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Margaret Q. To Date

“Passing”: An investigation of its distribution and association with depression and anxiety in a cohort of transgender people.

By

Margaret Q. To
Master of Public Health

Global Epidemiology

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Michael M. Goodman, MD,MPH
Committee Chair

“Passing”: An investigation of its distribution and association with depression and anxiety in a cohort of transgender people.

By

Margaret Q. To

B.A., B.S.
University of Pittsburgh
2013

Thesis Committee Chair: Michael M. Goodman, MD,MPH

An abstract of
A thesis submitted to the Faculty of the
Rollins School of Public Health of Emory University
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Master of Public Health
in Global Epidemiology
2019

Abstract

"Passing": An investigation of its distribution and association with depression and anxiety in a cohort of transgender people.

By Margaret Q. To

Visual conformity with desired gender identity or 'passing' is thought to be an important, but poorly understood, determinant of well-being in transgender people. This study explores 'passing' from two perspectives - first, as visual conformity with societal expectations for appearance (social affirmation or SoA), and second, as conformity with personal expectations for appearance (self affirmation or SeA). SoA and SeA were measured as differences between actual and desired scores on gender identity and expression continuums. The frequency and extent of SeA and SoA and their independent associations with anxiety and depression symptoms were explored in a study of 508 transgender individuals that included 244 persons assigned male sex at birth (AMAB) and 264 persons assigned female sex at birth (AFAB). High levels of SeA was reported in 54.1% of AMAB participants and 67.4% of AFAB participants. The corresponding proportions for SoA were 24.3% and 60.7% among AMAB and AFAB cohort members, respectively. Multivariable logistic regression models controlling for transgender congruence scale, AMAB/AFAB status, age, and receipt of gender confirmation treatment indicated that persons with high levels of SoA or SeA had a lower likelihood of depression with odds ratios (95% confidence intervals) of 0.53 (0.36, 0.79) and 0.67 (0.46, 0.99), respectively. In the analyses for anxiety there was significant inverse association with SoA, but not SeA. These results, once confirmed by prospective studies, can help us better characterize the determinants of mental health in the transgender community, facilitating the design of interventions to improve the well-being of this vulnerable population.

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INTRODUCTION

The term 'transgender' refers to an individual whose gender identity or gender expression differs from the male or female sex designation assigned at birth.[8-10] Systematic reviews of the literature have demonstrated that transgender persons experience disproportionately high rates of depression and anxiety compared to members of the general population.[3,11,12] Understanding the risk factors for mental health problems among transgender people is crucial; however quantitative data capable of closing this knowledge gap are still lacking.[3 4,13]

It has been proposed that mental health in transgender persons may be related to gender congruence, referring to the agreement between the internal and external gender identity. Some transgender persons choose to increase this congruence through hormone therapy (HT) or surgery to achieve desired femininity or masculinity.[10,14] HT can include estrogens and antiandrogens for transgender persons assigned male at birth (AMAB) or testosterone for transgender persons assigned female at birth (AFAB), while gender confirmation surgery may involve surgical alteration of the genitalia and other secondary sex traits.[10,15,16] A number of studies have linked these gender affirming therapies to improved mental health status and quality of life. For example, Gomez-Gil et al. found lower prevalence of anxiety and depression in transgender persons undergoing HT compared to controls (61% vs. 33% for anxiety, 31% vs. 8% for depression).[17] Lindgren and Pauly were among the first to find that HT and/or GCS alleviated body dissatisfaction and improved well-being.[18] A number of recent studies have also demonstrated improved health-related quality of life measures following HT and/or GCS in both AMAB and AFAB groups.[19-24]

While the body of evidence supports increased external body-gender congruence as a positive predictor of mental health, other studies have sought to explore more nuanced determinants of mental health in the transgender community. Kozee et al., for example, sought to assess how feelings of comfort and authenticity were associated anxiety and depression symptoms. They developed the Transgender Congruence Scale (TCS) to assess these feelings, first by quantifying the perceived agreement between external appearance and gender identity, and second by quantifying acceptance or pride in gender identity. They found that higher scores on TCS were correlated with fewer symptoms of depression and anxiety, independent of the number of steps taken to achieve gender affirmation through confirmation surgery.[7]

The mental health of the transgender community, as suggested by these body of studies, is influenced both by perceptions of external body-gender congruence and internal body-gender congruence. To this end, this study seeks to explore the influence of 'passing' from an external and internal perspective on the mental health of a cohort of transgender individuals. To our knowledge, this is the first study of its kind to explore a quantitative association of 'passing' with symptoms of anxiety and depression in the transgender community. We reframe 'passing status' as 'affirmation status' and define it further from an external (social) and internal (self) perspective. Social affirmation (SoA) explores passing as a marker of whether one achieves visual conformity with societal expectations for the desired gender identity. Self affirmation (SeA) explores passing as a marker of whether one meets personal expectations for their physical appearance. Most available studies conducted on mental health in the transgender community have been limited by small sample sizes or were conducted at single clinical sites.

Data are also rarely presented separately for AMAB and AFAB persons or across multiple gender affirmation status-specific groups. [19-24]

We hypothesize that transgender persons with higher SoA and SeA levels will have fewer symptoms of anxiety and depression, independent of other factors, including TCS, age in years, AMAB/AFAB status, and history of gender confirmation therapy (GCT).

