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Epidemiology of gender dysphoria and transgender identity

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Abstract. This review provides an update on the epidemiology of gender dysphoria and transgender identity in children, adolescents and adults. Although the prevalence of gender dysphoria, as it is operationalised in the fifth edition of the *Diagnostic and Statistical Manual of Mental Disorders* (DSM-5), remains a relatively ‘rare’ or ‘uncommon’ diagnosis, there is evidence that it has increased in the past couple of decades, perhaps reflected in the large increase in referral rates to specialised gender identity clinics. In childhood, the sex ratio continues to favour birth-assigned males, but in adolescents, there has been a recent inversion in the sex ratio from one favouring birth-assigned males to one favouring birth-assigned females. In both adolescents and adults, patterns of sexual orientation vary as a function of birth-assigned sex. Recent studies suggest that the prevalence of a self-reported transgender identity in children, adolescents and adults ranges from 0.5 to 1.3%, markedly higher than prevalence rates based on clinic-referred samples of adults. The stability of a self-reported transgender identity or a gender identity that departs from the traditional male–female binary among non-clinic-based populations remains unknown and requires further study.

Additional keywords: DSM-5, gender identity, sexual orientation, transsexualism.

Received 24 March 2017, accepted 22 May 2017, published online 25 August 2017

Introduction

When the third edition of the *Diagnostic and Statistical Manual of Mental Disorders* (DSM-III) was published in 1980,¹ it included, for the first time, diagnoses pertaining to gender identity, including Gender Identity Disorder of Childhood and Transsexualism (for adolescents and adults). Regarding prevalence, the DSM-III said this: ‘apparently rare’. In the revised third edition,² published in 1987, the DSM-III-R said this: ‘apparently uncommon’.

Thirty years post-DSM-III-R, can we do better than these rather vague statements? In contemporary times, individuals who self-identify as transgender (some of whom may meet the DSM-5 diagnostic criteria for Gender Dysphoria) seem to have come out of the closet in droves: both online and ‘in real life’.³ Online, this is reflected via the literally hundreds, if not thousands, of websites, blogs, discussion groups, etc. – of both consumers and professional organisations – that provide information about what it means to be transgender, how to access health care when it is desired or required, social support and much more. In real life, the number of specialised gender identity clinics has dramatically increased, with new programs established in Australia, Western Europe, North America and elsewhere,^{4,5} with these centres (and older ones) reporting a sharp increase in referral rates.^{6–9} Given these developments, it is timely to provide an update on what is known about the epidemiology of gender dysphoria and self-identification as transgender. Information on epidemiology is important for

various reasons, including healthcare planning (e.g. staffing needs) and in the identification of associated factors that may be useful in understanding clinical presentation.

In this review, a summary and analysis of new research will be provided, supplementing two recent summaries of the literature.^{10,11} In preparing this review, I considered the relevant citations from these two recent reviews, sex research periodicals (e.g. *Archives of Sexual Behavior*, *International Journal of Transgenderism*, *Journal of Sex Research*, *LGBT Health*, *Transgender Health*) and PubMed (keywords: gender dysphoria, gender identity, gender identity disorder, transgender, transsexualism). References from relevant articles were also examined for any additional studies.

Basic terminology

Prevalence

In epidemiology, prevalence refers to the presence of an illness, disorder or behavioural phenomenon in a representative or a complete population sample. *Point prevalence* refers to the ascertainment of a condition limited to a specific point in time. *Period prevalence* refers to the presence of a condition over a period of time, such as at any point during the past 12 months. Regarding point prevalence, for example, one could ask: for a randomly selected sample of adults, what percentage self-identify as having an asexual sexual orientation?^{12,13}

Incidence

Incidence is defined as the number of new cases of an illness, disorder or behavioural phenomenon that occurs in a population during a specified period of time. *Cumulative incidence*, therefore, is defined as the number of new cases during a specified period of time, divided by the total population during that period of time. As an example, one might find that, for a randomly selected sample of adults, over a 1-year period, 100 new cases of persons self-identifying as asexual occurred per 100 000 persons in the population.

Correlates of prevalence and incidence

Epidemiologists are interested in identifying factors that are associated with the prevalence and incidence of disorders or behavioural phenomena, and several methods are commonly used to identify these factors, using measures of association.¹⁴ For example, if one examined a sample of adults who self-identify as asexual, one might find an overrepresentation of women, compared with adults who self-identify as 'sexual' or that self-identified asexuals differ from sexuals with regard to various personality traits.¹⁵

Methodological issues

Estimates of prevalence and incidence will be affected by the precision in which one measures the phenomenon of interest. Cruder measures are likely to yield higher prevalence and incidence rates than measures that are more precise. For example, it may well be the case that the prevalence of gender dysphoria as a diagnosis will be lower than the prevalence of self-identification as transgender, because the former utilises precise diagnostic criteria whereas the latter probably captures a broader segment of the population. Prevalence may also be affected by how 'caseness' is ascertained, particularly when the method used is only quasi-epidemiological in nature.

