

Gender dysphoria in children and adolescents: A retrospective analysis of cases in Singapore

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ABSTRACT

Introduction: The understanding of gender dysphoria (GD) in children and adolescents is limited in Singapore. This study aims to review the presentation of GD in an outpatient psychiatric clinic, to gain insights into its prevalence and associated factors.

Method: We conducted a retrospective review of medical records for patients diagnosed with GD according to criteria from the Diagnostic and Statistical Manual of Mental Disorders, Fourth and Fifth editions, at the clinic between 1 January 2017 and 31 December 2021. We collected and analysed demographic, medical and other GD-specific clinical variables.

Results: The study included 107 participants (mean age 16.6 years), comprising 47 natal males and 60 natal females. The prevalence of GD was found to be 1:5434 (0.019%). Incidence rates increased from 2.17 to 5.85 per 100,000 population between 2017 and 2021. The mean age of diagnosis was 15.6 years, with an average delay of 5 years between experiencing gender identity-related concerns and seeking formal assistance. Approximately 45% of participants reported social and physical transitions, and 20.6% reported self-harm or suicidal thoughts.

Conclusion: The study highlights the presentation of GD in an under-researched Asian setting. Supporting individuals with GD in Asia requires sensitivity to cultural and societal factors with a holistic approach to individual well-being.

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Keywords: children and adolescents, gender dysphoria, gender identity

CLINICAL IMPACT

What is New

- The study examines the presentation of gender dysphoria (GD) in children and adolescents at an outpatient psychiatric clinic in Singapore across 5 years.
- There was an increase in new GD diagnoses being made at younger ages which may suggest greater self-awareness and willingness to seek help among younger individuals.

Clinical Implications

- Our findings emphasise the significant distress experienced by children and adolescents with GD, underscoring the need for tailored interventions and support.
- The study provides valuable insights to guide the development of practice guidelines and clinical strategies aimed at enhancing the well-being of this population.

INTRODUCTION

The understanding of gender dysphoria (GD) has evolved significantly, from early connotations of sexual orientation and gender identity to its recognition as a distinct condition characterised by gender incongruence. GD is now classified in the Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (DSM-5).¹ GD is currently defined as

the discomfort with one's sex-relevant physical characteristics or with one's assigned gender at birth.¹ Western studies estimate the prevalence of GD to range from 0.002% to 0.7%,^{1,2} while Asian studies report a range from 0.0015% to 0.92%.^{2,3,4} These rates can vary based on study methodologies, sample populations and the sociocultural context of the region.^{1,2} In more conservative Asian cultures, the diagnosis may still carry stigma, potentially causing delays in identification and increased risks.

Studies on gender dysphoria in the Asian context are limited. In Singapore, early research estimated a prevalence of up to 35.2 per 100,000 (0.035%),⁵ though this likely reflects sampling bias, as it only included individuals who sought services at the country's only provider for gender-affirming surgery. Transgender males were found to be slightly

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younger, with lower educational levels and employment⁶ compared to female counterparts.⁷ Crossdressing, parent–child relationship issues and early childhood onset were also reported.⁸ Follow-up studies of individuals who underwent sex reassignment surgery reported positive post-operative adjustments among transgender males,⁹ where only 65% of transgender females were satisfied post-surgery, and 59% reported they would opt for the surgery again if given the choice. With advancements in medicine, policy changes and shifts in service availability, these earlier findings may not accurately represent the current situation. However, no official estimate of present-day prevalence exists, underscoring the need for more research in the Singapore population.

Psychiatric services addressing gender-related issues began with the establishment of the psychiatric ward at Singapore General Hospital (SGH) in 1979. The National University Hospital (NUH) operated a gender identity clinic from the early 2000s until 2008. In 2017, the Institute of Mental Health (IMH) launched a gender care programme that concluded in 2022. Currently, individuals in Singapore must be at least 18 years old or have parental consent if under 21 years old to receive hormonal treatment. In addition to public healthcare services, support can be sought from social services or private agencies. Ongoing efforts to develop clinical practice guidelines for GD highlight the importance of updated insights into the condition within Singapore. GD in Singapore remains poorly investigated. Hence, this study aims to profile young individuals presenting with GD at the Child Guidance Clinic, IMH; estimate the prevalence and incidence of GD based on clinical attendance; and examine the trajectories and outcomes of these individuals over time to better understand factors influencing the onset and presentation of GD.

