

INTERSEX AND GENDER IDENTITY

Age-Related Differences for Male-to-Female Transgender Patients Undergoing Gender-Affirming Surgery



Dmitry Zavlin, MD,^{1,2} Richard J. Wassersug, PhD,^{3,4} Vishwanath Chegireddy, MD,⁵ Jürgen Schaff, MD,² and Nikolaos A. Papadopoulos, MD, PhD, FACS^{2,6}

ABSTRACT

Introduction: It has been theorized that there are 2 subgroups within the male-to-female (MtF) transgender population: individuals who are predominantly androphilic and those who are predominantly gynephylic or interested in both male and female partners.

Aim: To explore the role of a dichotomous distribution of age at dysphoria onset in individuals diagnosed with MtF gender dysphoria.

Methods: 40 patients who presented to a surgical clinic in Germany for gender-affirming surgery (GAS) were included in this study. Their age distribution was plotted as a histogram and the population was then divided at the median self-reported age of onset of gender dysphoria—that is, those 17 years and younger and those 18 years and older. The 2 groups were then compared with regard to demographic data, partnership history, various quality of life parameters, as well as sexual orientation and sexual history.

Main Outcome Measure: Self-designed questionnaires for demographics and sexuality, Questions on Life Satisfaction and Body Image (FLZ^M), Freiburg Personality Inventory, Rosenberg Self-Esteem Scale, and Patient Health Questionnaire were used.

Results: Early-onset, gender-dysphoric MtF patients underwent GAS at a much younger age (mean 32.7 vs 43.8 years, $P = .004$), but had similar characteristics regarding weight, height, body mass index, marital status, and living situation to individuals who reported later onset of gender dysphoria. Preoperatively, they showed greater depressive symptoms (4.6 vs 3.3 points, $P = .045$), which disappeared after GAS. Following surgery, the younger MtFs were predominantly attracted to men (52.6%), whereas individuals who were diagnosed with late-onset of gender dysphoria preferred women or both men and women (85.7%) as sexual partners ($P = .010$). Younger trans individuals were more frequently sexually active (73.7% vs 42.9%, $P = .049$).

Conclusion: Our findings suggest that there are 2 MtF populations that differ in age of dysphoria onset, sexual history, and multiple personal details including sexual orientation. These data may be used to improve care to transgender individuals by providing treatment reflecting their sexual interests. **Zavlin D, Wassersug RJ, Chegireddy V, et al. Age-Related Differences for Male-to-Female Transgender Patients Undergoing Gender-Affirming Surgery. Sex Med 2019;7:86–93.**

Copyright © 2018, The Authors. Published by Elsevier Inc. on behalf of the International Society for Sexual Medicine. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

Key Words: Transgender; Male-to-Female; Gender-Affirming Surgery; Sexuality; Age; Quality of Life

Received May 17, 2018. Accepted November 25, 2018.

¹Department of Surgery, Easton Hospital, Drexel University College of Medicine, Easton, PA, USA;

²Department of Plastic and Hand Surgery, University Hospital Rechts der Isar, Technical University Munich, Munich, Germany;

³Department of Cellular and Physiological Sciences, University of British Columbia, Vancouver, British Columbia, Canada;

⁴Australian Research Centre in Sex, Health and Society, Latrobe University, Melbourne, Australia;

⁵Institute for Reconstructive Surgery, Houston Methodist Hospital, Weill Cornell Medicine, Houston, TX, USA;

⁶Department of Plastic Surgery and Burns, Alexandroupoli University Hospital, Democritus University of Thrace, Alexandroupoli, Greece

Copyright © 2018, The Authors. Published by Elsevier Inc. on behalf of the International Society for Sexual Medicine. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

<https://doi.org/10.1016/j.esxm.2018.11.005>

INTRODUCTION

According to the 5th edition of *Diagnostic and Statistical Manual of Mental Disorders* (DSM-5), the nomenclature of gender dysphoria characterizes persons that have significant distress and the desire to live in another gender.¹ The World Professional Association for Transgender Health regularly publishes treatment guidelines and recommendations for transgender individuals that include mental health counseling, hormonal therapy, and surgical interventions.² To provide the best healthcare for male-to-female (MtF) individuals, the professionals treating them need to be aware of the diversity in that population in terms of desires, expectations, and comorbidities. Offering the same treatment approach for every individual diagnosed with MtF gender dysphoria may not be the best standard of care.^{3–5}

