THE JOURNAL OF
SEXUAL MEDICINE

ORIGINAL RESEARCH & REVIEWS

TRANSGENDER HEALTH

Mental Healthcare Utilization of Transgender Youth Before and After Affirming Treatment

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ABSTRACT

Objective: Transgender and gender-diverse (TGD) adolescents experience increased mental health risk compared to cisgender peers. Limited research suggests improved outcomes following gender-affirmation. This study examined mental healthcare and psychotropic medication utilization among TGD youth compared to their siblings without gender-related diagnoses and explored utilization patterns following gender-affirming care.

Method: This retrospective cohort study used military healthcare data from 2010−2018 to identify mental healthcare diagnoses and visits, and psychotropic medication prescriptions among TGD youth who received care for gender dysphoria before age 18, and their siblings. Logistic and Poisson regression analyses compared mental health diagnosis, visits, and psychotropic prescriptions of TGD youth to their siblings, and compared healthcare utilization pre- and post-initiation of gender-affirming pharmaceuticals among TGD adolescents.

Results: 3,754 TGD adolescents and 6,603 cisgender siblings were included. TGD adolescents were more likely to have a mental health diagnosis (OR 5.45, 95% CI [4.77−6.24]), use more mental healthcare services (IRR 2.22; 95% CI [2.00−2.46]), and be prescribed more psychotropic medications (IRR = 2.57; 95% CI [2.36−2.80]) compared to siblings. The most pronounced increases in mental healthcare were for adjustment, anxiety, mood, personality, psychotic disorders, and suicidal ideation/attempted suicide. The most pronounced increased in psychotropic medication were in SNRIs, sleep medications, anti-psychotics and lithium. Among 963 TGD youth (M_{age}: 18.2) using gender-affirming pharmaceuticals, mental healthcare did not significantly change (IRR = 1.09, 95% CI [0.95−1.25]) and psychotropic medications increased (IRR = 1.67, 95% CI [1.46−1.91]) following gender-affirming pharmaceutical initiation; older age was associated with decreased care and prescriptions.

Conclusion: Results support clinical mental health screening recommendations for TGD youth. Further research is needed to elucidate the longer-term impact of medical affirmation on mental health, including family and social factors associated with the persistence and discontinuation of mental healthcare needs among TGD youth.
Hisle-Gorman E, Schvey NA, Adirim TA, et al. Mental Healthcare Utilization of Transgender Youth Before and After Affirming Treatment. J Sex Med 2021;18:1444−1454.

Key Words: Transgender; Gender-Diverse; Mental Health; Adolescent; Youth

Received December 30, 2020. Accepted May 14, 2021.

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https://doi.org/10.1016/j.jsxm.2021.05.014

BACKGROUND

Transgender and gender-diverse (TGD) youth include those whose gender identity, expression, or behavior differs from that typically associated with their sex assigned at birth.[1] An estimated 0.7−2.7 percent of adolescents identify as TGD,[2−5] and TGD individuals are increasingly presenting for associated healthcare.[1,6−10]

While TGD individuals remain under-represented in medical research,[11−13] a growing body of literature suggests significant health disparities and poorer mental and physical health among TGD individuals as compared to cisgender peers.[2,3,14−21] In adult populations, large data studies of TGD Medicare recipients and Veterans indicate TGD adults use more mental healthcare, and experience increased disability, chronic conditions, substance abuse disorders, chronic pain, suicide, suicide related events, and disabling mental illness as compared to cisgender controls.[14−18] Health outcomes appear related to environment, with Veterans living in more accepting communities having fewer substance use and mental health comorbidities.[22,23]

In studies of children and adolescents, school and internet based surveys in the United States and other parts of the world, found self-identified TGD youth were less likely to report having a caring parent, and more likely to report depression, suicide attempts, suicidal risk, violence victimization, self-harm, substance use, unsafe sex, psychological distress, and bullying as compared to cisgender peers − outcomes likely related to stigma, family rejection, and victimization.[2,3,19,20,24−29] Parents of 105 adolescents with gender dysphoria reported 32% had a concurrent psychiatric disorder, including anxiety, mood, and disruptive disorders, and that multiple diagnoses were increased in those with transfeminine identities.[30] Larger studies using records from a community-based clinic and a 2-state integrated health system compared TGD youth to cisgender controls and found that the odds of multiple mental health diagnoses were increased 2 to several fold in TGD youth.[21,31]