METHOD

Study design and participants

We retrospectively reviewed the medical records of 107 patients with an existing GD diagnosis at the outpatient psychiatric clinic over a 5-year period between 1 January 2017 and 31 December 2021. Diagnoses were made by a psychiatrist using DSM-4/5 criteria. Ethics approval for the study was granted by the IMH Institutional Research Review Committee (775-2021) and the National Healthcare Group Domain Specific Review Board (2021/01015).

Data collection focused on the documentation of patients' psychiatric background and GD-specific clinical variables, aiming to establish the age when

gender issues first surfaced and the details of their transition. Participants were categorised into 3 groups: (1) those diagnosed with GD before another psychiatric disorder, (2) those diagnosed with a psychiatric disorder before GD and (3) those diagnosed with GD only. Social transitioning included changes such as name, gender pronouns and clothing, while physical transitioning involved puberty blockers, hormone replacement therapy (HRT) and chest or genital surgery. Participants were grouped into 3 categories: (1) no concrete steps taken, (2) socially transitioned only and (3) both socially and physically transitioned. HRT information was based on self-reports during clinical consultations, as IMH does not offer HRT, and existing medical records did not capture prescription from other healthcare providers.

Mental health ratings

Participants were assessed using the Children's Global Assessment Scale (CGAS) and Clinical Global Impression-Severity (CGI-S) by their attending clinicians during clinic visits. CGAS is a clinician-rated scale measuring overall functioning, ranging from 1 to 100.¹⁰ CGI-S rates the severity of illness, on a scale of 1 (normal) to 7 (most severely ill). Participants' earliest and most recent CGAS and CGI-S scores were collected as proxy measures of their well-being, given the lack of validated and reliable assessments for GD and the variability in their presentations, which often included other conditions or concerns over time.

Data analysis

Data were extracted from existing medical records (CPSS2), with clinic administrators processing and de-identifying the information before it was provided to the study team for analysis. Data on the number of Singapore residents aged 6 to 19 years were gathered from Singapore Department of Statistics to estimate the incidence and prevalence rates of GD from 2017 to 2021. We used the SPSS Statistics software version 26 (IBM Corp, Armonk, NY, US) to analyse demographic details, psychiatric history and GD-specific clinical variables to gain a clear understanding of the presentation of GD in an outpatient psychiatric setting using primarily correlation and regression analyses.

RESULTS

Demographics

The study included 107 participants, aged 6 to 19 years (mean age 16.58 years, standard deviation [SD] 1.77), all diagnosed with GD. Of these, 47 were natal males and 60 were natal females. The

majority of participants (95.3%) were Singapore citizens or Permanent Residents. Additionally, 71% were aged 14 to 17 years (mean age 15.0 years, SD 2.2) and of Chinese ethnicity (75.7%). Demographic characteristics are detailed in Table 2.

Prevalence and incidence of GD

We examined the incidence of newly diagnosed cases of GD from 2017 to 2021 (inclusive) (Table 1). The number of GD cases in the clinic increased over the 5-year study period, from 13 cases in 2017 to 33 in 2021 (Fig. 1). Based on the population of Singapore residents aged 6 to 19,^{11,12} the incidence rate of GD increased from 2.17 per 10,000 population in 2017 to 5.85 per 10,000 population in 2021. The prevalence (2017–2021) of GD in the study was 1:5434 (0.019%).

Additionally, a simple linear regression further revealed a significant relationship between year (2017–2021) and number of new GD diagnoses at the clinic, ($F[1, 3]=26.76$, $P=0.014$, $R^2=0.90$, $\beta=0.95$).