Blanchard was one of the first scientists to suggest the existence of subgroups in the cohort of MtF trans persons based on demographic and sexual characteristics.^{6,7} He reported that some were sexually interested in men (classified as homosexual or androphilic), whereas others were more attracted to women (gynephilic) or both men and women. Blanchard subsequently suggested that individuals who first sought medical attention for MtF gender dysphoria at an older age more frequently had children and were commonly married to females. Furthermore, those individuals were more likely to fit in the latter category.⁸

Blanchard's hypothesis was built upon data suggesting that one motivating factor for late-transitioning gynophilic MtFs was autogynophilia—that is, that the individuals were not only sexually attracted to females but were aroused by envisioning themselves as females. Lawrence supported Blanchard's theory in her review of various typologies for MtF transgender individuals related to age and sexual orientation.^{9,10} The cause of these subtypes is not uncontested, and currently the subject of various discussions and investigations.^{10–13}

In a large retrospective chart review, Jackowich et al¹⁴ were the first to demonstrate a bimodal age distribution for MtF patients presenting for gender-affirming surgery (GAS). Their brief communication was based on a sample from Canada that did not include details regarding the patients' personal characteristics, sexual orientation, or sexual history.

AIM

After Papadopoulos et al¹⁵ reported on an independent clinical sample of MtFs seeking GAS in Europe, we hypothesized that there would be a similarly bimodal age distribution in their raw data. We made use of the fact that they had independently collected self-reported personality, quality of life (QOL) outcomes, and sexual behavior data that could be used to assess whether there were 2 distinct populations of MtFs distinguishable on their age of onset for gender dysphoria and sexual orientation. Given that the idea of 2 populations is a controversial topic,¹⁰ we decided to investigate this from a different perspective. Here, we used the self-

reported age of onset of gender dysphoria in our surgical patients as the independent variable.

In this study, we test the hypothesis that there is an association between age at gender dysphoria onset and sexual orientation. We also investigate secondary outcome measures, such as QOL, depression/anxiety, and operative satisfaction between early- and late-onset MtF patients.

METHODS

Participants

All adult transgender patients who underwent their first GAS for MtF gender dysphoria with penectomy, orchiectomy, and creation of a neovagina performed by the senior plastic surgeon (J.S.) between 2012 and 2014 were contacted preoperatively for study enrollment by the first author (D.Z.). Exclusion criteria were patients who had previous genital surgery and were thus presenting for revision, as well as patients not fluent in German. A baseline questionnaire was first filled out at that time. 6 months later, the vast majority of participating patients received their second procedure to address any cosmetic or functional issues, such as scar revisions, removal of dog-ears, and breast augmentations. 12 months following the initial GAS, patients were contacted again by the first author (D.Z.) to complete a second set of questionnaires.

Of the 47 patients who initially consented to participate and completed the baseline questionnaires, 40 completed the 12-month postoperative questionnaires (response rate, 85.1%) and were included in our final data analysis. For more details about the operative technique, please see our previous article.¹⁶

Questionnaires

The patients' demographic details and information about their personal life were collected via a set of non-validated questions specifically designed for this study (Tables 1, 2, and 3). We asked questions about their marital status, whether they cohabit with others, children, self-assessed health, prior psychotherapy, and feeling of femininity. Sexual history including preferred gender of partners and details on frequency of intercourse were obtained both before and after GAS. This part of our survey largely followed the closed-question pattern with multiple-choice options for answers, or used 0–10 or 1–5 Likert scales.

In addition, we used the German versions of standardized and validated QOL questionnaires during both time points in our study (Table 4). These included the German Questions on Life Satisfaction questionnaire (FLZ^M, *Fragebogen zur Lebenszufriedenheit Module*), which has 3 modules: General, Health, and Body Image.^{17,18} The patients also answered the Patient Health Questionnaire 4 (PHQ-4)¹⁹ assessing symptoms of depression or anxiety, the Freiburg Personality Inventory—Revised Version²⁰ used to evaluate emotional status, as well as the Rosenberg Self-Esteem Scale (RSES)²¹ for estimates of patients' self-esteem.

