreements that will be required of users. Provide a copy of any usage agreement that you plan to execute with investigators who obtain biospecimens from yo - Not Applicable

XIV. Data Coordinating Center: Complete if JHSPH serves as the Data Coordinating Center.

1. How will the study procedures be developed? Not Applicable
2. How will the study documents that require IRB approval at each local site be developed? Will there be some sort of steering or equivalent committee that will provide central review and approval of study documents, or will template consent forms, recruitment materials, data collection forms, etc. be developed by and provided to the local sites by the coordinating center without external review? Not Applicable

3. Will each local clinical site have its own IRB with an FWA? State whether the coordinating center will collect IRB approvals and renewals from the clinical centers; if not, explain why. **Not Applicable**
4. How will the coordinating center provide each local site with the most recent version of the protocol and other study documents? What will be the process for requesting that these updates be approved by local clinical center IRBs? **Not Applicable**
5. What is the plan for collecting data, managing the data, and protecting the data at the coordinating center? **Not Applicable**
6. What is the process for reporting and evaluating protocol events and deviations from the local sites? Who has overall responsibility for overseeing subject safety: the investigators at the recruitment site, the Coordinating Center, the Steering Committee, or a Data and Safety Monitoring Board (DSMB)? Is there a DSMB that will evaluate these reports and provide summaries of safety information to all the reviewing IRBs, including the coordinating center IRB? Please note that if there is a DSMB for the overall study, then the coordinating center PI does not have to report to the coordinating center IRB each individual adverse event/problem event that is submitted by the local site PIs. **Not Applicable**
7. Some FDA regulated studies have different AE reporting criteria than that required by the IRB (IRB Policy No. 103.06). How will you reconcile the different requirements, and who is responsible for this reconciliation? **Not Applicable**
8. Who is responsible for compliance with the study protocol and procedures and how will the compliance of the local sites be monitored and reviewed? How will issues with compliance be remedied? **Not Applicable**

XV. Drug Products, Vitamins, Food and Dietary Supplements:

Complete this section if your study involves a drug, botanical, food, dietary supplement, or other product that will be applied, inhaled, ingested, or otherwise absorbed by the study participants. If you will be administering drugs, please upload the product information- **Not Applicable**

1. List the name(s) of the study product(s), and the manufacturer/source of each product.

Name of Study Product	Manufacturer/Source

2. List each study product by name and indicate its approved/not approved status.

Approved by the FDA and Commercially Available	Approved by Another Gov't Entity (provide name)	Cleared for Use at Local Study Site

- a) If your study product has an Investigational New Drug (IND) application through the U.S. Food and Drug Administration, provide the IND number, the Investigators Brochure and complete and upload into PHIRST the Drug Data Sheet available on the JHSPH IRB website www.jhsph.edu/irb
- b) If your study product is a marketed drug, provide the package inserts or other product information. If the study product WILL NOT be used for its approved indication, dose, population, and route of administration, provide a detailed rationale justifying the off-label use of the study product.
- c) If the study product does not require FDA approval (e.g., dietary supplements, botanicals, products not subject to the U.S. FDA, etc.), provide safety information (as applicable) and a

certificate of analysis

- d) Explain who will be responsible for drug management and supply, labeling, dispensing, documentation, and recordkeeping.
- e) What drug monitoring and/or regulatory oversight will be provided as part of the study?

XVI. Medical Devices:

Complete this section if your study will involve an approved or investigational medical device (diagnostic, non-significant risk, significant risk) - **Not Applicable**

- i List the name(s) of the study product(s), the manufacturer/source of each product, and whether or not it is powered (electric, battery). Provide product information. If it is electric, upload documentation of clinical engineering approval or its equivalent from a local authority.

Name of Study Product	Manufacturer/Source	Powered?

- ii. List each study product by name and indicate its status as approved by a government authority or not approved.

Approved by the FDA and Commercially Available	Approved by Another Gov't Entity (provide name and approval information)	Not Approved

- iii. If your investigational device is Exempt from the FDA IDE regulations, explain which section of the code applies to your device and why it meets the criteria provided. If it is a diagnostic device, provide pre-clinical information about the sensitivity and specificity of the test and the anticipated failure rate. If you plan to provide the results to participants or their physicians, justify doing so, and explain how those results will validate (or not) against the current “gold standard”.
- iv. If you believe the investigational device is not IDE exempt under 21CFR 812.2(c) but is a “Non-Significant Risk” device considered to have an approved IDE application, provide information from the manufacturer supporting that position.
- v. If you are using an investigational device that is a Significant Risk Device, provide the IDE number given by the FDA, or if not under FDA jurisdiction, explain why it is appropriate to use this device in this study. Provide a description of the device and upload a picture or manufacturing schematics into PHIRST. Provide any other information relevant to a determination of its safety to be used for the purposes outlined in this research plan.

References

1. Banke-Thomas, O. E., Banke-Thomas, A. O., & Ameh, C. A. (2017). Factors influencing utilization of maternal health services by adolescent mothers in Low-and middle-income countries: a systematic review. *BMC Pregnancy Childbirth, 17*(1), 65. doi:10.1186/s12884-017-1246
2. Chandra-Mouli, V., Lane, C., & Wong, S. (2015). What Does Not Work in Adolescent Sexual and Reproductive Health: A Review of Evidence on Interventions Commonly Accepted as Best Practices. *Glob Health Sci Pract, 3*(3), 333-340. doi:10.9745/GHSP-D-15-0012

3. Chandra-Mouli, V., McCarraher, D. R., Phillips, S. J., Williamson, N. E., & Hainsworth, G. (2014). Contraception for adolescents in low- and middle-income countries: needs, barriers, and access. *Reprod Health, 11*(1), 1. doi:10.1186/1742-4755-11-1
4. Chandra-Mouli, V., Parameshwar, P. S., Parry, M., Lane, C., Hainsworth, G., Wong, S., Say, L. (2017). A never-before opportunity to strengthen investment and action on adolescent contraception, and what we must do to make full use of it. *Reprod Health, 14*(1), 85. doi:10.1186/s12978-017-0347
5. Darroch, & Jacqueline. (2016). Adding It Up: Costs and Benefits of Meeting the Contraceptive Needs of Adolescents, New York. In W. Vanessa, B. Akinrinola, & A. Lori (Eds.). New York: Guttmacher Institut
6. Denno, D. M., Hoopes, A. J., & Chandra-Mouli, V. (2015). Effective strategies to provide adolescent sexual and reproductive health services and to increase demand and community support. *J Adolesc Health, 56*(1 Suppl), S22-41. doi: 10.1016/j.jadohealth.2014.09.01
7. Godia, P. M., Olenja, J. M., Hofman, J. J., & van den Broek, N. (2014). Young people's perception of sexual and reproductive health services in Kenya. *BMC Health Serv Res, 14*, 172. doi:10.1186/1472-6963-14-17
8. Godia, P. M., Olenja, J. M., Lavussa, J. A., Quinney, D., Hofman, J. J., & van den Broek, N. (2013). Sexual reproductive health service provision to young people in Kenya; health service providers' experiences. *BMC Health Serv Res, 13*, 476. doi:10.1186/1472-6963-13-47
9. Jacqueline E. D., Vanessa W., Akinrinola B and Lori S. A (2016). *Adding it up: Costs and benefits of meeting the contraceptive needs of adolescents*. Guttmann Institute New York
10. Kalanda, B. F., Verhoeff, F. H., Chimsuku, L., Harper, G., & Brabin, B. J. (2006). Adverse birth outcomes in a malarious area. *Epidemiol Infect, 134*(3), 659-666. doi:10.1017/S09502688050052
11. Ministry of Health (2015). Kenya National Adolescent Sexual and Reproductive Health Policy. In (pp. Nairobi, Kenya)
12. Kenya, M. o. H. (2016). National Guidelines for Provision of Adolescent and Youth Friendly Services in Kenya. In: Ministry of Health Kenya
13. 56 Tab., Preis 83 s.Kish, L. (1965). Survey Sampling. John Wiley & Sons, Inc., New York, London 1965, IX + 643 S., 31 Abb.,
14. Rosemary, M., & Martin, O. (2008). *Down the drain: counting the costs of teenage pregnancy and school drop out in Kenya*: Center for the study of Adolescents.
15. Singh, N. S., Aryasinghe, S., Smith, J., Khosla, R., Say, L., & Blanchet, K. (2018). A long way to go: a systematic review to assess the utilization of sexual and reproductive health services during humanitarian crises. *BMJ Glob Health, 3*(2), e000682. doi:10.1136/bmjgh-2017-00068
16. Statistics, K. N. B. S., MOH/Kenya, M. o., Council/Kenya, N. A. C., Development/Kenya, N. C. f. P. a., Institute, K. M. R., & International, I. (2015). *Kenya Demographic and Health Survey 2014*. Retrieved from Rockville, MD, US
17. Svanemyr, J., Amin, A., Robles, O. J., & Greene, M. E. (2015). Creating an enabling environment for adolescent sexual and reproductive health: a framework and promising approaches. *J Adolesc Health, 56*(1 Suppl), S7-14. doi: 10.1016/j.jadohealth.2014.09.0
18. Rizopoulos, D. (2006). ltm: An R Package for Latent Variable Modeling and Item Response Theory Analyses. *Journal of Statistical Software*. Volume 17, Issue 5. <https://www.jstatsoft.org/index>
19. Rasch, G. (1960). Probabilistic models for some intelligence and achievement tests. Copenhagen: Danish Institute for Educational Research
20. UNFPA. (2011). The Rights to Contraceptive Information and Services for Women and Adolescents.
21. UNFPA. (2014). Adolescent Sexual Reproductive Health. USA: UNFPA

22. UNFPA. (2016). *Summary Report of the Assessment of UNFPA's Advocacy Campaign to End Preventable Maternal and Newborn Mortality in Kenya*. UNFPA Kenya.
23. UNFPA (2015). *Girlhood not Motherhood, Preventing Adolescent Pregnancy*. New York, 10158, USA:
24. World Health Organization (2018) Fact sheet on adolescent pregnancy: In (Vol. 2018).
25. World Health Assembly, (2014). Resolution 64:28: Youth and Health Risks. (Geneva): World Health Organization.

8.4 Annex 4: Informed consent forms

Consent Form-Adolescent boys and girls (18-19 years) – Focus Group Discussions (FGDs)

Study Title: Effectiveness of a combined approach towards Improving Utilization of Adolescent Sexual Reproductive Health Services in Kisumu and Kakamega Counties, Kenya

Principal Investigator: Mark Kabue

IRB No.: 9227PI Version Date: Nov.23, 2018_v1

Introduction

Greetings. My name is _____, I am representing the AFYA Halisi Project that is led by Jhpiego in partnership with the Ministry of Health of Health in Kenya

Purpose of the study

We want to tell you about a research study we are doing. We would like to find out more about the preferences and experiences of young people in seeking and using Sexual Reproductive health services. We would like to use the information from this study for further improvement of the health services for young people in this area.

Why you are being asked to join the study.

You are being asked to take part in this study from among young men and women 18-19 years residing in your community. We believe you are one among those who could help us understand how to improve utilization of Adolescent Sexual Reproductive the health services in your community. You may choose not to any of the questions if you are not comfortable. If you choose not to take part, all the services you receive in the community or at the health facility will continue and there will be no penalty. We hope to include among the sixty (60) young people like you in this type of discussion as part of the study.

Procedures

If you agree to take part this study, you will be asked to join a group of ten young people for in a focus group discussion which will take up to 90 minutes. The discussion will be audio recorded.

Risks

There is minimal risk or discomfort expected from taking part in this study. You may find it uncomfortable answering some of the questions asked or talking about Sexual reproductive health in the presence of other young persons. However, you may choose what you wish to share and decline to answer any questions if you feel uncomfortable or, for any other reason.

If you will ask the child sensitive personal questions, include the following section:

Some of the questions we will ask may make you uncomfortable. We will ask about your sexual experience and your use of sexual reproductive health services. You may skip any questions you want or take time thinking about your responses. We will keep your answers private and will not share them with your parent/guardian.

Benefits

This study will not help you, but we hope to learn something about use of sexual reproductive health services among young people and improve delivery of these services in the community and health facilities.

Payment:

You will not receive any payment for being in this study. However, it gives you an opportunity to share your relevant experiences with us, which will contribute in improving Adolescent, Sexual and Reproductive Health in your community.

Voluntary participation

You do not have to join this study. It is up to you. You can say okay now, and you can change your mind later. All you have to do is tell us. No one will be mad at you if you change your mind.

