Body Dissatisfaction and Mental Health Outcomes of Youth on Gender-Af rming Hormone Therapy

Laura E. Kuper, PhD,[a,b] Sunita Stewart, PhD,[a,b] Stephanie Preston, MD,[b] May Lau, MD, MPH,[a,b] Ximena Lopez, MD[a,b]

abstract

OBJECTIVES: Our rst aim was to examine baseline differences in body dissatisfaction, depression, and anxiety symptoms by gender, age, and Tanner (ie, pubertal) stage. Our second aim was to test for changes in youth symptoms over the rst year of receiving gender-af rming hormone therapy. Our third aim was to examine potential differences in change over time by demographic and treatment characteristics. Youth experiences of suicidal ideation, suicide attempt, and nonsuicidal self-injury (NSSI) are also reported.

METHODS: Participants (n = 148; ages 9–18 years; mean age 14.9 years) were receiving gender-af rming hormone therapy at a multidisciplinary program in Dallas, Texas (n = 25 puberty suppression only; n = 123 feminizing or masculinizing hormone therapy). Participants completed surveys assessing body dissatisfaction (Body Image Scale), depression (Quick Inventory of Depressive Symptoms), and anxiety (Screen for Child Anxiety Related Emotional Disorders) at initial presentation to the clinic and at follow-up. Clinicians completed the Quick Inventory of Depressive Symptoms and collected information on youth experiences of suicidal ideation, suicide attempt, and NSSI.

RESULTS: Af rmed males reported greater depression and anxiety at baseline, but these differences were small (P .01). Youth reported large improvements in body dissatisfaction (P .001), small to moderate improvements in self-report of depressive symptoms (P .001), and small improvements in total anxiety symptoms (P .01). No demographic or treatment-related characteristics were associated with change over time. Lifetime and follow-up rates were 81 and 39 for suicidal ideation, 16 and 4 for suicide attempt, and 52 and 18 for NSSI, respectively.

CONCLUSIONS: Results provide further evidence of the critical role of gender-af rming hormone therapy in reducing body dissatisfaction. Modest initial improvements in mental health were also evident.

[a]*Childrens Health Systems of Texas Dallas Texas; and* [b]*University of Texas Southwestern Medical Center Dallas Texas*

Dr Kuper oversaw data collection, conducted data analysis, and drafted the manuscript; Drs Stewart, Lau, and Lopez conceptualized and designed the study and provided feedback on manuscript drafts; Dr Preston assisted with drafting the manuscript; and all authors contributed to the development of study aims, approved the nal manuscript as submitted, and agree to be accountable for all aspects of the work.

DOI: https://doi.org/10.1542/peds.2019-3006

Accepted for publication Dec 6, 2019

Address correspondence to Laura E. Kuper, PhD, Department of Endocrinology, Childrens Health Systems of Texas, 1935 Medical District Dr, Mail Code F4.05, Dallas, TX 75235. E-mail: laura.kuper@childrens.com

WHAT S KNOWN ON THIS SUBJECT: Guidelines exist for providing gender-af rming hormone therapy (ie, puberty suppression and masculinizing or feminizing hormone therapy) to transgender youth; however, little research has been conducted on the impact of treatment on body dissatisfaction and mental health and factors that may influence this impact.

WHAT THIS STUDY ADDS: One year of receiving gender-af rming hormone therapy resulted in large reductions in youth body dissatisfaction and modest improvements in mental health. No demographic or treatment-related factors were associated with change over time.

To cite: Kuper LE, Stewart S, Preston S, et al. Body Dissatisfaction and Mental Health Outcomes of Youth on Gender-Af rming Hormone Therapy. *Pediatrics.* 2020; 145(4):e20193006

Two influential longitudinal studies from the Netherlands have helped establish guidelines for providing gender-af rming hormone therapy (ie, puberty suppression and masculinizing or feminizing hormone therapy) to transgender youth with gender dysphoria.[1,2] De Vries et al[3] conducted a prospective study with 70 youth who received puberty suppression (ie, medication to stop the progression of puberty). After 2 years, internalizing, externalizing, and depressive symptoms improved along with global functioning, but there was no improvement in body dissatisfaction or anxiety symptoms. A subset of the same cohort (n = 55) was reassessed after masculinizing or feminizing hormone therapy and gender-af rming surgery (vaginoplasty or mastectomy and hysterectomy), at which point there was a sustained improvement in global functioning and most measures of mental health. Gender dysphoria and body dissatisfaction also improved, and self-reported quality of life was similar to the Dutch population.[4] However, patients were not evaluated after masculinizing or feminizing hormone therapy alone.

