It Might Take Time: a Study on the Evolution of Quality of Life in Individuals with Gender Incongruence during Gender-Affirming Care

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ABSTRACT

Introduction: The distress caused by gender incongruence has been shown to be reduced with gender-affirming care. The current study follows a cohort of patients that requested gender-affirming care at Ghent University Hospital and examines the outcome of the procedures.

Methods: The prospective design with four assessment times allows the study to assess the evolution of self-reported quality of life (QoL) and gender incongruence throughout a medical transition process. All the participants (N=119) received hormone therapy, 52% underwent a separate gonadectomy (N=62), and 41% vaginoplasty or phalloplasty (N=49).

Results: The results suggest that gender incongruence improves after surgery. QoL has slightly different trends for the different gender groups: compared to people who were assigned male at birth (AMAB), people who were assigned female at birth (AFAB) report lower QoL after gonadectomy. Meeting other transgender people facilitates QoL after starting hormone therapy. A higher number of friends after genital surgery is predictive of a better QoL.

Clinical implications: These results may be useful for clinicians working with transgender patients, as they provide information collected assessing patients soon after surgery and may raise awareness regarding the specific clinical attention that post-surgery patients need.

Conclusions: QoL can be compromised after the invasive surgery, while gender incongruence is alleviated throughout the transition. Our results should be confirmed with other prospective study designs that include a longer follow-up period.

INTRODUCTION

Gender identity does not always correspond with the sex assigned at birth through the visual inspection of external genitals. In the present work, we use the word *transgender* to identify someone whose gender identity, gender expression, or behavior does not conform to those typically associated with the sex they were assigned at birth. When relevant, we make a distinction between transgender people who were assigned female at birth (AFAB) and those who were assigned male at birth (AMAB). Transgender people may report a mild to intense distress, caused by the discrepancy between assigned and experienced gender, this distress is known as gender dysphoria [1] In this work we prefer to use the term gender incongruence, instead of gender dysphoria (used in the DSM-5 [2]), as it is a term that has recently been broadly utilized. In order to alleviate distress, some may seek gender-affirming care. The 7th version of the Standards of Care lists social transition (living full or part-time in one's gender identity for an extended period of time), psychotherapy, surgery, and hormone therapy as intervention options for individuals with gender incongruence [1]. Gender-affirming care, which includes all of the above factors, is considered the most effective intervention for people with gender incongruence [3].

Quality of Life (QoL) is a broad concept encompassing different aspects of a person's life. It is defined by the World Health Organization as individuals' perception of their position in life in the context in which they live, including their goals, expectations, standards, and concerns [4]. To express this construct through quantitative measurements, different tools have been developed, allowing researchers to use it as an outcome measure and to assess the level of perceived well-being of the respondents [4,5]. Some studies used these outcome measures to compare the QoL of post-surgical transgender patients to that of matched controls, [6–8], whereas in the context of our work we focus on monitoring the impact that the different stages of gender-affirming care can have on the self-reported QoL.

The hormonal and surgical interventions have been shown to reduce or even resolve gender incongruence and concurrent psychological complaints [9–11]. Hormone therapy is generally the first, and may be the only, medical intervention started by people who wish to modify their bodily appearance to be consistent with their gender identity. In AFAB testosterone therapy is used to masculinize the body and suppress female secondary sex characteristics, whereas AMAB often use estrogens to feminize their body. Additional anti-androgenic therapy is also usually necessary since estrogen alone is often not enough to achieve the desired androgen suppression [12].

In AFAB who chose to undergo surgical intervention to masculinize their body, the "top surgery" is a bilateral mastectomy, and the genital or "bottom surgery" can include ovariectomy and hysterectomy, metoidioplasty (clitoral release), phalloplasty (the construction of a penis with tissue from another part of the body such as forearm or thigh), and scrotoplasty (using labia majora tissue and silicone testicular implants). Since there are multiple options available for AFAB, it is important that the patient chooses after receiving extensive information about the surgical procedures and the risks and potential outcomes associated with each one [3,13]. In AMAB there can be an augmentation mammoplasty to obtain a feminine appearance of the chest, while the genital surgeries to obtain a feminization of the genitalia can include orchiectomy and vaginoplasty. Other procedures involve facial and vocal feminization.

Role of social support

Transgender people are subject to high levels of discrimination due to their gender identity or expression [14]. They may experience forms of minority stress shared with LGB (lesbian, gay, and bisexual) or other minority groups, such as discrimination, expectation of rejection, or prejudice-related hate crimes, and also unique stressors, such as identity concealment [15] or internalized transphobia [16]. These unique stressors that minorities face may result in negative consequences for mental and physical health [17,18]. Belonging to a minority can result in the emerging of impactful stressors, but at the same time activate resilience processes. When a minority identity is associated with a feeling of belonging, with opportunities of affiliation and social support, the resulting coping mechanisms might be important modifiers in the stress process and might be a source of strength for the individual [19]. Social support is defined as a form of help received by others and has been classically linked to better mental health [for a review see 20]. Social support was found to have a positive correlation with QoL in AFAB, and both social support and QoL showed a negative correlation with depression, anxiety, and stress scores [21]. Several studies on the transgender population found three assets of social support that are associated with psychological well-being, namely family support, peer support, and identity pride [22–24]. In this work, we will focus on these three protective social support factors, as well as loneliness in relation to QoL. The aims of our longitudinal study on a cohort of transgender people entering the X Hospital are the following:

1. To evaluate the evolution of the QoL and particularly to examine the social support factors in relation to the QoL at the four different assessment times. We hypothesize that the QoL will improve.