MATERIALS AND METHODS

Study Population:

The present study uses the cohort of participants from the Study of Transition, Outcomes, and Gender (STRONG) recruited from three Kaiser Permanente health plans located in Georgia, Northern California, and Southern California. These 3 integrated health care systems provide comprehensive health services to approximately 8 million members. Enrollees are socio-demographically diverse and broadly representative of the communities in the corresponding areas.[25]

The 3 KP organizations use similar electronic medical record systems and have comparably organized databases with identical variable names, formats, and specifications across sites. The study was conducted in partnership with Emory University, which served as the coordinating center, and all activities were reviewed and approved by the institutional review boards of the 4 participating institutions.

The methods of cohort ascertainment were described in detail previously.[2,26] Briefly, electronic medical record data for all participating health plan members of all ages enrolled between January 1, 2006, and December 31, 2014, were used to identify supporting evidence

for transgender/gender non-conforming status based on relevant *International Classification of Diseases, Ninth Revision* codes; and presence of specific key words in free-text notes. Eligibility status was independently verified by 2 trained reviewers with disagreements adjudicated by a committee that included the project manager and 2 investigators.

As not all data elements of interest could be ascertained from the electronic medical record data alone, the project also included a cross-sectional survey that collected self-reported information via an online survey software tool or by paper for those who did not want/were not able to complete the survey on the Internet.

Survey Recruitment:

The survey eligibility criteria included: age 18 years or older, current enrollment in 1 of the participating health plans, at least 1 relevant diagnostic code, and text string-confirmed transgender status. Participants were excluded from the survey if their transgender-related encounters were limited to mental health services; their physicians did not provide consent for initiating the contact; or in their responses to the screening questions, their gender identity was the same as sex assigned at birth. All initial invitations were sent via regular mail. The letter included a web site address and a unique password linked to the study identification number; participants were asked to read and electronically sign the consent form online prior to survey initiation.

Survey Content:

Transgender status was confirmed based on a 2-step question: first inquiring about participants' sex assigned at birth and then asking about their current gender identity. If the gender identity was different from the assigned female sex the participant was considered AFAB; if the gender identity was different from the assigned male sex, the participant was considered AMAB. Five persons who reported being born with intersex conditions were excluded from the current analysis. Extent of GCT received was determined by asking participants about past, current, and planned HT and their history of GCS. Based on reported history of GCT, each participant was placed in one of the following 5 ordered categories: (1) no gender confirmation therapy to date; (2) HT only; (3) "top" surgery (e.g., mastectomy or breast augmentation); (4) partial bottom surgery (e.g., hysterectomy without vaginectomy or orchiectomy without vaginoplasty); and (5) definitive bottom surgery (e.g., vaginectomy or vaginoplasty).

The "affirmation status" of each participant was determined using gender-specific scales (male/female/masculine/feminine) reflecting self-reported scores ranging from 0 – 100. Participants were prompted with the following questions: "Assuming gender and gender expression are continuums, where would you place yourself on the scales below at the present time? Assuming gender and gender expression are continuums, where do you want to be on the scales below?" Participants with high SeA level were those whose current scores were equal to or exceeded their desired scores. Participants were then prompted with the following questions: "Assuming gender and gender expression are continuums, how do you think others perceive you on the scales below? Assuming gender and gender expression are continuums,

how do you want others to perceive you on the scales below?" Participants with high SoA levels were those whose current scores were equal to or exceeded their desired scores.

Body-gender congruence was measured using the 12-item TCS instrument.[7] Overall TCS score was defined as high vs. low using study population's median value as the cutoff.

Information about the participants' depression and anxiety levels was collected using the 10-item Center for Epidemiologic Studies Depression Scale (CES-D-10) and the Beck Anxiety Index (BAI), respectively. [27-29] For depression and anxiety, the binary outcome was defined using the previously proposed clinically relevant cutoffs of 10 for CES-D-10, and 21 for BAI.[1,28,30]

Data analyses:

The goal of the analyses was to compare mental health status (expressed as prevalence estimates for depression and anxiety) across SoA and SeA categories and TCS levels. These associations were examined using multivariable logistic regression models. The covariates in the model included AMAB/AFAB status, age in years, and extent of gender confirmation treatment received.

All models were examined for interactions between AMAB/AFAB status and each of the covariates in the model. In the presence of significant interaction (two sided p-value <0.05) the analyses were performed separately for AMAB and AFAB participants. The results of each model were expressed as adjusted odds ratios (OR) and the corresponding 95% confidence intervals (CI). All data analyses were performed using SAS (SAS Institute Inc., Cary, NC).

RESULTS

Of the 2,136 individuals invited to participate, 697 (33%) completed at least part of the survey and of those, 510 and 501 responded to CES-D-10 and BAI items, respectively. Two additional individuals were excluded owing to missing values for GCT, leaving 508 individuals (264 TM, 244 TF) in the analysis of depression and 499 individuals (257 TM, 242 TF) in the analysis of anxiety.

