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Does Genital Self-image Correspond with Sexual Health before and after Vaginoplasty?

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Background: Patient-reported outcomes regarding sexual health are lacking or have not been validated for transgender patients following vaginoplasty. The aim of this study is to further characterize the difference in sexual health, genital self-image, and the relationship between them for patients who were pre- and postvaginoplasty.

Methods: A community advisory board informed an anonymous online survey utilizing patient-reported outcomes. Pre- and postvaginoplasty respondents were recruited online. Survey measures included the Female Genital Self-Image Scale (FGSIS) and the Patient-Reported Outcomes Measurement Information System sexual health measures. Welch approximation *t* tests were performed for FGSIS and Patient-Reported Outcomes Measurement Information System questions, using Bonferroni correction.

Results: A total of 690 respondents prevaginoplasty ($n = 525$; 76%) and postvaginoplasty ($n = 165$; 24%) participated. The postoperative cohort, compared with the preoperative cohort, reported higher scores for orgasm ($P = 0.0003$), satisfaction ($P = 0.001$), and pleasure ($P = 0.002$). FGSIS total score was higher among postoperative respondents ($79.4\% \pm 17.1\%$) than preoperative respondents ($50.6\% \pm 15.1\%$) ($P < 0.0001$). Using Spearman rho, no significant correlation between FGSIS total score and any Patient-Reported Outcomes Measurement Information System subsectional measures was observed for the postoperative cohort, but a correlation ($P < 0.001$) was observed for the preoperative cohort.

Conclusions: Individuals who are contemplating vaginoplasty have worse sexual health and genital self-image than those who underwent vaginoplasty, yet genital self-image does not correlate directly with sexual health. Sexual health is multimodal for each person. (*Plast Reconstr Surg Glob Open* 2023; 11:e4806; doi: 10.1097/GOX.0000000000004806; Published online 17 February 2023.)

INTRODUCTION

Genital gender-affirming surgery for transgender, two-spirit, nonbinary, and other gender expansive (T/GE)

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individuals has been shown to improve quality of life by up to 93%, with minimal reported regret following vaginoplasty.^{1–3} For T/GE individuals, gender-affirming “vaginoplasty” is an overarching term to describe multiple techniques for a type of genital gender-affirming surgery that typically utilizes penile and scrotal tissue to create a vulva, clitoris, and often a vaginal canal.

Sexual health can strongly impact quality of life, yet there are limited studies qualifying patients’ sexual experiences in the setting of preoperative and postoperative gender-affirming vaginoplasty.^{4,5} Many studies and reviews examine the sexual health after vaginoplasty in cisgender women who were born with limited vaginal depth with investigations into which surgical techniques

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provide best sexual function.⁶ The studies that do exist have end points selected by surgeons, rather than utilizing patient-selected outcomes or objective measures that reflect the motivations and desires to undergo the procedure.^{7–9} Among T/GE individuals seeking vaginoplasty, the barriers to sexual satisfaction and function may include feelings of distress associated with their genitals, mental health comorbidities, or reduced libido.^{5,10} Confounding factors influencing sexual health could include hormonal therapy and breast augmentation. Estrogen hormone therapy has been associated with decreased sexual arousal/desire, whereas breast augmentation has been linked within improved sexual health.^{5,11} Following vaginoplasty, patients have reported improved feelings of genital self-image and reduced incongruence.¹²

There has not been a direct investigation of the correlation between genital self-image and sexual health while comparing preoperative and postoperative vaginoplasty patients. The current understanding of sexual health in relation to self-image is unclear, and we aim to understand the changes in these metrics of quality of life pre- and postvaginoplasty. **Figure 1** models our hypothesis that, following genital gender-affirming surgery (ie, vaginoplasty), there is both improvement in genital self-image and sexual health, which then influence each other.