2. To evaluate the evolution of gender incongruence. We hypothesize that distress will decrease.

METHODS

From October 2012 to October 2019 participants who entered the clinic, were also invited to participate in the data collection for this work. The study was conducted following the recommendations of the Declaration of Helsinki, and it received approval from the Ghent University Hospital Ethical Committee.

The four assessment times were planned as follows: upon the first consultation or assessment time 0 (AT0), 6 months after the beginning of hormone therapy (AT1), 8 weeks after the gonadectomy (AT2), and 8 weeks after the phalloplasty or vaginoplasty (AT3). After 6 months of hormonal therapy we expect to see an impact on the outcome variable. The assessment times following the surgical procedures were planned uniformly 8 weeks after them, since by that time patients who underwent vaginoplasty or phalloplasty are usually able to return to work and their regular activities. The gonadectomy is commonly performed together with genital surgery. However, the waiting list for genital surgery can be quite long at our clinic, and this is one of the reasons why some patients included in our study were given the option to have a separate gonadectomy performed. This allowed them to move forward in their transition process and possibly decrease their dysphoria. Having received a gonadectomy fulfilled a requirement for the former application for a legal change of the sex stated in their identity documents. In fact, the majority of the data has been collected before the new X Gender Recognition Act had entered into force on January 1st, 2018, enabling people to have their self-defined (binary) gender identity legally recognized without undergoing psychiatric assessment or genital surgery [25]. Respondents either received a paper version of the survey and a stamped return envelope or completed the questionnaire in person during a visit to the hospital.

Measures

QoL. We used the Dutch validated translation of the SF-36 [26] to measure the health-related QoL at all assessment times. This widely used measurement tool [5] contains 36 questions that cover eight multi-item scales regarding emotional and physical domains of the respondents. All raw scale scores were linearly converted to a 0–100 scale, with higher scores indicating higher levels of functioning or well-being. The cut-off for the population norm is around 50. The internal consistency of the subscales of the SF-36 in our data was confirmed in all eight components, the average Cronbach's α is 0.84 (Cronbach's α range: 0.79 - 0.90).

Gender Incongruence (or Gender Dysphoria). The Utrecht Gender Dysphoria Scale (UGDS) was used to measure the degree of experienced gender incongruence at all assessment times. This is a 12-item scale, with two different versions based on the sex assigned at birth, and the respondents rated each item on a 5-point Likert scale. The sum score ranges from 12 (minimal dysphoria) to 60 (maximal dysphoria) [27]. At assessment times 2 and 3 participants received an adapted UGDS version, as performed in previous research [28,29]. The internal consistency of the UGDS scale was confirmed for all the 12 component items (Cronbach's $\alpha >$ .86).

Social support. At AT0 participants also filled in a questionnaire to collect background information. We selected four items from the section that concerned social support. The first question is "Do you meet with other transgenders?" (Yes, No). The second is "How many close friends (people whom you can rely on) do you have when you have a problem? (0, 1-2, 3-10, 10+). The third is "How would you describe your relationship with your family?" (poor, not very good, good, very good). The last question is "Are you lonely now? (always, regularly, sometimes, never).

Sample

146 participants were invited, 27 of them were excluded. Reasons for exclusion were age younger than 16 years old, not signing the informed consent, not being fluent in Dutch, not participating in at least 2 of the 4 assessments. We also excluded the respondents that did not fill out the questionnaires on time. Participants received a Diagnostic and Statistical Manual of Mental Disorders diagnosis of gender dysphoria [30], or gender identity disorder [31]. Counseling or psychotherapeutic support is continuously offered throughout the entire medical transition.

All the 119 subjects who were included in the analysis received at least hormone therapy (Table 1). The average age at the time of the first consultation was 24 for AFAB (SD = 10.51) and 32 for AMAB (SD = 12.33).

	AFAB	AMAB	Total	Response rate
Hormone Therapy (AT1)	Yes 100% (N=62)	100% (N=57)	N = 119	84 % (N=100)
Metoidioplasty	Yes 13% (N=8)			
	No 87% (N=54)			
Gonadectomy (AT2)	Yes 73% (N=45)	30% (N=17)	N = 62	69% (N=43)

	No	27% (N=17)	70% (N=40)	
Vaginoplasty / phalloplasty (AT3)	Yes	29% (N=18)	54% (N=31)	N = 4973 % (N=36)
	No	71% (N=44)	46% (N=26)	
Days between HT and gonadectomy		M=485, DS=332 range: 63-2508	M=521, DS=195, range: 291-918	
Days between gonadectomy and vagino/phalloplasy		M=616, DS=275 range: 94-1228	M=322, DS=92 range: 205-483	

Table 1. *Descriptive statistics: medical procedures*

Since not everyone decided upon genital surgery, we expected to have many applicants not participating in the last two measurement times (Table 1).

Data analysis

All analyses were done using SPSS 26.0 software. Linear mixed models were used to account for repeated measures and missing data (no response, no surgery). We can assume our data to be missing at random (MAR). The random effects covariance structure was *Unstructured*, so that each variance and each covariance is estimated uniquely from the data. P values < 0.05 were considered significant.