However, some research indicates that mental health conditions in TGD youth and adults were not elevated, or were ameliorated in those with some level of medical or social affirmation (ie, those supported to live openly in their asserted gender identity).[32−43] Limited data, primarily using small samples, and self-report measures, indicate that mental health concerns and suicidality decreased, and well-being increased, following medical or social affirmation.[32−41,61] Small studies of youth who have completed social affirmation report improvement on psychological functioning and well-being and decreased gender dysphoria, but generally results rely on parent or child-report of symptoms.[35,36] Among adults, a meta-analysis of 1,833 TGD adults indicated self-reported improvement on gender dysphoria, psychological symptoms, quality of life, and sexual function following pharmaceutical affirmation.[44] One study in adults found that length of hormone treatment was not associated with changes in healthcare utilization for mood or anxiety disorders, but time from surgery was associated with decreases in care.[41,61]

Most TGD pediatric mental health research is limited by use of self- or parent-report, small sample size, limited geographic area, and lack of a non-TGD control group. While 2 studies have explored mental health diagnoses in larger samples,[21,31] neither examined patterns in mental healthcare utilization nor psychotropic medication prescriptions, which are important indicators of the severity of mental health conditions. Research specifically exploring effects of gender-affirming care on mental health have similar limitations, with few including adolescents or young adults.[32−41,61]

Given research indicating that TGD youth may be at increased risk for mental health conditions adequately powered studies are needed to better elucidate the mental healthcare needs of TGD youth, compared to matched controls, and to identify the trajectory of mental health comorbidities following gender affirmation. The current study examined mental healthcare and psychotropic medication utilization among TGD youth in a large healthcare administrative dataset, as compared to their siblings without a gender-related diagnosis, and explored mental health and psychotropic medication use in TGD adolescents following gender-affirming pharmaceutical care. We hypothesized that mental healthcare needs would be greater in TGD adolescents as compared to their siblings and that pharmaceutical affirmation would be associated with decreased treatment needs.

METHODS

We performed a retrospective cohort study examining mental healthcare utilization among TGD youth in the military healthcare system between October 2010 and September 2018 using the Military Healthcare Data Repository (MDR). The MDR includes records of all inpatient and outpatient care and outpatient prescriptions provided to military service members and retirees, and their family members domestically and abroad at military and civilian treatment facilities. The military provides no- to low-cost comprehensive care to these populations, including mental health and media (eg, pharmaceutical) care for gender dysphoria; active-duty members may also qualify for related surgical care. Access to care for gender dysphoria my differ geographically, however, the military attempts to address disparities through telemedicine and flying beneficiaries stationed overseas back to the United States, if needed, for specialized consultations. While generally reflective of the United States as a whole, the military tends to be more politically conservative, and more male, the proportion of African American individuals in the military is decreased, and the proportion of White individuals is increased as compared to the nation as a whole.[45]

TGD military dependent youth, <18 years of age at time of first contact, who received care in the military healthcare system were identified by 1 or more International Classification of Diseases (ICD) code (ICD-9 302.6, 302.85 302.50, 302.51, 302.52, 302.53, and ICD-10 F64.0, F64.1, F64.2, F64.8, F64.9, Z87.890) indicative of TGD status in their inpatient or outpatient record. This is a validated methodology.[8] ICD-9/10

codes are well-matched with clinical text notes in identification of TGD individuals.[46] We identified sibling controls in the MRD using the following criteria: shared a military sponsor (parent/guardian) with our TGD subjects; were <18 years old at their first encounter with the military health system during our study interval: and had no TGD diagnosis recorded, these siblings were considered cisgender controls, TDG youth and sibling were followed for the same time periods as care depended upon parental service.

We identified mental health care visits in the inpatient and outpatient care record by ICD-9/10 code using the Healthcare Cost and Utilization Project Clinical Classification Software system.[47] Mental health visits were sub-categorized by Healthcare Cost and Utilization Project categories for adjustment, anxiety, attention-deficit, conduct, developmental, mood, and cognitive disorders; disorders usually diagnosed in infancy or childhood (which includes autism), suicidal ideation/self-harm; alcohol use, substance use disorders; and miscellaneous mental health conditions (dissociative, eating and factitious disorders). The total number of mental health visits were counted overall, and by diagnosis sub-category; individuals were counted as having a given diagnosis if they had 1 or more visit for the diagnosis. Visits for TGD status, gender dysphoria, or mental health screening were not counted as mental health diagnoses. Children with one or more diagnosis for a mental health condition sub-category were categorized as having that mental health condition and having a mental health condition overall.