In the only other longitudinal study of youth, participants seen in a gender clinic in the United Kingdom (n = 35) demonstrated improvement in clinician assessment of psychosocial functioning after 12 months of receiving puberty suppression.[5] Only 1 cross-sectional study has included a subset of transgender youth (n = 82 of 202). In comparison with those who had not started treatment, individuals who received both puberty suppression and/or masculinizing or feminizing hormone therapy as well as surgery had more favorable body image but not those who received puberty suppression and/or masculinizing or feminizing hormone therapy only.[6] Within this study, youth and adults as well as those receiving puberty suppression and/or masculinizing or feminizing hormone therapy were combined.

The bene ts of gender-af rming treatment are better described in adults. A recent review of 5 longitudinal and 2 cross-sectional studies found that receipt of masculinizing or feminizing hormone therapy alone was associated with improved depression in 5 of 7 studies, improved anxiety in 2 of 2 studies, and better quality of life in 3 of 3 studies.[7] Two studies also found lower rates of body uneasiness in adults who received masculinizing or feminizing hormone therapy alone (ie, dissatisfaction with body parts and negative body-related experiences, such as avoidance and self-monitoring).[8,9]

Understanding the impact of gender-af rming hormone therapy on the mental health of transgender youth is critical given the health disparities documented in this population. Within samples of transgender youth presenting for gender-af rming hormone therapy, estimates of clinically signi cant depressive symptoms or diagnoses have averaged in the range of 30 to 60 ,[10–13] and estimates of clinically signi cant anxiety symptoms or diagnoses have averaged in the range of 20 to 30 .[11,14–16] Lifetime history of suicidal ideation (average range 30 –50),[10,11,16] suicide attempt (average range 15 –30),[10,11,13] and nonsuicidal self-injury (NSSI) (average range 20 –40)[12,13,16] also appear common.

There is also some evidence that rates of mental health concerns may vary by gender, but no clear pattern has emerged.[11,14,15,17] Two studies have found higher levels of body dissatisfaction among af rmed females (ie, individuals assigned male at birth who identify as female) in comparison with af rmed males (ie, individuals assigned female at birth who identify as male).[6,18] Changes associated with puberty, as reflected in age and/or Tanner stage (ie, stage of puberty), may exacerbate body dissatisfaction and mental health concerns. Fewer studies have examined differences by age; however, one study found greater symptoms of depression but not anxiety among older adolescents,[16] and one study found higher levels of body dissatisfaction.[4] None have speci cally examined the impact of Tanner stage.

Our rst aim in this study was to explore how transgender youth baseline body dissatisfaction, depression, and anxiety symptoms vary on the basis of their gender, age at initial assessment, and Tanner stage at rst medical visit. Consistent with our earlier article examining differences in mental health functioning using the Child Behavior Checklist and Youth Self-Report,[14] we hypothesized that af rmed males will report greater symptoms of depression and anxiety. We also hypothesized that older age and greater Tanner stage will be associated with higher ratings of body dissatisfaction and more symptoms of depression and anxiety.

Our second aim was to examine how transgender youth body dissatisfaction, depression, and anxiety symptoms change over the rst year of receiving gender-af rming hormone therapy. We anticipated improvements in each of these domains but did not have any a priori hypotheses regarding which domains would demonstrate the greatest improvements.

Our third aim was to explore how any changes over time vary by af rmed gender, Tanner stage, age, type of treatment, months on masculinizing or feminizing hormone therapy, mental health treatment received, and whether chest (ie, "top") surgery was also obtained (among those assigned female at birth). We hypothesized that older age, greater Tanner stage,

receipt of puberty suppression only, fewer months on masculinizing or feminizing hormone therapy, and lack of chest surgery will be associated with fewer changes over time. Lastly, for descriptive purposes, we report information on lifetime and follow-up rates of suicidal ideation, suicide attempts, NSSI, and mental health treatment.

METHODS

Participants and Procedure

Participants are youth who received gender-af rming hormone therapy with a multidisciplinary program in Dallas, Texas. Before initiating care, participants and their families participated in an initial assessment with the program s psychologist, psychiatrist, and/or clinical therapist after parents completed a phone intake survey and provided a referral letter from a licensed therapist or counselor documenting the presence of gender dysphoria (this letter is no longer required). Approximately 34 of families did not follow-up after the phone intake. Initial assessments occurred between August 2014 and March 2018, with most occurring in 2017 (41) or 2016 (37). At home before this visit, participants completed self-report measures of depression, anxiety, and body dissatisfaction. During the visit, clinicians also completed a report of depressive symptoms and collected information regarding lifetime and recent suicidal ideation, suicide attempts, and NSSI as well as current participation in therapy and support groups and use of psychiatric medication(s).

