Male fertility–related mhealth:

does it create new vulnerabilities?

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**Abstract**

Male fertility–related mHealth (MFmHealth), including smartphone applications that allow men to test their fertility at home, is getting some attention now and then. In this commentary, I argue that MFmHealth technology has the potential to undermine established norms around male reproduction but cannot be examined using traditional individualist frameworks in bioethics. Instead, theoretical literature on the concept of vulnerability in feminist bioethics allow a theoretical alliance with critical studies of men and masculinities. Proposed benefits like empowerment, shared responsibility, and democratization may justify disruptive innovation but may also obscure more fundamental ethical concerns about vulnerability and social justice.

**Keywords:** Male fertility–related mHealth, vulnerability and social justice.

1 Introduction

Mobile health (mHealth) technology, found in apps and smartwatches, is galvanized as revolutionary and transformative for healthcare and disease prevention (European Commission 2018). The hope is that mHealth can positively influence health promotion as well as access to health care, and that it can reduce overall economic costs (Kreps and Neuhauser 2010; Ospina-Pinillos et al. 2018). In the domain of reproduction, most mHealth developed in recent years is centered on women’s reproductive health in the so-called Femtech industry. For instance, fertility tracking devices are part of today’s emergent self-monitoring digital health business that promise their users empowerment, but scholars have pointed toward significant contradictions and tensions in this discursive tale (Healy 2020; Hendl and Jansky 2022; Paton 2022). Furthermore, many pregnant women use pregnancy-related mHealth to inform themselves and monitor fetal development, but there is a moral concern that this could be overdemanding for women (Segers et al. 2021).

 In contrast, mHealth aimed at men’s reproductive health is rather small but is getting some attention now and then. As noted by an article in *The Guardian* (Devlin 2017): “Smartphone App Could Allow Men to Test Their Fertility at Home.” Smartphone applications and lenses adaptable to smartphone cameras are currently the most promising tools to reach men for sperm testing (Onofre 2021). Can this development be considered revolutionary? It bears the promise of cheaper, better, and more efficient healthcare for the male reproductive body and of counteracting a dominant image of men as the unmarked or second sex in reproduction (Inhorn et al. 2009). Maybe it is a solution for the long-standing crisis of masculinity and the role of men in reproduction. One could even perceive it as a “morally and ethically disruptive innovation” as it could undermine established moral and gendered norms (Baker 2013, 58). Mobile health technology is a way of enhancing men’s reproductive autonomy because it enables them to become more informed, more engaged, more responsible, and more in control of their own fertility. The use of male fertility–related mHealth (MFmHealth)1 is topical, but it is unclear whether the benefits of promoting such applications are proportionate to the burdens.

 Bioethics has analyzed emerging health technologies for decades and should be well placed to investigate the normative implications of MFmHealth, which is actually a yet-unrealized technology. As with mHealth in general, many arguments in favor of MFmHealth center around an anticipated shift toward more patient empowerment and broader accessibility. This mirrors a belief in individual and technological fixes for broader societal concerns. To the best of my knowledge only two articles specifically focus on the broader social context of MFmHealth (Kroløkke 2020, Wilson 2022). However, MFmHealth technology not only operates in the realm of individual health and well-being but can also influence sociopolitically relevant factors and power patterns.

 How should the growing attention for the technological market in men’s reproductive health be perceived? Which ethical frameworks could be used in argumentations regarding MFmHealth? In this commentary, I will first offer a brief overview of the scientific background of the phenomenon under study and further introduce the notion of MFmHealth. I will subsequently connect this new phenomenon with the discourse on vulnerability, thereby adding a normative macro focus to the existing individualist and consumeristic perspectives. I will then turn to the theoretical literature on the concept of vulnerability in feminist bioethics and critical studies of men and masculinities. Building on this theoretical literature, I will show how new vulnerabilities can be created in relation with masculine configurations which may not meet the eye when one considers only an individualist narrative.