Psychotropic medications were identified by name in the outpatient pharmacy record, and included Bupropion, Selective Serotonin Reuptake Inhibitors (SSRI), Serotonin-Norepinephrine Reuptake Inhibitors (SNRI), other anti-depressants, sleep medication, benzodiazepines, antipsychotics, simulants, migraine medications, and lithium. Medications were classified by type and counted by day's supply. Gender affirming medications included puberty suppression (ie, implantable or injectable gonadotropin-releasing hormone agonists), masculinizing hormones and feminizing hormones, and were identified by name in the outpatient pharmacy record. Demographic data were extracted from the medical record and healthcare enrollment eligibility records; race/ethnicity data was not available.

Chi-squared analysis and Wilcoxon Rank sum test compared groups on demographics, logistic regression clustered by family compared groups on mental health diagnosis, and any psychotropic medication use overall and care/medication sub-category, and Poisson regression clustered by family compared mental healthcare visit rates and psychotropic medication days. Adjusted analyses controlled for sex assigned at birth, total healthcare contacts per year, age at study initiation, and parental rank. Parental rank was dichotomized as Junior Enlisted (enlisted ranks 1−4) vs more senior military ranks; Junior enlisted acted as a proxy for low income as Junior enlisted service member earn less than $35,000 a year.

Poisson regression clustered by individual compared mental healthcare visit rates and psychotropic medication days pre- and post- initiation of gender affirming pharmaceutical treatment, and logistic regression identified factors associated with decreased mental healthcare use and decreased psychotropic medications following initiation of gender-affirming medications. Adjusted models controlled for sex assigned at birth, total healthcare contacts per year, age at affirming medication initiation, type of initial gender affirming medication (puberty suppression vs gender-affirming hormones), and parental rank. Analyses were conducted using Stata Intercooled, version 13; P values <.05 was considered statistically significant. The study was reviewed and approved by the Uniformed Services University Institutional Review Board.

RESULTS

The research team identified a total of 3,754 TGD youths and 6,603 cisgender siblings who received Military Health System care between fiscal years 2010 and 2018. Both groups were tracked for a mean of 8.5 years. TGD youth were slightly older, less likely to be assigned male at birth, less likely to have Junior Enlisted parents, and utilized more outpatient healthcare overall as compared to their cisgender siblings (Table 1).

Mental Health Diagnosis

As compared to their cisgender siblings, TGD youth were more likely to have a mental health diagnosis and have a greater number of total mental health diagnoses (Table 1, 2). Looking at specific

Table 1. Demographics of included transgender and gender-diverse youth and their cisgender siblings

	TGD children N = 3,754	Cisgender siblings N = 6,603	Significance
Age at Study Initiation— Median [IQR]	10 [8-−13]	9 [4−14]	$P < .001$
Age at Study Completion— Median [IQR]	18 [16−21]	17 [11−21]	$P < .001$
Male Assigned Birth Sex	1,193 (31.8%)	3,312 (50.1%)	$P < .001$
Parent of Jr Enlisted Rank	1,524 (43.7%)	2960 (47.6%)	$P < .001$
Visits Per Year — Median [IQR]	18.7 [10.0−32.9]	9.5 [4.6−18.9]	$P < .001$
On psychotropic	2,820 (75.1%)	2,425 (37.7%)	$P < .001$
Years Tracked	8.5 [8.5−8.6]	8.5 [8.5−8.5]	$P < .001$
Median Mental Health Diagnoses	2 [1−4]	1 [0−2]	$P < .001$
Median Mental Health Visits Per Year	2.9 [0.8−7.0]	0.1 [0−2.0]	$P < .001$

TGD = transgender or gender-diverse.

Table 2. Mental health diagnoses and visits by transgender and gender-diverse status