Table 1. Demographic details of the patients

Demographic	Dysphoria onset ≤17 years (N = 19)	Dysphoria onset ≥18 years (N = 21)	P value
Age at onset of gender dysphoria, y (mean ± SD)	12.3 ± 3.9	34.8 ± 13.1	<.001*
Age at surgery, y (mean ± SD)	32.7 ± 10.9	43.8 ± 11.9	.004*
Weight, kg (mean ± SD)	76.6 ± 10.4	78.8 ± 16.6	.635
Height, cm (mean ± SD)	178.6 ± 4.8	179.3 ± 5.9	.705
BMI, kg/m ² (mean ± SD)	24.0 ± 3.3	24.5 ± 5.0	.744
Marital status [†] (%)			.380
Unmarried	14 (73.7)	10 (47.6)	
Married	1 (5.3)	3 (14.3)	
Separated	1 (5.3)	3 (14.3)	
Divorced	3 (15.8)	5 (23.8)	
Living situation (%)			.426
Alone	6 (31.6)	11 (52.4)	
With partner	7 (36.8)	5 (23.8)	
With children, no partner	1 (5.3)	0 (0.0)	
With parents	3 (15.8)	1 (4.8)	
With relatives	0 (0.0)	1 (4.8)	
With roommates	2 (10.5)	3 (14.8)	
Children (%)	5 (26.3)	10 (47.6)	.165

BMI = body mass index.

*Significant at $P < .05$.

[†]Only refers to marriage to female partners before male-to-female transition.

Statistics and Ethics

The age distribution of our 40 MtF transgender patients is shown in [Figure 1](#) in 2 forms. The patients' age at the time of surgery ranged from 19 to 66 years (green). Meanwhile, their self-reported onset of gender dysphoria was between 4 and 63

years (orange). This second age variable was used to stratify the patients into 2 cohorts, dividing the population into those age 17 years and younger and age 18 years and older. The split was based on the overall median age of onset of gender dysphoria, which was 18.5 years. For the statistical assessment of our data

Table 2. Personal self-designed questions

Personal details	Dysphoria onset ≤17 years (N = 19)	Dysphoria onset ≥18 years (N = 21)	P value
Subjective impression of own health (%)			.504
Very good	6 (31.6)	8 (38.1)	
Good	10 (52.6)	12 (57.1)	
Mediocre	3 (15.8)	1 (4.8)	
Bad	0 (0.0)	0 (0.0)	
Very bad	0 (0.0)	0 (0.0)	
Length of preoperative psychotherapy, mo (mean ± SD)	31.2 ± 14.3	25.6 ± 11.4	.174
“Was the psychotherapy useful to you?”* (%)			.054
Yes	11 (57.9)	19 (90.5)	
Unsure	1 (5.3)	0 (0.0)	
No	7 (37.8)	2 (9.5)	
“How feminine do you feel?”** [†] (mean ± SD)			
Baseline	7.9 ± 1.4	7.3 ± 2.1	.333
12 mo later	8.7 ± 1.2	9.3 ± 1.0	.103
“How feminine do you appear to others?”** [†] (mean ± SD)			
Baseline	7.6 ± 1.7	6.9 ± 1.6	.183
12 mo later	8.1 ± 1.4	7.4 ± 2.2	.267

*All questions in quotes are translated from German.

[†]0 = very unfeminine; 10 = very feminine.

Table 3. Sexuality

Sexual details	Dysphoria onset ≤17 years (N = 19)	Dysphoria onset ≥18 years (N = 21)	P value
At baseline and before surgery			.026*
Interest in ... (%)			
Male	10 (52.6)	4 (19.0)	
Female/Both/Neither	9 (47.4)	17 (81.0)	
Sexually active (%)	4 (21.1)	3 (14.3)	.574
12 mo later, after surgery			
Interest in ... (%)			.010*
Male	10 (52.6)	3 (14.3)	
Female/Both/Neither	9 (47.4)	18 (85.7)	
Sexually active (%)	14 (73.7)	9 (42.9)	.049*
Satisfaction with intercourse (mean ± SD) [†]	6.6 ± 2.2	6.8 ± 1.9	.881

*Significant with $P < .05$.

[†]0 = very unsatisfied; 10 = very satisfied.

we used SPSS software (IBM SPSS Statistics for Windows, Version 24.0., IBM Corp, Armonk, NY, USA). The level of significance was set at 5% or less ($P < .05$) using the 2-sided t -test for continuous and the chi-square test for categorical variables. This study had written approval from the institutional ethics committee where the GAS procedures took place. Informed consent was obtained from all patients. Non-participation in this purely observational cohort study did not affect the treatment of any patient. The work described here has been carried out in accordance with the Declaration of Helsinki.

RESULTS

The histogram in [Figure 1](#) clearly shows bimodal age distributions for the MtF population undergoing GAS, both for their age at surgery and their age of onset for gender dysphoria. The average age at onset of transgender symptomatology was naturally earlier in the early-onset than the late-onset cohort (12.3 vs 34.8 years, $P < .001$). Early MtF patients also underwent GAS at an earlier age in their life (32.7 vs 43.8 years, $P = .004$).