2 Paternal effects and mHealth solutions

Historical references to male-mediated effects on progeny date from antiquity to modernity. Plato (1970, 255–56) mentioned in the *Laws* that when a man is drunk “he’ll produce unbalanced children who are not to be trusted, with devious characters, and in all probability with misshapen bodies too.” *The Anatomy of Melancholy*, published by Robert Burton (1621/2001), cited Gellius: “if a drunken man get a child it will never likely have a good brain”. Policy in England during the 1700s Gin Epidemic focused social concern on the impact of both men’s and women’s drinking on the quality of their offspring (Friedler 1996).

 Although such sources suspected a biological link between paternal exposures and fetal health, the prime emphasis throughout history was placed on maternal exposure. In the 1980s, the first articles were published in popular media targeting scientific evidence around the male reproductive body. “Sperm Found Especially Vulnerable to Environment” was the title of an article in the *New York Times* (Brody 1981)*.* Two decades later the urologist Harry Fish (2004) published *The Male Biological Clock*, wherein he tried to destroy the myth that men of all ages have an equal chance of getting biological children*.* That men’s fertility declines with age and their overall lifestyle could negatively impact sperm count was the core message of the book. Echoing Fish’s early concern, an article from the *New York Post* stated that “the battle of the sexes just got a lot more equalized” with research indicating the existence of a male biological clock (Bailey-Millado 2019, 1). Some controversial evidence even suggests sperm counts are declining over time as hormone-altering chemicals and pollution damage the genetic material inside sperm (Tiegs et al. 2019).2 These processes are often categorized together under the umbrella phase of paternal effects. However, basic definitions on paternal effects in epigenetic research are still lacking (Crean and Bonduriansky 2014; Almeling 2020).3

 Together with this growing attention on paternal effects, disruptive technologies aimed at men’s reproductive health (an industry referred to as Big Sperm) are also on the rise. Some medical researchers in the field of epigenetic risks, such as Paul Turek, have developed an equivalent interest in MFmHealth. Recent epigenetic research and MFmHealth are often mentioned in the same breath. It is interesting to notice how the language and metaphors of empowerment, taking shared responsibility, and democratization are often used when new applications in MFmHealth are promoted. Khaled Kteily, the founder of Legacy, who underwent fertility treatment himself, found masturbating in a small, dingy room to be “emasculating” and “awkward”. This brought him to the following questions: “Why even go to a clinic in a first place? Why couldn’t he do it from the privacy of his own bedroom?” (Raphael 2019, 1). Legacy, therefore, offers a package for collecting sperm at home; the package is picked up by a representative of their company and then frozen in a fertility clinic. Through a personal smartphone application, medical specialists send reader-friendly sperm analysis reports that explain diagnoses, treatments, and lifestyle recommendations in layman’s terms instead of incomprehensible medical jargon.The whole procedure is framed as a form of proactive decision-making, a taking control of one’s reproductive health. The marketing material used by the ExSeed Health app, a sperm assessment device that only focuses on testing and not sperm banking, illustrates a similar narrative (Kroløkke 2020).

 In a YouTube commercial for the YO Sperm Test smartphone application, a male voice indicates that “when struggling with infertility, the man and woman share equal responsibility” (YO Sperm Test 2020). Likewise Greg Sommer, the chief science officer of Trak, another at-home sperm test, further highlights that “in the past, men have mostly shrugged off fertility as a women’s issue. Today, men *and* women recognize the role that men play” (Godwin 2019, 1). In the same article Allan Pacey, a professor of andrology at the University of Sheffield who has advised ExSeed and Legacy on its sperm-testing technology, hopes “these tech startups will be able to disrupt things in a good way” (Godwin 2019, 1). This optimism is shared by Onofre et al. (2021, 79): “these tools represent an actual opportunity to standardize and improve male subfertility diagnosis and treatment.” However, Onofre et al. caution that the effects of these tools are largely undocumented. For instance, a common denominator among all these devices is that they still provide limited information. Apart from volume, concentration, and motility, nothing else is measured: too few parameters are provided to disclose male infertility.