	Mental health diagnosis			Visits per year		
	TGD Children N (%)	Cisgender Siblings N (%)	Adjusted* odds of mental health diagnosis or [95%CI]	TGD	Cisgender siblings	Adjusted* visit rate IRR [95%CI]
All Mental Health	3,352 (89.3)	3,308 (50.1)	5.45 [4.77–6.24]	5.5	3.1	2.22 [2.00–2.46]
Adjustment	1,687 (44.9)	1,191 (18.0)	1.09 [1.80–3.41]	0.74	0.29	2.49 [2.19–2.84]
Anxiety	1,908 (50.8)	1,216 (18.4)	3.30 [2.98–3.65]	0.77	0.28	2.49 [2.13–2.90]
ADHD	1,119 (29.8)	1,229 (18.6)	1.77 [1.59–1.97]	0.60	0.47	1.60 [1.37–1.88]
Cognitive	137 (3.7)	122 (1.9)	1.64 [1.26–2.14]	0.014	0.008	2.01 [1.39–2.89]
Developmental	189 (5.0)	429 (6.5)	1.11 [0.89–1.38]	0.10	0.30	0.97 [0.65–1.45]
First Diagnosed in Infancy	432 (11.5)	578 (8.8)	1.53 [1.30–1.79]	0.65	1.24	1.39 [0.86–2.26]
Impulse	60 (1.6)	45 (0.7)	2.18 [1.40–3.38]	0.013	0.009	1.55 [0.68–3.58]
Mood	2,413 (64.3)	1182 (18.9)	6.12 [5.51–6.80]	2.18	0.46	4.14 [3.64–4.71]
Personality	86 (2.3)	43 (0.7)	2.54 [1.71–3.78]	0.019	0.005	3.28 [1.53–7.00]
Psychotic	363 (9.7)	104 (1.6)	5.38 [4.20–6.88]	0.12	0.014	7.43 [4.72-–11.69]
Alcohol	57 (1.5)	66 (1.0)	1.25 [0.85–1.82]	0.011	0.010	0.93 [0.50–1.73]
Substance	237 (6.3)	209 (3.2)	1.61 [1.31–1.97]	0.053	0.032	1.77 [1.15–2.70]
Suicide	683 (18.2)	162 (2.5)	7.45 [6.11–9.08]	0.08	0.01	6.83 [5.03–9.26]
Miscellaneous	512 (13.6)	375 (5.7)	2.08 [1.77–2.45]	0.12	0.03	3.38 [2.20–5.18]

*Adjusted analysis, adjusts for sex assigned at birth, total healthcare contacts per year, age at study initiation, and parental rank.TGD = transgender or gender-diverse.

one-year periods, which is a more typical time period in which to access mental health diagnoses, TGD youth were more likely than their siblings to have a mental health diagnosis in a given year (eg, in 2010 [23.7% vs 13.9%, $P < .001$], 2015 [46.5% vs 18.8%, $P < .001$] and 2018 [42.7% vs 17.1%, $P < .001$]). The most common mental health diagnosis in TGD youth was mood/depressive disorder which impacted 64% of TGD youth at some point during the 8-year study period; followed by anxiety (51%) and adjustment disorders (44.9%; Table 2). For cisgender siblings, the most common mental health diagnoses were mood/depressive disorders (18.9%), ADHD (18.6%), and anxiety disorders (18.4%). After adjustment for age at study initiation, assigned sex at birth, parent rank, and number of outpatient visits per year, odds of having any mental health diagnosis were over 5 times higher in TGD youth as compared to their siblings (aOR = 5.45, 95% CI [4.77–6.24], $P < .001$). TGD youth were over 7 times as likely to have diagnosed suicidal ideation/self-harm (OR 7.45, 95%CI 6.11–9.08), over 6 times as likely to have a mood/depressive disorder (OR 6.12 95%CI [5.51–6.80]), over 5 times as likely to have a psychotic disorder (eg, schizophrenia) diagnosed (OR 5.38 95% CI [4.20–6.88]); and had similar odds of diagnosed developmental and alcohol use disorders (Table 2).

Mental Healthcare Use

TGD youth had an average of 5.5 mental healthcare visits per year over the course of the study as compared to 3.1 mental health visits per year for their cisgender siblings, and over twice as many visits in adjusted analysis (aIRR 2.22; 95% CI [2.00–2.46], $P < .001$). Mirroring diagnoses, mental healthcare visits for TGD youth were largely for mood/depressive, anxiety and adjustment disorders; however, care for cognitive, mood/depressive, personality, psychotic, and miscellaneous disorders, ADHD, substance use, and suicidal ideation/self-harm were all greater among TGD youth as compared to their siblings (Table 2). The most common diagnoses among siblings were disorders diagnosed in infancy and childhood, ADHD, and mood/depressive disorders. Care for development diagnoses, disorders usually diagnosed in infancy and childhood, impulse control disorder and alcohol use did not differ between the 2 groups (Table 2).

Psychotropic Medication Use

Over the full study period, 75% (2,820) of TGD youth were prescribed a psychotropic medication as compared to 38% (2,425) of their cisgender siblings ($P < .001$; Table 1). In adjusted analysis, TGD youth had over 2 and a half times as many medication days as their siblings (aIRR = 2.57; 95% CI [2.36–2.80], $P < .001$). SSRIs accounted for the most medication days in TGD youth, resulting in close to 3 times as many medication days for TGD youth; followed by stimulants, and antipsychotics. For siblings, stimulants accounted for the largest number of medication days followed by SSRIs, and anti-psychotics. In adjusted analyses TGD youth had over 3 times as many medication days for SNRIs, Lithium, anti-psychotics, and sleep medications as compared to their cisgender siblings (Table 3).