With regard to the preoperatively collected demographic details, our younger and older groups had similar mean body

Table 4. Validated questionnaires

Psychometric findings	Dysphoria onset ≤17 years (N = 19)	Dysphoria onset ≥18 years (N = 21)	P value
At baseline and before surgery			
FLZ ^M : sum scores (mean ± SD)			
General module	44.0 ± 30.8	38.4 ± 23.8	.520
Health module	61.8 ± 49.1	63.2 ± 31.2	.911
Body image module	94.7 ± 89.8	79.5 ± 67.5	.546
PHQ-4 (mean ± SD)	4.6 ± 2.7	3.3 ± 2.2	.045*
PHQ-4 score over 2 (%)	16 (84.2)	12 (57.1)	.062
FPI-R (mean ± SD)	7.0 ± 4.1	6.0 ± 3.8	.429
RSES (mean ± SD)	32.2 ± 5.7	33.1 ± 6.0	.635
12 mo later, after surgery			
FLZ ^M : sum scores (mean ± SD)			
General module	64.4 ± 33.3	53.9 ± 26.7	.278
Health module	80.3 ± 43.2	79.3 ± 32.3	.932
Body image module	167.5 ± 76.2	141.3 ± 80.7	.108
PHQ-4 (mean ± SD)	2.0 ± 1.9	1.7 ± 2.1	.659
PHQ-4 score over 2 (%)	6 (31.6)	5 (23.8)	.583
FPI-R (mean ± SD)	4.8 ± 3.3	4.9 ± 3.4	.954
RSES (mean ± SD)	35.3 ± 3.8	34.6 ± 5.9	.552

FLZ^M = Fragebogen zur Lebenszufriedenheit Module; FPI-R = Freiburger Personality Inventory – Revised Version; PHQ-4 = Patient Health Questionnaire 4; RSES = Rosenberg Self Esteem Scale.

*Significant at $P < .05$.

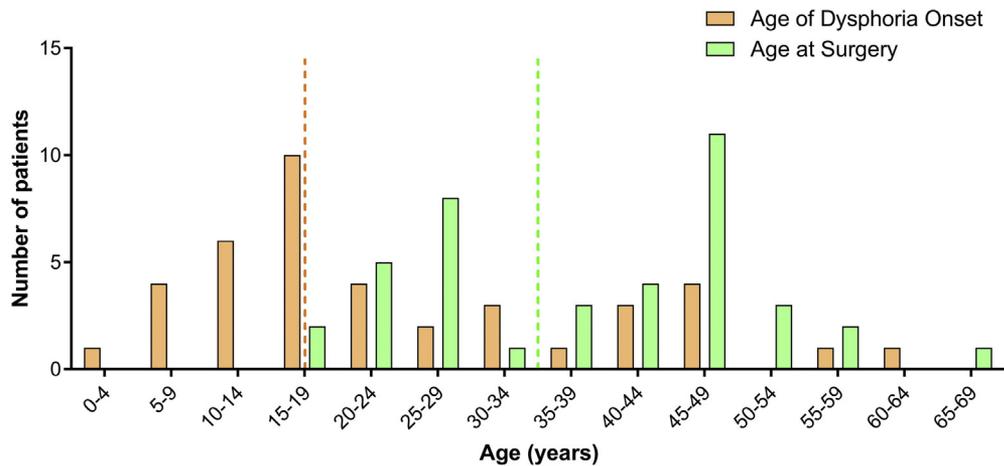


Figure 1. Age distribution for male-to-female patients when they first experienced gender dysphoria (orange bars) and the age when they underwent gender-affirming surgery (GAS) (green bars). Total N = 40. The vertical dotted line to the left represents the median age when the patients reported first experiencing gender dysphoria. The vertical line to the right represents the low point between the 2 peaks for the bimodal distribution in age at the time of GAS. Our data support the hypothesis that individuals who had an early onset of gender dysphoria and GAS before the age of 35 years are significantly more likely to be androphilic than the late-onset individuals, who had GAS after 35 years (refer to Table 3).

weight (76.6 vs 78.8 kg, $P = .635$), height (178.6 vs 179.3 cm, $P = .705$), and body mass index, which were within normal range (24.0 vs 24.5, $P = .744$). No differences were observed with regard to marital status, living situation, or the presence of children when the study population was divided by the self-declared age of onset of gender dysphoria. All marriages were established with female partners before gender transitioning because same-sex marriage was not yet legal in Germany at the time of the study (Table 1). But when the sample was divided by the age at surgery (with a low point between 30 and 39, Figure 1), those patients who had GAS past the age of 35 years were significantly more frequently married and had fathered children.