METHODS

The institutional review board granted approval of the survey before data collection in May of 2020. As a preliminary step, a community advisory board (CAB) of eight members was assembled for this study, composed of community leaders who had undergone or were scheduled for vaginoplasty.¹³ Members were recruited based on previous participation in transgender health events focused on vaginoplasty and represented the diversity of the community with differences in race, social economic status, and education levels. They evaluated the language and structure of the survey, and helped select outcome measures with conceptual relevance. The CAB approved the sexual

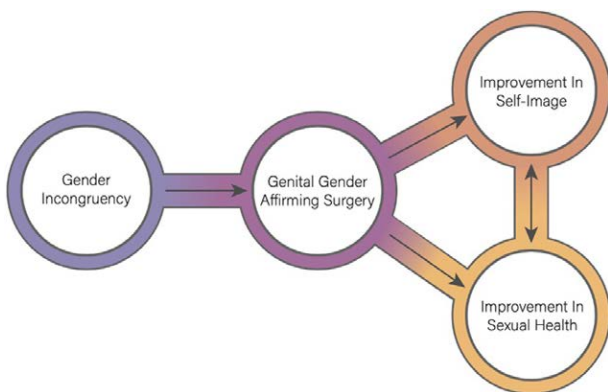


Fig. 1. Hypothesis for model of genital surgery influence on self-image and sexual health.

Takeaways

Question: How can clinicians measure genital self-image and sexual health in transgender patients pre- and post-gender-affirming vaginoplasty?

Findings: The novel use of the validated questionnaire, Patient-Reported Outcome Measurement Information System (PROMIS) Sexual Function and Satisfaction (SexFS), among a transgender population was demonstrated to be a useful tool for analyzing preoperative and postoperative sexual health. Our study showed that respondents who are contemplating vaginoplasty have overall worse sexual health and genital self-image than those who underwent vaginoplasty, and lack of intervention can negatively affect sexual health.

Meaning: PROMIS SexFS offers clinical utility to understand sexual health in transgender populations.

health domains to include from the Patient-Reported Outcome Measurement Information System (PROMIS) Sexual Function and Satisfaction (SexFS) measures, which consisted of questions for Interest, Arousal, Activity, Orgasm, Pleasure, Interfering Factors, Satisfaction, Self-lubrication, and Therapeutic Aids.¹⁴

Eligibility criteria to participate included (1) identifying as a T/GE person who underwent vaginoplasty (postoperative) or who is potentially considering vaginoplasty (preoperative), (2) assigned male at birth, (3) aged 18 years or older, and (4) able to read English, and agreed to an informed consent form. There were no limitations regarding technique of vaginoplasty or vaginal canal lining. The survey, approximately 30 minutes in length, asked questions regarding vaginoplasty history and complications, including detailed questions of sexual health chosen from the PROMIS SexFS measures (1–5 scale), cosmesis and self-esteem from the Female Genital Self-Image Scale (FGSIS) (1–5 scale), demographic information (ie, gender identity, relationship status, sexual orientation, etc), and COVID-19 pandemic interferences with sexual health.^{14–16} The survey tool combined many questionnaires validated in cisgender women with author/CAB-designed questions, and used methodology similar to that in previous literature published by our research team regarding phalloplasty data.¹⁷ The study was hosted on an encrypted platform, Qualtrics (Qualtrics, Seattle, Wash.).

The survey was advertised via social media platforms (including Instagram, Facebook, and Twitter) via the accounts of the CAB and authors in June–November of 2020 and further dispersed with respondent-driven sampling within T/GE communities.¹⁸ There were no limitations to nationality or location. No platform was associated with a single medical institution or geographic region. Survey data were anonymized. Collection ended in November 2020. Data analyzed included respondent demographics using χ^2 or Welch *t* tests ($P < 0.0017$, 29 tests using Bonferroni corrections) when appropriate for comparing the preoperative and postoperative cohorts.¹⁹ The PROMIS SexFS and FGSIS measurements were analyzed with Welch approximation *t* tests ($P < 0.0025$, 20 tests and $P < 0.007$, 7 tests, respectively).