Figures 1 and 2 present self-reported current and desired gender identity and gender expression among all survey participants. Among AMAB participants, a desire to be in the highest range (80-100%) for score on female identity was expressed by 90% of survey participants, but only 67% reported being in that range. In addition, 74% expressed a desire to be in the highest range for feminine expression, but only 43% reported being in that range. Among AFAB individuals, a desire to be in the highest range for score on male identity was expressed by 79% of survey participants; and 69% reported being in that range. Also, 61% of AFAB participants expressed a desire to be in the highest masculinity range for gender expression with 50% reported achieving it.

Figures 3 and 4 present participants' reports of their current and desired gender identity and gender expression, as they thought they were perceived by others. Among AMAB individuals, 91% and 75% reported a wish to be seen in the highest category of female identity and feminine expression, but only 45% and 35% felt that others would place them in the highest category of female gender identity and feminine expression, respectively. Among AFAB individuals, 84% and 63% reported a wish to be seen in the highest category of male identity

and masculine expression, but only 70% and 48% felt that others would place them in the highest category of male identity and masculine expression.

Tables 1 and 2 compare the distributions of depression and anxiety, respectively, by sex assigned at birth, age, history of GCT, and by "affirmation status" and TCS. Approximately half of respondents (48.1% AFAB and 49.2% AMAB) met criteria for a current episode of depression. AFAB individuals were more likely to experience clinically significant symptoms of anxiety at the time of survey completion than AMAB individuals (24.9% vs 15.7%).

As reported in a previous analysis of these data,[1] prevalence of depression and anxiety decreased as the extent of GCT increased (from no treatment to definitive bottom surgery). Generally, the prevalence of depression and anxiety was also lower for individuals achieving SoA and SeA, and for individuals with TCS scores above the median.

Table 3 shows the results of the multivariable analyses assessing the associations of SoA (model 1) and SeA (model 2) with depression. Persons with high levels of either SoA or SeA had a lower likelihood of depression with ORs (95% CIs) of 0.53 (0.36- 0.80) and 0.67 (0.46-0.99) after controlling for TCS, GCS receipt, and sex assigned at birth. As anticipated, transgender persons receiving GCS had significantly lower odds of depression symptoms, with odds continuing to decrease as the extent of GCS increased in both models. Neither TCS nor sex assigned at birth was significantly associated with depression symptoms after controlling for the other covariates in Models 1 and 2.

Table 4 presents the corresponding analyses for anxiety symptoms, with binary outcome defined as CES-D score >10. The association between SoA and anxiety was inverse and statistically significant (OR=0.57; 95% CI: 0.34-0.95) whereas the result for SeA was weaker

(OR=0.70) with 95% CI overlapping the null value (0.43-1.14). In contrast to the results for depression (Table 3), persons with higher TCS had lower odds of anxiety independently of other factors. The results for GCS and anxiety were in the same direction, and somewhat more pronounced compared to those observed for GCS and depression.

DISCUSSION

For both AMAB and AFAB participants, individuals who felt that others perceive them as having the gender with which they most strongly identified (denoted as higher SoA score) were significantly less likely to experience both depression and anxiety. These results were independent of transgender congruence (TCS) and receipt of gender affirming therapies, which have also been shown to improve mental well-being in the transgender community.[1] Prior studies have described the influence of body-gender congruence on mental health by measuring feelings of authenticity with oneself or correlating psychometric testing with stages of gender confirmation therapies.[7 19-24] To our knowledge, this is the first study to quantify the phenomenological experience of "passing" as an individual of the desired gender identity, a concept we have reframed as "social affirmation" to fit within the existing gender affirmation framework. [31]

The desire to be recognized and affirmed by others as having the gender with which one most strongly identifies has been studied previously primarily using qualitative methods [32]. While body-gender congruence, self-acceptance, and social affirmation are all closely inter-related, this study is the first to quantitatively demonstrate that social affirmation is associated with mental health status in a way that is independent of validated measures of body-gender congruence and/or treatment receipt.[31]

Social affirmation can be a sensitive issue because it implies the need to conform to cis-normative binary gender.[33] For some, the desire for social affirmation originates not only from an internal desire to mediate body-gender incongruence, but from external pressures to blend in.[5,31] Studies have shown that individuals who adopt cis-normative gender expressions are less likely to be victim to stigma, discrimination, and violence, which are known risk factors for depression, anxiety, and other psychopathology.[5,6,31]

Several limitations of the present study should be recognized. The cross-sectional design of the survey does not allow direct causal inferences. It is quite possible that the observed associations are bidirectional. For example, while transgender individuals with lower social affirmation are more likely to experience depression, it is also plausible that persons suffering from depression are less likely to report high levels of social affirmation. It is worth noting, however, that there are studies suggesting that increased visibility as a transgender individual, whether through self-disclosure or being visibly trans, increases risk of mental health problems, including suicide ideation and self-harm attempts.[34,35]

Questions related to SeA and SoA were proposed by the STRONG stakeholder advisory group who considered them as high-priority. These survey items were extensively pilot tested; however, they have not been previously validated and require further evaluation. We also recognize that transgender individuals enrolled through Kaiser Permanente health systems represent a cohort of individuals who are insured and therefore may not be representative of the broader transgender population in the United States.