Both cohorts displayed a similar subjective impression of their own physical health and reported similar lengths of pre-GAS psychotherapy. Nevertheless, patients in the younger cohort deemed these therapy sessions less useful (57.9%) than our older cohort (90.5%, $P = .054$). No differences were detected between the 2 cohorts concerning their subjective feeling of femininity on a 0–10 Likert scale either before or after GAS. These findings are summarized in Table 2.

Preoperatively, our younger MtF participants were more often sexually attracted to men (52.6%), whereas the older group showed more interest in women or rated themselves as bisexual or rather asexual (81.0%). These preoperative differences were statistically significant ($P = .026$). Moreover, this trend was amplified after GAS when assessed at the later time point ($P = .010$). In other words, patients who developed gender dysphoria before the age of 17 years were mostly attracted to men (52.6%), whereas patients who developed dysphoria as adults favored women, both men and women, or neither gender (85.7%) as their targets of sexual interest. Patients in the younger group

were also more often sexually active with others at 12 months after GAS ($P = .049$) than those in the older group (Table 3).

The 2 cohorts did not score statistically differ on the General, Health, and Body Image modules of the German FLZ^M, either preoperatively nor postoperatively. However, individuals in the younger group appeared to have higher scores on the Body Image module at 12 months after GAS (167.5 vs 141.3), indicating a slightly higher satisfaction with their overall appearance, although these data did not reach significance ($P = .108$).

Before surgery, younger patients had significantly higher values of anxiety/depression on the PHQ-4 (4.6 vs 3.3, $P = .045$). These differences, however, disappeared when assessed 12 months after GAS. Additionally, the self-esteem evaluated through the RSES questionnaire showed no difference between the 2 groups at both time points (Table 4).

DISCUSSION

There is an ongoing debate about whether individuals with MtF gender dysphoria can be realistically sorted into 2 subcategories based on their targets of sexual interest—that is, into androphilic and gynephilic groups.²² Advocates of this 2-population model suggest that the 2 groups can be further distinguished on demographic criteria and clinical presentation.^{9,23} Those who endorse this taxonomy have suggested, for example, that androphilic MtF individuals generally seek GAS earlier than those in the gynephilia group.²⁴ They have also suggested that individuals in the androphilic group are less likely to have a history of being married to women and to have fathered children.

Opponents to the 2-population model claim that dichotomizing MtF transgender persons along the lines of sexual orientation is too generalized and inaccurate for many MtF

individuals with gender dysphoria. Nuttbrock et al,²⁵ for instance, suggested that there are more than these 2 subcategories of MtFs and more research is necessary to define those additional subgroups. However, Lawrence rebutted this, arguing that further categorization tended to cause confusion and distract from the validity of the basic dichotomy.²⁶

The DSM-5 itself does not divide transgender women into 2 groups based on sexual orientation. It does describe differences in the characteristics of early vs late individuals with clinically significant MtF gender dysphoria. In our study, we aimed to investigate whether there was a correlation between the age of dysphoric onset and sexual orientation within an MtF-only transgender cohort. Given the controversies around distinguishing MtF individuals on sexual orientation,¹⁰ we specified age as the independent and sexual orientation as the primary dependent variable in our statistical analyses.

Our data overall support such a 2-population model. Although our sample size is smaller, Figure 1 confirms the observation of Jackowich et al¹⁴ that there is indeed a bimodal age distribution for when MtF transsexuals undergo GAS.

2 subpopulations emerged from our histogram with the lowest point between the 2 age peaks occurring around age 35 years (green). The reason for this trough in Figure 1 is not known, but various factors may account for this low point in both our and Jackowich et al's¹⁴ age distribution graphs. Transgender individuals in their 30s may be focused on career advancement, unable to take time off from work to transition, or fear discrimination at their job. Such factors may account for the underrepresentation of individuals in their 30s having GAS. It should be pointed out that this pattern results solely from when the individuals came forward seeking surgical intervention and not from any exclusion from the age range shown in Figure 1.