Children with gender dysphoria

Prevalence

None of the numerous epidemiological studies on the prevalence of psychiatric disorders in children and youth have examined Gender Dysphoria (or Gender Identity Disorder – the former diagnostic label). Accordingly, estimates of prevalence have been based on less sophisticated approaches.

Self-identification as transgender

In a random sample of 2730 Grade 6–8 students from San Francisco in the USA, Shields *et al.*¹⁶ found that 1.3% self-identified as 'transgender' in response to the question 'What is your gender?', with the other response options being female or male. To my knowledge, this is the only random sample of children to which this question has been asked.

Parent report

Parent-report questionnaires are widely used in clinical child psychology and psychiatry to establish the prevalence of various behavioural phenomena. The Child Behavior Checklist (CBCL), a parent-report behaviour problem questionnaire with

excellent psychometric properties, is one of the most widely used measures of this type.¹⁷

In the 1999 standardisation sample of the CBCL for children ages 6–18 years,¹⁷ of 118 items, one item pertains to gender identity ('Wishes to be of opposite sex'). For children 6–12 years of age ($n=1822$), less than 1% of parents of non-referred boys and 1.2% of non-referred girls endorsed this item as either 'somewhat or sometimes true' or 'very true or often true' on a 0–2-point response scale. The percentages were higher for referred boys and girls (2.7% and 4.7% respectively). In the prior 1991 CBCL standardisation sample (Achenbach 1991),¹⁸ 1% of parents of 4- to 11-year-old non-referred boys and girls endorsed this item compared with 3% and 5% of referred boys and girls ($n=2402$). Thus, two consistent findings emerge: (1) the item is endorsed more often for girls than for boys; and (2) it is endorsed more often for referred than for non-referred children.

In the original version of the CBCL from the early 1980s,¹⁹ there was also an item pertaining to gender-variant behaviour ('Behaves like opposite sex'). Zucker *et al.*²⁰ reported that, among non-referred boys aged 4–11 years, 3.8% received a rating of '1' and 1.0% received a rating of a '2' for this item. The comparable percentages among non-referred girls were 8.3% and 2.3% respectively. These percentages were higher than the percentages reported for the item pertaining to the wish to be of the other gender; for non-referred boys, it was 1.0% and 0.0% respectively and for non-referred girls, it was 2.5% and 1.0% respectively (total $n=1600$). Thus, in a sample of non-referred boys and girls, the percentage of children whose mothers endorsed the presence of at least some gender-variant behaviour was higher than the percentage who endorsed the wish to be of other gender (for similar studies, see Achenbach *et al.*²¹ and van Beijsterveldt *et al.*²²).

Summary

From the one study in which children were given the option of self-identification as transgender and the CBCL datasets, one could argue that the percentages reflect a liberal, upper-bound estimate of caseness – it is highly unlikely that all children who either self-identify as transgender or whose parents report that their child expresses the wish to be of the other gender would meet formal DSM criteria for Gender Dysphoria. In the study by Shields *et al.*¹⁵, for example, it is not clear how children understood the response option of 'transgender' and, on this point, qualitative exploration is needed.

Sex ratio

In samples of children referred clinically for possible gender dysphoria, the sex ratio has historically favoured a predominance of males. Among 577 Canadian children referred between 1976 and 2011, the male-to-female ratio was 4.49:1, which was significantly higher than the 2.02:1 ratio in the Netherlands.²³ As noted by Wood *et al.*,²³ the sex ratio appears to have narrowed in more recent years. There also appear to be age effects; for example, in the Canadian sample, the sex ratio for 3-year-olds was 33:1 of boys to girls whereas the sex ratio was 1.12:1 for the 12-year-olds. Until age 10 years, the percentage of referred boys to girls was

75% or higher, but after that, the percentage began to drop and moved towards parity.

From a theoretical perspective, it is an open question as to what the 'true prevalence' is of gender dysphoria in children. For example, from a biological perspective, it might be argued that males are more vulnerable to gender dysphoria because the process of physical sex differentiation is more complex; from a psychosocial perspective, it could also be argued that males are more vulnerable because, for a sex-typical male gender identity to differentiate, a boy must shift his early attachment-related identification from the mother to the father (because, for most infants, the primary attachment is to the mother because of traditional patterns of parenting in the infancy and toddlerhood period).¹¹ Given the theoretical uncertainty, social factors have been considered in accounting for the male predominance of gender-referred children. For example, gender-variant behaviour in boys tends to elicit more parental anxiety than gender-variant behaviour in girls, and gender-variant behaviour in boys is also subject to more social ostracism within the peer group than gender-variant behaviour in girls. As a result, the threshold for referral may be lower for boys than it is for girls.²⁰ Thus, one must keep in mind the potential distinction between the sex difference in referral rates and 'true prevalence'.