After the assessment, participants were discussed by the multidisciplinary team of providers from psychology, social work, pediatric endocrinology, pediatric and adolescent gynecology, and adolescent medicine. The Endocrine Society Clinical Practice Guidelines[2] guided the initiation of hormone therapy. Chest surgery was not performed within the program, but participants were provided with referrals when requested.

Approximately 1 year after this initial assessment (range: 11–18 months), all patients were asked to participate in a yearly reassessment visit. Participants were readministered self-report measures, and clinicians again completed a report of depressive symptoms and documented information about suicidal ideation, suicide attempts, NSSI, and mental health treatment.

Survey and clinician data were entered into a research database for analysis along with demographic and treatment-related information (ie, Tanner stage at rst medical visit, treatment start and end dates, and chest surgery date extracted from physicians notes). All participants provided consent, or assent with parent consent, to allow this information to be used for research. The study was approved by the institutional review board at the University of Texas Southwestern Medical Center.

Measures

Participants were asked to self-report their gender identity (all ages) and sexual orientation (age 12 and older). These responses were recorded verbatim by the clinician and entered into the research database. Gender identities were coded into the following categories: (1) male, boy, or man; (2) male spectrum (eg, “trans masculine” or “masculine nonbinary”); (3) female, girl, or woman; (4) female spectrum (eg, “mostly female, slightly nonbinary”); and (5) nonbinary (eg, “agender” or “part girl, part boy”).

To assess body dissatisfaction, participants aged 12 years and older rated their degree of dissatisfaction with 29 areas of the body using the Body Image Scale (BIS).[19] Participants of all ages completed the Screen for Child Anxiety Related Emotional Disorders (SCARED), which produces a total score as well as subscale scores for panic-related, social, separation-related, generalized, and school avoidance–related anxiety symptoms,[20] as well as the Quick Inventory of Depressive Symptoms (QIDS)[21] to measure symptoms of depression that reflect the *Diagnostic and Statistical Manual of Mental Disorders Fifth Edition* criteria for major depressive disorder.[22] The QIDS produces a total score that can also be grouped into clinical categories: not elevated (0–5), mild (6–10), moderate (11–15), and severe (16–27). Clinicians also completed the clinician version of the QIDS. When the percentage of missing values for each total score and subscale score was 15 , missing values were imputed by using the mean of nonmissing values.

Analyses

To examine baseline differences in depression (QIDS self and clinician), anxiety (SCARED), and body dissatisfaction (BIS), bivariate correlation coef cients were rst examined by using Pearson s r for age, Spearman s for Tanner stage, and point biserial for gender. Variables with signi cant correlations were then simultaneously entered into a linear regression for each outcome, and Cohen s f^2 was calculated as a measure of effect size (0.1 = small, 0.25 = moderate, and 0.4 = large).[23]

To examine change over time, QIDS (self and clinician), SCARED, and BIS scores were rst tested for normality by using the Kolmogorov-Smirnov test. Changes in normally distributed variables were examined by using paired *t* tests, and the Wilcoxon rank test was used when the Kolmogorov-Smirnov value was signi cant. Cohen s *d* was used as a measure of effect size (0.2 = small, 0.5 = moderate, and 0.8 = large).[23] Changes

in clinical groupings on the QIDS were also examined by using the Wilcoxon rank test. For both baseline and longitudinal analyses, we planned to rst examine the SCARED total score then test for differences in subscale scores only if this change was signi cant.

To test for associations between change scores and demographic and treatment characteristics, change scores were calculated by subtracting baseline scores from follow-up scores for variables that exhibited a signi cant change over time. Bivariate correlation coef cients were then examined by using Pearson s r for age and months on feminizing or masculinizing hormone therapy, Spearman s for Tanner stage and therapy frequency, and point biserial for gender, treatment type, psychiatric medication use, support group participation, and chest surgery receipt (for those assigned female at birth). We planned to include any variables with signi cant correlations in a linear regression. *P* .01 was signi cant for all statistical tests to help account for the overall number of tests. Con dence intervals (CIs) are reported at the 95 level.