Do you have any questions? If you want to be in this study, please sign your name. You will get a copy of this form to keep for yourself_____

(Signature or thumbprint) (Date)

(Signature of Person Obtaining Consent) (Date)

Consent Form-Adolescent boys and girls (18-19 years) – In-depth Interviews (IDI)

Study Title: Effectiveness of a combined approach towards Improving Utilization of Adolescent Sexual Reproductive Health Services in Kisumu and Kakamega Counties, Kenya

Principal Investigator: Mark Kabue

IRB No.: 9227

PI Version Date: Nov.23, 2018_v1

Introduction. Greetings. My name is _____, I am representing the AFYA Halisi Project that is led by Jhpiego in partnership with the Ministry of Health of Health in Kenya

Purpose of the study

We want to tell you about a research study we are doing. We would like to find out more about the preferences and experiences of young people in seeking and using Sexual Reproductive health services. We would like to use the information from this study for further improvement of the health services for young people in this area.

Why you are being asked to join the study.

You are being asked to take part in this study from among young men and women 18-19 years residing in your community. We believe you are one among those who could help us understand how to improve utilization of Adolescent Sexual Reproductive the health services in your community. You may choose not to any of the questions if you are not comfortable. If you choose not to take part, all the services you receive in the community or at the health facility will continue and there will be no penalty. We hope to include among the sixty (60) young people like you in this type of discussion as part of the study.

Procedures

If you agree to take part this study, you will be asked to join a group of ten young people for in a focus group discussion which will take up to 90 minutes. The discussion will be audio recorded.

Risks

There is minimal risk or discomfort expected from taking part in this study. You may find it uncomfortable answering some of the questions asked or talking about Sexual reproductive health in the presence of other young persons. However, you may choose what you wish to share and decline to answer any questions if you feel uncomfortable or, for any other reason.

If you will ask the child sensitive personal questions, include the following section:

Some of the questions we will ask may make you uncomfortable. We will ask about your sexual experience and your use of sexual reproductive health services. You may skip any questions you want or take time thinking about your responses. We will keep your answers private and will not share them with your parent/guardian.

Benefits

This study will not help you, but we hope to learn something about use of sexual reproductive health services among young people and improve delivery of these services in the community and health facilities.

Payment:

You will not receive any payment for being in this study. However, it gives you an opportunity to share your relevant experiences with us, which will contribute in improving Adolescent, Sexual and Reproductive Health in your community.

Voluntary participation

You do not have to join this study. It is up to you. You can say okay now, and you can change your mind later. All you have to do is tell us. No one will be mad at you if you change your mind.

Do you have any questions?

If you want to be in this study, please sign your name. You will get a copy of this form to keep for yourself.

(Signature or thumbprint) (Date)

(Signature of Person Obtaining Consent) (Date)

Adult Consent Form – Key Informant Interviews (KII) with County Leaders

Study Title: Effectiveness of a combined approach towards Improving Utilization of Adolescent Sexual Reproductive Health Services in Kisumu and Kakamega Counties, Kenya

Principal Investigator: Mark Kabue

IRB No.: 9227, PI Version Date: Nov.23, 2018_v1

Introduction

Greetings. My name is _____, I am representing the AFYA Halisi Project that is led by Jhpiego in partnership with the Ministry of Health in Kenya

What you should know about this study

We are conducting a study to understand what is happening around utilization of Sexual Reproductive health among adolescents in your community.

Purpose of research project

We would like to understand the barriers, facilitators, preferences, and experiences of young people when in seeking sexual reproductive health services in your community. We will use the information from this study for further improvement of sexual reproductive health services of young people.

Why we are asking you to participate.

You have been selected from the County leaders as one among the decision makers on health of adolescents and are invited to take part in an interview as a key informant. We believe that based on your knowledge and experience you can help us understand more about the needs, barriers, facilitators, and enablers of ASRH services. We hope to talk to ten county leaders like you in this study and to engage them in a similar interview.

Study procedures

If you agree to join this study, you will be asked to participate in a discussion that will last approximately 30-45 minutes at _____ (**Location**). The discussion will be audio recorded.

Risks/discomforts

There is minimal risk or discomfort expected from taking part in this study. You may find it uncomfortable answering some of the questions asked or talking about Sexual reproductive health in the presence of a stranger. However, you may choose what you wish to share and decline to answer any questions if you feel uncomfortable or for any other reason.

Benefits: This study will not help you, but we hope to learn something about use of sexual reproductive health services among young people and improve delivery of these services in the community and health facilities.

Payment: You will not receive any payment for being in this study; however, it gives you an opportunity to share your relevant experiences with us that will contribute to improving Adolescent, Sexual and Reproductive Health in your community. We will reimburse you for any travel costs in excess of your regular costs for transportation to and from work.

Data Sharing

Your responses to the questions will be confidential. The entire interview will be audio-recorded, but you will not be identified by name on the recording. The audio-recorder will be safely kept under lock and key and only the research team will be allowed to listen to the recordings, which will be destroyed after they have been transcribed. The notes will be shared only with the members of the study team, to help analyze the results from the interviews. We will not cite your name in our report. All research projects carry some risk that people outside of a study may know

information about you. Some data from this study may be shared with other researchers or may be put into United States Agency for International Aid (USAID's) publicly accessible database for research data. There is very little risk that someone outside the study can find out who you are because we will not be collecting names or sharing your personal information and will do our best to keep your information safe.

Protecting your privacy during data collection

No one else but you, the researcher and his/her assistant will be present during this discussion.

Your alternatives to joining the study.

Your participation in this study is voluntary: You choose whether to participate. If you decide not to participate, there are no penalties, and you will not lose any benefits to which you would otherwise be entitled. If you choose to participate in the study, you can stop your participation at any time, without any penalty or loss of benefits.

Do you have any questions? *[Interviewer: Please respond to all questions]*

Who do you call if you have questions or problems?

You can contact the local Institutional Review Board (IRB) if you have questions about your rights as a study participant or if you have other concerns. The local IRB contact is:

The Chair, KEMRI Scientific Ethics Review Unit

P.O Box 54840-00200, Nairobi;

Phone: 020-2722541, 0717-719477

Email: seru@kemri.org. You can also call the Principal Investigator if you have questions or complaints.

Principal Investigator: Mark Kabue at +1 443 928 6475

What does your signature on this consent form mean?

Your permission means:

You have been informed about this study's purpose, procedures, possible benefits, and risks.

- You have been given the chance to ask questions.
- You have voluntarily agreed to be in this study.

Would you like to participate in the study?

Individual consents to participate in study **(circle one): Yes / No**

Signatures: Your signature below means that you understand the information in this consent form. Your signature also means that you agree to participate in the study.

By signing this consent form, you have not waived any legal rights you otherwise would have as a participant in a research study.

Print name of participant Signature/thumbprint of participant Date

Print name of person obtaining consent Signature of Person obtaining consent Date

Adult Consent Form - Adolescent (18-19) years -Household Survey

Title: Effectiveness of a combined approach towards Improving Utilization of Adolescent Sexual Reproductive Health Services in Kisumu and Kakamega Counties, Kenya

Principal Investigator: Mark Kabue

IRB No.: 9227

PI Version Date: Nov.23, 2018_v1

Introduction

Greetings. My name is _____, I am representing the AFYA Halisi Project that is led by Jhpiego in partnership with the Ministry of Health of Health in Kenya.

Purpose of the study

We want to tell you about a research study we are doing. We would like to find out more about young peoples' knowledge, attitude, and practices of Sexual Reproductive health. We would like to use the information from this study for further improvement of the health services for young people in this community.

Why you are being asked to join the study.

You are being asked to take part in this study from among young women 18-19 years residing in your community. We believe you are one among those who could help us understand how to improve utilization of Adolescent Sexual Reproductive the health services in your community. You may choose not to answer any of the questions if you are not comfortable. If you choose not to take part, all the services you receive in the community or at the health facility will continue and there will be no penalty. We hope to include **1,980** young women like you in this household survey.

Procedure: If you agree to join this study, you will be asked to take part in an interview that will last approximately 30-45 minutes.

Risks: There is minimal risk or discomfort expected from taking part in this study. You may find it uncomfortable answering some of the questions asked or talking about Sexual reproductive health in the presence of a stranger. However, you may choose what you wish to share and decline to answer any questions if you feel uncomfortable or, for any other reason.

If you will ask the child sensitive personal questions, include the following section:

Some of the questions we will ask may make you uncomfortable. We will ask when you last had sex and your use of sexual reproductive health services. You may skip any questions you want or take time thinking about your responses. We will keep your answers private and will not share them with your parent/guardian.

Benefits: This study will not help you, but we hope to learn something about use sexual reproductive health services among young people and improve delivery of these services in the community and health facilities.

Payment: You will not receive any payment for being in this study. However, it gives you an opportunity to share your relevant experiences with us, which will contribute to improving Adolescent, Sexual and Reproductive Health in your community.

Voluntary participation: You do not have to join this study. It is up to you. You can say okay now, and you can change your mind later. All you have to do is tell us. No one will be mad at you if you change your mind.

Do you have any questions?

If you want to be in this study, please sign your name. You will get a copy of this form to keep for yourself.

(Signature or thumbprint) (Date)

(Signature of Person Obtaining Consent) (Date)

Adult Consent Form – In-depth Interviews (IDIs) with Community representatives

Title: Effectiveness of a combined approach towards Improving Utilization of Adolescent Sexual Reproductive Health Services in Kisumu and Kakamega Counties, Kenya

Principal Investigator: Mark Kabue

IRB No.: 9227

PI Version Date: Nov.23, 2018_v1

Introduction

Greetings. My name is _____, I am representing the AFYA Halisi Project that is led by Jhpiego in partnership with the Ministry of Health of Health in Kenya.

What you should know about this study

We are conducting a study to understand what is happening around utilization of Sexual Reproductive health among adolescents in your community.

Purpose of research project

We would like to understand the barriers, facilitators, preferences, and experiences of young people when seeking and using sexual reproductive health services in your community. We will use the information from this study for further improvement of sexual reproductive health services of young people.

Why we are asking you to participate.

You have been selected from among community leaders who have influence on health of young people in your area and are invited to take part in an in-depth interview as part of the study. We believe that based on your knowledge and experience you can help us understand more about the needs, barriers, facilitators, and enablers of ASRH services. We hope to hold interviews with twelve (12) community representatives from this community.

Study procedures

If you agree to join this study, you will be asked to take part in an interview that will last approximately 30-45 minutes at _____ (**Location**). The discussion will be audio recorded.

Voluntary participation and right to withdraw:

Your participation in this study is voluntary: You choose whether to take part. If you decide not to take part, there are no penalties, and you will not lose any benefits to which you would otherwise be entitled. If you choose to take part in the study, you can stop your participation at any time, without any penalty or loss of benefits.

Risks/discomforts

There is minimal risk or discomfort expected from taking part in this study. You may find it uncomfortable answering some of the questions asked or talking about Sexual reproductive health in the presence of a stranger. However, you may choose what you wish to share and decline to answer any questions if you feel uncomfortable or, for any other reason.

Benefits

This study will not help you, but we hope to learn something about use of sexual reproductive health services among young people and improve delivery of these services in the community and health facilities.

Payment

You will not receive any payment for being in this study but gives you an opportunity to share your relevant experiences with us which will contribute to improving Adolescent, Sexual and Reproductive Health in your community. However, if you incur any travel costs coming to the interview, you will receive a refund of the actual cost incurred.

Data Sharing

Your responses to the questions will be confidential. The entire interview will be audio-recorded, but you will not be identified by name on the recording. The audio-recorder will be kept safely under lock and key and only the research team will be allowed to listen to the recordings, which will be destroyed after they have been transcribed. The notes will be shared only with the members of the study team, to help analyze the results from the interviews. We will not cite your name in our report. All research projects carry some risk that people outside of a study may know information about you. Some data from this study may be shared with other researchers or may be put into United States Agency for International Aid (USAID's) publicly accessible database for research data. There is very little risk that someone outside the study can find out who you are because we will not be collecting names or sharing your personal information and will do our best to keep your information safe.

Protecting your privacy during data collection

No one else but you, the researcher and his/her assistant will be present during this discussion.

Do you have any questions?

[Interviewer: Please respond to all questions]

Who do you call if you have questions or problems?

You can contact the local Institutional Review Board (IRB) if you have questions about your rights as a study participant or if you have other concerns. The local IRB contact is:

The Chair

KEMRI Scientific Ethics Review Unit

P.O Box 54840-00200, Nairobi.

Phone: 020-2722541, 0717-719477

Email: seru@kemri.org

You can also call the Principal Investigator if you have questions or complaints.