Impact of Gender Affirming Pharmaceutical Treatment

Of 3,754 included TGD youth, 963 (25.6%) initiated gender-affirming pharmaceutical treatment (puberty suppression or gender-affirming hormones) during the study period. The 963

Table 3. Psychotropic medication days by transgender and gender-diverse status

	Medication days per year		
	TGD children	Cisgender siblings	Adjusted† IRR [95% CI]
All Mental Health Meds	111.4	42.5	2.57 [2.36–2.80]
Wellbutrin	5.38	1.57	2.76 [2.12–3.60]
SSRI	37.25	11.18	2.96 [2.65–3.31]
SNRI	4.10	0.96	3.82 [2.64–5.54]
Other Antidepressant	7.93	2.50	3.01 [2.48–3.66]
Sleep Medications	5.82	1.61	3.28 [2.61–4.12]
Benzodiazepines	3.01	1.14	2.56 [1.85–3.56]
Anti-Psychotics	18.24	5.88	3.39 [2.83–4.07]
Stimulants	26.89	19.52	1.57 [1.39–1.77]
Migraine Medications*	0.92	0.42	1.69 [1.27–2.26]
Lithium	1.68	0.48	3.64 [2.02–6.55]

*Migraine Medications – Triptan.
†Adjusted analysis, adjusts for sex assigned at birth, total healthcare contacts per year, age at study initiation, and parental rank.TGD = transgender or gender-diverse.

pharmaceutically treated youth were tracked for a mean of 7.1 [IQR 5.5–7.8] years prior to pharmaceutical treatment initiation, and 1.5 [IQR 0.8–2.8] years following initiation of gender-affirming treatment. The median age of initiation of affirming medication was 18.2 [IQR 16.6–19.8] years, and the first gender affirming medications were: masculinizing hormones (61.4%, n = 591), feminizing hormones (28.7%, n = 276), and puberty suppression (10.0%, n = 96; Table 4). The median number of mental healthcare visits per years declined after starting gender affirming hormones (3.5 [IQR 1.2–7.5] vs 1.5 [0–7.8], Table 4). However, in adjusted Poisson regression analysis mental healthcare visits overall did not significantly change following gender-affirming pharmaceutical care (aIRR = 1.09, 95% CI [0.95–1.25], $P < .60$; 5.5 before vs 6.1 after) nor did care for most specific mental health diagnoses (Table 5). Of the youths who received gender-affirming pharmaceutical care, the majority (89%, n = 857) also used a psychotropic medication during the study period. Psychotropic medication use increased from mean of 120 days per year to a mean 212 days per year following gender affirming pharmaceutical care (aIRR = 1.67, 95%CI [1.46–1.91], $P < .001$]); medication use was increased in all classes explored except stimulants, migraine medications and lithium.

Factors Associated with Decreased Post-Affirming Mental Healthcare

Of youths receiving gender-affirming pharmaceutical care, 66.7% (642) had fewer mental healthcare visits following treatment. Decreased mental healthcare following gender-affirming care was associated with older age of medication initiation (aOR = 1.10, 95% CI [1.04–1.16]), and fewer overall visits per year over the study period (aOR = 0.99, 95%CI [0.99–0.99]), but was not associated with affirming medication type, sex assigned at birth, or parental rank. The median age of gender-affirming medication initiation of those with less mental healthcare use after initiation was 18.4 [IQR 17.0–19.8], and of those

Table 4. Demographics of 963 transgender and gender-diverse youth who initiated gender-affirming pharmaceutical treatment*

	TGD children N = 963		
	Before	After	*P*
Years Followed - Median	7.1 [5.6–7.9]	1.5 [0.7-2.7]	<.001
Mental Health Visits Per Year – Median [IQR]	3.5 [1.2–7.5]	1.5 [0-7.8]	<.001
Psychotropic Medication Days – Median [IQR]	69[17–157]	104[0-365]	.054
Fewer Mental Health Visits following Treatment	642 (66.7%)		
Fewer Medication Days Following Treatment	384 (44.8%)		
Age of First Affirming Medication	18.2 [16.6–19.8]		
First Medication Puberty Suppressant	96 (7.2%)		
First Medication Feminizing Hormone	276 (28.7%)		
First Medication Masculinizing Hormone	591 (61.4%)		
Male Sex Assigned at Birth	300 (31.2%)		
Parent of Jr Enlisted Rank	325 (33.8%)		
First Study Age – Median [IQR]	12 [10–14]		
Total Visits Per Year - Median[IQR]	48.9 [30.3–77.6]		

*Pharmaceutical treatment includes puberty suppression and gender-affirming hormonal therapy.TGD = transgender or gender-diverse.