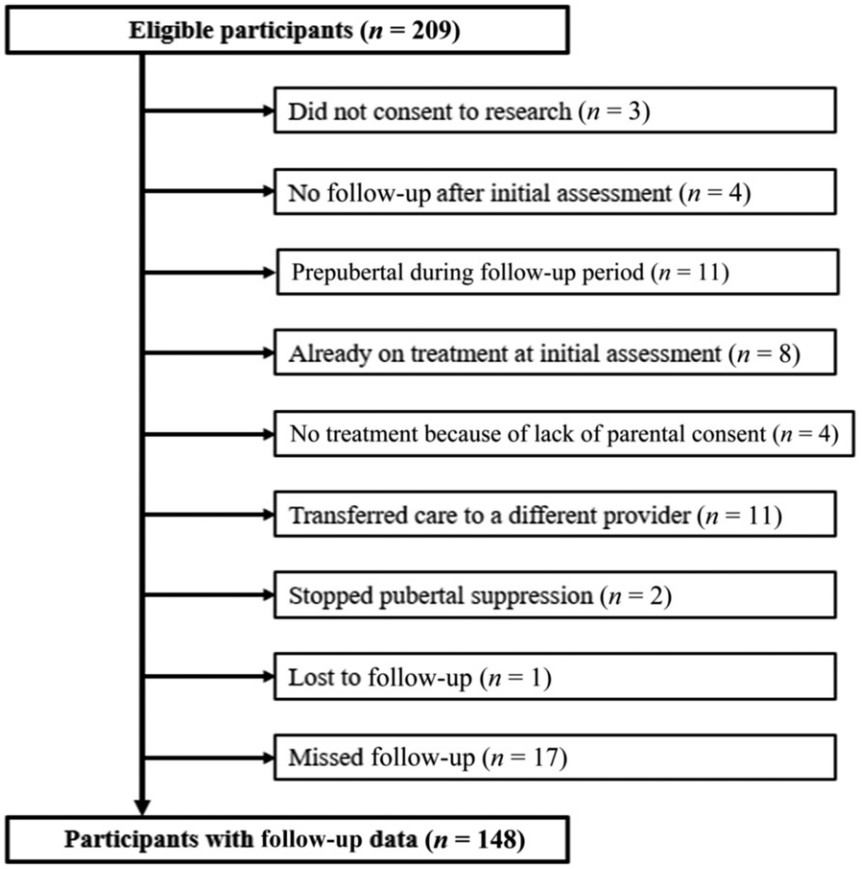

FIGURE
Flow diagram.

RESULTS

Figure 1 presents a flow diagram of participants who were due for follow-up (≥18 months since initial assessment), participants with follow-up data, and the reasons why follow-up data were not available or excluded. The mean number of months between initial assessment and reassessments was 14.9 (SD 2.1). Table 1 presents demographic information on participants. At the initial assessment, patients ranged in age from 9 to 18 years (mean 15.4; SD 2.0). All but 1 participant met *Diagnostic and Statistical Manual of Mental Disorders Fifth Edition* criteria for gender dysphoria. This participant subsequently met criteria at a follow-up visit and was started on treatment. Participants who started puberty suppression only did so at a mean age of 13.7 years (range 9.8–14.9; SD 1.5), and participants started feminizing or masculinizing hormone therapy at a mean age of 16.2 years (range 13.2–18.6; SD 1.2). For participants who were on masculinizing or feminizing hormone therapy, the mean length of time receiving treatment before follow-up was 10.9 months (range 1–18; SD 3.3). During the follow-up period, 2 participants stopped puberty suppression without starting masculinizing or feminizing hormone therapy, and no participants stopped masculinizing or feminizing hormone therapy. Fifteen af rmed males obtained chest surgery at an average age of 17.1 years (range 15.2–18.7; SD 1.2) and at an average of 9.2 months from baseline (range 3.0–16.0; SD 3.3).

Table 2 presents means, SDs, and ranges for QIDS, SCARED, and BIS scores at initial assessment and follow-up for the full sample as well as by gender and treatment type. At baseline, af rmed males had greater clinician-reported depressive symptoms (CI −3.76 to −0.81), self-reported depressive symptoms (CI −4.46 to −0.79), total anxiety symptoms (CI −14.94 to −3.99), panic symptoms (CI −5.88 to −1.78), and school avoidance symptoms (CI −1.81, to −0.36) in comparison with af rmed females. However, Cohen s f^2 effect sizes were all in the small range (0.07, 0.06, 0.09, 0.10, and 0.07, respectively). No differences were found by age or Tanner stage.

Within the full sample, a signi cant decrease in body dissatisfaction (CI

TABLE Participant Demographics

	n ( )
Gender identity	
Male, boy, or guy	81 (55)
Male spectrum	9 (6)
Female, girl, or woman	52 (35)
Female spectrum	2 (1)
Something else[a]	3 (2)
Assigned sex	
Male	55 (37)
Female	94 (63)
Sexual orientation[b]	
Pansexual	25 (20)
Straight	24 (19)
Bisexual	15 (12)
Gay	12 (10)
Unsure	12 (10)
No label	11 (9)
Asexual	10 (8)
Something else	10 (8)
Lesbian	6 (5)
Race	
White	137 (95)
African American	3 (2)
Multiracial	3 (2)
American Indian	1 (1)
Ethnicity	
Hispanic	24 (17)
Non-Hispanic	120 (83)
Tanner stage	
I	3 (2)
II	6 (4)
III	5 (4)
IV	32 (23)
V	94 (67)
Treatment type[c]	
Puberty suppression only	25 (17)
Masculinizing or femininizing therapy only	93 (63)
Both treatments	30 (20)

[a] Excluded from gender analyses.