Principal Investigator: Mark Kabue at +1 443 928 6475

What does your signature on this consent form mean? Your permission means:

- You have been informed about this study's purpose, procedures, possible benefits, and risk
- You have been given the chance to ask questions.
- You have voluntarily agreed to be in this study.

Would you like to take part in the study?

Individual consents to take part in study (**circle one**): **Yes/No**

Signatures:

Your signature below means that you understand the information in this consent form. Your signature also means that you agree to participate in the study.

By signing this consent form, you have not waived any legal rights you otherwise would have as a participant in a research study. _____

Print name of participant Signature/thumbprint of participant Date _____

Print name of person obtaining Signature of Person obtaining Date
consent

Adult Consent Form – In-depth Interviews (IDI) with Health Workers

Study Title: Effectiveness of a combined approach towards Improving Utilization of Adolescent Sexual Reproductive Health Services in Kisumu and Kakamega Counties, Kenya

Principal Investigator: Mark Kabue

IRB No.: 9227

PI Version Date: Nov.23, 2018_v1

Introduction Greetings. My name is _____, I am representing the AFYA Halisi Project that is led by Jhpiego in partnership with the Ministry of Health of Kenya

What you should know about this study

We are conducting a study to understand what is happening around utilization of Sexual Reproductive health among adolescents in your community.

Purpose of research project

We would like to understand the barriers, facilitators, preferences, and experiences of young people when in seeking sexual reproductive health services in your community. We will use the information from this study for further improvement of sexual reproductive health services of young people.

Why we are asking you to participate.

You have been selected from among ASRH health providers in your area and are invited to take part in an in-depth interview as part of the study. We believe that based on your knowledge and experience you can help us understand more about the needs, barriers, facilitators, and enablers of ASRH services. We hope to talk to twelve (12) health workers like you in this study and to engage them in one-on-one interviews.

Study procedures

If you agree to join this study, you will be asked to participate in an interview approximately 30-45 minutes at _____ (**Location**). The discussion will be audio recorded.

Risks/discomforts There is minimal risk or discomfort expected from taking part in this study. You may find it uncomfortable answering some of the questions asked or talking about Sexual reproductive health in the presence of a stranger. However, you may choose what you wish to share and decline to answer any questions if you feel uncomfortable or, for any other reason.

Benefits: This study will not help you, but we hope to learn something about use of sexual reproductive health services among young people and improve delivery of these services in the community and health facilities.

Payment: You will not receive any payment for being in this study, however it gives you an opportunity to share your relevant experiences with us which will contribute to improving Adolescent, Sexual and Reproductive Health in your community. We will reimburse you for any travel costs in excess of your regular costs for transportation to and from work.

Data Sharing

Your responses to the questions will be confidential. The entire interview will be audio-recorded, but you will not be identified by name on the recording. The audio-recorder will be safely kept under lock and key and only the research team will be allowed to listen to the recordings, which will be destroyed after they have been transcribed. The notes will be shared only with the members of the study team, to help analyze the results from the interviews. We will not cite your name in our report. All research projects carry some risk that people outside of a study may know information about you. Some data from this study may be shared with other researchers or may

be put into United States Agency for International Aid (USAID's) publicly accessible database for research data. There is very little risk that someone outside the study can find out who you are because we will not be collecting names or sharing your personal information and will do our best to keep your information safe.

Protecting your privacy during data collection

No one else but you, the researcher and his/her assistant will be present during this discussion.

Your alternatives to joining the study.

Your participation in this study is voluntary: You choose whether to participate. If you decide not to participate, there are no penalties, and you will not lose any benefits to which you would otherwise be entitled. If you choose to participate in the study, you can stop your participation at any time, without any penalty or loss of benefits.

Do you have any questions?

[Interviewer: Please respond to all questions]

Who do you call if you have questions or problems?

You can contact the local Institutional Review Board (IRB) if you have questions about your rights as a study participant or if you have other concerns. The local IRB contact is:

The Chair

KEMRI Scientific Ethics Review Unit

P.O Box 54840-00200, Nairobi.

Phone: 020-2722541, 0717-719477

Email: seru@kemri.org

You can also call the principal Investigator if you have questions or complaints.

Principal Investigator: Mark Kabue at +1 443 928 6475

What does your signature on this consent form mean? Your permission means:

- You have been informed about this study's purpose, procedures, possible benefits and risks.
- You have been given the chance to ask questions.
- You have voluntarily agreed to be in this study.

Would you like to participate in the study?

Individual consents to participate in study **(circle one): Yes/No**

Signatures:Your signature below means that you understand the information in this consent form. Your signature also means that you agree to participate in the study.

By signing this consent form, you have not waived any legal rights you otherwise would have as a participant in a research study.

_____	_____	_____
Print name of participant	Signature/thumbprint of participant	Date
_____	_____	_____
Print name of person obtaining Consent	Signature of Person obtaining Consent	Date

Adult Consent Form – In-depth interviews (IDI) with Teachers

Study Title: Effectiveness of a combined approach towards Improving Utilization of Adolescent Sexual Reproductive Health Services in Kisumu and Kakamega Counties, Kenya

Principal Investigator: Mark Kabue

IRB No.: 9227

PI Version Date: Nov.23, 2018_v1

Introduction

Greetings. My name is _____, I am representing the AFYA Hali Project that is led by Jhpiego in partnership with the Ministry of Health of Health in Kenya.

What you should know about this study

We are conducting a study to understand what is happening around utilization of Sexual Reproductive health among adolescents in your community.

Purpose of research project

We would like to understand the barriers, facilitators, preferences, and experiences of young people when in seeking sexual reproductive health services in your community. We will use the information from this study for further improvement of sexual reproductive health services of young people.

Why we are asking you to participate.

You have been selected from among Teachers who handle guidance and counselling of adolescents in schools within your community and are invited to take part in an in-depth interview as part of the study. We believe that based on your knowledge and experience you can help us understand more about the needs, barriers, facilitators, and enablers of ASRH services. We hope to talk to twelve (12) teachers like you in this study and engage them in a one-on-one interview.

Study procedures

If you agree to join this study, you will be asked to participate in an interview approximately 30-45 minutes at _____ (**Location**). The discussion will be audio recorded.

Risks/discomforts

There is minimal risk or discomfort expected from taking part in this study. You may find it uncomfortable answering some of the questions asked or talking about Sexual reproductive health in the presence of a stranger. However, you may choose what you wish to share and decline to answer any questions if you feel uncomfortable or, for any other reason.

Benefits

This study will not help you, but we hope to learn something about use of sexual reproductive health services among young people and improve delivery of these services in the community and health facilities.

Payment

You will not receive any payment for being in this study, however it gives you an opportunity to share your relevant experiences with us which will contribute to improving Adolescent, Sexual and Reproductive Health in your community. We will reimburse you for any travel costs in excess of your regular costs for transportation to and from work.

Data Sharing

Your responses to the questions will be confidential. The entire interview will be audio-recorded, but you will not be identified by name on the recording. The audio-recorder will be safely kept under lock and key and only the research team will be allowed to listen to the recordings, which will be destroyed after they have been transcribed. The notes will be shared only with the members of the study team, to help analyze the results from the interviews. We will not cite your name in our report. All research projects carry some risk that people outside of a study may know

information about you. Some data from this study may be shared with other researchers or may be put into United States Agency for International Aid (USAID's) publicly accessible database for research data. There is very little risk that someone outside the study can find out who you are because we will not be collecting names or sharing your personal information and will do our best to keep your information safe.

Protecting your privacy during data collection

No one else but you, the researcher and his/her assistant will be present during this discussion.

Your alternatives to joining the study.

Your participation in this study is voluntary: You choose whether to participate. If you decide not to participate, there are no penalties, and you will not lose any benefits to which you would otherwise be entitled. If you choose to participate in the study, you can stop your participation at any time, without any penalty or loss of benefits.

Do you have any questions?

[Interviewer: Please respond to all questions]

Who do you call if you have questions or problems?

You can contact the local Institutional Review Board (IRB) if you have questions about your rights as a study participant or if you have other concerns.

The local IRB contact is:

The Chair

KEMRI Scientific Ethics Review Unit

P.O Box 54840-00200, Nairobi.

Phone: 020-2722541, 0717-719477

Email: seru@kemri.org

You can also call the Principal Investigator if you have questions or complaints.

Principal Investigator: Mark Kabue at +1 443 928 6475

What does your signature on this consent form mean? Your permission means:

- You have been informed about this study's purpose, procedures, possible benefits, and risks.
- You have been given the chance to ask questions.
- You have voluntarily agreed to be in this study.

Would you like to participate in the study?

Individual consents to participate in study **(circle one): Yes, No**

Signatures:

Your signature below means that you understand the information in this consent form. Your signature also means that you agree to participate in the study. By signing this consent form, you have not waived any legal rights you otherwise would have as a participant in a research study.

_____	_____	_____
Print name of participant	Signature/thumbprint of participant	Date
_____	_____	_____
Print name of person obtaining Consent	Signature of Person obtaining	Date Consent

Consent Form-Adolescent boys and girls (15-17 years) - IDIs

Study Title: Effectiveness of a combined approach towards Improving Utilization of Adolescent Sexual Reproductive Health Services in Kisumu and Kakamega Counties, Kenya

Principal Investigator: Dr. Mark Kabue

IRB No: 9227

PI Version Date: Nov.23, 2018_v1

Interviewer: First, obtain parent or guardian consent before obtaining the minor's assent

Introduction - Greetings. My name is _____, I am representing the AFYA Halisi Project that is led by Jhpiego in partnership with the Ministry of Health of Health in Kenya

Purpose of the study -We want to tell you about a research study we are doing. We would like to find out more about the experiences and preferences of young people in seeking and using Sexual Reproductive health services. We would like to use the information from this study for further improvement of the health services for young people in this area.

Why you are being asked to join the study.

You are being asked to take part in this study from among young men and women aged 15-17 years residing in your community. We believe you are one among those who could help us understand what helps or hinders young people from using Sexual Reproductive the health services in your community. You may choose not to answer any of the questions if you are not comfortable. If you choose not to take part, all the services you receive in the community or at the health facility will continue and there will be no penalty. We hope to engage ten young people like you in this type of interview.

Procedures: If you agree to take part this study, you will be asked to take part in an interview that will last approximately 30-45 minutes. The discussion will be audio recorded.

Risks: There is minimal risk or discomfort expected from taking part in this study. You may find it uncomfortable answering some of the questions asked or talking about Sexual reproductive health in the presence of a stranger. However, you may choose what you wish to share and decline to answer any questions if you feel uncomfortable or, for any other reason.

If you will ask the child sensitive personal questions, include the following section:

Some of the questions we will ask may make you uncomfortable. We will ask about your sexual experience and your use of sexual reproductive health services. You may skip any questions you want or take time thinking about your responses. We will keep your answers private and will not share them with your parent/guardian.

Benefits: This study will not help you, but gives you an opportunity to share your relevant experiences with us which will contribute in improving Adolescent, Sexual and Reproductive Health in your community.

Payment: You will not receive any payment for being in this study. However, if you incur any travel costs coming to the interview, you will receive a refund of the actual cost incurred.

Voluntary participation: You do not have to join this study. It is up to you. You can say okay now, and you can change your mind later. All you have to do is tell us. No one will be mad at you if you change your mind. Do you have any questions?

If you want to be in this study, please sign your name. You will get a copy of this form to keep for yourself.

(Signature / thumbprint of boy or girl.

(Date)

(Signature of Person Obtaining Consent.

(Date)

Consent Form-Adolescent girls (15-17years) - Household Survey

Study Title: Effectiveness of a combined approach towards Improving Utilization of Adolescent Sexual Reproductive Health Services in Kisumu and Kakamega Counties, Kenya

Principal Investigator: Dr. Mark Kabue

IRB No.: 9227

PI Version Date: Nov.23, 2018_v1

[Interviewer: First, obtain parent or guardian consent before obtaining the minor's assent.

Introduction

Greetings. My name is _____, I am representing the AFYA Halisi Project that is led by Jhpiego in partnership with the Ministry of Health of Health in Kenya,

Purpose of the study

We want to tell you about a research study we are doing. We would like to find out more about young peoples' knowledge, attitude, and practices of Sexual Reproductive health. We would like to use the information from this study for further improvement of the health services for young people in this community.

Why you are being asked to join the study.

You are being asked to participate in this study from among young women aged 15-17 years residing in your community. We believe you are one among those who could help us understand how to improve utilization of Adolescent Sexual Reproductive the health services in your community. You may choose not to answer any of the questions if you are not comfortable. If you choose not to participate, all the services you receive in the community or at the health facility will continue and there will be no penalty. We hope to include other **1,980** young women like you in this household survey.