For this study, a five-point Likert scale was used for the FGSIS to maintain consistency with the five-point Likert scale used in the PROMIS SexFS tool. The higher the values (5 as the highest) designated the affirmative for each category (ie, greatest satisfaction, highest frequency orgasm, highest interference of pain with sexual activity, or in agreement with the statement presented). As guided by the CAB, the additional point of a neutral stance was added to the survey. The results for the FGSIS were then converted to percentages for comparability with the published cisgender values to provide a comparator group without gender incongruence (GIC) or reconstructed genitalia. Separate scatter plots of the preoperative and postoperative cohorts compared the FGSIS scores (aggregate score of all seven questions) and PROMIS scores [included comparable questions/domains despite anatomy: Sexual Interest, Orgasm – Ability, Orgasm – Pleasure, Sexual Activity (excluding vaginal penetration) and Satisfaction], and a Spearman rank-order correlation was performed to investigate if there is a relationship between genital self-image and sexual health.²⁰ Analysis was completed using Excel, version 16.44 (Microsoft, Redmond, Wash.).

RESULTS

A total of 690 respondents participated in the survey. About a quarter of the respondents were “postoperative” (165 patients, 23.9%), having undergone vaginoplasty, whereas three quarters of the respondents were “preoperative” (525 patients, 76.1%). The characteristics of the survey respondents are reported in Supplemental Digital Content 1. (See table 1, Supplemental Digital Content 1, which displays the characteristics of respondents. <http://links.lww.com/PRSGO/C398>.)

The two groups differed significantly regarding the mean age and gender self-identification for man/male, trans woman/trans female, and women/female (Supplemental Digital Content 1, <http://links.lww.com/PRSGO/C398>). Postoperative respondents had an average of 3.8 years postsurgery (Table 1). Among the

Table 1. Vaginoplasty History for Postoperative Group

	Postoperative (N = 165)
Age at the time of surgery (y)	
Average (median)	34.5 (31)
Range	17–72
Time since surgery (y)	
Average (median)	3.8 (2)
Range	0–38
Canal constructed	
N (%)	148 (89.7)
Vaginal canal lining	
Genital skin only (scrotal and/or penile)	121 (81.8)
Transferred skin graft	6 (4.1)
Peritoneal flap	16 (10.8)
Colonic flap	3 (2.0)
Unsure	2 (1.2)
Revision history	
No. patients (%)	39 (23.6)
One revision, N (%)	27 (16.3)
More than one revision, N (%)	11 (6.67)

N, number of respondents.

postoperative group, 148 (89.7%) respondents reported having a vaginal canal constructed with the majority having genital skin used to line it. About half of the respondents for both groups were in romantic relationships at the time of the survey.

Sexual Health

Raw scores for the results of the PROMIS SexFS are presented in Supplemental Digital Content 2. (See table 2, Supplemental Digital Content 2, which displays PROMIS Sexual Function and Satisfaction average scores in pre- and postoperative vaginoplasty respondents. <http://links.lww.com/PRSGO/C399>.) Five questions within four domains of the PROMIS SexFS were found to be statistically significant, all with higher scores for the postoperative cohort.

Genital Self-image

For all seven questions of the adapted-FGSIS, the postoperative group rated the questions significantly higher than the preoperative group (Table 2). The average aggregate score was more than 10 raw points higher for the postoperative group than for the preoperative group (Preoperative: raw: 17.7 ± 5.3 ; percentage: $50.6\% \pm 15.1\%$, Postoperative: raw: 27.8 ± 6.0 , percentage $79.4\% \pm 17.1\%$, $P < 0.00001$). The maximum score is 100% for the FGSIS scoring and a higher score signifies a more positive genital self-image. All postoperative group scores were within 7% of the cisgender women group (Table 2), which are values taken from the literature by Herbenick et al.¹⁵ Additionally, the postoperative group had higher average scores than the cisgender group for all questions except for “I think my genitals work the way they are supposed to work” (postoperative: $72\% \pm 34\%$; cisgender: $80\% \pm 17.5\%$).¹⁵

PROMIS SexFS versus FGSIS

Raw scores for the PROMIS SexFS and FGSIS were plotted in separate scatter plots for the preoperative and postoperative group respondents who completed responses for both questionnaires, which were analyzed with Spearman rho to look for correlation. Figure 2 shows the plotted data for the preoperative group (N = 418; 80%), finding a low correlation coefficient ($\rho = 0.22$) yet a statistically significant correlation ($P < 0.00001$). The preoperative group demonstrated a slight correlation between genital self-image and sexual function and satisfaction. Figure 3 shows the plotted data for the postoperative group (N = 123; 75%) who completed this measure, finding a low correlation coefficient ($\rho = 0.19$) and no statistical significance.