 While there is a great variety of applications in MFmHealth, they share a common rationale by aiming to disrupt or undermine established norms around male reproduction. They allow more men to not only pursue security and control of their reproductive bodies but also take on shared responsibility. Nevertheless, the growing industry is primarily focused on individualist framings, such as singles or individual couples’ interactions with these new applications, leaving out broader normative questions at the social level as well as other aspects of human–technology relations and interactions. Such considerations, though highly relevant from a feminist bioethics view, are rarely discussed in the scholarly literature. Instead of an overly individualist approach, I suggest using the concept of vulnerability as a heuristic to better understand normative and social dimensions of MFmHealth.

3 A new theoretical alliance

Recent feminist literature on the ethics of vulnerability and critical studies of men and masculinities make it possible to further explore this hypothesis. They also make constructive proposals concerning what is needed to achieve social and reproductive justice in the case of MFmHealth. The concept of vulnerability is often associated with a range of negative conditions such as suffering from harm and being wronged (Belmont Report 1978; Goodin 1985), but this ethical tradition ignores its transformative potential for facilitating supportive relationships and positive effects in social justice. Such potential was subsequently taken up by Alasdair MacIntyre (1999) and Judith Butler (2004). The feminist ethicist Gilson (2013, 24), building further on Butler’s work, defines vulnerability as “a [sic] unavoidable feature of life and, as such, is not simply an opening to harm but an opening to all experience, negative, positive, and ambiguous.” It is all about an openness to being affected. Only such an account, she argues, can provide a sufficiently nuanced concept that can do justice to “the complexity and diversity of experiences of vulnerability” (Gilson 2021, 86). Several scholars in bioethics support the view that vulnerability is ambiguous as it enables acknowledgment of the embodied and interdependent ontological dimension of the concept while assessing its unequal distribution in certain relations (Bluhm 2012; Mackenzie, Rogers, and Dodds 2013; Zagorac and Stamenković Tadić 2022).

 Feminist work on vulnerability, however, has rarely considered issues of masculinity within the conceptual frameworks developed.4 Two main explanations can be offered for this. First, there is a historical view that (White Western) men’s bodies are the norm, ideal or prototype of invulnerability to which others are compared (Mann 2014). This view is somewhat similar to Luna and Vanderpoel’s (2013, 326) description of the “paradigmatic research subject: a mature, moderately well-educated, clear thinking, literate, self-supporting person.” An implicit message is then promulgated that if men’s bodies are the norm, vulnerabilities are identified in individuals and groups that vary from the paradigm and are therefore prone to being protected. This relates to a second explanation whereby men’s gender often remains invisible and thus capable of avoiding critical scrutiny. As bell hooks (2004) observed, it is not permitted to speak openly and honestly about men. There are, of course, good pragmatic reasons for focusing on female bodies in bioethics research. The problem is that by doing so, we still grant the emperor the clothes that protect him against critical scrutiny (Oudshoorn 2004). In other words, male bodies and masculinities remain unquestioned. However, I think there are interesting parallels between the feminist literature on vulnerability, especially the work of Gilson, and critical studies on men and masculinities.

 Social scientists who study health behavior and masculinity have pointed out that risk-taking behavior and disinterest in seeking medical care are important factors in men’s cultural narratives (Courtenay 2000; Bird and Rieker 2008). Showing vulnerability in the form of fear is considered unmanly, and taking risks is encouraged, in men’s upbringing (Messner 1997; McQueen 2012). For instance, in the book *Exposing Men*, Daniels (2006) developed the concept of reproductive masculinity to describe a set of interrelated beliefs about men’s relationships to human reproduction. These symbolic beliefs posit that men are “secondary in biological reproduction,” and “less vulnerable to reproductive harm than women,” “assumed to be virile” while their own conditions are not thought to “affect both pregnancy and the children they father” (Daniels 2006, 6–7). Such beliefs represent a normativity and embody the most honored way of being a reproductive man. This is illustrated by Law (2020), who interviewed men on the possibility of sperm testing and freezing. Most of her participants believed that men could still have children late in their lives, that sperm quantity or quality did not significantly decline with age, and that men were relatively invulnerable to reproductive harm associated with aging.