This incidental finding is also concordant with our main finding that there are 2 cohorts of MtFs based on whether a patient's onset of gender dysphoria occurred during childhood (ie, 17 years and younger) or as adults (ie, 18 years and older). Splitting the population at 18 years has not only statistical significance, but also clinical implications. In Germany, surgical treatment is prohibited for transgender persons who have not yet reached the legal age of 18 years. However, psychological and endocrine counseling are frequently offered in pediatric cases. As shown in Table 1, those who develop transgender symptoms earlier also tend to undergo GAS at a significantly younger age.

In addition to showing a bimodal age distribution among MtF seeking GAS, we have further identified other characteristics that distinguish the 2 populations and are in accord with recognizing 2 populations of MtFs. These are drawn from demographic details, sexual history obtained through our self-designed questionnaire, as well as QOL determined via standardized and previously validated survey instruments.

We demonstrated, for example, that our patients were more frequently sexually attracted to women or bisexual, if they

belonged to the older cohort (Table 3). These findings are consistent with those of Gaither et al,²⁴ who reported that gynephilic MtFs presenting for GAS were significantly older than heterosexual or bisexual controls. A study reporting on a consecutive series of predominantly young MtF patients in Spain with a mean age of 29.4 years at their day of surgery showed that 89.9% were sexually interested in men.²⁷ In contrast, the population of Docter and Fleming²⁸ with an average age of 44 years—similar to our older cohort—was preferably interested in females (47%), with few individuals interested only in males (19%), or both males and females (17%). These differences in sexual orientation persisted when the variable of age of onset of gender dysphoria was used as a basis for calculations,⁹ which are hereby replicated by our prospective study. Using the 2010 National Transgender Discrimination Survey with more than 6,000 participants, Kattari and Hasche²⁹ discovered a plurality of significant distinctions between younger and older transgender individuals regarding their sexual characteristics. Regrettably though, they did not separately analyze MtFs from female-to-male data. Although the sexual orientation of our 40 surgical patients did not change between baseline and the 1-year follow-up, further time and acclimatization to the new anatomy could potentially impact the sexual orientation during longer follow-up periods and improve the power of our current study.

Our data also statistically distinguish younger and older MtFs populations in terms of improvements in their sexual life (regardless of sexual practices) subsequent to GAS, as well as other factors that contribute to QOL. Not only did we identify differences between the 2 age cohorts of MtFs, but we were also able to assess the impact of GAS because the data were collected at 2 different time points: preoperatively and postoperatively.

Some new findings are that the younger patients showed higher symptoms of depression and anxiety on the PHQ-4 (4.6 vs 3.3, $P = .045$) before GAS. Concordant with another recent study,³⁰ our preoperative data demonstrated that the majority of our patients, both young and old, had high rates of mild to major depressive symptoms, with over 2 points on the PHQ-4 questionnaire, 84.2% and 57.1%, respectively. After surgery, however, this discrepancy disappeared (Table 4). This suggests that despite the differences in psychological assessment between the 2 subgroups of MtFs before surgery, both groups benefited from the surgical intervention when measured a year after treatment.

Last, our data suggest that, although younger patients were just as dissatisfied with their external appearance as the older MtF patients before surgery, they tend to be happier with their body image postoperatively (Table 4). This change was not statistically significant, but was consistent with some previously reported data.³¹ The differences in satisfaction with their self-image and their sexual activity between the MtF in the 2 populations suggest that younger individuals may have an advantage in passing as females, perhaps in facial structures, although we did not objectively assess that. However, they would have an endocrinologic advantage with earlier hormonal therapy. Merely because

of their younger age, they were less likely to have experienced the androgenic alopecia that commonly leads to cranial hair loss as males age.

The differences in satisfaction with postoperative appearance and sexual activity between the 2 populations suggest that the postsurgical psychological support needs may differ between individuals in the younger vs older cohorts. Our findings may also be important for reconstructive surgeons performing GAS. Younger MtF patients, who tend to be more attracted to men, may desire being the receptive partner in penetrative intercourse, and would thus require larger neovaginal depth. However, in our surgical experience, those MtF patients desiring sex with females, will be more interested in clitoral stimulation. As such, careful dissection of the neovascular bundle supplying the glans penis is crucial to achieve a sensitive neoclitoris. A detailed sexual history is thus of utmost importance during the preoperative assessment and physical exam of new patients presenting for GAS. An interdisciplinary approach with psychiatrists and endocrinologists is not only recommended but—in Germany—even mandated to obtain treatment coverage by public and private insurers.³²

To the best of our knowledge, this is the first study to describe a statistically significant association between age, on the one hand, and sexual orientation and QOL, on the other hand, for individuals treated surgically for MtF gender dysphoria. Our findings are concordant with descriptions in the DSM-5 regarding certain common differences between early and late MtF transgender persons.¹ Although our data are consistent with hypotheses about the origin of gynophilic MtF transsexuals,^{6–10} they cannot be said to validate those hypotheses. That is because all of our data on the age of onset of gender dysphoria is retrospective and prone to recall bias.