COVID-19 Considerations and Reasons for Not Having Sexual Activity

A total of 193 patients reported that the COVID-19 pandemic influenced their responses to the PROMIS SexFS in some way. An additional 115 patients reported that they were not sure if the COVID-19 pandemic influenced their responses. Among the preoperative group, 80 patients responded that the most common reasons for no sexual activity or reduced sexual activity in the past 30 days

Table 2. FGSIS Average Scores in Pre- and Postoperative Vaginoplasty Respondents

FGSIS Items	Preoperative* (N = 521† [Herbenick et al, 2010]§, % (SD %))	Postoperative* (N = 164‡), % (SD %)	P§	Cisgender Women¶ [Herbenick et al, 2010]§ (N = 2056), % (SD %)
“I feel positively about my genitals.”	36 (16)	82 (20)	<0.00001	77.5 (17.5)
“I am satisfied with the appearance of my genitals.”	34 (18)	78 (24)	<0.00001	75 (20)
“I would feel comfortable letting a sexual partner look at my genitals.”	56 (28)	82 (22)	<0.00001	75 (20)
“I think my genitals smell fine.”	64 (22)	78 (20)	<0.00001	75 (20)
“I think my genitals work the way they are supposed to work.”	56 (26)	72 (34)	<0.00001	80 (17.5)
“I feel comfortable letting a healthcare provider examine my genitals.”	58 (30)	82 (24)	<0.00001	75 (20)
“I am not embarrassed about my genitals.”	44 (28)	80 (28)	<0.00001	75 (20)
Total	50.6 (15.1)	79.4 (17.1)	<0.00001	

*A five-point Likert scale was used.

†Four preoperative respondents did not answer these questions.

‡One postoperative patient did not respond to these questions.

§Bonferroni correction used for Welch approximation *t* tests comparing preoperative and postoperative vaginoplasty groups, significant if $\alpha < 0.007$.

¶A 4-point Likert scale was used. Scores were converted to percentages for compatibility with published literature. Responses ranged from 1 to 5, with 5 being the most affirmative response for each statement.

N, number of responses.

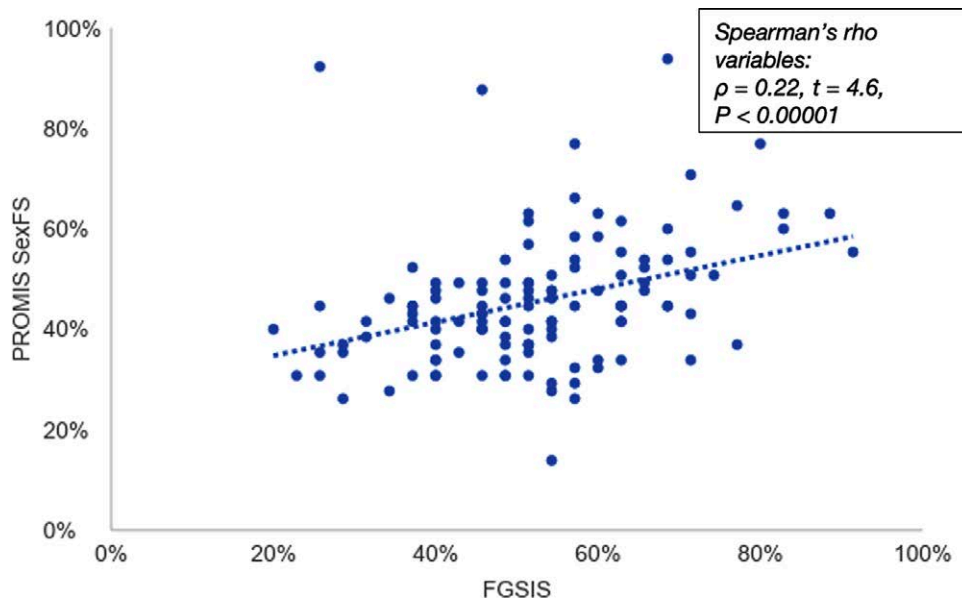


Fig. 2. Scatter plot using Spearman rho for the preoperative cohort of 418 respondents comparing FGSIS vs Patient-Reported Outcomes Measurement Information System (PROMIS) Sexual Function and Satisfaction (SexFS) measures.