[b] Age 12 and older.

[c] Masculinizing or feminizing therapy only and both treatments were collapsed for analysis by treatment type.

14.74 to 21.90), self-reported depressive symptoms (CI 1.24 to 2.97), and total anxiety symptoms (CI 1.05 to 6.70) was observed during the follow-up period. Decreases in generalized, separation, and school-related anxiety symptoms were signi cant at the *P* .05 level but not the *P* .01 level. No change in clinician report of depressive symptoms was found. Cohen s *d* effect sizes were large for change in BIS scores (1.04), small to moderate for change in QIDS self-report scores (0.44), and small for change in SCARED total scores (0.27). Table 3 reports the percentage of the sample that fell into each clinical category on the QIDS at initial assessment and follow-up. A signi cant change was also found in self-reported depressive symptom categories (*P* .001) but not clinician-reported categories. No correlations were found between change scores and demographic and treatment-related characteristics. Although change scores were generally higher for participants who received chest surgery, no correlations were signi cant.

Table 4 presents descriptive data on mental health treatment, and Table 5 presents data on suicidal ideation, suicide attempt, and NSSI. During the follow-up period, the distribution of therapy frequency was as follows: none (16), less than every 3 months (15), every 2 to 3 months (12), monthly (22), every other week (21), and weekly (14). Of those who experienced suicidal ideation during the follow-up period, 94 had a lifetime history. These gures were 67 for suicide attempt and 87 for NSSI.

DISCUSSION

Youth reported large improvements in body dissatisfaction during the 1-year follow-up period. The amount of improvement was not related to treatment type. These ndings are consistent with a handful of studies that have documented improvements in body dissatisfaction within samples of adults receiving feminizing or masculinizing hormone therapy[8,9] but contrast with the 2 existing studies of youth. Within the longitudinal cohort from Amsterdam, puberty suppression alone was not associated with improvements in body dissatisfaction,[3] and within a cross-sectional study with a mixed sample of youth and adults, puberty suppression and/or feminizing or masculinizing hormone therapy was not associated with more favorable body image.[6] In contrast to the Amsterdam sample, youth in the current study were younger when starting puberty suppression (age: mean 12.5 and range 9.8–14.9 versus mean 13.7 and range 11.1–17.0).

Age, puberty stage, length of time receiving feminizing or masculinizing hormone therapy, and receipt of chest surgery were also not associated with amount of improvement. However, the sample size of participants receiving puberty suppression only and chest surgery were small, and variations in months on feminizing or masculinizing hormone therapy may not have been meaningful enough in the relatively short follow-up period.

TABLE 2 Body Dissatisfaction, Depression, and Anxiety Symptoms at Baseline and Follow-up