Delay in formal help-seeking

During initial consultations, participants provided the age at which they first experienced gender-related issues. Among them, 71 (67%) first experienced gender-related issues before they turned 13 years old. The median age for the onset of these issues was 11 years, while the median age for seeking help from a healthcare provider was 16 years, indicating a 5-year delay in formal help-seeking (Fig. 2). The average age at which participants sought

help for their GD concerns was 15.6 years (SD 1.8). A Spearman's rank-order correlation further revealed a positive correlation between age and time of GD diagnosis ($r_s[105]=0.58$, $P<0.01$).

This suggests that participants were diagnosed with GD at a younger age as time passes, decreasing the gap in formal help-seeking. A logistic regression found no difference between assigned sex at birth and delay in formal help-seeking ($F[1, 105]=0.15$, $P=0.70$, $R^2=0.001$).

Comorbid conditions and well-being

In addition to GD, 72 (67.29%) of the participants had psychiatric comorbidities. The most common comorbid diagnoses were mood disorders ($n=53$), followed by attention deficit hyperactivity disorder (ADHD) ($n=21$), anxiety disorders ($n=12$) and autism spectrum disorder (ASD) ($n=12$). One third of participants ($n=32$) were diagnosed with GD and at least 1 other psychiatric condition after their GD diagnosis, while 40 participants had a pre-existing psychiatric diagnosis prior to their GD diagnosis (Table 2).

A multiple linear regression model was used to assess how duration of follow-up at the clinic, age, gender and ethnicity contributed to changes in CGI-S and CGAS scores before and after treatment. The model for CGI-S score changes was significant ($F[4, 94]=3.45$, $P=0.01$, $R^2=0.13$), suggesting that participants' overall functioning improved after receiving clinic services. Further analysis showed that duration of follow-up at the clinic was a

Fig. 1. Prevalence and incidence rates of gender dysphoria (GD).

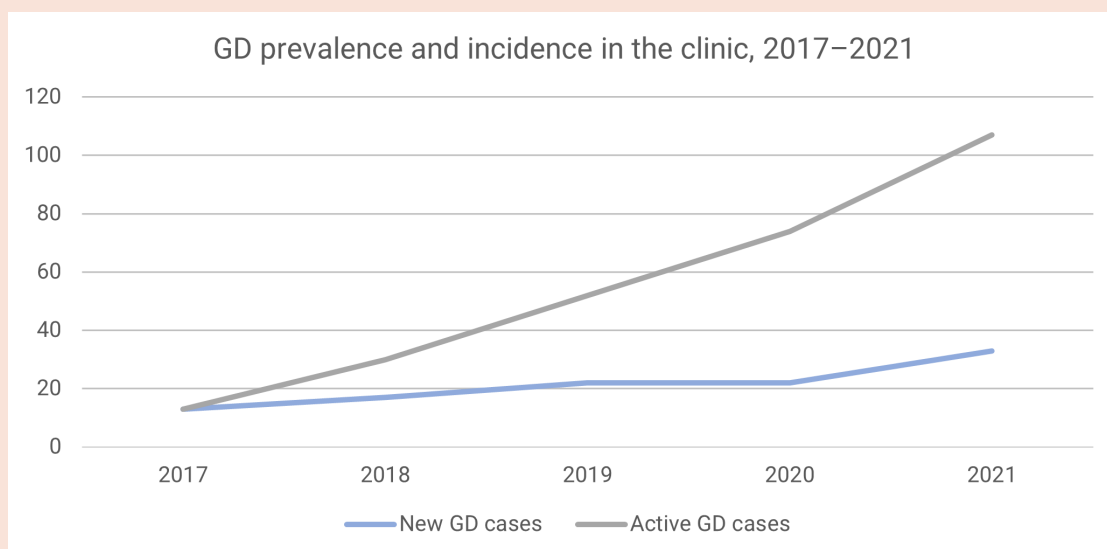


Table 1. Unique cases per year.