were lack of interest and no partner. Of the postoperative group, 11 patients reported that they were still in the healing stages after vaginoplasty, and thus could not participate in vaginal/anal sexual activity yet.

DISCUSSION

The results showed that the postoperative respondents experienced improved sexual experiences and more positive genital self-image perceptions than the preoperative respondents. The connection between genital self-image and sexual health for both pre- and postoperative respondents did not show a strong correlation between the two variables.

This study incorporated questionnaires validated in cisgender women and built on the methodology utilized in our research team’s previous phalloplasty survey to design a survey for the pre- and postoperative vaginoplasty population of T/GE individuals.¹⁷ Notable demographic information included the age difference between the two groups, race/ethnicity representation (discussed in the Limitations section), and their self-reported gender. The postoperative group being on average an older group may demonstrate the years of gender-affirming care required before vaginoplasty and significant socioeconomic barriers to obtaining surgery. While most research refers to preoperative and postoperative vaginoplasty patients as “transgender women,” the demographics reported by

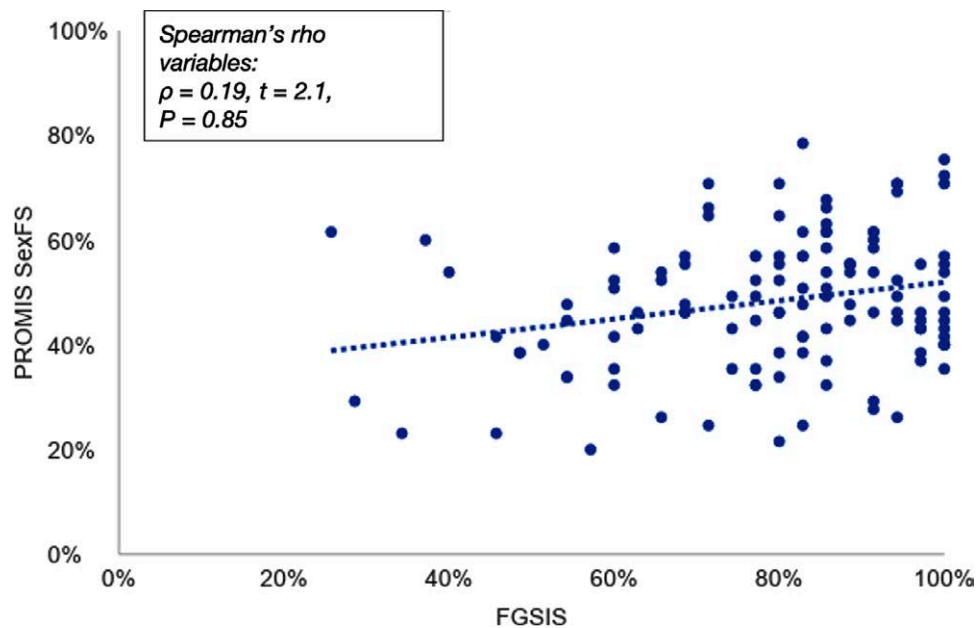


Fig. 3. Scatter plot using Spearman rho for the postoperative cohort of 123 respondents comparing Female Genital Self-Image Scale vs Patient-Reported Outcomes Measurement Information System (PROMIS) Sexual Function and Satisfaction (SexFS) measures.

participants in this study show that more accurate language would include women, nonbinary/genderqueer people, and those who select multiple gender identities. The finding of 36 self-identified men in the preoperative group may reflect bigender or genderfluid individuals, those who responded given their public gender expression rather than internal identity, and/or barriers to accessing medical interventions that may eventually change the gender identity they select.