Model 1: QoL. The first model was devised calculating fixed effects for categorical predictors such as gender (2 levels: AFAB, AMAB), assessment time (4 levels: AT0, AT1, AT2, AT3), social support items: "meet other transgenders" (2 levels: Yes, No), "number of friends" (4 levels: 0, 1-2, 3-10, 10+), "relationship with family" (4 levels: poor, not very good, good, very good), "loneliness" (4 levels: always, regularly, sometimes, never), as well as 2 predictors of whether or not participants underwent gonadectomy (2 levels: yes, no) and vagino/phalloplasty (2 levels: yes, no). The analysis tested the total effect of our independent variables, the interaction among social support items and time, and the interaction of gender and time; the outcome variable was the total score of the QoL measured through the SF-36. We included a random intercept for each subject ID and since there is a lot of variation, we included a random slope for the time.

Model 2: Gender Incongruence. The second model tested the effect of time and gender, and their interaction, as well as the effect of the 2 binary predictors of whether or not participants underwent gonadectomy and vagino/phalloplasty. We included a random intercept

for the subject ID. The outcome variable was the gender incongruence score, measured through the UGDS.

RESULTS

Model 1: QoL.

Model 1 on QoL shows an interaction effect between time and gender (graph 1), and an interaction effect between time and two social support items (both the items "meeting other transgender people", and "number of friends" show a significant interaction with time).

The QoL mean score remains stable after the start of hormone therapy, it begins to lower for AMAB after the gonadectomy, and drops considerably for both AFAB and AMAB after the vaginoplasty or phalloplasty.

Graph 1: *Trend of QoL for AFAB and AMAB. On the X-axis the four assessment times are represented and on the Y-axis the mean scores of Quality of Life are represented for each gender. The asterisks indicate differences that are statistically significant (p values < 0.05).*

There is a significant interaction between time and gender, $F(3, 142.13) = 3.398$, $p = .02$, so the trend of the QoL score is different for AFAB and AMAB across the 4 time points. Specifically, we can see that at AT2 the mean score of the QoL is estimated to be 15.99 points lower, $SE = 5.75$ for AMAB compared with AFAB, $p = .006$, 95% CI [-27,37, -4.60]. Compared to AMAB, the AFAB group hence reports a lower QoL after gonadectomy.

Social support: Model 1 further shows that the item "relationship with family" with time did not reach statistical significance. The other social support items however show a significant interaction with time (see Table 2). We performed a post-hoc analysis to look at the mean differences for QoL of the three items that showed a significant interaction with time. We estimated the means for each interaction, and we used Bonferroni correction to correct for multiple testing.

Model 1. QoL

Effect	DF	DF	F value	p	Mean difference	SE	95% CI

Gender	1	111.81	.525	.470
Gonadectomy	1	90.09	.000	.984
Vaginoplasty/phalloplasty	1	89.31	3.274	.074
Meet other T	1	129.71	1.902	.170
Number of Friends	3	111.52	1.800	.151
Relationship with Family	3	100.07	1.199	.314
Loneliness	3	94.62	.335	.800
Time Period	3	132.27	7.751	<.001
Meet other T * Time Period	3	139.61	6.675	<.001
Number of Friends * Time Period	7	139.44	3.471	.002
Relationship with Family * Time Period	9	139.44	1.755	.082
Loneliness * Time Period	8	138.52	2.911	.005
Gender * Time Period	3	142.133	3.398	.020

Model 1. QoL: post hoc analysis

Meet other T (AT1) yes vs no	7.72	3.89	0.25, 15.60
Meet other T(AT 3) yes vs no	-27.95	8.32	-44.35, 11.55
Number of friends (AT3) 10+ vs 3-10	23.93	7.21	6.52, 41.33
Number of friends (AT3) 10+ vs 1-2	28.35	9.07	6.46, 50.25

Model 2. Gender Incongruence

Gender	1	156.44	4280.872	< .001
Time Period	3	175.68	1275.754	< .001
Gender * Time Period	3	183.85	117.488	< .001

Gonadectomy	1	111.94	3.514	.063			
Vaginoplasty/phalloplasty	1	112.04	6.746	.011			
Post-hoc analysis							
AMAB vs AFAB (AT0)					15.26	.97	13.34, 17.18
AMAB vs AFAB (AT1)					16.33	1.00	14.35, 18.32
AMAB vs AFAB (AT2)					- 6.31	1.53	-9.34, -3.30
AMAB vs AFAB (AT3)					- 4.80	1.70	-8.14, -1.46

Table 2. *GLMM for QoL and gender incongruence.*

Meeting other transgender people: At AT1 there is a significant difference in QoL between people who answered YES and those who answered NO, $F(1, 176.15) = 4.148$, $p = .043$. The QoL score is expected to be higher for people who answered YES. However, at AT3 there is a significant difference in QoL score between people who answered YES and those who answered NO, $F(1, 190.98) = 11.295$, $p = .001$, but the QoL score is expected to be lower for people who answered YES. At AT0 (baseline) and AT2 we found no significant difference. In conclusion, meeting other transgender people can be seen as predictive of a better QoL only depending on the phase of transition. After starting hormonal therapy, meeting peers facilitates a better QoL. After genital surgery, however, participants not socially involved with their peer group experience a better QoL.

Graph 2: *Trend of QoL based on whether the person meets with other transgender people. On the X-axis the four assessment times are represented and on the Y-axis the mean scores of Quality of Life are represented for the two groups. The asterisks indicate differences that are statistically significant (p values < 0.05).*

Number of friends: At AT3 there is a significant difference between subjects who have 10+ friends and 3-10 friends, $p = .003$, and between subjects who have 10+ friends, and 1-2 friends, $p = .006$. Therefore, if the subjects have more than 10 friends, we estimate their mean

QoL score to be 23.93 points higher than those who have 3-10 friends, and 28.35 points higher than those who have 1-2 friends. In the other assessment times, we do not see statistically significant differences in the QoL scores based on the number of friends the subjects have. In conclusion, only after genital surgery QoL is higher in participants with the highest number of friends.