Procedures

If you agree to join this study, you will be asked to take part in a group discussion with other girls about your age that will last approximately 30-45 minutes.

Risks

There is minimal risk or discomfort expected from taking part in this study. You may find it uncomfortable answering some of the questions asked or talking about Sexual reproductive health in the presence of a stranger. However, you may choose what you wish to share and decline to answer any questions if you feel uncomfortable or, for any other reason.

If you will ask the child sensitive personal questions, include the following section:

Some of the questions we will ask may make you uncomfortable. We will ask when you last had sex and use of sexual reproductive health services. You may skip any questions you want or take time thinking about your responses. We will keep your answers private and will not share them with your parent/guardian.

Benefits; This study will not help you, but we hope to learn something about use of sexual reproductive health services among young people and to help improve delivery of these services in the community and health facilities.

Payment- You will not receive any payment for being in this study. However, it gives you an opportunity to share your relevant experiences with us which will contribute to improving Adolescent, Sexual and Reproductive Health in your community.

Voluntary participation

You do not have to join this study. It is up to you. You can say okay now, and you can change your mind later. All you have to do is tell us. No one will be mad at you if you change your mind.

Do you have any questions?

If you agree to be in this study, please sign your name. You will get a copy of this form to keep for yourself.

(Signature or thumbprint of adolescent)

(Date)

(Signature of Person Obtaining Consent)

(Date)

Consent Form-Adolescent (15-17 years) – FGD with boys and girls

Study Title: Effectiveness of a combined approach towards Improving Utilization of Adolescent Sexual Reproductive Health Services in Kisumu and Kakamega Counties, Kenya

Principal Investigator: Dr. Mark Kabue

IRB No.: 9227

PI Version Date: Nov23, 2018_v1

Interviewer: First, obtain parent or guardian consent before obtaining the minor's assent

Introduction

Greetings. My name is _____, I am representing the AFYA Halisi Project that is led by Jhpiego in partnership with the Ministry of Health of Health in Kenya

Purpose of the study

We want to tell you about a research study we are doing. We would like to find out more about the experiences and preferences of young people in seeking and using Sexual Reproductive health services. We would like to use the information from this study for further improvement of the health services for young people in this area.

Why you are being asked to join the study.

You are being asked to take part in this study from among young men and women 15-17 years residing in your community. We believe you are one among those who could help us understand how to improve utilization of Adolescent Sexual Reproductive the health services in your community. You may choose not to answer any of the questions if you are not comfortable. If you choose not to take part, all the services you receive in the community or at the health facility will continue and there will be no penalty. We hope to include other 59 young people like you in this study.

Procedures

If you agree to take part this study, you will be asked to join a group of ten young people for in a focus group discussion which will take up to 90 minutes. The discussion will be audio recorded.

Risks

There is minimal risk or discomfort expected from taking part in this study. You may find it uncomfortable answering some of the questions asked or talking about Sexual reproductive health in the presence of other young persons. However, you may choose what you wish to share and decline to answer any questions if you feel uncomfortable or, for any other reason.

If you will ask the child sensitive personal questions, include the following section:

Some of the questions we will ask may make you uncomfortable. We will ask about your sexual experience and your use of sexual reproductive health services. You may skip any questions you want or take time thinking about your responses. We will keep your answers private and will not share them with your parent/guardian.

Benefits

This study will not help you, but gives you an opportunity to share your relevant experiences with us which will contribute in improving Adolescent, Sexual and Reproductive Health in your community.

Payment

You will not receive any payment for being in this study. However, if you incur any travel costs coming to the interview, you will receive a refund of the actual cost incurred.

Voluntary participation

You do not have to join this study. It is up to you. You can say okay now, and you can change your mind later. All you have to do is tell us. No one will be mad at you if you change your mind.

Do you have any questions?

If you want to be in this study, please sign your name. You will get a copy of this form to keep for yourself.

(Signature / thumbprint of boy or girl)

(Date)

(Signature of Person Obtaining Consent)

(Date)

8.5 Annex 5: Permission forms

Parental permission for minor form - Adolescent girls (15-17) years: Household survey

Study Title: Effectiveness of a combined approach towards Improving Utilization of Adolescent Sexual Reproductive Health Services in Kisumu and Kakamega Counties, Kenya

Principal Investigator: Mark Kabue

IRB No. 9227

PI Version Date: Nov.23, 2018_v1

Introduction

Greetings. My name is _____, I am representing the AFYA Halisi Project that is led by Jhpiego in partnership with the Ministry of Health of Health in Kenya.

What you should know about this study

We want to tell you about a research study we are doing. We would like to find out more about young peoples' knowledge, attitude, and practices of Sexual Reproductive health. We would like to use the information from this study for further improvement of the health services for young people in this area.

Why we are asking your child to participate.

Your child is being asked to take part in this study from among young women 15-17 years residing in your community. We believe that she is one among those who could help us understand how to improve utilization of Adolescent Sexual Reproductive the health services in your community.

Voluntary participation and right to withdraw:

Taking part in this study is voluntary: You choose whether your child will take part. If you decide that she does not take part, there are no penalties, and she will not lose any benefits to which you or her would otherwise be entitled. If you choose that she takes part in the study, you can stop her taking part at any time, without any penalty or loss of benefits.

Study procedures

If you give permission for your child to join this study, and she agrees to take part, I will ask her to take part in a discussion that will last approximately 30 minutes. The discussion will be audio recorded.

Risks/discomforts

There is minimal risk or discomfort expected from taking part in this study. She may find it uncomfortable answering some of the questions asked or talking about sexual and reproductive health in the presence of a stranger. However, she may choose what to share and decline to answer any questions if she feels uncomfortable or for any other reason.

Benefits: This study will not help your child in person, but we hope to learn something about the quality of sexual reproductive health services among young people and therefore improve these services in the community and health facilities.

Payment: Your child will not receive any payment for being in this study. This will however give her an opportunity to share relevant experiences that will contribute to improving quality of Adolescent, Sexual and Reproductive Health in your community.

Data Sharing: Your child's' responses to the questions will be confidential. The entire interview will be audio-recorded, but she will not be identified by name on the recording. The audio-recorder will be safely kept under lock and key and only the research team will be allowed to listen to the recordings, which will be destroyed after they have been transcribed. The notes will

be shared only with the members of the study team, to help analyze the results from the interviews. We will not cite her name in our report. All research projects carry some risk that people outside of a study may know information about her. Some data from this study may be shared with other researchers or may be put into a publicly accessible database for research data. There is very little risk that someone outside the study can find out who she is because we will not be collecting names or sharing her personal information and will do our best to keep her information safe.

Protecting your child’s privacy during data collection

The interview will take place in a private space within the health facility or outreach point. We keep what is shared during the interview private.

What happens if your child leaves the study early?

You may withdraw your permission allowing your daughter to take part in the study at any time. Information obtained before you withdraw your permission will continue to be used for research. Whenever you wish to withdraw your permission allowing your daughter to take part, let us know.

Do you have any questions? *[Interviewer: Please respond to all questions]*

Who do you call if you have questions or problems?

You can contact the local Institutional Review Board (IRB) if you have questions about your daughter’s rights as a study participant or if you have other concerns. The local IRB contact is:

The Chair, KEMRI Scientific Ethics Review Unit

P.O Box 54840-00200, Nairobi.

Phone: 020-2722541, 0717-719477

Email: seru@kemri.org. You can also call the Principal Investigator Mark Kabue at +1 443 928 6475, if you have questions or complaints.

What does your permission mean?Your permission means:

- You have been informed about this study’s purpose, procedures, possible benefits, and risks
- You have been given the chance to ask questions.
- You have voluntarily agreed to be in this study.

Would you like your child to take part in the study?

Parent consents child to participate in study **(Circle one): Yes No**

Signatures:

Your signature below means that you understand the information in this consent form. Your signature also means that you agree that your child can take part in the study. By signing this consent form, you have not waived any legal rights you otherwise would have as a participant in a research study.

_____ **Print name of parent /Legal Guardian** _____ **Signature/thumbprint of parent/guardian**
_____ **Date**

_____ **Print name of person** _____ **Signature of Person** _____ **Date**
_____ **obtaining consent** _____ **obtaining consent**

Give one copy to the participant, if s/he wishes to have one, and keep one copy in your study records.

Parental Permission for Minor Form – In-depth Interviews (IDI) with Adolescents (15-17) years

Study Title: Study Title: Effectiveness of a combined approach towards Improving Utilization of Adolescent Sexual Reproductive Health Services in Kisumu and Kakamega Counties, Kenya

Principal Investigator: Mark Kabue: IRB No. 9227

PI Version Date: Nov.23, 2018_v1

Introduction

Greetings. My name is _____, I am representing the AFYA Halisi Project that is led by Jhpiego in partnership with the Ministry of Health of Health in Kenya

What you should know about this study

We would like to find out more about the preferences and experiences of young people seeking and using Sexual Reproductive health services. We would like to use the information from this study for further improvement of the health services for young people in this area.

Why we are asking your child to participate.

Your child is being asked to take part in one-on-one interview with young men and women aged 15-17 years residing in your community. We believe that your child is one among those who could help us understand how to improve utilization of Adolescent Sexual Reproductive health services in your community. We plan to talk to 12 young persons in the study and to hold similar interviews.

Voluntary participation and right to withdraw:

Taking part in this study is voluntary: You choose whether your child will take part. If you decide that he/she does not take part, there are no penalties, and he/she will not lose any benefits to which you or her would otherwise be entitled. If you choose that he/she take part in the study, you can stop his/her taking part at any time, without any penalty or loss of benefits.

Study procedures: If you permit your child to join the study and he/she agrees to take part - we will ask him/her, you and her to do the following things:

- Your child will take part in an interview where I will ask him/her to share her views and experiences on adolescent sexual reproductive health among persons 15-17 years.
- This discussion will take approximately 30-45 minutes and will be guided by myself [name of moderator]
- Be aware the interview session will be audio recorded.

Risks/discomforts: There is minimal risk or discomfort expected from taking part in this study. She may find it uncomfortable answering some of the questions asked or talking about Sexual reproductive health in the presence of a stranger. However, she may choose what to share and decline to answer any questions if she feels uncomfortable or, for any other reason.

Benefits: This study will not help your child in person, but we hope to learn something about use sexual reproductive health services among young people and improve delivery of these services in the community and health facilities.

Payment: Your child will not receive any payment for being in this study. He/or she will however be reimbursed for transport costs incurred to travel to and from the venue of the discussion.

Data Sharing: Your child's' responses to the questions will be confidential. The entire interview will be audio-recorded, but he/she will not be identified by name on the recording. The audio-recorder will be safely kept under lock and key and only the research team will be allowed to listen to the recordings, which will be destroyed after they have been transcribed. The notes will

be shared only with the members of the study team, to help analyze the results from the interviews. We will not cite her name in our report. All research projects carry some risk that people outside of a study may know information about him/her. Some data from this study may be shared with other researchers or may be put into United States Agency for International Aid (USAID's) publicly accessible database for research data. There is very little risk that someone outside the study can find out who she is because we will not be collecting names or sharing his/her personal information and will do our best to keep his/her information safe.

Protecting your child's privacy during data collection

The interview will take place in a private space at your home or as identified by you and the young person. We will keep what is shared during the interview private.

What happens if your child leaves the study early?

You may withdraw your permission allowing your child to take part in the study at any time. Information obtained before you withdraw your permission will continue to be used for research. Whenever you wish to withdraw your permission allowing your child to take part, let us know.

Do you have any questions? *[Interviewer: Please respond to all questions]*

Who do you call if you have questions or problems?

You can contact the local Institutional Review Board (IRB) if you have questions about your daughter's rights as a study participant or if you have other concerns.

The local IRB contact is: The Chair, KEMRI Scientific Ethics Review Unit

P.O Box 54840-00200, Nairobi, Phone: 020-2722541, 0717-719477: Email: seru@kemri.org

You can also call the Principal Investigator if you have questions or complaints.

Principal Investigator: Mark Kabue at +1 443 928 6475

What does your permission mean? Your permission means:

- You have been informed about this study's purpose, procedures, possible benefits, and risks
- You have been given the chance to ask questions
- You have voluntarily agreed to be in this study.

Would you like your child to take part in the study?