Table 5. Transgender and gender-diverse youth mental healthcare and psychotropic medication use following initiation of gender affirming pharmaceutical treatment as compared to before initiation

	Mental healthcare visits (N = 963)		
	Crude rate of visits per year		Adjusted* IRR [95% CI]
	Before	After	
All Mental Health Visits	5.50	6.10	1.04 [0.90-–1.20]
Adjustment	0.94	0.83	0.89 [0.67–-1.18]
Anxiety	0.98	1.04	1.07 [0.84–1.35]
ADHD	0.50	0.20	0.40 [0.27–-0.58]
Cognitive	0.02	0.02	0.83 [0.40–1.75]
Developmental	0.03	0.01	0.35 [0.16–0.78]
Infancy	0.37	0.53	1.02 [0.41–2.54]
Impulse	0.001	0.01	0.10 [0.02–0.53]
Mood	2.90	2.33	1.12 [0.94–1.35]
Personality	0.02	0.03	1.40 [0.44–-4.39]
Psychotic	0.13	0.16	0.99 [0.48–2.06]
Alcohol Abuse	0.13	0.06	0.66 [0.15–2.87]
Substance Abuse	0.05	0.12	1.39 [0.68–2.85]
Suicide	0.07	0.12	1.74 [1.18–2.56]
Miscellaneous	0.09	0.19	1.45 [0.56–3.60]

	Medication days (N = 857)		
	Crude rate of medication days per year		Adjusted* IRR [95% CI]
	Before	After	
All Mental Health Meds	119.7	211.5	1.67 [1.46–1.91]
Wellbutrin	6.3	16.2	2.51 [2.71–3.69]
SSRI	44.8	73.9	1.72 [1.47–2.00]
SNRI	4.7	14.0	2.59 [1.52–4.38]
Other Antidepressant	9.2	18.9	1.61 [1.18–2.21]
Sleep Medications	6.4	16.2	2.23 [1.61–3.10]
Benzodiazepines	3.0	12.7	3.01 [1.95–4.65]
Anti-Psychotics	15.9	30.1	1.77 [1.34–2.35]
Stimulants	26.4	25.1	0.96 [0.72–1.26]
Migraine Medications	1.5	2.2	0.76 [0.37–1.53]
Lithium	1.3	2.3	1.11 [0.48–2.59]

*Adjusted analysis, adjusts for sex assigned at birth, total healthcare contacts per year, age at affirming medication initiation, and parental rank.

with more care was 17.9 [IQR 16.0–19.5]. Of included youth, 384 (44.8%) had decreased psychotropic medication prescription days following gender affirming pharmaceutical treatment. Decreased psychotropic medication use following gender affirming pharmaceutical treatment was associated with older age at time of affirming medication initiation (aOR = 1.09, 95% CI [1.03–1.16]) and male sex assigned at birth (aOR = 1.60 95% CI [1.18–2.17]).

DISCUSSION

Using a considerably larger population than previous studies, this research study found that TGD youth had greater mental healthcare use as compared to their cisgender siblings, with TGD youth more likely to have a mental health diagnosis, have multiple mental health diagnoses, use increased mental healthcare services, be prescribed a psychotropic medication, and use psychotropic medications for an increased number of days. For those TGD adolescents who initiated gender-affirming pharmaceutical care, mental healthcare and psychotropic medication needs were not reduced in the period following initiation after adjusting for confounders. Findings support previous research on a larger scale, control for family factors by comparing TGD youth to siblings, include psychotropic medication use as an additional mental health indicator, and document mental healthcare use rates as both an indicator of mental health severity and healthcare service need.

Over the 8.5-year course of the study's inclusion period, close to 90% of TGD youth had a mental health diagnosis, as compared to 50% of their cisgender siblings. For both TGD and cisgender youth, findings are higher than previously reported rates,[30,48] which likely relate to the study's extensive time period.

The median age of gender-affirming pharmaceutical treatment initiation was 18.2 years in this study which is substantially older than previous self- and parent-report studies of the initiation of medical and social transition (range 3−16 years).[32-37] Eighteen is the age at which youth can make their own medical choices; the fact that over half of included youth initiated gender-affirming pharmaceutical care after age 18 may suggest a lack of parental support or involvement in gender-affirming care among this study population. A lack of parental support may increase the need for new or ongoing mental health and/or psychotropic medication use which may also explain part of the increased rates of mental health diagnoses in our population. Yearly data from our study indicating that 23.7% to 46.5% of TGD youth had a mental health diagnosis in a given year is consistent with parental reports of mental health diagnoses in TGD youth at a given point in time.[29] Similarly, the yearly rate of mental health diagnoses among siblings (13.9%−18.8%) is comparable to published estimates.[48−50]