These limitations notwithstanding, the results from the present study provide evidence that affirmation status is not only associated with body-gender congruence and feelings of self-

acceptance, but is an independent predictor of depression and anxiety. The extent of social affirmation may be especially important in improving mental health in the transgender community. These findings require confirmation using prospective study design. If confirmed, the results of observational studies can then be used to design individual or community-based interventions aimed at improving the well-being of transgender people. Such interventions should consider possible influence of social affirmation and will require multidimensional approaches geared towards increasing self-acceptance, improving body-gender congruence, and developing strategies to strengthen transgender resilience.

REFERENCES

1. Owen-Smith AA, Gerth J, Sineath RC, et al. Association Between Gender Confirmation Treatments and Perceived Gender Congruence, Body Image Satisfaction, and Mental Health in a Cohort of Transgender Individuals. The journal of sexual medicine 2018;15:591-600.
2. Quinn VP, Nash R, Hunkeler E, et al. Cohort profile: Study of Transition, Outcomes and Gender (STRONG) to assess health status of transgender people. BMJ Open 2017;7:e018121.
3. Bariola E, Lyons A, Leonard W, Pitts M, Badcock P, Couch M. Demographic and Psychosocial Factors Associated With Psychological Distress and Resilience Among Transgender Individuals. Am J Public Health 2015;105:2108-16.
4. Reisner SL, Poteat T, Keatley J, et al. Global health burden and needs of transgender populations: a review. Lancet 2016;388:412-36.
5. White Hughto JM, Reisner SL, Pachankis JE. Transgender stigma and health: A critical review of stigma determinants, mechanisms, and interventions. Social science & medicine (1982) 2015;147:222-31.
6. Grant J, Mottet L, Tanis J, Harrison J, Herman J, Keisling M. Injustice at Every Turn: A Report of the National Transgender Discrimination Survey. Washington, DC: National Center for Transgender Equality and National Gay and Lesbian Task Force; 2011.
7. Kozee HB, Tylka TL, Bauerband LA. Measuring Transgender Individuals' Comfort With Gender Identity and Appearance: Development and Validation of the Transgender Congruence Scale. Psychology of Women Quarterly 2012;36:179-96.
8. American Psychiatric A. Diagnostic And Statistical Manual Of Mental Disorders DSM-IV-TR Fourth Edition (Text Revision) Author: American Psychiatr. 2000.
9. Richards C, Barker M-J. Sexuality & gender for mental health professionals : a practical guide2013.
10. Coleman E, Bockting W, Botzer M, et al. Standards of Care for the Health of Transsexual, Transgender, and Gender-Nonconforming People, Version 7. International Journal of Transgenderism 2012;13:165-232.
11. Owen-Smith A, Sineath RC, Sanchez T, et al. Perception of Community Tolerance and Prevalence of Depression among Transgender Persons. J Gay Lesbian Ment Healt 2016.
12. Nuttbrock L, Bockting W, Rosenblum A, et al. Gender abuse and major depression among transgender women: a prospective study of vulnerability and resilience. Am J Public Health 2014;104:2191-8.
13. Dhejne C, Van Vlerken R, Heylens G, Arcelus J. Mental health and gender dysphoria: A review of the literature. International review of psychiatry (Abingdon, England) 2016;28:44-57.
14. Feldman J, Brown GR, Deutsch MB, et al. Priorities for transgender medical and healthcare research. Curr Opin Endocrinol Diabetes Obes 2016;23:180-7.
15. 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 2011;13:165-232.
16. Wylie K, Barrett J, Besser M, et al. Good practice guidelines for the assessment and treatment of adults with gender dysphoria. Sexual and Relationship Therapy 2014;29:154-214.
17. Gomez-Gil E, Zubiaurre-Elorza L, Esteva I, et al. Hormone-treated transsexuals report less social distress, anxiety and depression. Psychoneuroendocrinology 2012;37:662-70.
18. Lindgren TW, Pauly IB. A body image scale for evaluating transsexuals. Arch Sex Behav 1975;4:639-56.
19. Gorin-Lazard A, Baumstarck K, Boyer L, et al. Hormonal therapy is associated with better self-esteem, mood, and quality of life in transsexuals. J Nerv Ment Dis 2013;201:996-1000.