Parent consents child to participate in study **(Circle one): Yes No**

Signatures: Your signature below means that you understand the information in this consent form. Your signature also means that you agree that your child can take part in the study. By signing this consent form, you have not waived any legal rights you otherwise would have as a participant in a research study. _____

_____ **Print name of parent /Legal guardian** **Signature/thumbprint of parent/ guardian** **Date**

_____ **Print name of person** **Signature of Person** **Date**
obtaining consent **obtaining consent**

Give one copy to the participant, if s/he wishes to have one, and keep one copy in your study records.

Parental Permission for Minor Form – Focus Group Discussion (FGDS) with Adolescents (15-17) years

Study Title: Study Title: Effectiveness of a combined approach towards Improving Utilization of Adolescent Sexual Reproductive Health Services in Kisumu and Kakamega Counties, Kenya

Principal Investigator: Mark Kabue : IRB No. 9227

PI Version Date: Nov.23, 2018_v1

Greetings. My name is _____, I am representing the AFYA Halisi Project that is led by Jhpiego in partnership with the Ministry of Health of Health in Kenya

What you should know about this study

We would like to find out more about the preferences and experiences of young people seeking and using Sexual Reproductive health services. We would like to use the information from this study for further improvement of the health services for young people in this area.

Why we are asking your child to participate.

Your child is being asked to take part in group discussions with other young men and women aged 15-17 years residing in your community. We believe that your child is one among those who could help us understand how to improve utilization of Adolescent Sexual Reproductive health services in your community. We plan to talk to about 60 young persons in the study and to hold similar discussions.

Voluntary participation and right to withdraw:

Taking part in this study is voluntary: You choose whether your child will take part. If you decide that he/she does not take part, there are no penalties, and he/she will not lose any benefits to which you or her would otherwise be entitled. If you choose that he/she take part in the study, you can stop his/her participation at any time, without any penalty or loss of benefits.

Study procedures: If you permit your child to join the study and he/she agrees to take part - we will ask him/her, you, and her to do the following things

- Your child will take part in an interview where I will ask him/her to share her views and experiences on adolescent sexual reproductive health among persons 15-17 years.
- This discussion will take approximately 30-45 minutes and will be guided by myself [name of moderator]
- Be aware the interview session will be audio recorded.

Risks/discomforts: There is minimal risk or discomfort expected from taking part in this study. She may find it uncomfortable answering some of the questions asked or talking about Sexual reproductive health in the presence of a stranger. However, she may choose what to share and decline to answer any questions if she feels uncomfortable or, for any other reason.

Benefits: This study will not help your child in person, but we hope to learn something about use sexual reproductive health services among young people and improve delivery of these services in the community and health facilities.

Payment: Your child will not receive any payment for being in this study. He/or she will however be reimbursed for transport costs incurred to travel to and from the venue of the discussion.

Data Sharing

Your child's' responses to the questions will be confidential. The entire interview will be audio-recorded, but he/she will not be identified by name on the recording. The audio-recorder will be safely kept under lock and key and only the research team will be allowed to listen to the recordings, which will be destroyed after they have been transcribed. The notes will be shared

only with the members of the study team, to help analyze the results from the interviews. We will not cite her name in our report. All research projects carry some risk that people outside of a study may know information about him/her. Some data from this study may be shared with other researchers or may be put into United States Agency for International Aid (USAID's) publicly accessible database for research data. There is very little risk that someone outside the study can find out who she is because we will not be collecting names or sharing his/her personal information and will do our best to keep his/her information safe.

Protecting your child's privacy during data collection

The interview will take place in a private space at your home or as identified by you and the young person. We will keep what is shared during the interview private. **What happens if your child leaves the study early?**

You may withdraw your permission allowing your child to take part in the study at any time. Information obtained before you withdraw your permission will continue to be used for research. Whenever you wish to withdraw your permission allowing your child to take part, let us know.

Do you have any questions? [Interviewer: Please respond to all questions]

Who do you call if you have questions or problems? You can contact the local Institutional Review Board (IRB) if you have questions about your daughter's rights as a study participant or if you have other concerns.

The local IRB contact is: The Chair
KEMRI Scientific Ethics Review Unit
P.O Box 54840-00200, Nairobi.

Phone: 020-2722541, 0717-719477; Email: seru@kemri.org . You can also call the Principal Investigator Mark Kabue at +1 443 928 6475 if you have questions or complaints.

- **What does your permission mean?** Your permission means: You have been informed about this study's purpose, procedures, possible benefits, and risk
- You have been given the chance to ask questions
- You have voluntarily agreed to be in this study.

Would you like your child to take part in the study?

Parent consents child to participate in study **(Circle one): Yes No**

Signatures: Your signature below means that you understand the information in this consent form. Your signature also means that you agree that your child can take part in the study.

By signing this consent form, you have not waived any legal rights you otherwise would have as a participant in a research study.

_____	_____	_____
Print name of parent /Legal guardian	Signature/thumbprint of parent/ guardian	Date
_____	_____	_____
Print name of person obtaining consent	Signature of Person obtaining consent	Date

Give one copy to the participant, if s/he wishes to have one, and keep one copy in your study records

8.6 Annex 6: Data collection tools

Tool 1: FGD Guide for adolescents

Study Title: Effectiveness of a combined approach towards Improving Utilization of Adolescent Sexual Reproductive Health Services in Kisumu and Kakamega Counties, Kenya.

PI Name: Mark Kabue, IRB: 9227

PI Version No. / Date: Nov.23, 2018_v1

Process

Step 1: Obtain written informed consent from adolescents aged 18 -19 years old and from parents of minor (15-17 years old); and assent from minors (15-17 years)

Step 2: Read the interviewer instructions below.

Step 3: Conduct interview after completing section 1 on Participant identification.

Interviewer Instructions:

- ✓ Administer this interview with: Adolescents 15-19; boys or girls, in and out of school.
- ✓ Remember to record: participant study ID#, date of interview, start and end time
- ✓ Before conducting the interview, confirm the respondent's agreement to participate in the interview/discussion and to be audio-recorded (indicate this in the checkbox below).
- ✓ Confirm that the audio-recorder is on before you start the interview.

Section 1: participant identification

Date:	Interviewer ID:
County:	Note taker ID:
Sub County:	Number of Participants _____
Ward:	Participant category: Adolescents Male <input type="checkbox"/> Female <input type="checkbox"/>
Date of interview	

Section 1: Introduction

Good Morning/Afternoon/Evening

Thank you for having agreed to take part in today's discussions. For purposes of accurate documentation of our discussion, I would like to use a digital audio recorder. This is to enable us not to lose out anything you will have said during the interview/ discussion. Let me know if that is acceptable to you.

Please remember that:

- ✓ You do not have to answer any question that makes you feel uncomfortable.
- ✓ All the information collected will be strictly kept confidential.
- ✓ If you do not wish to be audio recorded, you are free to stop the interview, and this will not lead to any penalty or loss to you.
- ✓ Participation in the discussion is voluntary and you are free to stop the discussion at any point for whatever reason.
- ✓ Would you agree that I use the recorder?
 - Yes No
 - Do you have any questions before we start?

- First, I would like to know more about you, please tell me a little about yourself?

Participant's socio-demographic information

- a. In which year were you born? _____
- b. What is your highest level of education?
 - ✓ Nursery Primary Secondary Tertiary/college No schooling
- c. Are you married?
 - ✓ Yes for how long have you been married (months/years) _____
 - ✓ No
- d. Do you have children?
- e. No If no, skip to f below.
 - ✓ Is Yes to "d",
 - ✓ How many children do you have? ____ (write #)
 - ✓ How old were you when you got your first child? _____ (years)
 - ✓ Do your children depend on you directly for upkeep? Yes No
 - ✓ Are there other people in your family who are dependent on you?
 - ✓ Yes No Who?
 - ✓ How many? Do they live with you? What kind of support do you provide to them?
- f. What do you do for a living?
 - Student Self-employed Employed
- g. How old were you when you first had sex? Who was it with? (Probe for stranger, boyfriend, relative, teacher etc.). Did you agree to have sex with him/her?

Section 3: FGD process

Interviewer script: Today we are going to hear our views on circumstance that help young people like you or hinder them from receiving sexual reproductive health services. First, we are going to discuss general issues that affect youth and adolescents in this community.

Health of adolescents in the community

- In your opinion, what issues are of great concern to the youth in this community? [Probe for, education, health, employment, ...] Of these, which ones are the most pressing?
- What particular health concerns do boys in this community have? (Probe for girls as well)
- Tell me about some specific issues prevalent in this community that have an effect on the health of adolescents? [Probe for availability of information, HIV, Access to treatment/care/support, Unwanted pregnancies, sexual violence, early marriage, etc. ...]
- In this community, with whom do adolescents discuss sexuality issues? [Probe for peers, parents, teachers, religious leaders, etc. Preference?]. What topics are frequently discussed? [Probe for pregnancy, HIV, post rape care, STIs, relationship issues...]

Knowledge of SRH of Services:

Next, I would like to ask you a number of questions to learn about your understanding of sexual and reproductive health (SRH) services available to young men and women in this community."

- What is your understanding of sexual and reproductive health?
- What sexual and reproductive health services do you know of? (Probe for where these services are offered, who offers these services, how do young men/ women usually find out about availability of such services- [Probes: parents, family, friends, school, health care provider, media...])

- In your opinion, what information exists on SRH in this community? (Probe how should adolescent boys and girls receive information on SRH- separately as boys and girls? together? What are the reasons)
- In general, at what age do most young people start having sex in this community? (Probe: When do they start receiving information on SRH? What type of information do they receive on sex)?

Availability and utilization of sexual and reproductive health services

We shall now look at your perception of the available SRH services and how boys and girls access these services

- What services are available in this community to adolescents who become pregnant? (Probe for Who do they confide in first of their pregnancy? How does the community look at girls who become pregnant? Where do they do for help when they realize they are pregnant?)
- Tell me about some of the services boys and girls typically seek from the healthcare providers. [Interviewer: list all the services mentioned by respondents then ask where they prefer to access each service]
- What is the perception of the young men (and girls) of your age in visiting the local health facilities for SRH services? To what extent do they utilize services offered at the local facilities? [Probe Do you think the services offered in health care facilities are friendly to young people like you? ...]
- What are some of the factors that influence where young people seek services(Probe if government or private facility? What determines where one goes for SRH services?)Do girls and boys in this community experience any difficulties in accessing sexual and reproductive health services? (Probe: for some of the problems girls face; problems boys experience in accessing these services?)

Socio-cultural beliefs, perceptions and practices that influence utilization of SRH services.

We are going to discuss how cultural practices influence people's decision on utilization of SRH services.

- What are some of the myths and beliefs that influence utilization of SRH of services by adolescents' boys and girls in this community? (Probe for norms that hinder girls and boys from receiving accurate information on SRH)
- In your communities, are females receive the same treatment as males when they access services? Please explain (probe for how women/girls and men/boys receive information differently? Are women and men treated equally when they access services and/or information?)
- Do adolescent women and men make decisions differently about RH related issues? (Probe for the differences in where to seek services, type of services, who do they consult before seeking services?)
- Is there a difference in the way men and women approach the following reproductive issues unintended pregnancy, STI/HIV, sexual violence, ... (Probe: what is the best way to address these differences at individual, household, or community level)?

Now, I would like us to talk about how SRH services targeted adolescents can be designed or improved.

- Do girls and boys in this community experience any difficulties in accessing sexual and reproductive health services? (Probe: for some of the problems girls face; problems boys experience in accessing these services?)

- If you were given an opportunity to design the perfect place for young men and women to receive SRH services, what would this place look like? [Probe for essential elements of a service that will appeal to young people e.g., privacy, confidentiality, flexi hours, etc.]. What kind of service providers would be working at such a facility? [Probe for age, sex, provider attitude, etc.]
- Please share with us your recommendations to improve or strengthen sexual reproductive health services to better meet the needs of adolescents. (Probe for what needs to be put in place at the community, health facility and providers, and policy level)

Any additional comments?

[Thank participant and end interview]

Tool 2: Adolescents IDI guide

Study Title: Effectiveness of a combined approach towards Improving Utilization of Adolescent Sexual Reproductive Health Services in Kisumu and Kakamega Counties, Kenya.

PI Name: Mark Kabue, IRB: 9227

PI Version No. / Date: Nov.23, 2018_v1

Process

Step 1: Obtain written informed consent from adolescents aged 18 -19 years old and from parents of minor (15-17 years old); and assent from minors (15-17 years)

Step 2: Read the interviewer instructions below.

Step 3: Conduct interview after completing section 1 on the participant identification.