	n	Range[a]	Baseline, Mean (SD)	Follow-up, Mean (SD)
Body dissatisfaction (BIS)		0–116		
Full sample[b]	96		69.9 (15.6)	51.7 (18.4)
Af rmed males	66		71.1 (13.4)	52.9 (16.8)
Af rmed females	30		67.5 (19.5)	49.0 (21.6)
Puberty suppression	10		64.1 (18.2)	53.8 (20.1)
Feminine or masculine hormone therapy	86		70.7 (15.2)	51.4 (18.3)
Depressive symptoms (QIDS), self report[c]		0–27		
Full sample[b]	118		9.4 (5.2)	7.3 (4.6)
Af rmed males	76		10.4 (5.0)	7.5 (4.5)
Af rmed females	40		7.5 (4.9)	6.6 (4.4)
Puberty suppression	13		8.2 (6.1)	7.0 (5.6)
Feminine or masculine hormone therapy	105		9.6 (5.0)	7.4 (4.5)
Depressive symptoms (QIDS), clinician report[c]		0–27		
Full sample	125		5.8 (4.2)	5.9 (3.9)
Af rmed males	78		6.7 (4.4)	6.2 (4.1)
Af rmed females	45		4.2 (3.2)	5.4 (3.4)
Puberty suppression	19		5.3 (4.9)	5.5 (4.8)
Feminine or masculine hormone therapy	106		5.9 (4.1)	6.0 (3.8)
Anxiety symptoms (SCARED), total score[c]		0–82		
Full sample[d]	102		32.4 (16.3)	28.6 (16.1)
Af rmed males	65		35.4 (16.5)	29.8 (15.5)
Af rmed females	33		26.4 (14.2)	24.3 (15.4)
Puberty suppression	22		31.8 (16.6)	29.3 (17.1)
Feminine or masculine hormone therapy	80		32.6 (16.3)	28.4 (15.9)
Panic symptoms (SCARED)[c]		0–26		
Full sample	104		8.2 (6.3)	7.1 (6.3)
Af rmed males	66		9.3 (6.5)	7.9 (6.5)
Af rmed females	34		5.7 (4.9)	5.1 (4.9)
Puberty suppression	22		8.7 (6.5)	7.2 (5.7)
Feminine or masculine hormone therapy	82		8.1 (6.3)	7.1 (6.5)
Generalized anxiety symptoms (SCARED)		0–18		
Full sample	104		9.7 (5.1)	8.7 (5.1)
Af rmed males	66		10.4 (5.0)	9.0 (5.1)
Af rmed females	34		8.6 (5.1)	8.0 (5.1)
Puberty suppression	22		8.5 (5.2)	8.2 (5.4)
Feminine or masculine hormone therapy	82		10.0 (5.1)	8.8 (5.0)
Social anxiety symptoms (SCARED)		0–14		
Full sample	104		8.0 (4.1)	7.6 (4.3)
Af rmed males	66		8.5 (4.0)	7.8 (4.1)
Af rmed females	34		7.1 (3.9)	6.8 (4.4)
Puberty suppression	22		6.3 (3.6)	7.3 (4.7)
Feminine or masculine hormone therapy	82		8.5 (4.1)	7.7 (4.2)
Separation anxiety symptoms (SCARED)[e]		0–16		
Full sample	103		4.0 (3.4)	3.3 (2.7)
Af rmed males	65		4.2 (3.4)	3.4 (2.6)
Af rmed females	34		3.4 (3.3)	2.7 (2.3)
Puberty suppression	22		5.8 (4.0)	4.2 (3.1)
Feminine or masculine hormone therapy	81		3.5 (3.0)	3.1 (2.5)
School avoidance symptoms (SCARED)[c]		0–8		
Full sample	102		2.6 (2.2)	2.0 (2.1)
Af rmed males	65		2.9 (2.3)	2.0 (2.3)
Af rmed females	33		1.8 (1.7)	1.9 (2.1)
Puberty suppression	22		2.6 (2.7)	2.4 (2.4)
Feminine or masculine hormone therapy	80		2.6 (2.1)	2.0 (2.0)

[a] Absolute range.

[b] Signi cant change from initial assessment to follow-up (P .001).

[c] Signi cant difference in baseline scores by gender (P .01).

[d] Signi cant change from initial assessment to follow-up (P .01).

[e] Signi cant difference in baseline scores by age (P .01).

TABLE 3 Depressive Symptoms (QIDS) Scoring Ranges

	Range	Self-Report[a]		Clinician Report	
		Baseline, *N* ( )	Follow-up, *N* ( )	Baseline, *N* ( )	Follow-up, *N* ( )
Not elevated	0–5	33 (25)	51 (40)	73 (53)	67 (49)
Mild	6–10	46 (35)	48 (37)	44 (32)	49 (36)
Moderate	11–15	29 (22)	22 (17)	15 (11)	16 (12)
Severe	16–27	24 (18)	8 (6)	5 (4)	4 (3)

[a] Signi cant change from initial assessment to follow-up (*P* .001).

Most participants (90) were also in advanced stages of puberty (Tanner stage IV or V) when presenting for care. Limitations associated with collecting data within a busy clinical setting with multiple providers also resulted in missing data. Nonetheless, results suggest that youth receiving gender-af rming hormone therapy experience meaningful short-term improvements in body dissatisfaction, and no participants discontinued feminizing or masculinizing hormone therapy. These results provide additional support for the incorporation of these treatments into the standards of care for transgender youth experiencing gender dysphoria.[1,2]

Youth also reported modest improvements in mental health functioning during the follow-up period. These results are consistent with the existing longitudinal studies of youth.[3–5] Several factors may help explain why improvements were not greater than what was observed. Although physical changes associated with feminizing or masculinizing hormone therapy often start within the rst 3 months, changes continue over the course of several years. Furthermore, environmental stressors associated with one s transgender status may not improve after hormone therapy and could potentially worsen should they increase the youth s visibility as a transgender person. Research has consistently documented higher rates of bullying among transgender youth in comparison with nontransgender youth.[24,25] Within the current study, rates of school avoidance–related anxiety did not improve over the follow-up period.