Year	Population number (6–19 years old) ^a	New diagnoses of gender dysphoria (n)	Incidence rate (new cases per 100,000 population)
2017	600,510	13	2.165
2018	591,778	17	2.873
2019	589,248	22	3.734
2020	579,900	22 ^b	3.794
2021	563,970	33	5.851

^a Singapore residents statistics from Singapore Department of Statistics

^b Decrease in figure likely due to reduction in clinic appointment slots following restriction measures and public healthcare services advisories for COVID-19

significant predictor ($t=3.70$, $P<0.01$), while age ($t=-0.88$, $P=0.38$), gender ($t=0.07$, $P=0.95$) and ethnicity ($t=-0.63$, $P=0.53$) were not. This suggests that the longer they were on follow-up at the clinic, the larger the improvement in their CGI-S score. However, the model for changes in CGAS scores was not significant ($F[4, 93]=1.78$, $P=0.14$, $R^2=0.03$).

Changes in CGAS and CGI-S scores were analysed for each comorbid diagnosis. A multiple linear regression model was used to evaluate the impact of each comorbid condition on pre- and post-treatment changes in CGI-S and CGAS scores. A significant model was found for CGI-S score changes ($F[5, 93]=3.26$, $P=0.009$, $R^2=0.10$), with ASD being the only significant predictor ($t=2.92$, $P=0.004$), while mood disorders ($t=1.42$, $P=0.16$), ADHD ($t=0.41$, $P=0.68$) and anxiety ($t=-0.88$, $P=0.38$) were not. A significant model was also found for CGAS score changes ($F[5, 92]=4.29$, $P=0.001$, $R^2=0.19$). ASD ($t=-2.2$, $P=0.030$) was a significant predictor while mood disorders ($t=-0.98$, $P=0.33$), ADHD ($t=0.19$, $P=0.85$) and anxiety ($t=1.42$, $P=0.16$) were not. ASD was a significant predictor of pre- and post-treatment changes in both CGI-S and CGAS scores.

Among the 107 participants, 22 (20.6%) had previously been hospitalised for self-harm or suicidality concerns (e.g. suicidal ideation, verbalisation or attempts). None of the participants had more than 1 admission during the data extraction period. A total of 22 (20.5%) participants had attempted suicide before receiving their GD diagnosis, with 10 continuing to do so after the diagnosis. Additionally, 11 participants (10.3%) had not attempted suicide prior to their diagnosis but reported at least 1 attempt afterwards (Table 3).

Gender transition

In terms of transition, 42 (39.3%) of the participants had transitioned socially only, while 49 (45.8%) had transitioned both socially and physically.

The remaining 16 (15%) either did not state their transition plans explicitly or had not attempted any form of transition. No participants had transitioned physically without also transitioning socially. Among those who had transitioned both socially and physically, most received HRT and/or puberty blockers through public healthcare institutions ($n=22$) or private clinics ($n=20$). A few did not report the source of their HRT ($n=2$), while others obtained it through online sources or friends ($n=5$). Additionally, 8 participants reported having undergone surgery (chest augmentation only, $n=4$; genital reassignment only, $n=3$; both, $n=1$). Moreover, 6 (75%) of participants who underwent surgery reported positive post-operative adjustments, while 1 (12.5%) reported feelings of regret. There was no update on the last participant post-surgery. No significant gender differences were found among the 3 transition groups, $r(105)=-0.16$, $P=0.10$.

A multiple linear regression analysis was conducted to examine the influence of demographic factors on HRT receipt. Participants' natal gender, nationality and ethnicity accounted for about 21% of the variance, but the model was not statistically significant ($F[3, 103]=1.60$, $P=0.19$, $R^2=0.21$). No other variables significantly predicted HRT receipt. However, receiving HRT was significantly correlated with improvements in CGAS, $r(96)=0.46$, $P<0.1$ and CGI-S scores, $r(97)=-0.30$, $P<0.01$. Regression analyses showed that HRT receipt significantly predicted changes in CGAS ($F[1, 96]=25.46$, $P<0.01$, $R^2=0.21$) and CGI-S scores ($F[1, 97]=9.22$, $P<0.01$, $R^2=0.09$), indicating that participants who received HRT experienced improvements in well-being based on these scores.