Findings of our study are consistent with adolescent and parent survey research, indicating that TGD youth have increased self- or parent-reported depression, suicide attempts/ideation, self-harm, substance use, and, emotional distress as compared to peers.[2,3,19,20,30] Results are also similar to large data research on adolescents and adults using clinic, healthcare provider, Medicaid, and veterans administration data which found increased mental health diagnoses in TGD individuals as compared to cisgender controls.[14,15,17,18,21,31] Our findings support current clinical recommendations to screen TGD youth for mental health concerns and address the underlying factors that increase risk in this population, and also suggest the importance of emphasizing mental health screening in future clinical recommendations.[51,52]

It is unclear why TGD youth were more likely to be diagnosed with psychotic conditions than their cisgender siblings, bur our findings are consistent with limited previous research in youth and adults.[31,52] Results may relate to lack of affirming care leading to depression with psychotic features.[53] Observed rates of increased provision of anti-psychotic medications among TGD youth may also be due to low dose prescriptions as an adjunct treatment for conditions such as severe depression and insomnia. The possible link between psychosis and TGD status warrants further exploration with well-validated psychiatric interviews.

While adjustment disorder, ADHD, cognitive, impulse control, personality, and miscellaneous diagnoses, substance use disorder, and conditions diagnosed in infancy or childhood (which includes autism) were significantly greater among TGD youth, differences were less pronounced. The finding of increased odds of conditions diagnosed in infancy and childhood, which includes autism, is consistent with previous research indicating increased odds of autism in TGD children and youth.[54,55] Developmental disorders and alcohol use disorders were not significantly increased among TGD youth.

Findings of increased psychotropic medication use (75% vs 38%) and medication days (111 vs 43 days per year) in TGD youth as compared to cisgender siblings are novel and corroborate prior studies indicating increased mental health needs in TGD youth.[2,3,14,15,17−21,30,31] Results are also consistent with findings that TGD adults were over 3 times as likely to use an antidepressant and/or anxiolytic,[41,61] but the current study is the first to examine psychotropic medications in youth, and include multiple medication classes. Consistent with increased care for anxiety, mood, and psychotic disorders; SSRIs, SNRIs, other antidepressants, Lithium, and anti-psychotics were all significantly increased in TGD youth (Table 3). TGD youth also had over 3 times as many sleep medication days as their cisgender siblings, results are consistent with research indicating a link between poor sleep duration/quality and depression/poor psychological well-being,[56,57] and suggests that screening for sleep concerns may be indicated in TGD care.

This study is among the first to analyze the associations of gender-affirming pharmaceutical treatment with mental health care patterns among TGD youth. Findings indicated that mental healthcare visits were not significantly changed and psychotropic medication use rose following gender-affirming pharmaceutical treatment after adjusting for potential confounders. Results are not consistent with adult and adolescent self-report survey research indicating improvements in mental health symptoms following gender-affirming care.[11,35−37,40,44] However, findings are consistent with one 10 year study which found visits for anxiety and mood disorders, and suicide attempt hospitalizations did not decrease following gender-affirming pharmaceutical care, but did decrease some following gender affirming surgery.[41,61] Findings that mental healthcare and psychotropic medications did not decrease after gender affirming care may be related to a number of factors. The median period following gender-affirming pharmaceutical care in the current study was relatively short (ie, 1.5 years), making it difficult to ascertain if the lack of a change in care patterns was related to continuing mental health problems, or represents the delivery of responsible mental healthcare that maintains a therapeutic relationship through a substantial life transition. Similarly, the period before initiation of gender affirming care was 7.1 years, making it possible that mental healthcare during the earlier portion of this period is not reflective of mental healthcare use patterns of youth with gender dysphoria, artificially deflating the rate of care in the period before gender affirming pharmaceutical care. Patients also age during the pretreatment period and mental health utilization may increase over time irrespective of gender affirming care.

Also, the sample in this study may differ from samples previously recruited from specialty transgender clinics. Military connected families are generally more conservative,[58] which may relate to the relatively low percentage receiving puberty blockers, and relatively older age of starting gender affirming pharmaceutical care. Military connected children and youth also have free mental healthcare and psychiatric medications through the age of 23, which may lower barriers to continued engagement in treatment of mental health conditions after gender transition. This

care would allow patients and clinicians to thoroughly address and treat all identified issues irrespective of gender-affirming treatment status, and maintain engagement in ongoing care even as symptoms begin to remit.[59]

The impact of access to high quality no-or low-cost mental healthcare available to the study population may impact mental healthcare and psychotropic medication trends, making results potentially less generalizable for adolescents and young adults in the United States. Although adults in the United States report some of the highest rates of mental health conditions, access to mental healthcare in the United States is reduced as compared to other high-income countries.[60]