This report is thus not without certain limitations. Owing to the retrospective design of our study, all significant findings have associative and not causative character; that is, we cannot determine whether age or sexual orientation is the antecedent variable. The age of onset of gender dysphoria, which was used as the independent variable, was obtained by briefly questioning the patient at the time of admission to our surgical department and was not based on a psychiatric evaluation. Further, our sample size was small and included individuals treated only in 1 plastic surgery department, which admittedly treats the largest number of transgender patients in Germany. Thus these data may not be representative of all MtF individuals. Indeed, a significant portion of individuals with MtF gender dysphoria may never undergo operative procedures or be recruited for research.³³ Furthermore, the data here originate from Germany with all German-speaking patients and may not apply to other countries, nationalities, or ethnic groups, especially any with vast cultural differences.³⁴ Larger international studies will hopefully follow to reproduce these results.

CONCLUSION

Our study strengthens the theory that there are 2 distinct age-related subgroups within the MtF transgender population undergoing GAS. Patients who report experiencing gender dysphoria at a younger age (ie, as children), tend to be more androphilic and are likely to have GAS before the age of 35 years. Older patients, who report first experiencing gender dysphoria as adults, are more frequently gynophilic and often undergo GAS after the age of 35 years. Meanwhile, younger patients are in general significantly more sexually active. These findings may have implications on the outcomes of psychotherapeutic, endocrinologic, and operative treatment and could ultimately influence therapeutic strategies.

Corresponding Author: Dmitry Zavlin, MD, Department of Surgery, Easton Hospital, 250 S. 21st Street, Easton, PA 18042, USA. Tel: 610-250-4375; Fax: 610-250-4851; E-mail: research@zavlin.com

Conflict of Interest: The authors report no conflicts of interest.

Funding: None.

STATEMENT OF AUTHORSHIP

Category 1

(a) Conception and Design

Dmitry Zavlin; Nikolaos A. Papadopoulos

(b) Acquisition of Data

Dmitry Zavlin; Jürgen Schaff

(c) Analysis and Interpretation of Data

Richard J. Wassersug; Vishwanath Chegireddy

Category 2

(a) Drafting the Article

Dmitry Zavlin

(b) Revising It for Intellectual Content

Richard J. Wassersug; Vishwanath Chegireddy; Jürgen Schaff; Nikolaos A. Papadopoulos

Category 3

(a) Final Approval of the Completed Article

Dmitry Zavlin; Richard J. Wassersug; Vishwanath Chegireddy; Jürgen Schaff; Nikolaos A. Papadopoulos

REFERENCES

1. American Psychiatric Association. Diagnostic and statistical manual of mental disorders. 5th ed. Washington, DC: American Psychiatric Press; 2013.
2. Coleman E, Bockting W, Botzer M, et al. Standards of care for the health of transsexual, transgender, and gender-nonconforming people, version 7. *Int J Transgenderism* 2012;13:165–232.