DISCUSSION

The incidence rate of GD in our study increased from 2.17 per 100,000 population in 2017 to 5.85 per 100,000 population in 2021. The prevalence

Table 2. Characteristics of participants (n=107).

Characteristics	No. (%)	Mean (SD)
Sex		
Female	60 (56.1)	
Male	47 (43.9)	
Nationality	107	
Singaporean	91 (85.0)	
Permanent Resident	11 (10.3)	
Non-citizens or resident	5 (4.7)	
Ethnicity ^a		
Chinese	81 (75.7)	
Malay	4 (3.7)	
Indian	5 (4.7)	
Others	17 (15.9)	
Age at first visit		15.04 (2.22)
Current age		19.25 (2.42)
Age when diagnosed with GD		16.58 (1.78)
Number of siblings		1.16 (0.96)
0	29 (27.1)	
1	41 (38.3)	
2	25 (23.4)	
≥3	10 (9.3)	
No information	2 (1.9)	
First diagnosis received		
ADHD	11 (10.3)	
Mood disorders	22 (20.56)	
Anxiety disorders	5 (4.7)	
ASD	3 (2.8)	
Eating disorders	1 (0.9)	
GD/gender identity disorder	64 (61.86)	
OCD	1 (0.9)	
Comorbid psychiatric diagnosis		
Mood disorders	53 (50.96)	
Anxiety disorders	12 (11.54)	
ADHD	21 (20.19)	
ASD	12 (11.54)	

Table 2. Characteristics of participants (n=107). (Cont'd)

Characteristics	No. (%)	Mean (SD)
Others	6 (5.77)	
Eating disorders	3 (2.88)	
PTSD	1 (0.96)	
Hallucination	1 (0.96)	
Unspecified	1 (0.96)	
Number of comorbidities		0.97 (0.87)
0	35 (32.7)	
1	45 (42.06)	
2	21 (19.63)	
≥3	6 (5.61)	
Admission		
No	85 (79.4)	
Yes	22 (20.6)	
Father's occupation		
Professional/managerial/executive/technical	47 (43.9)	
Others/self-employed	55 (51.4)	
Not working	2 (1.9)	
Mother's occupation		
Professional/managerial/executive/technical	56 (52.3)	
Others/self-employed	31 (29.0)	
Not working	20 (18.7)	
Age at which gender issue was raised to healthcare provider		15.64 (1.81)
Retrospective age when gender issues surfaced		10.43 (3.61)
Age when diagnosed with GD		16.58 (1.78)
Timeline of GD diagnosis		
GD diagnosis first	32 (29.9)	
GD diagnosis after	40 (37.4)	
GD diagnosis only	35 (32.7)	
Transition group		
No concrete steps taken	16 (15.0)	
Social only	42 (39.3)	
Social and physical	49 (45.8)	
Number of psychotherapy sessions attended in a year	67 (62.6)	8.90 (7.26)

^a Ethnic composition referenced the Singapore Census 2020¹² whereby Chinese, Malays and Indians constituted 74.3%, 13.5% and 9.0% of the resident population, respectively; 3.2% comprised all other ethnicities.