Graph 3: *Trend of QoL for number of friends. On the X-axis the four assessment times are represented and on the Y-axis the mean scores of Quality of Life are represented for the four groups. The asterisks indicate differences that are statistically significant (p values < 0.05).*

We found a significant interaction of the item "loneliness" with time, but probably due to the correction of p-values for multiple testing, nothing showed significance within the post-hoc.

Model 2: Gender Incongruence. The gender incongruence lowers throughout time, especially after AT2, meaning after the first surgery, as can be seen in graph 4. The graph also shows the interaction between gender and time.

Graph 4: *Trend of gender incongruence based on gender. On the X-axis the four assessment times are represented and on the Y-axis the mean scores of gender incongruence are represented for both genders. The asterisks indicate differences that are statistically significant between AFAB and AMAB (p values < 0.05).*

The results indicate a main effect of vaginoplasty/phalloplasty on gender incongruence p = .011. Having received a gonadectomy or not does not seem to influence the gender incongruence score, p=0.63 (Table 2).

There is a significant interaction between time and gender, p < .001. Through the post-hoc analysis, we compare the trends of the scores of AFAB and AMAB. At baseline the mean score for gender incongruence for AMAB is 52.17 *SE* = .64, 95% CI [50.90, 53.81] and for AFAB 36.91, *SE* = 0.66, 95% CI [35.60, 38.22]. Similarly, at AT1 AMAB have a higher gender incongruence mean score than AFAB. However, after the surgery, the situation is reversed: at AT2 and AT3 AMAB have a lower gender incongruence than AFAB.

Vaginoplasty/phalloplasty: The patients who received a vaginoplasty or a phalloplasty had a baseline gender incongruence score slightly higher than those who did not,

by 2.03 points, *SE* = .78, *p* = .011, 95% CI [0.48, 3.5]. A possible interpretation of this result is that many of the patients who experience greater distress in terms of gender incongruence are the ones who will ask for the complete GAS (gender-affirming surgery).

DISCUSSION

The main objective of this longitudinal study was to assess the impact of gender-affirming care, specifically the evolution over time of the quality of various aspects of life, and gender incongruence. Another aim was to explore the role that social support factors might have on the QoL in the transition process. Our first hypothesis regarding the QoL is that it could improve after hormone therapy and after surgery. Our data show that the QoL remains stable after the start of HT. Our results show that two months after the gonadectomy the QoL of AMAB lowers, and two months after the vaginoplasty or phalloplasty the QoL lowers for both AFAB and AMAB. This result is not in line with the previous research on the topic since gender-affirming care has been shown to have a generally positive effect [32].

We have also explored if social support can improve or influence the QoL at different measurement times: the social support received does not have a straightforward influence on the QoL, but rather changes depending on the phase of the transition process. Our results show that people who have genital surgery performed (vaginoplasty for AMAB and phalloplasty for AFAB) tend to present a higher degree of gender incongruence at AT0 and that gender-affirming surgery significantly improves gender incongruence for all participants.

Regarding the benefits of HT, for instance, Heylens and colleagues [10] report a prominent decrease in psychopathological symptoms, with the most evident effect occurring after the initiation of hormone therapy. Our research shares Heylens and colleagues' goal to better understand the differential effects of the phases of gender-affirming care by following prospectively the evolution of the outcome variable scores. According to Heylens and colleagues, the effect of surgery on psychopathological symptoms is not more pronounced than that of HT. HT alone brings a big improvement, whereas we do not observe a significant difference between baseline and after receiving HT. The responses were collected 3-6 months after the start of HT, and it included a smaller sample number (N=57). However, the authors are using a different validated tool to assess psychological well-being, the SCL-90, that assesses psychopathological symptoms, while we focus on the QoL. These methodological differences could contribute to explaining the different results.

In a French study regarding the effects of hormone therapy [9] which uses the SF-36 to measure the QoL outcome variable, the results suggest that hormone therapy is independently

linked to better mental QoL (a composite score made up of the subscales of the SF-36 that regard mental health, namely General Mental Health, Social Functioning, and Role Limitations due to Emotional Problems). The study design involves three psychiatric departments of public University teaching hospitals in France where data were collected cross-sectionally, while our design is focused on one clinic, Ghent University Hospital, and works prospectively. It should also be noted that the French sample had been in hormone therapy for a median period of 20 months (minimum 12, range 12–42), while our Belgian sample had a shorter experience (minimum 5, range 4.5–7.8). These differences could explain the contradicting results.

Gava and colleagues' study on transgender women, testing the effects of a specific HT, did not result in statistically significant changes after 12 months, regarding the investigated psychological aspects which included QoL assessed through the SF-36 [33]. A recent review on mental health and QoL in transgender people, however, concluded that the majority of studies have shown, although with limitations, that HT has a link with increased QOL, decreased depression, and decreased anxiety [34].

Regarding the impact of the GAS on QoL, many studies show improvements [32,35,36], but the debate in literature is still ongoing due to the limitation of the methodologies that have been utilized [37]. Some of the methodologies of studies on QoL are different from ours. For instance, a work with a German sample of AMAB by Papadopulos and colleagues [38] uses a retrospective design and does not include preoperative data. The study focuses mostly on the specific combined surgical technique they perform, and how it can help achieve high scores of satisfaction and a positive influence on QoL and body image. The data show that QoL was improved by the surgery, through a self-developed indication-specific questionnaire (it includes questions on demographic, socio-economic issues, satisfaction with postoperative outcomes, and QoL). The sample is made up of 47 AMAB patients, while we also included AFAB, and patients that did not complete genital surgery.