Interviewer Instructions:

- Administer this interview with: Adolescents 15-19; boys or girls, in and out of school
- Remember to record: participant study ID#, date of interview, start and end time
- Before conducting the interview, confirm the respondent's agreement to participate in the interview/discussion and to be audio-recorded (indicate this in the checkbox below).
- Confirm that the audio-recorder is on before you start the interview.

Section 1: Participant identification

Date:	Interviewer ID:
County:	Note taker ID:
Sub County	Number of Participants _____
Ward:	Participant category: Adolescents Male <input type="checkbox"/> Female <input type="checkbox"/>
Date of interview	

Intro-duction:

Good Morning/Afternoon/Evening

Thank you for having agreed to take part in today's discussions. For purposes of accurate documentation of our discussion, I would like to use a digital audio recorder. This is to enable us not to lose out anything you will have said during the interview/ discussion. Let me know if that is acceptable to you.

Please remember that:

- ✓ You do not have to answer any question that makes you feel uncomfortable.
- ✓ All the information collected will be strictly kept confidential.
- ✓ If you do not wish to be audio recorded, you are free to stop the interview, and this will not lead to any penalty or loss to you.
- ✓ Participation in the discussion is voluntary and you are free to stop the discussion at any point for whatever reason.
- ✓ Would you agree that I use the recorder?
 - Yes No
 - Do you have any questions before we start?
 - First, I would like to know more about you, please tell me a little about yourself?

Participant's socio-demographic information

- c. In which year were you born? _____
- d. What is your highest level of education?
✓ Nursery Primary Secondary Tertiary/college No schooling
- h. Are you married?
✓ Yes for how long have you been married (months/years) _____
✓ No
- i. Do you have children?
- j. No If no, skip to f below.
✓ Is Yes to "d",
✓ How many children do you have? ____ (write #)
✓ How old were you when you got your first child? _____ (years)
✓ Do your children depend on you directly for upkeep? Yes No
✓ Are there other people in your family who are dependent on you?
✓ Yes No Who?
✓ How many? Do they live with you? What kind of support do you provide to them?
- k. What do you do for a living?
 - Student Self-employed Employed
- l. How old were you when you first had sex? Who was it with? (Probe for stranger, boyfriend, relative, teacher etc.). Did you agree to have sex with him/her?

Will briefly ask you some questions as we prepare for the discussions, we are to have with you today.

- Brief share with me about your family (Probe: who you live with? How old are you? What do you do on a daily basis?)
- What are some of the health concerns persons of your age experience in this community?

Health seeking behavior: Will now discuss on whether you have ever had a health problem and where you went for services.

- Could you please think back on the last time you needed care for a health problem (Probe what was the problem, who did you talk to about the problem, where did you go for help? What services did they receive you?)
- Have you ever had any reproductive health problem? (Probe: what was it all about, when did you last experience this problem, who did you first talk to and why? What help did they give you?)
- Have you ever visited a health facility for any sexual and reproductive health related problem? (Probe for pregnancy, STI, HIV, abortion related complications, family planning- establish what necessitate the need for this service.
- did you go to the facility alone or were you accompanied? Please explain.
- Are there any challenges persons of your age face in seeking for similar services? Please explain (Probe: are there any difficulties experienced by adolescents in seeking services? Or in sharing their health problems with their parents?)
- What are some of things that would encourage/discourage young boys and girls from seeking services at local health facilities (probe for demographic and socio-cultural factors, provider attitude, time when services are offered, location where services are offered, costs involved)

Knowledge and cultural beliefs on SRH services

- We will take time to discuss about your level of awareness of some of the SRH services available to adolescents in this community.
- What type of SRH services (those related to sex, family planning, HIV, pregnancy, etc.) are available to boys and girls in this community). Of the services mentioned, which ones would you consider most important? Please explain why. In your opinion, what health services will you be most comfortable in accessing from the health facility? Please explain.
- Where did you/do they get information on existing services from? (Probe from whom- peers, family, school teachers, providers; How do they access this information- media, school talks, etc?)
- Have you ever had sex in the last 12 months? (If yes, did you use any protection and /or contraceptives? Did you do anything to protect yourself from diseases or pregnancy? If NOT, what do people your age in this community do to protect themselves from diseases or pregnancy?)
- In this community are there any socio-cultural taboos that hinder adolescents' girls and boys from accessing information on SRH services? (Please explain some of these taboos)
- What services are available for adolescents in this community who become pregnant? (Probe: to who do they disclose their pregnancy? How does the community treat adolescent girls who become pregnant? Can these girls readily access services? What are some of the difficulties they experience in seeking these services?)
- Has any of you ever visited a health facility for SRH services (Probe: for services ever received: Would you go back for health services in that facility again? If yes, what did you like about that health facility? (Probe confidentiality, provider attitudes, age of providers, distance, time taken etc.) If no, what did you dislike about the site where you are accessing (probe health provider attitude, patient queues, stigma, age of provider, confidentiality, distance, time taken etc.).

Any additional comments

Thank participant and end interview.

Tool 3: IDI guide for Community Representatives

Study Title: Effectiveness of a combined approach towards Improving Utilization of Adolescent Sexual Reproductive Health Services in Kisumu and Kakamega Counties, Kenya

PI Name: Mark Kabue, IRB No. 9227

PI Version No. / Date: Nov.23, 2018_v1

Process

Step 1: Obtain written informed consent.

Step 2: Read the interviewer instructions below.

Step 3: Conduct interview after completing section 1 on the participant identification.

Interviewer Instructions:

- Administer this interview with: A community representative
- Definition of community representatives: Parents of adolescents’ activists/religious leaders/Administration leaders/Community health workers
- Remember to record participant study ID#, date of interview, start and end time.
- Before conducting the interview, confirm the respondent’s agreement to participate in the interview/discussion and to be audio-recorded (indicate this in the checkbox below).
- Confirm that the audio-recorder is on before you start the interview.

Section 1: participant identification

Date:	Interviewer ID:
County:	Note taker ID:
Sub County	Number of Participants _____
Ward:	Participant category: Adolescents Male <input type="checkbox"/> Female <input type="checkbox"/>
Date of interview	

Section 2: Introduction:

Good Morning/Afternoon/Evening

Thank you for having agreed to participate in today’s discussions. For purposes of accurate documentation of our discussion, I would like to use a digital audio recorder. This is to enable us not to lose out anything you will have said during the interview/ discussion. Let me know if that is acceptable to you.

Please remember that:

- You do not have to answer any question that makes you feel uncomfortable.
- All the information collected will be strictly kept confidential.
- If you do not wish to be audio recorded, you are free to stop the interview, and this will not lead to any penalty or loss to you.
- Participation in the discussion is voluntary and you are free to stop the discussion at any point for whatever reason.
- Would you agree that I use the recorder? Yes No
- Do you have any questions before we start?

Introductory questions

- How long have you been in working/residing in this community?
- In your opinion what would you say are common health problems adolescents in this community encounter? (Probe for pregnancies, STI, school dropout due to pregnancy, etc.)
- In what ways has the community been addressing these problems

Section 3: IDI process

Knowledge on sexual and reproductive health services available for adolescent boys and girls

- What is your understanding of sexual and reproductive health services? (Probe: what are the SRH needs for boys and girls in this community and in schools?)
- What are your views about these services? (Probe: what services should be provided and by who? Should parents be involved in deciding whether their adolescent child should be offered these services- reasons for this?)
- In your opinion, when an adolescent girl and boy has an SRH need, from whom or where do they reach out for help? (Probe: who mostly uses these services- boys or girls?, where do they opt to go for services regarding pregnancy, STI, HIV, post rape care, counselling, depression, abortion, etc.)
- How and from where do adolescent girls and boys in this community get information on SRH services (Probe for type of information they receive from parents, health providers, media, friends, etc.)
- What is your perception of some of the information that is conveyed to adolescents on SRH (Probe- reliable, message conveyed against socio-cultural expectations)
- What services are available in health facility for adolescent boys and girls? (Probe: who offers these services? How do adolescents get to know about these services?)
- In your opinion, are there any SRH services that you feel should not be provided to adolescent girls? Adolescent boys? (Probe for reasons why; the services that out to be provided; who should provide;)
- Identify and document socio-cultural factors that influence adolescent access to sexual and reproductive health information and services.

We are going to discuss about socio cultural beliefs and practices in this community.

- In your opinion, are there any sociocultural practices that influence the use of sexual and reproductive health services by adolescent girls and boys in this community?
- What do you think about the customs and taboos in relation to SRH services and information in this community? (Probe: sex before marriage, use of contraceptives)
- What are some of the reasons hinder adolescents from seeking services at a health facility (Probe for the following health providers, service delivery flow paths, service delivery related factors e.g., timing, cost, availability of drugs, religious beliefs, parental views, etc.)
- In your opinion, what are some of the cultural factors and beliefs that influence the accessibility to available RHS information and services by adolescents? How? (Probe: family values, religion,
- Determine barriers to utilization of sexual and reproductive health information and services by adolescents.
- In this community, are there any barriers that make it difficult for boys and girls to access SRH services (Probe for whether it's informed by location of these services, the person offering the services, or the timings when the services are offered?)

- In your opinion, to what extent should parents/caregivers be involved when their adolescent boys and girls need SRH services? (Probe- whether parents need to be informed before these services are offered; consent?)
- In your opinion, how important do you think it is to provide sexual and reproductive health education and services to adolescent males and young men? Why? (Probe: how should this information be conveyed to adolescents in comparison to adults?)

Any additional comments? [Thank participant and end interview]

Tool 4: IDI Guide for Teachers

Study Title: Effectiveness of a combined approach towards Improving Utilization of Adolescent Sexual Reproductive Health Services in Kisumu and Kakamega Counties, Kenya

PI Name: Mark Kabue, IRB No. 9227

PI Version No. / Date: Nov.23, 2018_v1

Process

Step 1: Obtain written informed consent.

Step 2: Read the interviewer instructions below.

Step 3: Conduct interview after completing section 1 on the participant identification.

Interviewer Instructions:

- Administer this interview with: Teachers.
- Definition of a Teacher: Teachers in primary and secondary schools who provide guidance and counselling to adolescents in their schools.
- Remember to record participant study ID#, date of interview, start and end time.
- Before conducting the interview, confirm the respondent's agreement to participate in the interview/discussion and to be audio-recorded (indicate this in the checkbox below).
- Confirm that the audio-recorder is on before you start the interview.

Section 1: Participant identification

Date:	Interviewer ID:
County:	Note taker ID:
Sub County	Number of Participants _____
Ward:	Participant category: Adolescents Male <input type="checkbox"/> Female <input type="checkbox"/>
Date of interview	

Section 2: Introduction

Opening statement: Before we begin, I would like to remind you that we will record your voice so that we may not lose anything you will have said during the interview/discussion. Let me know if that is acceptable to you.

Please remember that:

- You do not have to answer any question that makes you feel uncomfortable.
- All the information collected will be strictly kept confidential.
- If you do not wish to be audio recorded, you are free to stop the interview, and this will not lead to any penalty or loss to you.
- Participation in the discussion is voluntary and you are free to stop the discussion at any point for whatever reason.
- |___| Check this box to indicate that the participant has consented to be interviewed and to be audio-recorded.

Introductory questions

- How long have you been in working in your school?

- In your opinion who would you say are common health problems faced by adolescents in your school? (Probe for pregnancies, STI, school dropout due to pregnancy, etc.)
- In what ways has the school and the community been addressing these problems

Section 3: IDI Process

Knowledge on sexual and reproductive health services available for adolescent boys and girls

- What is your understanding of sexual and reproductive health services? (Probe: what are the SRH needs for boys and girls in this community and in schools?)
- What are your views about these services? (Probe: what services should be provided and by who? Should parents be involved in deciding whether their adolescent child should be offered these services- reasons for this?)
- In your opinion, when an adolescent girl and boy has an SRH need, from whom or where do they reach out for help? (Probe: who mostly uses these services- boys or girls? where do they opt to go for services regarding pregnancy, STI, HIV, post rape care, counselling, depression, abortion, etc.)
- How and from where do adolescent girls and boys in this community get information on SRH services (Probe for type of information they receive from parents, health providers, media, friends, etc. ;)
 - What is your perception of some of the information that is conveyed to adolescents on SRH (Probe- reliable, message conveyed against socio-cultural expectations)

Identify and document socio-cultural factors that influence adolescent access to sexual and reproductive health information and services.