The larger political context is also important to consider. Within Texas, where the current study was conducted, a well-publicized "bathroom bill" was introduced during the study period that prohibited transgender people from using a restroom that was different from the sex on their birth certi cate, although the bill ultimately failed to pass.[26] As a whole, the mental health functioning of youth from the present clinic as well as youth from a handful of other US- and European-based clinics appears poorer than the mental health functioning of youth from the Amsterdam clinic.[11,14,17] Previous studies have attributed this difference to Amsterdam s social and political climate, which is known to be more supportive of the lesbian, gay, bisexual, and transgender population.[17]

TABLE 4 Mental Health Treatment

	At Initial Assessment, *n* ( )	Follow-up Period, *n* ( )
Psychiatric medication	67 (47)	80 (61)
Therapist or counselor	144 (97)	114 (84)
Support group[a]	60 (43)	45 (35)

[a] Participation by parents and/or youth (eg, transgender family support organization; lesbian, gay, bisexual, and transgender youth center; or school-based Gay-Straight Alliance).

Consistent with our study examining baseline differences in mental health functioning as measured by the Child Behavior Checklist and Youth Self-Report,[14] af rmed males reported greater symptoms of depression and several forms of anxiety in comparison with af rmed females. However, the effect size of these differences was smaller within the current study in comparison with the former. Differences in measurement approach may help explain the mixed ndings regarding gender differences in mental health functioning across youth clinics.[11,15,17] Although some research suggests that nonclinic samples of af rmed male youth report more experiences of bullying,[24] af rmed females are thought to experience greater stigma regarding expression of femininity. Consistent with the current sample, the sex ratio of youth presenting to clinics also appears to be shifting from more af rmed females to more af rmed males presenting for care.[27] Although causes of this shift are largely unknown, they may be associated with other shifts in clinical presentations (eg, mental health and psychosocial functioning).

CONCLUSIONS

The current study is the largest longitudinal study of youth receiving gender-af rming hormone therapy to date and documents important improvements in body dissatisfaction over the rst year of treatment. Continued longitudinal study of this

TABLE 5 Suicidal Ideation, Suicide Attempt, and NSSI

	Lifetime, *n* ( )	1–3 mo Before Initial Assessment,[a] *n* ( )	Follow-up Period, *n* ( )
Passive ideation	105 (81)	33 (25)	51 (38)
Suicide attempt	20 (15)	3 (2)	6 (5)
NSSI	68 (52)	13 (10)	23 (17)

[a] One month for passive ideation and 3 months for NSSI and suicide attempt(s).

population will increase the eld s understanding of the bene ts of gender-af rming hormone therapy and assist providers in better anticipating needs. Follow-up periods of several years or more will help document the full impact of the physical changes with feminizing or masculinizing hormone therapy, and larger sample sizes will improve the ability to examine the speci c impacts of treatment type and chest surgery. Greater consideration of intersectionality and sociocultural context will further strengthen these efforts.

ACKNOWLEDGMENT

Rong Huang, MS, provided consultation on the data analysis.

ABBREVIATIONS

BIS: Body Image Scale
CI: con dence interval
NSSI: nonsuicidal self-injury
QIDS: Quick Inventory of Depressive Symptoms
SCARED: Screen for Child Anxiety Related Emotional Disorders

PEDIATRICS (ISSN Numbers: Print, 0031-4005; Online, 1098-4275).

FINANCIAL DISCLOSURE: The authors have indicated they have no nancial relationships relevant to this article to disclose.

FUNDING: Research reported in this publication was supported by Children s Health. The content is solely the responsibility of the authors and does not necessarily represent the of cial views of Children s Health. The Research Electronic Data Capture database was funded by the Clinical and Translational Science Awards program National Insitutes of Health grant UL1-RR024982 awarded to the UT Southwestern Center For Translational Medicine.

POTENTIAL CONFLICT OF INTEREST: Dr Lopez has participated as a member of an advisory board for Endo International; the other authors have indicated they have no potential conflicts of interest to disclose.