20. Murad MH, Elamin MB, Garcia MZ, et al. Hormonal therapy and sex reassignment: a systematic review and meta-analysis of quality of life and psychosocial outcomes. Clin Endocrinol 2010;72:214-31.
21. Lindqvist EK, Sigurjonsson H, Mollermark 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.
22. 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;14:721-30.
23. Ainsworth TA, Spiegel JH. Quality of life of individuals with and without facial feminization surgery or gender reassignment surgery. Qual Life Res 2010;19:1019-24.
24. Colizzi M, Costa R, Todarello O. Transsexual patients' psychiatric comorbidity and positive effect of cross-sex hormonal treatment on mental health: results from a longitudinal study. Psychoneuroendocrinology 2014;39:65-73.
25. Koebnick C, Langer-Gould AM, Gould MK, et al. Sociodemographic characteristics of members of a large, integrated health care system: comparison with US Census Bureau data. Perm J 2012;16:37-41.
26. Roblin D, Barzilay J, Tolsma D, et al. A novel method for estimating transgender status using electronic medical records. Ann Epidemiol 2016;26:198-203.
27. Beck AT, Guth D, Steer RA, Ball R. Screening for major depression disorders in medical inpatients with the Beck Depression Inventory for Primary Care. Behav Res Ther 1997;35:785-91.
28. Beck AT, Epstein N, Brown G, Steer RA. An inventory for measuring clinical anxiety: psychometric properties. J Consult Clin Psychol 1988;56:893-7.
29. Manne S, Nereo N, DuHamel K, et al. Anxiety and depression in mothers of children undergoing bone marrow transplant: symptom prevalence and use of the Beck depression and Beck anxiety inventories as screening instruments. J Consult Clin Psychol 2001;69:1037-47.
30. Yi MS, Mrus JM, Wade TJ, et al. Religion, spirituality, and depressive symptoms in patients with HIV/AIDS. J Gen Intern Med 2006;21 Suppl 5:S21-7.
31. White Hughto JM, Clark KA, Altice FL, Reisner SL, Kershaw TS, Pachankis JE. Creating, reinforcing, and resisting the gender binary: a qualitative study of transgender women's healthcare experiences in sex-segregated jails and prisons. International journal of prisoner health 2018;14:69-88.
32. van de Grift TC, Kreukels BP, Elfering L, et al. Body Image in Transmen: Multidimensional Measurement and the Effects of Mastectomy. J Sex Med 2016;13:1778-86.
33. Lombardi EL, Wilchins RA, Priesing D, Malouf D. Gender violence: transgender experiences with violence and discrimination. J Homosex 2001;42:89-101.
34. Bauer GR, Scheim AI, Pyne J, Travers R, Hammond R. Intervenable factors associated with suicide risk in transgender persons: a respondent driven sampling study in Ontario, Canada. BMC Public Health 2015;15:525.
35. Haas AP, Eliason M, Mays VM, et al. Suicide and suicide risk in lesbian, gay, bisexual, and transgender populations: review and recommendations. J Homosex 2011;58:10-51.

FIGURES AND TABLES

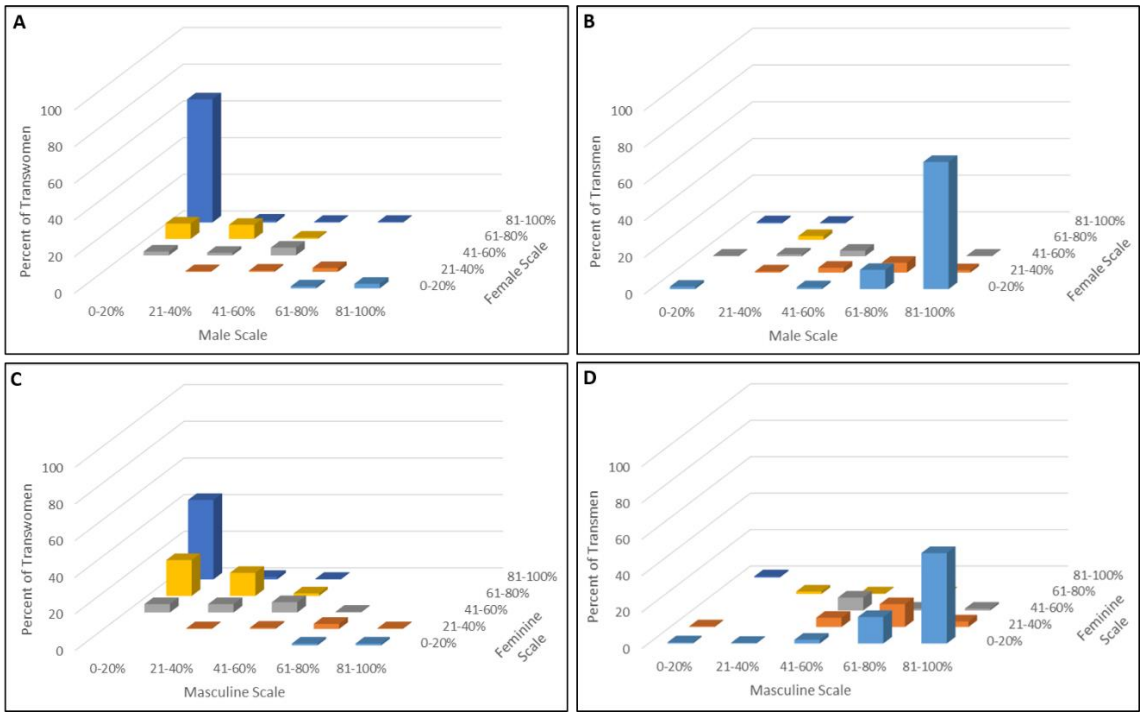

Figure 1. Extent to which survey respondents perceived themselves as a person of their desired gender among TF (A, C) and TM (B, D) ((Assuming gender and gender expression represent a continuum, where would you place yourself on the scales below at the present time?)