3. Costa R, Colizzi M. The effect of cross-sex hormonal treatment on gender dysphoria individuals' mental health: A systematic review. *Neuropsychiatr Dis Treat* 2016;12:1953-1966.
4. Fisher AD, Castellini G, Bandini E, et al. Cross-sex hormonal treatment and body uneasiness in individuals with gender dysphoria. *J Sex Med* 2014;11:709-719.
5. Fisher AD, Castellini G, Ristori J, et al. Cross-sex hormone treatment and psychobiological changes in transsexual persons: Two-year follow-up data. *J Clin Endocrinol Metab* 2016;101:4260-4269.
6. Blanchard R. The classification and labeling of nonhomosexual gender dysphorias. *Arch Sex Behav* 1989;18:315-334.
7. Blanchard R. The concept of autogynephilia and the typology of male gender dysphoria. *J Nerv Ment Dis* 1989;177:616-623.
8. Blanchard R. A structural equation model for age at clinical presentation in nonhomosexual male gender dysphorics. *Arch Sex Behav* 1994;23:311-320.
9. Lawrence AA. Sexual orientation versus age of onset as bases for typologies (subtypes) for gender identity disorder in adolescents and adults. *Arch Sex Behav* 2010;39:514-545.
10. Lawrence AA. Autogynephilia and the typology of male-to-female transsexualism. *Eur Psychol* 2017;22:39-54.
11. Cantor JM. New MRI studies support the Blanchard typology of male-to-female transsexualism. *Arch Sex Behav* 2011;40:863-864.
12. Bailey JM, Vasey PL, Diamond LM, et al. Sexual orientation, controversy, and science. *Psychol Sci Public Interest* 2016;17:45-101.
13. Lawrence AA. Men trapped in men's bodies. Focus on sexuality research. New York: Springer; 2013.
14. Jackowich RA, Johnson TW, Brassard P, et al. Age of sex reassignment surgery for male-to-female transsexuals. *Arch Sex Behav* 2014;43:13-15.
15. Papadopulos NA, Zavlin D, Lelle JD, et al. Male-to-female sex reassignment surgery using the combined technique leads to increased quality of life in a prospective study. *Plast Reconstr Surg* 2017;140:286-294.
16. Papadopulos NA, Zavlin D, Lelle JD, et al. Combined vaginoplasty technique for male-to-female sex reassignment surgery: Operative approach and outcomes. *J Plast Reconstr Aesthet Surg* 2017;70:1483-1492.
17. Henrich G, Herschbach P. Questions on life satisfaction (FLZM): A short questionnaire for assessing subjective quality of life. *Eur J Psychol Assess* 2000;16:10.
18. Papadopulos NA, Lelle JD, Zavlin D, et al. Quality of life and patient satisfaction following male-to-female sex reassignment surgery. *J Sex Med* 2017;14:721-730.
19. Kroenke K, Spitzer RL, Williams JBW, et al. An ultra-brief screening scale for anxiety and depression: The PHQ-4. *Psychosomatics* 2009;50:613-621.
20. Fahrenberg J, Hampel R, Selg H. Das Freiburger Persönlichkeits-inventar FPI. Revidierte Fassung FPI-R und teilweise geänderte Fassung FPI-A1. Göttingen, Germany: Hogrefe-Verlag; 1994.
21. Schmitt DP, Allik J. Simultaneous administration of the Rosenberg Self-Esteem Scale in 53 nations: Exploring the universal and culture-specific features of global self-esteem. *J Pers Soc Psychol* 2005;89:623-642.
22. Blanchard R. Clinical observations and systematic studies of autogynephilia. *J Sex Marital Ther* 1991;17:235-251.
23. Blanchard R, Clemmensen LH, Steiner BW. Heterosexual and homosexual gender dysphoria. *Arch Sex Behav* 1987;16:139-152.
24. Gaither TW, Awad MA, Osterberg EC, et al. Impact of sexual orientation identity on medical morbidities in male-to-female transgender patients. *LGBT Health* 2017;4:11-16.
25. Nuttbrock L, Bockting W, Mason M, et al. A further assessment of Blanchard's typology of homosexual versus non-homosexual or autogynephilic gender dysphoria. *Arch Sex Behav* 2011;40:247-257.
26. Lawrence AA. Further validation of Blanchard's typology: A reply to Nuttbrock, Bockting, Rosenblum, et al (2010). *Arch Sex Behav* 2011;40:1089-1091; author reply 1093-1086.
27. Gomez-Gil E, Trilla A, Salamero M, et al. Sociodemographic, clinical, and psychiatric characteristics of transsexuals from Spain. *Arch Sex Behav* 2009;38:378-392.
28. Docter RF, Fleming JS. Measures of transgender behavior. *Arch Sex Behav* 2001;30:255-271.
29. Kattari SK, Hasche L. Differences across age groups in transgender and gender non-conforming people's experiences of health care discrimination, harassment, and victimization. *J Aging Health* 2016;28:285-306.
30. White Hughto JM, Reisner SL. Social context of depressive distress in aging transgender adults. *J Appl Gerontol* 2016;37:1517-1539.
31. Lawrence AA. Factors associated with satisfaction or regret following male-to-female sex reassignment surgery. *Arch Sex Behav* 2003;32:299-315.
32. Sohn MH, Hatzinger M, Wirsam K. Genital reassignment surgery in male-to-female transsexuals: Do we have guidelines or standards? *Handchir Mikrochir Plast Chir* 2013;45:207-210.
33. Kockott G, Fahrner EM. Transsexuals who have not undergone surgery: A follow-up study. *Arch Sex Behav* 1987;16:511-522.
34. Lawrence AA. Societal individualism predicts prevalence of nonhomosexual orientation in male-to-female transsexualism. *Arch Sex Behav* 2010;39:573-583.