REFERENCES

1. 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(4):165–232
2. Hembree WC, Cohen-Kettenis PT, Gooren L, et al. Endocrine treatment of gender-dysphoric/gender-incongruent persons: an endocrine society clinical practice guideline. *J Clin Endocrinol Metab*. 2017;102(11):3869–3903
3. de Vries AL, Steensma TD, Doreleijers TA, Cohen-Kettenis PT. Puberty suppression in adolescents with gender identity disorder: a prospective follow-up study. *J Sex Med*. 2011;8(8):2276–2283
4. de Vries AL, McGuire JK, Steensma TD, Wagenaar EC, Doreleijers TA, Cohen-Kettenis PT. Young adult psychological outcome after puberty suppression and gender reassignment. *Pediatrics*. 2014;134(4):696–704
5. Costa R, Dunsford M, Skagerberg E, Holt V, Carmichael P, Colizzi M. Psychological support, puberty suppression, and psychosocial functioning in adolescents with gender dysphoria. *J Sex Med*. 2015;12(11):2206–2214
6. Becker I, Auer M, Barkmann C, et al. A cross-sectional multicenter study of multidimensional body image in adolescents and adults with gender dysphoria before and after transition-related medical interventions. *Arch Sex Behav*. 2018;47(8):2335–2347
7. Rowniak S, Bolt L, Shari C. Effect of cross-sex hormones on the quality of life, depression and anxiety of transgender individuals: a quantitative systematic review. *JBI Database Syst Rev Implement Rep*. 2019;17(9):1826–1854
8. Turan Ş, Aksoy Poyraz C, Usta Saglam NG, et al. Alterations in body uneasiness, eating attitudes, and psychopathology before and after cross-sex hormonal treatment in patients with female-to-male gender dysphoria. *Arch Sex Behav*. 2018;47(8):2349–2361
9. 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(11):4260–4269
10. Olson J, Schrager SM, Belzer M, Simons LK, Clark LF. Baseline physiologic and psychosocial characteristics of transgender youth seeking care for gender dysphoria. *J Adolesc Health*. 2015;57(4):374–380
11. Reisner SL, Vetters R, Leclerc M, et al. Mental health of transgender youth in care at an adolescent urban community health center: a matched retrospective cohort study. *J Adolesc Health*. 2015;56(3):274–279
12. Spack NP, Edwards-Leeper L, Feldman HA, et al. Children and adolescents with gender identity disorder referred to

a pediatric medical center. *Pediatrics*. 2012;129(3):418–425

13. Peterson CM, Matthews A, Copps-Smith E, Conard LA. Suicidality, self harm, and body dissatisfaction in transgender adolescents and emerging adults with gender dysphoria. *Suicide Life Threat Behav*. 2017;47(4):475–482
14. Kuper LE, Mathews S, Lau M. Baseline mental health and psychosocial functioning of transgender adolescents seeking gender-af rming hormone therapy. *J Dev Behav Pediatr*. 2019; 40(8):589–596
15. de Vries AL, Doreleijers TA, Steensma TD, Cohen-Kettenis PT. Psychiatric comorbidity in gender dysphoric adolescents. *J Child Psychol Psychiatry*. 2011;52(11):1195–1202
16. Holt V, Skagerberg E, Dunsford M. Young people with features of gender dysphoria: demographics and associated dif culties. *Clin Child Psychol Psychiatry*. 2016;21(1):108–118
17. de Graaf NM, Cohen-Kettenis PT, Carmichael P, et al. Psychological functioning in adolescents referred to specialist gender identity clinics across Europe: a clinical comparison study between four clinics. *Eur Child Adolesc Psychiatry*. 2018;27(7):909–919
18. Fisher AD, Ristori J, Castellini G, et al. Psychological characteristics of Italian gender dysphoric adolescents: a case-control study. *J Endocrinol Invest*. 2017; 40(9):953–965
19. Lindgren TW, Pauly IB. A body image scale for evaluating transsexuals. *Arch Sex Behav*. 1975;4(6):639–656
20. Birmaher B, Brent DA, Chiappetta L, Bridge J, Monga S, Baugher M. Psychometric properties of the Screen for Child Anxiety Related Emotional Disorders (SCARED): a replication study. *J Am Acad Child Adolesc Psychiatry*. 1999;38(10):1230–1236
21. Rush AJ, Trivedi MH, Ibrahim HM, et al. The 16-Item Quick Inventory of Depressive Symptomatology (QIDS), clinician rating (QIDS-C), and self-report (QIDS-SR): a psychometric evaluation in patients with chronic major depression. *Biol Psychiatry*. 2003;54(5):573–583
22. American Psychiatric Association. *Diagnostic and Statistical Manual of Mental Disorders*, 5th ed. Washington, DC: American Psychiatric Association; 2013
23. Cohen J. *Statistical Power Analysis for the Behavioral Sciences*, 2nd ed. Mahwah, NJ: Lawrence Erlbaum Associates; 1988
24. Eisenberg ME, Gower AL, McMorris BJ, Rider GN, Shea G, Coleman E. Risk and protective factors in the lives of transgender/gender nonconforming adolescents. *J Adolesc Health*. 2017; 61(4):521–526
25. Clark TC, Lucassen MF, Bullen P, et al. The health and well-being of transgender high school students: results from the New Zealand adolescent health survey (Youth 12). *J Adolesc Health*. 2014;55(1):93–99
26. Wikipedia. Bathroom bill. Available at: https://en.wikipedia.org/wiki/Bathroom_bill. Accessed August 15, 2019
27. Aitken M, Steensma TD, Blanchard R, et al. Evidence for an altered sex ratio in clinic-referred adolescents with gender dysphoria. *J Sex Med*. 2015; 12(3):756–763