There is a great range of gender identity and sexual orientation within the cohorts, which, in turn, demonstrates that this population is not a monolith. Supplemental Digital Content 1 demonstrates the heterogeneity of the respondents' gender and sexual-orientation identities at the time of taking the survey (<http://links.lww.com/PRSGO/C398>). Nevertheless, it is worth noting that gender and sexual orientation may change across a person's lifetime, and a future survey may benefit from taking into consideration changes in sexual orientation before and after vaginoplasty.

A common fear studied by Katz-Wise et al is parents and guardians of T/GE individuals expressing the concern that their children's gender will be a barrier to a positive future, including romantic relationships.²¹ In our study, more than half (52.6%) of the respondents were involved in romantic partnerships, and the percentage of postoperative respondents (61.8%) was higher than preoperative respondents (49.7%). These results are like the findings reported by Fein et al, in which 66% of respondents reported sexual partners.²² These demographic results may signify the improvements that arise from seeking gender-affirming care, including surgery.

Patient-reported outcome measures have provided further insight into the patient experience, bridging the

gap between surgeon observation and patient perspective. This study involved a novel usage of PROMIS SexFS for T/GE individuals interested in or having already undergone gender-affirming surgery. PROMIS SexFS questionnaires are commonly used in other surgical subspecialties, and it was chosen based on the comprehensive number of sexual health domains included (eight domains; **Supplemental Digital Content 2**, <http://links.lww.com/PRSGO/C399>).¹⁴ The inclusion of many sexual health domains was a priority for many members of the CAB, who affirmed the multidimensionality of sexual health and pleasure.

The Female Sexual Function Index (FSFI) has been utilized in many studies for examining postoperative sexual health following vaginoplasty but only includes a total of six domains (Desire, Arousal, Lubrication, Orgasm, Satisfaction and Pain).²³ Although both sexual health measurement questionnaires are rooted in gender binary organization, PROMIS SexFS has seven domains that have been validated in cisgender men and women of various sexual orientations, and thus are more likely to be applicable to people of all gender identities and sexual orientations. The SexFS then expands to have anatomy-specific (ie, vulva, vagina, penis) domains previously validated in cisgender men or women of various sexual orientations.¹⁴ Whereas the FSFI has a delimiting point of 26.55, in which any score lower indicates sexual dysfunction, this cutoff should be questioned regarding its applicability to T/GE individuals. Although Vedovo et al published a validated version of the FSFI (oMTFSFI) among T/GE patients following vaginoplasty, this measure has only been validated with respect to reliability.²⁴ Content validation has not been undertaken to determine if this measure appropriately captures all important domains of sexual health for this population.²⁴

Due to the intimate nature of GIC and sexual health, sexual health should aim to be as inclusive as possible. As seen in this respondent sample, 32.8% of all respondents reported more than one sexual orientation, and 42.8% of all respondents reported more than one gender. Thus, investigators should not be limited to cisgender or heterosexual binaries. Further, some T/GE individuals with GIC experience extreme distress with any mention, touching, or interaction with their native genitals, which can add the difficulty of novel exploration of sexual contact of any kind, in addition to the exploration of new anatomy after surgery.^{5,25} It is our clinical experience that postoperative testosterone supplementation, as is carried out for cisgender women experiencing hypoactive sexual desire disorder, can benefit some patients after vaginoplasty who are experiencing low libido or decreased sexual desire. Encouraging postoperative exploration and masturbation should be standard of care to relearn sexual engagement and pleasure, with additional options for hormonal or psychotherapeutic modalities to address additional barriers.