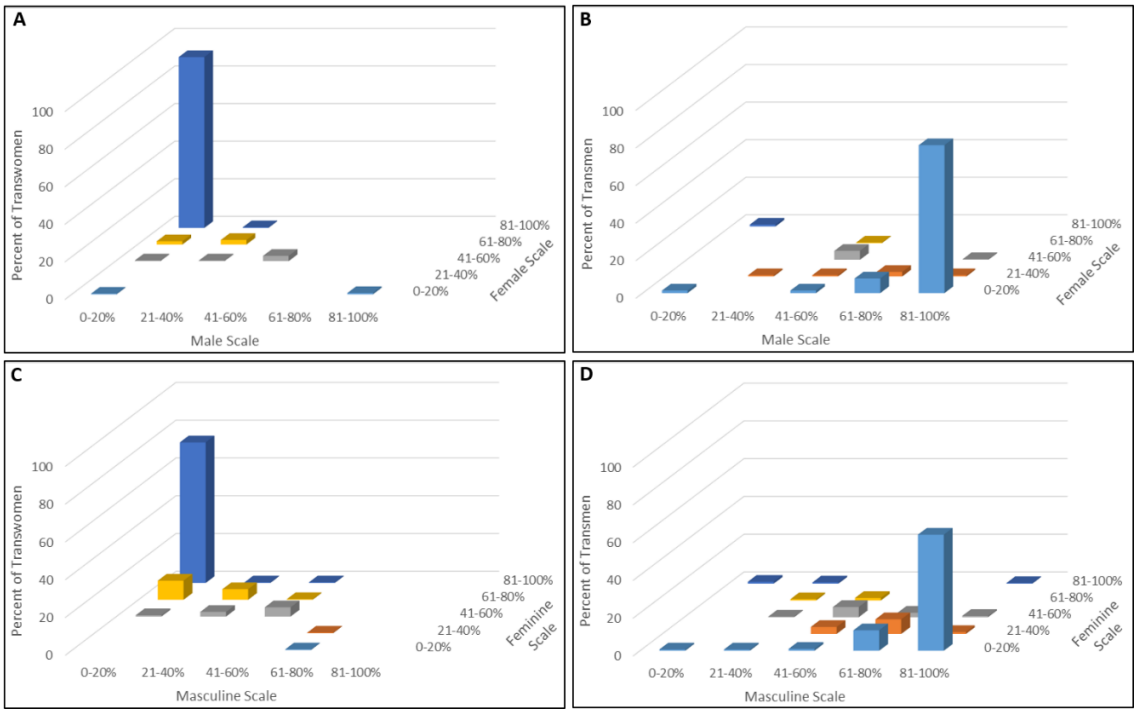

Figure 2. *Extent to which survey respondents want to be a person of their desired gender among TF (A, C) and TM (B, D)* ***(Assuming gender and gender expression represent a continuum, where do you want to be on the scales below?)***

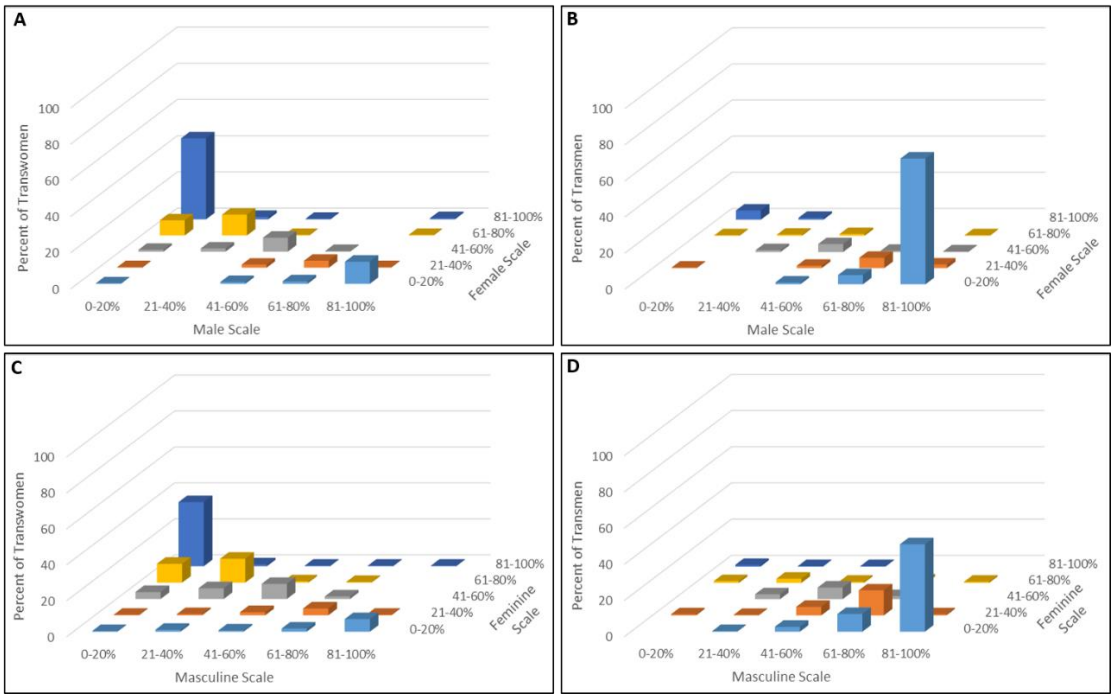

Figure 3. *Extent to which survey respondents believe others perceive them as a person of their desired gender among TF (A, C) and TM (B, D)* ***(Assuming gender and gender expression represent a continuum, how do you think others perceive you on the scales below?)***