- In your opinion, are there any socio-cultural practices that influence the use of sexual and reproductive health services by adolescent girls and boys in this community?
- What do you think about the customs and taboos in relation to SRH services and information in this community? (Probe: sex before marriage, use of contraceptives)
- Determine barriers to utilization of sexual and reproductive health information and services by adolescents.
- What services are available in health facility for adolescent boys and girls? (Probe: who offers these services? How do adolescents get to know about these services? What are some of the reasons hinder adolescents from seeking services at a health facility (Probe for the following health providers, service delivery flow paths, service delivery related factors e.g., timing, cost, availability of drugs, religious beliefs, parental views, etc.)
- What services are available in schools for adolescent boys and girls? (Probe: who offers these services? How do adolescents get to know about these services?)
- In your opinion, are there any SRH services that you feel should not be provided to adolescent girls? Adolescent boys? (Probe for reasons why; the services that out to be provided; who should provide.)
- In your opinion, to what extent should parents/caregivers be involved when their adolescent boys and girls need SRH services? (Probe- whether parents need to be informed before these services are offered; consent?)
- In your opinion, how important do you think it is to provide sexual and reproductive health education and services to adolescent males and young men? Why? (Probe: how should this information be conveyed to adolescents in comparison to adults?)
- Identify the myths, misconceptions and perception that influence access to sexual and reproductive health information and services among adolescent's health services by adolescent.

- In your opinion, what are some of the cultural factors and beliefs that influence the youth's accessibility to available RHS information and services? How? (Probe: family values, religion,
- To what extent can adolescent boys and girls access reliable and accurate information on SRH?
- How is implementation of the guidance from ministry of education on provision of ASRH services?
 - How can teachers best play a role in exploring and documenting opportunities to increase access and use of sexual and reproductive health services by adolescents?

Anything else you would like to add?

[Thank participant and end interview]

Tool 5: IDI Guide for Health Care Providers

Study Title: Effectiveness of a combined approach towards Improving Utilization of Adolescent Sexual Reproductive Health Services in Kisumu and Kakamega Counties, Kenya.

PI Name: Mark Kabue IRB No. 9227

PI Version No. / Date: Nov.23 2018_v1

Process

- Step 1: Obtain oral informed consent. 4
- Step 2: Read the interviewer instructions below. Step 3: Conduct interview after completing section 1 on the participant identification.

Interviewer Instructions:

- Administer this interview with: Health provider.
- Definition of health provider: Health providers working in health facilities and providing ASRH services
- Remember to record: participant study ID#, date of interview, start and end time
- Before conducting the interview, confirm the respondent's agreement to participate in the interview/discussion and to be audio-recorded (indicate this in the checkbox below).

Confirm that the audio-recorder is on before you start the interview.

Section 1: Participant identification

Date:	Interviewer ID:
County:	Note taker ID:
Sub County	Number of Participants _____
Ward:	Participant category: Adolescents Male <input type="checkbox"/> Female <input type="checkbox"/>
Date of interview	

Section 2: Introduction

Opening statement:

Before we begin, I would like to remind you that we will record your voice so that we may not lose anything you will have said during the interview/discussion. Let me know if that is acceptable to you. Please remember that

- You do not have to answer any question that makes you feel uncomfortable.
- All the information collected will be strictly kept confidential.
- If you do not wish to be audio recorded, you are free to stop the interview, and this will not lead to any penalty or loss to you.
- Participation in the discussion is voluntary and you are free to stop the discussion at any point for whatever reason.

Check this box to indicate that the participant has consented to be interviewed and to be audio-recorded.

Introductory questions

- How long have you been in working in your facility?
- In your opinion who would you say are common health problems reported by adolescents in your facilities (Probe for pregnancies, STI, school dropout due to pregnancy, etc.

- In what ways has the facility been addressing these problems

Section 3: IDI Process

- Identify the sexual and reproductive health needs of adolescents.
- What is your understanding of sexual and reproductive health services? (Probe: what are the SRH needs for boys and girls in this community and in schools?)
- What are the SRH services available in this community for adolescents?
- Have you ever (or are currently) provided services to adolescent males or young men? (Probe: What service did you offer? Who did you mostly attend to- boys, girls, or both?)
- What are the greatest concerns or worry of youths in relation to SRH/maternal health? (Probe for the following if not mentioned: Pregnancy, HIV/AIDS.
- How are youth involved in making decisions on their SRH/maternal health needs? (Probe for the following if not mentioned: Not involved, make their decisions without consulting, counselled at the hospital/clinic, etc.)

Assess the perceptions and experiences of adolescents about sexual and reproductive health services.

- What would you say are the health needs of adolescents in this this community? (Probe- who is most of need of these services- boys or girls and why>
- What are your views on the utilization of SRH services among adolescent boys and girls?
- How easy or difficult is it for youth to discuss or talk about sex? And how do you go about it? Probe the responses. What motivates or de-motivates you in providing services to adolescents and youth? Explain the response. Explore the socio-cultural and socio-economic issues that influence use of sexual and reproductive health services by young people?
- What are the enabling factors in providing SRH services to adolescents? (Probe: what makes it easy or hard for boys to access these services; girls? What are some of the cultural beliefs and practices that hinder access and utilization of SRH service by adolescents? (Probe: beliefs, parental involvement, cost of services, distance to facility, religious practices)
- What are some of the socio-cultural barriers to boys or girls accessing SRH services available in health facilities?
- What is your opinion on adolescents being offered SRH services (probe: contraception, post abortion care, etc. would you recommend your child to receive these services-please explain?
- What is Current uptake of sexual and reproductive health services by adolescent and youths?

Explore opportunities to increase access and use of sexual and reproductive health services by adolescents.

Myths, misconceptions, and perception that influence access to sexual and reproductive health information and services among young people.

- What are some of the cultural practices in this community that hinder utilization of SRH services (Probe- who is the custodian of these practice at household or community? In most families, who influences whether adolescents will seek health services or not?
- What are some of the negative perceptions associated with girls and boys seeking SRH services (probe- services regarding pregnancy, HIV/STI,

- What type of communication do young people use in the community to discuss their issues? Does this include social media? If so what social media? (Probe for the following if not mentioned: Twitter, Facebook etc.)
- Give recommendations on improving ASRH services targeting adolescents.

Any additional comments?

[Thank participant and end interview]

Tool 6: Key Informant Interviews Guide for County Leaders

Study Title: Effectiveness of a combined approach towards Improving Utilization of Adolescent Sexual Reproductive Health Services in Kisumu and Kakamega Counties, Kenya.

PI Name: Mark Kabue, IRB No. 9227

PI Version No. / Date: Nov23. 2018_v1

Process

Step 1: Obtain written oral consent.

Step 2: Read the interviewer instructions below.

Step 3: Conduct interview after completing section 1 on the participant identification.

Interviewer Instructions:

- Administer this interview with: Leaders in the county governments.
 - Definition of County Leader: Individuals in leadership in the ministries of health, education, and Youth responsible for ASRH policy direction and implementation. They include: county director for health, county director for education, county director for youth, Reproductive health coordinator, Head teachers in primary and secondary schools
 - Remember to record: participant study ID#, date of interview, start and end time
 - Before conducting the interview, confirm the respondent's agreement to participate in the interview/discussion and to be audio-recorded (indicate this in the checkbox below).
 - Confirm that the audio-recorder is on before you start the interview.

Section 1: Participant identification

Date:	Interviewer ID:
County:	Note taker ID:
Sub County	Number of Participants _____
Ward:	Participant category: Adolescents Male <input type="checkbox"/> Female <input type="checkbox"/>
Date of interview	

Section 2: Introduction

Opening statement:

Before we begin, I would like to remind you that we will record your voice so that we may not lose anything you will have said during the interview/discussion. Let me know if that is acceptable to you. Please remember that:

- You do not have to answer any question that makes you feel uncomfortable.
- All the information collected will be strictly kept confidential.
- If you do not wish to be audio recorded, you are free to stop the interview, and this will not lead to any penalty or loss to you.

- Participation in the discussion is voluntary and you are free to stop the discussion at any point for whatever reason. |___| Check this box to indicate that the participant has consented to be interviewed and to be audio-recorded.

Objective

- Assess the perceptions and experiences of KII about sexual and reproductive health services; explore barriers to utilization of sexual and reproductive health information and services by adolescents; explore perceptions of services rendered; explore opportunities to increase access and use of sexual and reproductive health services by adolescents make recommendations in order that sexual and reproductive health services are improved or strengthened to target adolescents.

Introductory questions

- How long have you been in the current leadership position?
- In your opinion who would you say are common problems facing adolescents in your county (Probe for pregnancies, STI, school dropout due to pregnancy, skills, lack of income) etc. In what ways has the county been addressing these problems.

Section 3: KII Interview

ASRH Services environment

- What are the policies related to SRH information and services among adolescents and youth
- Tell me about barriers and enablers to ASRH policy implementation that you are aware of.
- What are the Sexual and reproductive health needs of adolescents and youths?
- What are the barriers to utilization of sexual and reproductive health information and services by adolescents and youths?
- What are the myths, misconceptions and perception that influence access to sexual and reproductive health information and services among young people?
- What are the opportunities to increase access and use of sexual and reproductive health services by adolescents and youths are known?
- Can you share some recommendations in order that sexual and reproductive health services are improved or strengthened to target young people?

Any additional comments?

[Thank participant and end interview]

Tool 7: Household Survey Interview

Study Title: Effectiveness of a combined approach towards Improving Utilization of Adolescent Sexual Reproductive Health Services in Kisumu and Kakamega Counties, Kenya

PI Name: Mark Kabue

IRB: 9227

PI Version No. / Date: Nov.23 2018_v1

Process

Step 1: Obtain written informed consent.

Step 2: Read the interviewer instructions below.

Step 3: Conduct interview after completing the section on participant identification.

Interviewer Instructions:

- *Administer this interview with:* The household survey will target girls aged 15-19 have not yet had a first birth or are not pregnant.
- *Remember to record participant study ID#, date of interview, start and end time.*
- *Before conducting the interview, confirm the respondent's agreement to participate in the interview/discussion and to be audio-recorded (indicate this in the checkbox below).*
- *Confirm that the audio-recorder is on before you start the interview.*

Date:	Interviewer ID:
County:	Note taker ID:
Sub County:	Participant ID
Ward:	Household number
Date of interview	Questionnaire number

SECTION 1-DEMOGRAPHIC AND SOCIO-ECONOMIC INFORMATION			Skip
NO.	QUESTIONS	CODING CATEGORIES	
101	When were you born? <i>(record year if exact date of birth is unknown (best estimate))</i>	Date of birth: Year: _____	
102	Have you ever attended school?	YES.....1 NO.....2	→104
103	What is the highest level of school you attended: primary, vocational, secondary, or higher?	PRIMARY.....1 POST-PRIMARY/VOCATIONAL.....2 SECONDARY.....3 COLLEGE (MIDDLE LEVEL)4 UNIVERSITY (POST-SECONDARY)5 DON'T KNOW..... 99	
104	What is your current employment status or occupation?	EMPLOYED 1 SELF-EMPLOYED 2 HOUSEWIFE3 STUDENT 4 NOT EMPLOYED 5 OTHER (SPECIFY) _____ 6	

105	What is your current relationship status?	Married Monogamous..... 1 Married Polygamous.....2 Single (with a partner/ boyfriend)3 Single (no partner/boyfriend) 4 Divorced/Separated.....5 Widowed..... 5 Other (specify).....	
106	Who is the head of your family	Father.....1 Mother.....2 Grandmother.....3 Grandfather.....4 Older sibling.....5 Uncle/Aunt6 Myself.....7 Husband 8 Other9	
107	What is your religion?	Catholic..... 1 Protestant/other Christian.....2 Islam.....3 Traditional.....4 No religion.....5 Other..... 6 (specify)	
108	Are health facilities/ chemist/ outreach point where you can seek ASRH services near or far from your home?	Near (<5km) 1 Far (5-10km) 2 Very far (>10km) 3 No facility offering ASRH 4 Don't know 99	
Section 2 : Personal information about the respondent			
201	Have you ever had sex	Yes1 No2	→206
202	How old were you when you first had sex? (Age in years) Don't know/No response 99	
203	The first time you had sex, was it willing or by force?	Willing.....1 Force.....2 Refuses to answer.....3 Can't remember/don't know.....99	
204	When was the last time you have had sex?	A date within the last six months.....1 More than six months ago.....2 Never had sex3 Won't say (No response) 99	
205	Who was the last person you had sex with the last time you had sexual intercourse?	Friend (acquaintance, friend, other boy, school mate)..... 01 Boyfriend or Fiancé.....02 Stranger.....03 A relative.....04 Father..... (....) Brother..... (....) Cousin..... (....) Grandfather..... (....) Other relative..... (....) Others (specify) 05 Don't know..... 99	
206	Is there pressure from your friends for you to have sexual intercourse? (tick one response)	No pressure at all A little pressure A moderate amount of pressure A lot of pressure	