 At the same time, gender relations are not fixed; they are always associated with arenas of tension. Shifting cultural norms around masculinity and fatherhood have been noted to create new expectations of men’s care and the time invest for their children (Jordan 2020). Whereas Daniels (2006) pointed toward the structural dimension of hegemonic masculinity and reproduction, more recent work (Inhorn and Wentzell 2011; Lohan 2015) called attention to the emergent dimension of masculinity in men’s everyday engagements with reproductive technologies that continuously contest those structuring ideas which Daniels described. Men participating in reproduction cannot only be reified and associated with an “assemblage of toxic traits” (Connell and Messerschmidt 2005, 854). Oudshoorn (2004) confirmed the emergence of a new narrative of the caring man who is moved by empathy to share contraceptive responsibility with his long-term partner.

 Bringing together two otherwise disjointed scholarly fields (i.e., critical studies of men and masculinity, along with feminist ethics of vulnerability) could provide a fertile theoretical and cultural analytical framework to study MFmHealth and to speculate on different ethical tensions in its development. A common line of reasoning within both fields is to go beyond dualistic thinking and decouple vulnerability from weakness or masculinity from invulnerability. This non-dualist approach is critical and can assist in interrogating the potentiality and ambiguous implication of MFmHealth. For instance, the idea that men are vulnerable to reproductive harm can be used by men’s rights activists. Such a claim diverts attention from structural elements, but this theoretical alliance would recognize the severity of different forms of harm that persons can suffer from. Furthermore, both fields are connected to political imperatives for equality and social justice. All in all, the meaning of vulnerability combined with masculinity is far from apparent, seamless, or obvious. I propose that this theoretical alliance can be a first step toward doing justice to the ethical complexities of the phenomenon.

4 Starting thoughts and open questions

To further investigate the possibility of this new theoretical alliance, I suggest asking a set of questions about the use of MFmHealth that bring dimensions of vulnerability and social justice into view. What impact would the use of MFmHealth have for individuals from disadvantaged backgrounds? Which vulnerabilities, of individuals or groups, from disadvantaged or even privileged backgrounds, might be compounded by the use of MFmHealth? Could certain structural injustices stay unaddressed, or even be reinforced—especially if we take into account the idea of Oudshoorn (2004, 351), that “technologies that conflict with hegemonic masculinity have to struggle to come into existence”? What happens if large groups of men use at-home sperm testing, possibly in a competitive race that leads them to exaggerate their privilege? How would a society have to be structured so that MFmHealth could be used in fair and equitable ways?

 With this list I do not claim that MFmHealth should be rejected altogether in the future. Rather, I suggest evaluating it from a vulnerability perspective that pays attention to the differentiated embeddedness of individuals within social structures. This requires looking not only at the individual users, but also at groups; not in order to label or stigmatize their members, but in order to identify potential vulnerabilities including injustices and their underlying power dynamics. And it requires taking into account the effects of MFmHealth on societies as a whole, with their multidimensional landscapes of privileges, psychosocial dynamics and disadvantages.

 Furthermore, I do not take this to be an exhaustive list of questions. Nor do I think it is possible to come up with one definitive list. This research is still speculative in nature. I trust research on the topic of MFmHealth will continue in the future, and that what I offer here is not a final argument but a series of provocations for further thought. There is no empirical data on the influence of MFmHealth in the attitudes and views of men, nor on the reasoning of app developers. Further research is needed to bridge the gap between practice and the new theoretical alliance I propose. The emerging market of MFmHealth has the potential to alter everyday life and create moral uncertainty. It would therefore be a timely endeavor if new questions broadened academic and public debate about what the arrival of these technologies means for societies which are marred by structural injustices and inequalities.

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 **Notes**

 1. A similar style of abbreviation is used by Segers et al. (2021) to speak of women’s use of pregnancy-related mHealth (PRmHealth). My commentary is in a way the masculine counterpart of their paper.

 2. Such popular articles and books are rather the exception, especially if compared to maternal-focused articles on topics such as egg freezing (Campo-Engelstein et al. 2016).

 3. For instance, paternal effect research is often based on animal studies in a laboratory setting; it is still an open question of how those results translate to humans.

 4. There is one notable exception: the reflections on black masculinity and vulnerability by Gilson (2016).