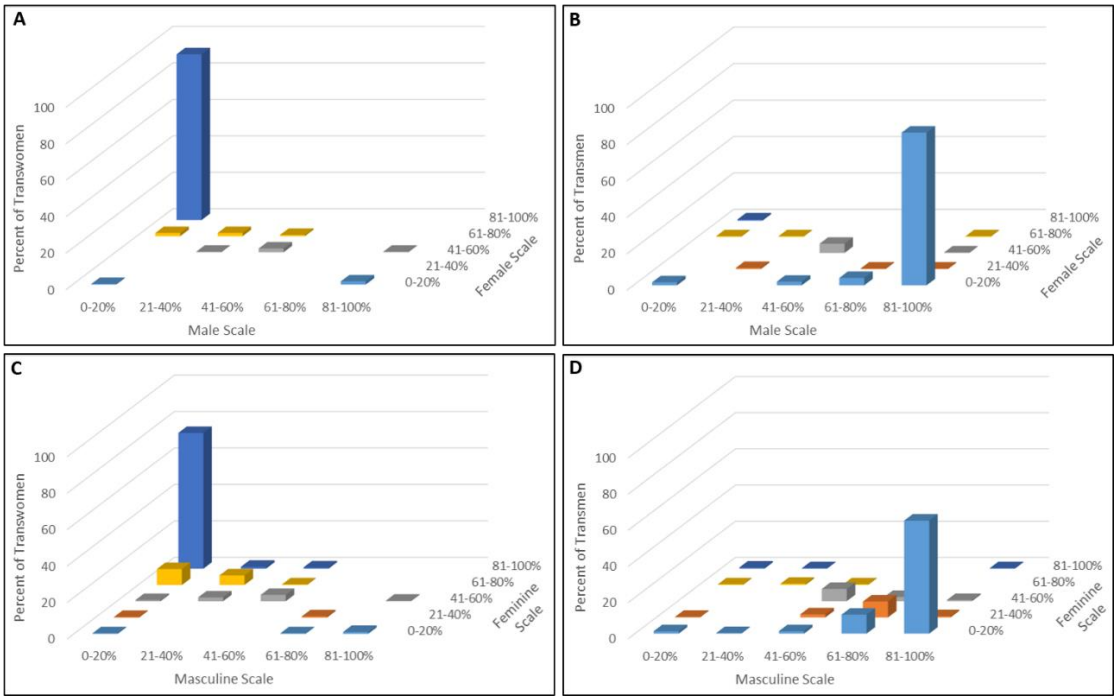

Figure 4. *Extent to which survey respondents want to be perceived by others as a person of their desired gender among TF (A, C) and TM (B, D)* ***(Assuming gender and gender expression represent a continuum, how do you want others to perceive you on the scales below?)***

Table 1. Characteristics of survey participants with and without evidence of depression*

Participant Characteristics:	Depression n (%)		No Depression n (%)		Total	
Sex assigned at birth						
AMAB	120	(49.2)	124	(50.8)	244	(48.0)
AFAB	127	(48.1)	137	(51.9)	264	(52.0)
Age (years)						
Under 30	109	(63.4)	63	(36.6)	172	(33.9)
30-39	46	(40.7)	67	(59.3)	113	(22.2)
40-54	52	(41.3)	74	(58.7)	126	(24.8)
55 or Older	40	(41.2)	57	(58.8)	97	(19.1)
History of GCT**						
No evidence of treatment	16	(80.0)	4	(20.0)	20	(3.9)
Hormone Therapy (HT)	100	(58.5)	71	(41.5)	171	(33.7)
Top Surgery	58	(42.3)	79	(57.7)	137	(27.0)
Partial Bottom	31	(47.0)	35	(53.0)	66	(13.0)
Complete Bottom	42	(36.8)	72	(63.2)	114	(22.4)
Affirmation Status						
Social Affirmation (SoA)						
Low	160	(55.2)	130	(44.8)	290	(57.1)
High	87	(39.9)	131	(60.1)	218	(42.9)
Self Affirmation (SeA)						
Low	110	(55.6)	88	(44.4)	198	(39.0)
High	137	(69.2)	173	(87.4)	310	(61.0)
Transgender Congruence Scale						
Total Score***						
Below Median	121	(50.0)	121	(50.0)	242	(47.6)
Above Median	126	(47.4)	140	(52.6)	266	(52.4)
Appearance Congruence subscale (ACS)						
Below Median	121	(51.7)	113	(48.3)	234	(46.1)
Above Median	126	(46.0)	148	(54.0)	274	(53.9)
Gender Identity Acceptance subscale (GIAS)						
Below Median	103	(46.8)	117	(53.2)	220	(43.3)
Above Median	144	(50.0)	144	(50.0)	288	(56.7)
All Subjects	**247**	(48.6)	**261**	(51.4)	**508**	(100.0)

*Defined as CES-D 10 score > 10

**Gender Confirmation Therapy

***Total Score reflects sum of the subscale scores for Appearance Congruence and Gender Identity Acceptance

Table 2. Characteristics of survey participants with and without evidence of anxiety*