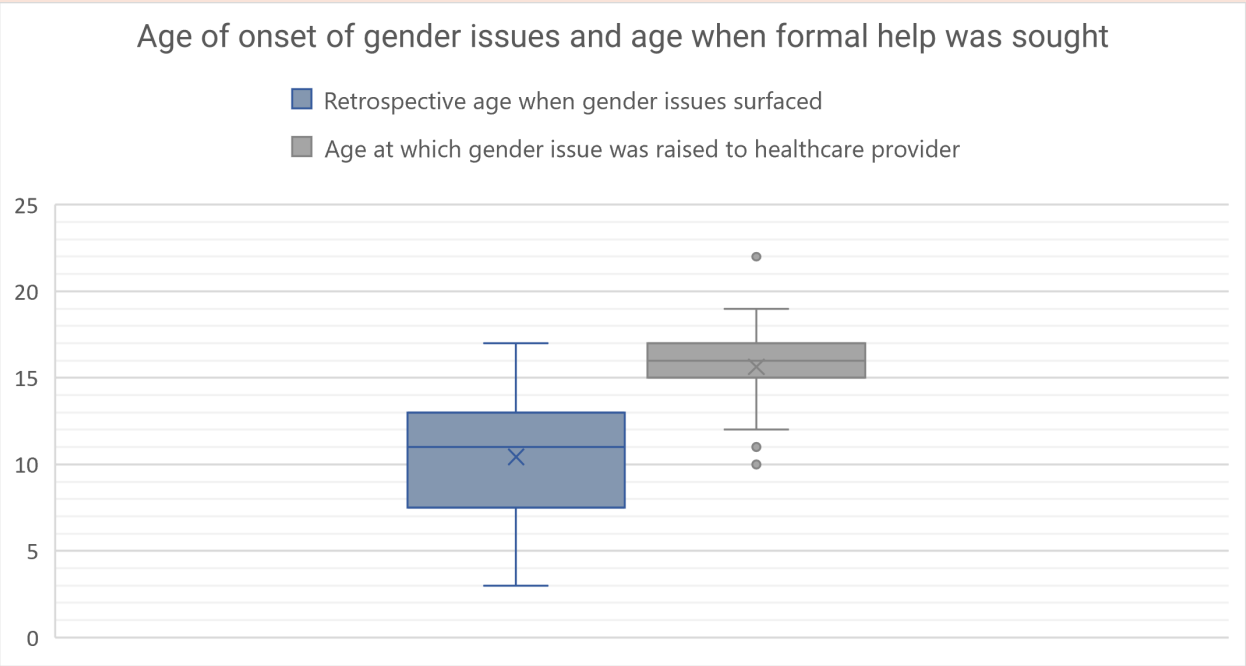
ADHD: attention deficit hyperactivity disorder; ASD: autism spectrum disorder; CGAS: Children's Global Assessment Scale; CGI: Clinical Global Impression; GD: gender dysphoria; OCD: obsessive compulsive disorder; PTSD: post-traumatic stress disorder; SD: standard deviation

Table 3. Frequencies of suicide attempts (n=107)

Suicide attempts	No.	% of total	% cumulative
Pre-GD diagnosis			
Nil	74	69.2%	69.2%
1 attempt	6	10.3%	79.5%
2 attempts	4		
≥3 attempts	1		
Post-GD diagnosis			
Nil	12	11.2%	90.7%
1 attempt	6	9.3%	100%
2 attempts	3		
≥3 attempts	1		

GD: gender dysphoria

Fig. 2. Delay in formal help-seeking (years).



of GD in the study was 1:5434 (0.019%). These statistics are in line with previous prevalence data from other Asian studies.^{2,3,4} There was an increase in new diagnoses over the 5-year study period, with diagnoses being made at younger ages. An earlier age of diagnosis may suggest greater self-awareness and willingness to seek help among younger individuals, rather than an earlier onset of GD. It could also reflect an increasingly supportive social environment for gender minorities, leading

to younger individuals seeking formal help earlier. Open discussions and psycho-education about GD could foster a more positive and collaborative approach to treatment, reduce unsafe practices and decrease stigmatisation. While there was a high rate of comorbid conditions, no significant difference in the severity of impairment or distress between natal males and females was observed, which may be due to participants' age (under 19 years). Past studies

reported a high level of psychiatric comorbidities,¹³ including increased rates of suicide attempts in 9.3% of the population,¹⁴ a 3-fold increased risk of anxiety disorders,¹⁵ and higher rates of personality disorders compared to cisgender individuals.¹⁶ Although the rate of suicide-related behaviours in our study was not higher than in other studies,¹⁷ it remains a concerning issue. Additionally, our study reported similar rates of co-occurring neurodevelopmental disorders in GD. Past studies reported 6% to 26% of ASD and 4.3% to 20.4% of ADHD.¹⁸ Greater gender non-conformity, dissatisfaction and societal pressure for gender conformity are associated with increased psychological distress.¹⁹ Commonly reported issues include self-deprecation, irritability, mood swings and parental conflicts.²⁰ The severity of these challenges is likely to increase as individuals age and continue to navigate their gender identity.