207	In your opinion, what is the ideal age for a girl to have sex for the first time	Age: ____ years After marriage.....1 Other (specify):2 Don't know.....99	
208	In your opinion, what is the ideal age for a boy to have sex for the first time	Age: ____ years After marriage.....1 Other (specify):2 Don't know.....99	
209	Have you ever been pregnant	Yes1 No..... 2	
210	Are you pregnant now?	Yes 1 No 2 Unsure.....3 No response99	

SECTION 3- ASRH KNOWLEDGE <i>Now I'm going to ask you questions to establish how well you know of sexual and reproductive health issues</i>

301		Agree	Disagree	Don't know
	Nowadays it's difficult for girls/boys not to engage in sex	1	2	99
	A girl gets pregnant if she has sex only once	1	2	99
	A girl gets pregnant if she has sex standing up?	1	2	99
	It is normal for girls to have sex before marriage	1	2	99
	It is normal for boys to have sex before marriage	1	2	99
	Boys below 18 years cannot impregnate girls of their age	1	2	99
	Young people's knowledge of contraception encourages them to have sex with many people.	1	2	99
	Unmarried young people who are having sex should use a contraceptive method to avoid pregnancy.	1	2	99
	The pill is not for girls, only adult women	1	2	99
	Condoms are not good for young people because it encourages them to have sex	1	2	99
	When a relationship moves from casual to serious, it is no longer necessary to use a condom.	1	2	99
	Using condoms is a sign of not trusting your partner.	1	2	99
	When a girl uses contraceptives, it will probably be more difficult for her to have children later on.	1	2	99
	Young girls cannot get contraceptives in hospitals	1	2	99

302	Which SRH service do you know of that adolescents and young people commonly seek? (tick all that apply)	FP/contraception1 Antenatal Care2 HIV counselling, testing, and treatment 3 STI counselling and treatment4 Postabortal care5 Others (specify)..... 6 Don't know 99
303	Which are the most common places where adolescents seek ASRH services? 2 top most	Public health facilities1 Private health facilities2 Pharmacies/chemists.....3 CHVs.....4 Peer educators 5 Others (Specify): 6 Don't know 99

304	Have you ever heard of a youth friendly room or services at the health facility	Yes _____ 1 No _____ 2																																														
305	As an adolescent what is your greatest fear when you think or unprotected sex?	None 0 Not Completing My Schooling..... 1 Getting Pregnant..... 2 Getting STIs..... 3 Getting HIV/AIDs 4 Other (Specify): _____ 5 Don't Know 99																																														
306	Are you aware of any special health risks to a young pregnant girl and her child?	Yes..... 1 No..... 2 Don't know 99																																														
307	If YES, what are some of the potential health risks to a young pregnant girl and child	Prolonged labor..... 1 Risk to life of woman..... 2 Risk to life of baby..... 3 Premature birth 4 Baby may be small/underweight..... 5 Risk of miscarriage..... 6 Obstructed labor..... 7 Other (Specify) _____ 8 Don't know 99																																														
308	Now I would like to talk about family planning - the various ways or methods that a couple can use to delay or avoid a pregnancy. Have you ever heard of any? (FP METHOD)?	<table border="1"> <thead> <tr> <th>FP Method</th> <th>Yes</th> <th>No</th> <th>Don't know</th> </tr> </thead> <tbody> <tr> <td>Female Sterilization. PROBE: Women can have an operation to avoid having any more children.</td> <td>1</td> <td>2</td> <td>99</td> </tr> <tr> <td>Male Sterilization. PROBE: Men can have an operation to avoid having any more children.</td> <td>1</td> <td>2</td> <td>99</td> </tr> <tr> <td>IUD. PROBE: Women can have a loop or coil placed inside them by a doctor or a nurse.</td> <td>1</td> <td>2</td> <td>99</td> </tr> <tr> <td>Injectables. PROBE: Women can have an injection by a health provider that stops them from becoming pregnant for one or more months</td> <td>1</td> <td>2</td> <td>99</td> </tr> <tr> <td>Implants. PROBE: Women can have one or more small rods placed in their upper arm by a doctor or nurse which can prevent pregnancy for one or more years.</td> <td>1</td> <td>2</td> <td>99</td> </tr> <tr> <td>Pill. PROBE: Women can take a pill every day to avoid becoming pregnant.</td> <td>1</td> <td>2</td> <td>99</td> </tr> <tr> <td>Male Condom. PROBE: Men can put a rubber sheath on their penis before sexual intercourse.</td> <td>1</td> <td>2</td> <td>99</td> </tr> <tr> <td>Female Condom. PROBE: Women can place a sheath in their vagina before sexual intercourse.</td> <td>1</td> <td>2</td> <td>99</td> </tr> <tr> <td>Lactational Amenorrhea Method (LAM).</td> <td>1</td> <td>2</td> <td>99</td> </tr> <tr> <td>Rhythm Method. PROBE: To avoid pregnancy, women do not have sexual intercourse on the days of the month they think they can get pregnant.</td> <td>1</td> <td>2</td> <td>99</td> </tr> </tbody> </table>	FP Method	Yes	No	Don't know	Female Sterilization. PROBE: Women can have an operation to avoid having any more children.	1	2	99	Male Sterilization. PROBE: Men can have an operation to avoid having any more children.	1	2	99	IUD. PROBE: Women can have a loop or coil placed inside them by a doctor or a nurse.	1	2	99	Injectables. PROBE: Women can have an injection by a health provider that stops them from becoming pregnant for one or more months	1	2	99	Implants. PROBE: Women can have one or more small rods placed in their upper arm by a doctor or nurse which can prevent pregnancy for one or more years.	1	2	99	Pill. PROBE: Women can take a pill every day to avoid becoming pregnant.	1	2	99	Male Condom. PROBE: Men can put a rubber sheath on their penis before sexual intercourse.	1	2	99	Female Condom. PROBE: Women can place a sheath in their vagina before sexual intercourse.	1	2	99	Lactational Amenorrhea Method (LAM).	1	2	99	Rhythm Method. PROBE: To avoid pregnancy, women do not have sexual intercourse on the days of the month they think they can get pregnant.	1	2	99		
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		Withdrawal. PROBE: Men can be careful and pull out before climax.	1	2	99
		Emergency Contraception. PROBE: As an emergency measure, within three days after they have unprotected sexual intercourse, women can take special pills to prevent pregnancy.	1	2	99
309	Have you heard of any other ways or methods that women or men can use to avoid pregnancy?	Yes 1(specify) No 2			
310	In the last six months, have you discussed. (Read each topic):	Body changes during puberty Sexual urges How to use condoms Where to get condoms Negotiating sex Sexual abuse/coercion Studies STIs or HIV/AIDS Drugs and alcohol Abortion Job availability Unwanted pregnancy Whether or not to have sex How to avoid getting pregnant Relationships with the opposite sex	YES 1 1 1 1 1 1 1 1 1 1 1 1 1		NO 2 2 2 2 2 2 2 2
311	With whom did you discuss the above topics with (tick all that apply)	Mother.....1 Father2 Sister3 Aunt4 Female friend5 Husband6 Boyfriend.....7 Teacher8 Nurse9 Religious leader 10 peer educator11 CHV12 Grandmother13 Other (specify):14			
312	In this community, who influences the decisions of adolescents' decision to seek ASRH services. ONE ANSWER ONLY	Parents of the Girl1 Girl Herself2 Partner/Boyfriend3 Friends/peers4 Husband5 Other Relatives6 Service provider7 Don't Know99			

313	From whom do adolescents prefer to seek sexual reproductive health information? (Tick 2)	Health workers -----1 Peers _____2 Teachers _____3 Parents _____4 CHVs _____5 Others (specify) _____6 Don't know 99	
314	In the last 12 months, From which channel/forum have you heard/read a message on adolescents and youth sexual reproductive health matters?	Radio1 Social media _____2 TV.....3 Newspapers/magazines.....4 Billboards5 Flyers.....6 Youth based seminars7 Public rallies8 Other (specify) _____9 Don't know 99	

SECTION 4-ADOLESCENTS ATTITUDE TOWARDS ASRH SERVICES

401	What kinds of high-risk sexual behavior do youth engage or face? <i>(Select all that apply)</i>	Drug abuse.....1 Rape.....2 Having unprotected sex.....3 Having multiple sexual partners.....4 Don't know 99	
402	What are some of the reason why adolescent engage in sexual activity?	Peer pressure1 community expects youth to have sex2 Rape3 No money to buy contraceptives.....4 don't know how to use contraceptives.....5 Drug abuse.....6 Others7 (specify) _____8 Don't know 90	
403	What are some of the ways in which adolescents prevent pregnancy?	Use of contraceptives.....1 Abstinence 2 Others (Specify)3 Don't know 99	
404	Are adolescents' comfortable seeking ASRH services in this community?	Yes1 No.....2	→501
405	What reason would make adolescents fear/not be comfortable seeking ASRH services?	Stigma from peers _____1 Fear of parents _____2 Lack of support from partner/boyfriend ___3 Provider bias _____4 Others (specify) _____5 Don't know _____98	

SECTION 5- ASRH SERVICE UTILIZATION

501	Are you currently doing something or using any method to delay or avoid getting pregnant?	Yes -----1 No _____2	→504
502	Which method are you using? Probe: anything else? Select all methods mentioned. Be sure to scroll to bottom to see all choices	NONE0 PILLS..... 1 IUCD 2 IMPLANTS 3 INJECTIONS 4 MALE CONDOMS 5	

		FEMALE CONDOMS 6 VASECTOMY..... 7 TUBAL LIGATION..... 8 EC PILLS 9 DIAPHRAGM 10 Other.....13 Specify.....14 DON'T KNOW 99	
503	How old were you when you first used a method to delay or avoid getting pregnant?	AGE _____ (years)	
504	In the past six months, have you sought ASRH services from the health facility?	Yes -----1 No _____ 2	→513
505	What ASRH service have you sought from the health facility?	FP/contraception _____ 1 STI management _____ 2 Post abortal care _____ 3 Others (specify) -----4 Don't know/unsure _____ 99	→513 →513 →513
506	At that time, did the health worker discuss about sexuality and contraception/family planning methods that you could use to avoid/delay pregnancy?	Yes1 No..... 2 Don't Remember.....3 No Response.....99	
507	During that visit, did you obtain the method you wanted to delay or avoid getting pregnant?	Yes _____ 1 No _____ 2 No Response.....99	
508	Why didn't you obtain the method you wanted? <i>(Select all that apply)</i>	Method out of stock that day.....1 Method not available at all.....2 Provider not trained to provide the method..... 3 Provide rrecommended a different method..... 4 Not eligible for method..... 5 Decided not to adopt a method..... 6 Too costly.....7 Other (Specify)8 No response..... 99	
509	During that visit, who made the final decision about what method you got?	You alone..... 1 Provider..... 2 Partner..... 3 You and provider..... 4 You and partner..... 5 Other (specify)6 No response 99	
510	Where did go for the most recent visit for an ASRH service?	PUBLIC SECTOR: GOVT HOSPITAL..... 1 GOVT HEALTH CENTER..... 2 GOVERNMENT DISPENSARY 3 OTHER..... 4 PRIVATE MEDICAL SECTOR: FAITH-BASED, CHURCH, MISSION facility.. 5 PRIVATE HOSPITAL/CLINIC..... 6 PHARMACY/CHEMIST..... 7 NURSING/MATERNITY HOME..... 8 ANOTHER SOURCE: MOBILE CLINIC..... 9	

		COMMUNITY-Health Volunteer 10 SHOP..... 11 FRIEND/RELATIVE..... 12 OTHER _____ DO NOT KNOW..... 98 NO RESPONSE..... 99	
511	Would you return to this provider?	Yes 1 No 2	
512	Would you refer your relative or friend to this provider /facility?	Yes 1 No 2	
513	What happens when an adolescent has been defiled or has undergone any form of gender-based violation? <i>(Select all that apply)</i>	Hospital for care and treatment..... 1 Police station to report..... 2 Parents both sides (his and yours) 3 Keep quiet and forgive..... 4 Hospital and police station to report..... 5 Go to court for divorce..... 6 Don't Know..... 98	

514- What would you suggest should be done to improve the service utilization of ASRH services by adolescents?

515: Do you have any other comments or feedback you would like to share?

Thank you for your time.

END

Author contact details:

ResearchGate: Lilian Mutea

LinkedIn: Lilian Mutea

Twitter: @Lnduku

Email: Lmutea@gmail.com

Telephone: +254722676753