Participant characteristics	Anxiety n (%)		No Anxiety n (%)		Total	
Sex assigned at birth						
AMAB	38	(15.7)	204	(84.3)	242	(48.5)
AFAB	64	(24.9)	193	(75.1)	257	(51.5)
Age (years)						
Under 30	60	(34.3)	115	(65.7)	175	(35.1)
30-39	13	(11.7)	98	(88.3)	111	(22.2)
40-54	20	(16.8)	99	(83.2)	119	(23.8)
55 or Older	9	(9.6)	85	(90.4)	94	(18.8)
History of GCT**						
No evidence of treatment	9	(45.0)	11	(55.0)	20	(4.0)
Hormone Therapy (HT)	43	(25.6)	125	(74.4)	168	(33.7)
Top Surgery	31	(22.8)	105	(77.2)	136	(27.3)
Partial Bottom	11	(17.2)	53	(82.8)	64	(12.8)
Complete Bottom	8	(7.2)	103	(92.8)	111	(22.2)
Affirmation Status						
Social Affirmation						
Low	66	(23.3)	217	(76.7)	283	(56.7)
High	36	(16.7)	180	(83.3)	216	(43.3)
Self Affirmation						
Low	45	(23.3)	148	(76.7)	193	(38.7)
High	57	(29.5)	249	(81.4)	306	(61.3)
Transgender Congruence Scale						
Total Score***						
Below Median	59	(24.8)	179	(75.2)	238	(47.7)
Above Median	43	(16.5)	218	(83.5)	261	(52.3)
Appearance Congruence Scale						
Below Median	56	(24.5)	173	(75.5)	229	(45.9)
Above Median	46	(17.0)	224	(83.0)	270	(54.1)
Gender Identity Acceptance Scale						
Below Median	47	(22.0)	167	(78.0)	214	(42.9)
Above Median	55	(19.3)	230	(80.7)	285	(57.1)
All Subjects	**102**	(20.4)	**397**	(79.6)	**499**	(100.0)

*Evidence of anxiety defined as BAI score > 21

** Gender Confirmation Therapy

***Total Score reflects sum of the subscale scores for Appearance Congruence and Gender Identity Acceptance

Table 3. Multivariable analysis* assessing factors associated with depression**

Independent variables	OR	95% CI
Model 1:		
SoA		
Low (current score < desired)	1.0	ref
High (current score ≥ desired)	0.53	0.36, 0.79
TCS		
Low (below median)	1.0	ref
High (above median)	0.91	0.63, 1.31
GCS		
No treatment	1.0	ref
Hormone therapy only	0.81	0.70, 0.95
Top surgery	0.66	0.48, 0.90
Partial bottom surgery	0.54	0.34, 0.86
Definitive bottom surgery	0.44	0.23, 0.82
Sex assigned at birth		
AMAB	1.0	ref
AFAB	0.92	0.60, 1.41
Model 2:		
SeA		
Low (current score < desired)	1.0	ref
High (current score ≥ desired)	0.67	0.46, 0.99
TCS		
Low (below median)	1.0	ref
High (above median)	0.87	0.60, 1.25
GCS		
No treatment	1.0	ref
Hormone therapy only	0.82	0.70, 0.96
Top surgery	0.67	0.49, 0.92
Partial bottom surgery	0.55	0.34, 0.89
Definitive bottom surgery	0.45	0.24, 0.85
Sex assigned at birth		
AMAB	1.0	ref
AFAB	0.75	0.51, 1.12

*Each model was also adjusted for age in years

**Defined as CES-D 10 score > 10

‡Abbreviations:

TCS: transgender congruence score

SoA: social affirmation

SeA: self affirmation

Table 4. Multivariable analysis* assessing factors associated with anxiety**

Independent variables	OR	95% CI
Model 1:		
SoA		
Low (current score < desired)	1.0	ref
High (current score ≥ desired)	0.57	0.34, 0.95
TCS		
Low (below median)	1.0	ref
High (above median)	0.59	0.37, 0.94
GCS		
No treatment	1.0	ref
Hormone therapy only	0.68	0.54, 0.85
Top surgery	0.46	0.29, 0.73
Partial bottom surgery	0.31	0.15, 0.62
Definitive bottom surgery	0.21	0.08, 0.53
Sex assigned at birth		
AMAB	1.0	ref
AFAB	1.67	0.97, 2.86
Model 2:		
SeA		
Low (current score < desired)	1.0	ref
High (current score ≥ desired)	0.70	0.43, 1.14
TCS		
Low (below median)	1.0	ref
High (above median)	0.55	0.34, 0.88
GCS		
No treatment	1.0	ref
Hormone therapy only	0.68	0.53, 0.86
Top surgery	0.46	0.28, 0.73
Partial bottom surgery	0.31	0.15, 0.63
Definitive bottom surgery	0.21	0.08, 0.54
Sex assigned at birth		
AMAB	1.0	ref
AFAB	1.44	0.86, 2.42

*Each model was also adjusted for age in years

**Defined as BAI score > 21

‡Abbreviations:

TCS: transgender congruence score

SoA: social affirmation

SeA: self affirmation