The aetiology of GD is complex and multifaceted. Twin studies suggest that genetic factors may account for up to 38% of the variance,²¹ while other factors such as the mother–child relationship, higher level of depression²² and staying in urban and populated areas have been implicated.²³ A disparate sex ratio²⁴—more natal males than females—also suggests a contribution of physical sexual differentiation in development that may involve biological, social and cultural determinants. The variability in persistence of GD further complicates the picture; about 80% of children reported GD desistance when they reached puberty.²⁵ A higher age of identification of GD has been associated with greater likelihood of persistence.²⁶

The American Academy of Child and Adolescent Psychiatry advocates for evidence-based, individualised clinical care.²⁷ The Guidelines for Psychological Practice with Transgender and Gender Nonconforming People²⁸ and the Standards of Care for the Health of Transsexual, Transgender and Gender Nonconforming People²⁹ recommend affirmative treatment, which emphasises acceptance for diverse gender expressions and identities.³⁰ Currently, there is no evidence-based intervention for changing gender identity.³¹ While affirmative treatment is supported, there is a recognised risk of iatrogenic harm, prompting the suggestion of exploratory psychotherapy (neither affirmative nor conversion) as a first-line treatment to provide psychological support.³² Medical interventions may include hormone therapy and gender reassignment surgery,³³ though evidence assessing the risks of hormone therapy remains limited.^{34,35} Extensive consultation, rigorous monitoring and follow-up with medical professionals are recommended.³⁶ There is also a lack of controlled studies and

validated outcome measures for those who undergo gender reassignment surgery.³⁷ The decision to transition is often influenced by factors such as sexual orientation, the intensity of dysphoria and societal expectations.^{38,39,40}

The availability of HRT from unlicensed sources poses significant health risks, particularly given the lack of evidence supporting its use in children and adolescents. The absence of significant findings related to risk and predictive factors in our study highlights the complexities of the subject, though this may also be due to the small sample size and limited study duration.

Our study has several notable limitations. Without matched controls, we are unable to determine whether the rate and severity of comorbid conditions in individuals with GD are higher than expected in the general population, nor can we draw conclusions about the timing of various diagnoses. The incidence rate and prevalence should be interpreted cautiously, as the study is based on data from a single hospital in Singapore and only includes individuals who have sought help. As a result, our figures likely underestimate the true prevalence of GD in the community. We also acknowledge the potential sampling bias in our population, which limits the generalisability of our findings. Additionally, the lack of standardised protocols for managing individuals with GD means there are no consistent indicators for systemic evaluation or comparison. Despite these limitations, our study provides valuable information and offers some insight into the complex presentation of GD in today's youths.

Further research into aetiological factors, such as comparisons with transgender individuals without GD, and longitudinal studies covering physical, mental and social aspects of functioning, including rates of desistance, the role of psychotherapy, vocational and social adjustment, physical health concerns and mental health well-being, would provide insights into the factors contributing to the development of GD. Many studies on GD rely on self-reports and retrospective data, limiting the accuracy, reliability and generalisability of findings. This, in turn, hinders the development of evidence-based treatment and management strategies, affecting the well-being of individuals with GD. There is also an urgent need for clear guidelines on the assessment and management of GD, especially in the youth population. While international guidelines offer useful references, it is essential to account for the unique social and cultural factors in the Asian context. The timely identification of GD, along with support for both individuals and their families and long-term monitoring, should be prioritised. Professionals working with gender-diverse youth

must recognise that variations in gender expression and identity are a normal part of human development. They should work collaboratively with individuals with GD and their families to develop personalised treatment plans, grounded in evidence-based care, that address the specific mental health needs and overall well-being of the individual.

Declaration

The authors declare there are no affiliations with or involvement in any organisation or entity with any financial interest in the subject matter or materials discussed in this manuscript.

Ethics statement

The manuscript was approved by the IMH Institutional Research Review Committee (775-2021) and the National Healthcare Group's Domain Specific Review Board (2021-01015).

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