A Swedish study includes long-term follow-ups after gender-affirming surgery [39]. The study, like the current work, is a prospective cohort study of the quality of life measured with SF-36, but the sample included only AFAB. One year after the surgery QoL was found to improve. However, they noticed a non-significant trend that shows the QoL score to decrease with time (up to 5 years). One possible explanation that the authors cite for this is that the QoL in the general population also shows a declining trend over time. However, there is no control group of ciswomen or AMAB without GAS involved in the study to be able to confirm this hypothesis. Almazan and Keuroghlian [40] analyzed the data from the 2015 US Transgender Survey, and found that undergoing at least one type of GAS showed an association with lower

past-month psychological distress, assessed using the Kessler Psychological Distress Scale. The authors conclude that their result can contribute to providing evidence in support of the possibility of offering GAS to TGNC people who seek it. The same survey has been further analyzed with specific attention to mental health outcomes [41].

Interestingly, the social support items we included in the model play diverse roles in different moments of the assessment, so we cannot draw overall conclusions on the effect they have on the QoL. Some studies demonstrated the social support the transgender person perceives does predict QoL and life satisfaction, for instance, the work of Davey and colleagues [42], and how it can positively correlate with QoL. However, these authors do not test whether the stage of the transition process was associated with social support, or if the social support plays a different role in predicting psychological well-being based on the time at which it was assessed. Nevertheless, since the literature has shown different benefits of social support systems, we believe it is a topic worth investigating more.

The second hypothesis, regarding gender incongruence, is that it will lower after hormone therapy and after surgery, so the subject is expected to experience less distress after hormone therapy and after surgery, as proposed by recent literature [10,28,29,43].

Our data at AT1 are not in line with the aforementioned hypothesis and literature. [28] using the same tool, reports improvements in gender incongruence after gender-affirming care, but does not differentiate between after hormone therapy and GAS [29]. Another study that focuses specifically on the consequences of HT, on the other hand, uses different outcome measures, making it hard to compare results [10].

Our hypothesis that gender-affirming surgical procedures are an effective intervention for gender incongruence is neatly supported by the analyzed data and is in line with previous research. A prospective Dutch study [43] measures, amongst other variables, gender incongruence pre and post gender-affirming care using the UGDS. The authors find that gender incongruence, although it was the main symptom for which the patients had requested intervention, decreases after surgery to such a degree that the group was no longer suffering from gender incongruence. Regarding the difference between the groups in our study for the levels of gender incongruence, the AMAB report significantly higher gender incongruence than AWAB at AT0 and AT1. According to some authors, this could be due to the tool used to measure the incongruence: when valuing how the UGDS is able to capture their subjective experience, AMAB reported the tool to be more aligned with their experience than AWAB, and this may mean that it captures better their experience also in our participants [44].

Our study has several strengths. First of all, it is worth mentioning that all the participants included have received interdisciplinary transgender health care. Secondly, the study design follows the well-defined cohort prospectively, and the temporal sequences that are established to capture 4 time points are followed precisely for all the subjects.

Also, the tools that are used are widely known in the literature: the SF-36 questionnaire is well validated in several populations [5,26,45], and UGDS is specific for the transgender population [27]. This work aims at filling a gap in literature, since there is a lack of assessments performed a short time after surgery.

There are also numerous limitations that are crucial to consider. The most important being the short follow-up period: there should be another assessment, several months after the last surgery, to see how the QoL settles when the patients are fully recovered. Literature has indeed documented complications and risk following GAS [46,47] A study investigating postoperative satisfaction, for instance, shows that after four to six years from the first clinical contact the patients reported high surgical satisfaction rates (despite the possible complications that can arise due to the invasive operations) [29]. We believe a follow-up as late as one year after the surgery could be useful. According to some authors, the first year after the transition does not paint a realistic picture regarding long-term sexual and psychological status [48] and we suggest that it might also be the case for health related QoL. Regarding the SF-36, looking at the individual role played by the 8 subscales would require a methodological procedure that exceeds the scope of the current work; however, it could be a parameter to be investigated in future research.

The UGDS, which we use to assess gender incongruence in all the phases, was originally developed to measure it upon admission. At AT2 and AT3 we use the UGDS version of the gender the participants currently lived in, and this might have reduced its sensitivity. The questionnaire used to measure social support and collect background data is not a validated tool. We should also consider the modification to the Belgian law while the data collection was ongoing. The Belgian Gender Recognition Act entered into force on January 1st, 2018, and transgender people can now apply for legal gender recognition merely based on self-determination [25]. Therefore, we cannot exclude that some participants included in our study whose main goal was to obtain a change of their registered sex, chose not to proceed after that date because certification of the medical transition is no longer required in order to obtain a change of their registered sex in the birth certificate in accordance with their gender. Finally, we only assessed participants through self-report questionnaires, and used one tool to measure each construct, which may not be enough to capture their complexity.

Clinical implications

It would be clinically useful to explore whether the QoL score of our sample changes (and how) after a longer time from the surgery. In fact, for both surgical procedures, in our study the data have been collected 8 weeks after the surgical interventions. Nevertheless, since the procedures are invasive, we believe that it might take more than 2 months to fully recover and to observe the potential benefits on the person's life. If our study had extended further, we may have seen the QoL score rise back up. However, by assessing patients so soon after surgery, we are able to give them the clinical attention they might need in this phase that, as this study confirms, may be challenging. The professionals in our clinic are acquainted with the difficulties that may arise right after surgical interventions, and they are aware of the literature and real-life experiences confirming the positive long-term outcomes of these interventions. Therefore, we think it's clinically helpful to discuss the implication of every phase with the patients and their families.