PROMIS SexFS proved an effective measurement tool in this population, allowing for a comparison between pre- and postoperative groups (**Supplemental Digital Content 2**, <http://links.lww.com/PRSGO/C399>). The FGSIS questionnaire has been used in vaginoplasty outcomes literature to measure aesthetic outcomes and self-image.^{12,26} Buncamper et al reported a raw mean score of 22.6 ± 4.1 (conversion for comparison: $80.7\% \pm 14.6\%$) for patients after penile inversion vaginoplasty, while Manrique et al reported a raw mean score of 20.0 ± 4.5 ($71.4\% \pm 16.1\%$) for patients following colon flap vaginoplasty.^{12,26} These results are similar to the average calculated in this study's postoperative group of $79.4\% \pm 17.1\%$. The results also demonstrated the strong impact that gender-affirming vaginoplasty has on T/GE patients with significant improvement for all measurements of genital self-image. The only question having lower average scoring for T/GE respondents than the cisgender comparator group was "I think my genitals work the way they are supposed to work." (postoperative: $72\% \pm 34\%$, cisgender: $80\% \pm 17.5\%$), which indicates a need for discussion regarding normative challenges with sexual function and preoperative expectation setting for patients regarding their reconstructed genitalia.¹⁵

The lack of a strong correlation between genital self-image and sexual health suggests that there are additional factors that influence genital self-image beyond sexual health, and vice versa. The preoperative group showed a slight correlation ($\rho = 0.22$; $P < 0.00001$) between genital self-image and sexual health measurements, which perhaps indicates that respondents with lesser genital-related distress are more apt to experience a healthy sex life; a lack of intervention can negatively affect sexual health. For the postoperative cohort, the finding of no correlation between genital self-image and sexual health reflected the complexity of evaluating sexual health. The idea of "look good, have good sex" is reductive, disregarding the multifactorial influences that lead to healthy sexual lives or dysfunction, and may underplay the role of GIC in genital self-image.⁵ Given a lower correlation between sexual

health and genital self-image in the postoperative cohort, we postulate that surgery reduced GIC, reducing this underlying factor impacting both domains and creating correlation in the preoperative cohort, aligning with our hypothesized model (Fig. 1). Alternatively, we should consider that the FGSIS and PROMIS questionnaires might not appropriately evaluate T/GE individuals' experiences. Further investigation is needed to understand the variables influencing sexual health in preoperative and postoperative vaginoplasty patients.

Nearly half of the respondents (308 respondents, 44%) reported that the COVID-19 pandemic influenced their responses, either increasing or decreasing their level of sexual activity. This finding is similar to the results of 50.4% of 6821 respondents having interruptions in sexual activity in a large cross-sectional study examining the impact of the COVID-19 lockdown on psychological and sexual well-being.²⁷

Limitations

The data from online respondents cannot be verified with clinical metrics. As a cross-sectional study, there are certain limitations that can introduce recall bias. The distribution of the survey relied on online recruitment in forums largely related to surgery or transgender health, which potentially introduced a selection bias. While the authors distributed the survey on multiple social media platforms and sought distribution assistance from the CAB members, the level of distribution cannot be verified and had the potential to target only certain demographics. The racial and ethnic distribution among the respondent groups is not reflective of the international T/GE populations seeking or having undergone vaginoplasty. Thus, the external validity of this data is limited in that the metrics may vary depending on cultural preferences. There is a larger issue of barriers to gender-affirming surgery or access to accurate information about surgery, and this disproportionately affects marginalized T/GE people. Participation in the survey was not funded, which possibly limited the participation of some individuals who do not have disposable time for unpaid work. Further, the discrepancy between number of respondents between the pre- and postoperative cohorts could prove to have an influence on the results found.

The questionnaire utilized measures that have been validated in uniformly cisgender and predominately heterosexual populations. The respondents presented in this data set have a diverse set of experiences, and thus, the validation of patient-reported outcomes in T/GE populations will provide valuable further insight into the patient experience. Such tools in development include the GENDER-Q.²⁸ Further, the use of FGSIS with the variation of the Likert scale to provide a "neutral" option has potential to reduce the validity and repeatability of the study. Confounding variables of hormone therapy and breast augmentation were not analyzed. As reflected in the results, the COVID-19 pandemic has impacted all aspects of society, and the results may differ once lockdown, social distancing, and overall fear of illness have reduced.

CONCLUSIONS

Individuals who are contemplating vaginoplasty aggregate have worse sexual health and genital self-image than those who underwent vaginoplasty, yet genital self-image does not correlate directly with sexual health. These findings demonstrate that sexual health is multimodal for each person.

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