Older age and fewer yearly visits were associated with decreased post-affirmation mental healthcare, and older age and male sex at birth were associated with decreased post-affirmation psychotropic medication prescriptions. Findings that older age was associated with decreased mental health and psychotropic care may suggest that parents were involved in scheduling and seeking mental healthcare and psychotropic medications for their younger children. Conversely, older youth who make their own medication decisions may have difficulties in scheduling care, or decide to reduce care they do not deem necessary. Alternatively, patients with higher levels of distress or engagement with mental health providers may be more likely to have parents that acknowledge their distress and consent for treatment.

Strengths of this study include the very large sample size, inclusion of data on psychiatric diagnoses, mental healthcare visits, and psychotropic medication use to assess mental health disparities, the extensive study period, the assessment of mental health care utilization following gender affirmation treatment, and the use of sibling controls. A sibling study group controls for household healthcare use, threshold for accessing mental healthcare, and gender socialization experience, but does not account for all differences between individuals. This study is limited by the use of healthcare data in the form of ICD-9/10 codes which cannot indicate the severity of diagnoses or the full breadth of complex TGD identities; however, the use of multiple indicators of mental health burden does mitigate this concern. The study is also limited by the short duration of care following gender-affirming pharmaceutical treatment, which may be insufficient to observe any clinically significant change. We were also unable to control for differing, regional, family level, and care provider acceptance, however within the military access to specialists can occur when requested. We also didn't distinguish puberty suppression from testosterone/estrogens as we were interested in pharmaceuticals as an indicator of treatment progression; however, it is possible that there are differences in outcomes for the 2 groups. Furthermore, the effect of affirming medical care may be confounded by increasing mental health disparities as TGD youth age (eg, due to increasing minority stress). Finally, results may have limited generalizability as military dependent youth face additional stressors, such as multiple moves and parental deployment, and benefit from high-quality free military healthcare until age 21 (or age 23 if in college), thereby potentially affecting post-affirming healthcare use patterns. The military population included in this study is likely substantially different than previous research which generally recruited youth from specialized TGD care clinics (which signals parental and family support). Available data did not allow for study of important intersections between cultural and ethnic factors which may predict outcomes such as healthcare utilization. While many adolescents included in this study received care for GD prior to age 18, many did not, and pharmaceutical affirmation was initiated after age 18 for over 50% of include youth. Therefore, results of this study may be more representative of the national population of TGD youth, some of whom receive parental support and some of whom self-report a lack of parental and family support, than the specialty clinic population used in many previous studies.

CONCLUSIONS

TGD youth have considerably greater mental health diagnoses, care, and psychotropic medication use across a range of diagnoses, as compared to their cisgender siblings. Results strongly support clinical recommendations for screening of mental health conditions in TGD youth and availability of healthcare for those in need. Additional research is needed to determine the long-term impact of gender-affirming care on psychiatric co-morbidities among TGD youth and young adults. While the need for mental health treatment appears to persist after the initiation of gender-affirming pharmaceutical treatment, longer term follow-up and care-specific analysis is needed to accurately understand changing care needs over time. Results may have policy implications as some states are currently considering limiting gender affirming care to adolescents.

DISCLAIMER

The contents of this article are solely the responsibility of the authors and do not necessarily represent the official views of the Uniformed Services University, the U.S. Air Force, the U.S. Navy, the U.S. Department of Defense, or the U.S. Government.

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Conflict of Interest: The authors report no competing interests.

Funding: None.

Parts of this research were presented at the annual meeting for the Society of Adolescent Health and Medicine (virtual) in March 2020.

STATEMENT OF AUTHORSHIP

Dr. Hisle-Gorman was responsible for conception and design of the study, analysis, and interpretation of results, drafting the article, and final approval of the paper.

Dr. Schvey was responsible for obtaining permission for data acquisition, assisting with the analysis plan, and revising the manuscript for intellectual content, and final approval of the paper.

Dr. Adirim was responsible for assisting with interpretation of results, revising the paper for critical content and final approval of the paper.

Dr. Rayne was responsible for helping to draft the paper, and approval of the final paper

Ms. Susi was responsible for acquisition of the data, and initial cleaning and analysis, revisiting the paper critically and approval of the final paper to be submitted.

Dr. Roberts was responsible for assisting with conception and design of the study, revising it critically for important intellectual content and approval of the final version to be submitted.

Dr. Klein was responsible for assisting with conception and design of the study, interpretation of results, revising the paper critically for important intellectual content, and final approval of the paper.

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