As mental health professionals ourselves, we can explain the results of the present study through our clinical experience. We have indeed noted that our patients may in a first stage be very focused on getting the medical intervention they desire. Sometimes, when those interventions have been carried out, as they heal and progress, other issues (that maybe were not a priority compared to the gender incongruence) might arise. Therefore, it is useful for clinicians to take into account the possibility that, after the incongruence decreases thanks to the gender-affirming care, the patient might have to face some other challenges before their QoL can settle.

CONCLUSION

Regarding our first hypothesis, we see that the QoL score remains stable after hormone therapy. In contrast with our prediction, we find that there is a big QoL score drop at AT3. Looking at the role played by social support, we can say that meeting with other transgender people can be seen as predictive of a better QoL depending on the phase of transition. After starting hormonal therapy, it facilitates a better QoL. After genital surgery, however, this aspect of social support does not seem to suffice to experience a better QoL. Looking at the role of the number of friends the subjects have, we can say that having numerous friends does not seem to improve the QoL until the last surgery, where it seems to function as a protective factor, and subjects who have a large group of friends tend to have a higher QoL.

Regarding the second hypothesis, for both AMAB and AFAB gender incongruence remained stable after the start of hormone therapy. However, when it was measured again, 8 weeks after the first surgery was performed, it had dropped significantly. It remains low also in the last time point, which is 8 weeks after the phalloplasty or vaginoplasty. The surgery seems to help alleviate gender incongruence in all the patients, but we can observe a bigger change for AMAB, whose gender incongruence score lowered in the measurements after both surgeries.

We also believe that further research is needed to assess which patients are at risk of a poor QoL after GAS. Given that social support is beneficial to QoL in those with gender incongruence, it is important that the health providers encourage patients to access their networks and receive the available social support throughout the process. Future studies should employ robust methodologies, like prospective cohort studies with large samples, and should use control groups such as the general population, non-clinical transgender people, people at different stages of the transition, and from different countries or environments.

Recent works point out how some of the distress can be believed to originate from gender incongruence per se, and some from stigma associated with cisnormative expectations from the society [49]. Thus when working around this topic, researchers should keep in mind the complexity and the components of gender incongruence. Indeed, since we may expect other variables to be at play and influence QoL, such as general stress and mental health, it may be worth assessing their relevance and possible mediating role with specific tools. More studies are required to explore long-term QoL with long-term follow-ups. Researchers may consider adding assessments throughout the transition process, for instance after the patients undergo top surgery. Finally, future experimental design may be built without binary assumptions about gender identities, including people that do not identify in the binary spectrum.

References

[1] Coleman E, Bockting W, Botzer M, Cohen-Kettenis P, DeCuypere G, Feldman J, et al. Standards of Care for the Health of Transsexual, Transgender, and Gender-Nonconforming People, Version 7. Int J Transgenderism 2012;13:165–232. https://doi.org/10.1080/15532739.2011.700873.

[2] American Psychiatric Association. Diagnostic and Statistical Manual of Mental Disorders. Fifth Edition. American Psychiatric Association; 2013. https://doi.org/10.1176/appi.books.9780890425596.

[3] Zurada A, Salandy S, Roberts W, Gielecki J, Schober J, Loukas M. The evolution of transgender surgery. Clin Anat 2018;31:878–86. https://doi.org/10.1002/ca.23206.

[4] Skevington SM, Lotfy M, O'Connell KA. The World Health Organization's WHOQOL-BREF quality of life assessment: Psychometric properties and results of the international field trial. A Report from the WHOQOL Group. Qual Life Res 2004;13:299–310. https://doi.org/10.1023/B:QURE.0000018486.91360.00.

[5] Ware JE, Sherbourne CD. The MOS 36-item short-form health survey (SF-36): I. Conceptual framework and item selection. Med Care 1992;30:473–83. http://dx.doi.org.proxy.unimib.it/10.1097/00005650-199206000-00002.

[6] Castellano E, Crespi C, Dell'Aquila C, Rosato R, Catalano C, Mineccia V, et al. Quality of life and hormones after sex reassignment surgery. J Endocrinol Invest 2015;38:1373–81. https://doi.org/10.1007/s40618-015-0398-0.

[7] Motmans J, Meier P, Ponnet K, T'Sjoen G. Female and Male Transgender Quality of Life: Socioeconomic and Medical Differences. J Sex Med 2012;9:743–50. https://doi.org/10.1111/j.1743-6109.2011.02569.x.

[8] Jellestad L, Jäggi T, Corbisiero S, Schaefer DJ, Jenewein J, Schneeberger A, et al. Quality of Life in Transitioned Trans Persons: A Retrospective Cross-Sectional Cohort Study. BioMed Res Int 2018;2018:1–10. https://doi.org/10.1155/2018/8684625.

[9] Gorin-Lazard A, Baumstarck K, Boyer L, Maquigneau A, Gebleux S, Penochet J, et al. Is Hormonal Therapy Associated with Better Quality of Life in Transsexuals? A Cross-Sectional Study. J Sex Med 2012;9:531–41. https://doi.org/10.1111/j.1743-6109.2011.02564.x.

[10] Heylens G, Verroken C, De Cock S, T'Sjoen G, De Cuypere G. Effects of Different Steps in Gender Reassignment Therapy on Psychopathology: A Prospective Study of Persons with a Gender Identity Disorder. J Sex Med 2014;11:119–26. https://doi.org/10.1111/jsm.12363.

[11] White Hughto JM, Reisner SL. A Systematic Review of the Effects of Hormone Therapy on Psychological Functioning and Quality of Life in Transgender Individuals. Transgender Health 2016;1:21–31. https://doi.org/10.1089/trgh.2015.0008.

[12] Unger CA. Hormone therapy for transgender patients. Transl Androl Urol 2016;5:877–84. https://doi.org/10.21037/tau.2016.09.04.

[13] Özer M, Pigot GLS, Bouman M-B, van de Grift TC, Elfering L, van Mello NM, et al. Development of a Decision Aid for Genital Gender-Affirming Surgery in Transmen. J Sex Med 2018;15:1041–8. https://doi.org/10.1016/j.jsxm.2018.04.644.

[14] Glynn TR, Gamarel KE, Kahler CW, Iwamoto M, Operario D, et al. The role of gender affirmation in psychological well-being among transgender women. Psychol Sex Orientat Gend Divers 2016;3:336–44. http://dx.doi.org.proxy.unimib.it/10.1037/sgd0000171.

[15] McConnell EA, Janulis P, Phillips G, Truong R, Birkett M. Multiple minority stress and LGBT community resilience among sexual minority men. Psychol Sex Orientat Gend Divers 2018;5:1–12. http://dx.doi.org.proxy.unimib.it/10.1037/sgd0000265.

[16] Scandurra C, Bochicchio V, Amodeo AL, Esposito C, Valerio P, Nelson MM, et al. Internalized Transphobia, Resilience, and Mental Health: Applying the Psychological Mediation Framework to Italian Transgender Individuals. Int J Environ Res Public Health Basel 2018;15:508. http://dx.doi.org.proxy.unimib.it/10.3390/ijerph15030508.

[17] Meyer IH, Frost DM. Minority stress and the health of sexual minorities. In: Patterson CJ [Ed, D'Augelli AR [Ed, editors. Handb. Psychol. Sex. Orientat., Oxford University Press (New York, NY, US); 2013, p. 252–66, Chapter x, 320 Pages.

[18] Testa RJ, Michaels MS, Bliss W, Rogers ML, Balsam KF, Joiner T. Suicidal ideation in transgender people: Gender minority stress and interpersonal theory factors. J Abnorm Psychol 2017;126:125–36. http://dx.doi.org.proxy.unimib.it/10.1037/abn0000234.

[19] Meyer IH. Prejudice as stress: Conceptual and measurement problems. Am J Public Health Wash 2003;93:262–5.

[20] Taylor SE. Social Support: A Review. Oxf Handb Health Psychol 2011. https://doi.org/10.1093/oxfordhb/9780195342819.013.0009.

[21] Meier SC, Pardo ST, Labuski C, Babcock J. Measures of Clinical Health among Female-to-Male Transgender Persons as a Function of Sexual Orientation. Arch Sex Behav N Y 2013;42:463–74. http://dx.doi.org.proxy.unimib.it/10.1007/s10508-012-0052-2.

[22] Bockting WO, Miner MH, Swinburne Romine RE, Hamilton A, Coleman E. Stigma, Mental Health, and Resilience in an Online Sample of the US Transgender Population. Am J Public Health 2013;103:943–51. https://doi.org/10.2105/AJPH.2013.301241.

[23] Moody C, Fuks N, Peláez S, Smith NG. "Without this, I would for sure already be dead": A qualitative inquiry regarding suicide protective factors among trans adults. Psychol Sex Orientat Gend Divers 2015;2:266. https://doi.org/10.1037/sgd0000130.

[24] Puckett JA, Matsuno E, Dyar C, Mustanski B, Newcomb ME. Mental health and resilience in transgender individuals: What type of support makes a difference? J Fam Psychol JFP J Div Fam Psychol Am Psychol Assoc Div 43 2019;33:954–64. https://doi.org/10.1037/fam0000561.

[25] Cannoot. The right to personal autonomy regarding sex (characteristics), gender (identity and/or expression) and sexual orientation : towards an inclusive legal system. Ghent Univ Fac Law

Criminol Ghent Belg 2019.

[26] Aaronson NK, Muller M, Cohen PDA, Essink-Bot M-L, Fekkes M, Sanderman R, et al. Translation, Validation, and Norming of the Dutch Language Version of the SF-36 Health Survey in Community and Chronic Disease Populations. J Clin Epidemiol 1998;51:1055–68. https://doi.org/10.1016/S0895-4356(98)00097-3.

[27] Cohen-Kettenis PT, van Goozen SH. Sex reassignment of adolescent transsexuals: a follow-up study. J Am Acad Child Adolesc Psychiatry 1997;36:263–71. https://doi.org/10.1097/00004583-199702000-00017.

[28] van de Grift TC, Elaut E, Cerwenka SC, Cohen-Kettenis PT, De Cuypere G, Richter-Appelt H, et al. Effects of Medical Interventions on Gender Dysphoria and Body Image: A Follow-Up Study. Psychosom Med 2017;79:815–23. https://doi.org/10.1097/PSY.0000000000000465.

[29] van de Grift TC, Elaut E, Cerwenka SC, Cohen-Kettenis PT, Kreukels BPC. Surgical Satisfaction, Quality of Life, and Their Association After Gender-Affirming Surgery: A Follow-up Study. J Sex Marital Ther 2018;44:138–48. https://doi.org/10.1080/0092623X.2017.1326190.

[30] American Psychiatric Association. Diagnostic and Statistical Manual of Mental Disorders. Fifth Edition. American Psychiatric Association; 2013. https://doi.org/10.1176/appi.books.9780890425596.

[31] American Psychiatric Association. Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition, Text Revision (DSM-IV-TR). vol. 1. 4th ed. Arlington, VA: American Psychiatric Association; 2000. https://doi.org/10.1176/appi.books.9780890423349.

[32] Nobili A, Glazebrook C, Arcelus J. Quality of life of treatment-seeking transgender adults: A systematic review and meta-analysis. Rev Endocr Metab Disord 2018;19:199–220. https://doi.org/10.1007/s11154-018-9459-y.

[33] Gava G, Cerpolini S, Martelli V, Battista G, Seracchioli R, Meriggiola MC. Cyproterone acetate vs leuprolide acetate in combination with transdermal oestradiol in transwomen: a comparison of safety and effectiveness. Clin Endocrinol (Oxf) 2016;85:239–46. https://doi.org/10.1111/cen.13050.

[34] Baker KE, Wilson LM, Sharma R, Dukhanin V, McArthur K, Robinson KA. Hormone Therapy, Mental Health, and Quality of Life Among Transgender People: A Systematic Review. J Endocr Soc 2021;5. https://doi.org/10.1210/jendso/bvab011.

[35] Passos TS, Teixeira MS, Almeida-Santos MA. Quality of Life After Gender Affirmation Surgery: a Systematic Review and Network Meta-analysis. Sex Res Soc Policy Berkeley 2019:1–11. http://dx.doi.org.proxy.unimib.it/10.1007/s13178-019-00394-0.

[36] Murad MH, Elamin MB, Garcia MZ, Mullan RJ, Murad A, Erwin PJ, et al. Hormonal therapy and sex reassignment: a systematic review and meta-analysis of quality of life and psychosocial outcomes. Clin Endocrinol (Oxf) 2010;72:214–31. https://doi.org/10.1111/j.1365-

2265.2009.03625.x.

[37] Bränström R, Pachankis JE. Reduction in Mental Health Treatment Utilization Among Transgender Individuals After Gender-Affirming Surgeries: A Total Population Study. Am J Psychiatry 2019;177:727–34. https://doi.org/10.1176/appi.ajp.2019.19010080.

[38] Papadopulos NA, Lellé J-D, Zavlin D, Herschbach P, Henrich G, Kovacs L, et al. Quality of Life and Patient Satisfaction Following Male-to-Female Sex Reassignment Surgery. J Sex Med 2017;14:721–30. https://doi.org/10.1016/j.jsxm.2017.01.022.

[39] Lindqvist EK, Sigurjonsson H, Möllermark C, Rinder J, Farnebo F, Lundgren TK. Quality of life improves early after gender reassignment surgery in transgender women. Eur J Plast Surg 2017;40:223–6. https://doi.org/10.1007/s00238-016-1252-0.

[40] Almazan AN, Keuroghlian AS. Association Between Gender-Affirming Surgeries and Mental Health Outcomes. JAMA Surg 2021. https://doi.org/10.1001/jamasurg.2021.0952.

[41] Marano AA, Louis MR, Coon D. Gender-Affirming Surgeries and Improved Psychosocial Health Outcomes. JAMA Surg 2021. http://dx.doi.org.proxy.unimib.it/10.1001/jamasurg.2021.0953.

[42] Davey A, Bouman WP, Arcelus J, Meyer C. Social Support and Psychological Well-Being in Gender Dysphoria: A Comparison of Patients With Matched Controls. J Sex Med 2014;11:2976–85. https://doi.org/10.1111/jsm.12681.

[43] Smith YLS, Van Goozen SHM, Kuiper AJ, Cohen-kettenis PT. Sex reassignment: outcomes and predictors of treatment for adolescent and adult transsexuals. Psychol Med Camb 2005;35:89–99. http://dx.doi.org.proxy.unimib.it/10.1017/S0033291704002776.

[44] Galupo MP, Pulice-Farrow L. Subjective Ratings of Gender Dysphoria Scales by Transgender Individuals. Arch Sex Behav 2020;49:479–88. https://doi.org/10.1007/s10508-019-01556-2.

[45] Ware JE, Gandek B. Overview of the SF-36 Health Survey and the International Quality of Life Assessment (IQOLA) Project. J Clin Epidemiol 1998;51:903–12. https://doi.org/10.1016/S0895-4356(98)00081-X.

[46] Bryson C, Honig SC. Genitourinary Complications of Gender-Affirming Surgery. Curr Urol Rep 2019;20:31. https://doi.org/10.1007/s11934-019-0894-4.

[47] Nassiri N, Maas M, Basin M, Cacciamani GE, Doumanian LR. Urethral complications after gender reassignment surgery: a systematic review. Int J Impot Res 2020:1–8. https://doi.org/10.1038/s41443-020-0304-y.

[48] Wierckx K, Elaut E, Van Caenegem E, Van De Peer F, Dedecker D, Van Houdenhove E, et al. Sexual desire in female-to-male transsexual persons: exploration of the role of testosterone administration. Eur J Endocrinol 2011;165:331–7. https://doi.org/10.1530/EJE-11-0250.

[49] Galupo MP, Pulice-Farrow L, Lindley L, (2020). “Every time I get gendered male, I feel a pain in my chest”: Understanding the social context for gender dysphoria. Stigma and Health, 5(2), 199–208. https://doi.org/10.1037/sah0000189