Incidence

Over three decades ago, Lothstein²⁴ argued that parents influenced by the cultural Zeitgeist to employ 'non-sexist' socialisation techniques may have inadvertently induced gender identity conflict in their children. This argument, therefore, advanced the hypothesis that social factors contributed to a change in incidence. If we fast-forward to the present day, it is certainly fair to say, based on reports from speciality clinics across several continents, that there is a marked increase in referrals.^{6–9} Are there contemporary social factors that might be contributory? It has become, for example, more common for parents on their own initiative, on the recommendation of a professional, or jointly to implement what has been called a 'gender social transition' in childhood, after a period of time of marked gender-variant behaviour, including either the expressed desire to be of the other gender or an insistence that one is the other gender.²⁵ Some parents appear to interpret the expression of gender-variant behaviour as a marker that their child 'is' transgender. Perhaps this philosophical perspective has contributed to a bona fide increase in the incidence of gender dysphoria. Alternatively, it could be argued that there has been a gradual depathologisation and destigmatisation of gender dysphoria and gender-variant behaviour, which has led more parents of children with gender dysphoria to seek out mental health care, so the putative increase in referrals is not really evidence of a true increase in prevalence and/or incidence, but rather simply an increase in seeking out health care. In this regard, it is of interest that the increase in the rates of seeking out health care corresponds with the notable increase in the establishment of specialised gender identity/

transgender healthcare programs.^{4,5} On this point, it is unclear if the establishment of such speciality programs has led to an increase in referrals (via 'visibility') or if the increase in patients and families seeking out specialised health care has motivated administrators in hospitals or community clinics to support the establishment of such programs.

Adolescents with gender dysphoria

The epidemiological picture for adolescents with gender dysphoria is similar to that of children in that there are no formal studies.

Self-identification as transgender

In a 2012 random sample of 8166 high school students from New Zealand, Clark *et al.*²⁶ found that 1.2% answered 'yes' to the question 'Do you think you are a transgender?', which was followed by a definition of the term. Another 2.5% reported that they were not sure about their gender and 1.7% reported that they did not understand the question. More recently, Eisenberg *et al.*^a sampled in 2016 81 885 high school students in Grades 9 and 11 in the state of Minnesota, who were asked 'Do you consider yourself transgender, genderqueer, genderfluid, or unsure about your gender identity?' For birth-assigned females, 3.6% answered yes to this question and the corresponding percentage for birth-assigned males was 1.7%.

Parent-report

In the 1999 standardisation sample of the CBCL for children aged 13–18 years ($n = 1388$), 0% of parents of non-referred boys and 1.2% of non-referred girls endorsed the item pertaining to the wish to be of the other gender. The percentages were higher for referred boys and girls (3.0% and 6.3% respectively).¹⁷ In the prior 1991 CBCL standardisation sample ($n = 1818$),¹⁸ 0% of parents of 12- to 18-year-old non-referred boys and girls endorsed this item compared with 2% and 5% of referred boys and girls. Thus, two consistent findings emerge: (1) the item is endorsed more often for girls than for boys; and (2) it is endorsed more often for referred than for non-referred children.

Self-report

On the Youth Self-Report (YSR) analogue of the CBCL for ages 11–18 years ($n = 1938$) in the 1999 standardisation sample,¹⁷ the percentage of non-referred boys and girls who endorsed this item was 3.1% and 12.2% respectively. For referred boys and girls, the corresponding percentages were 4.3% and 16.1%. In the original YSR standardisation sample from the mid-1980s ($n = 1494$),²⁷ the percentage of non-referred boys and girls who endorsed this item was 2.75% and 13.25% respectively. For referred boys and girls, the corresponding percentages were 4.0% and 16%.

Summary

As was the case for the CBCL child data, the CBCL and YSR data for adolescents also showed that the wish to be of the other gender was generally more prevalent in girls than in boys, and

^aEisenberg ME, Gower GL, McMorris BJ, Rider GN, Shea G, Coleman E. Risk and protective factors in the lives of transgender/gender nonconforming adolescents. *J Adolesc Health* 2017. doi:10.1016/j.jadohealth.2017.04.014.

in referred than in non-referred samples. However, it is also apparent that the adolescents were much more likely to endorse this item than were their parents. For example, among referred girls in the 1999 YSR standardisation sample, 16.1% endorsed the item compared with only 6.3% of the parents. As with children, it is likely that a percentage this high would be a very liberal, if not implausible, upper-bound value for caseness. In this regard, it is of interest that the percentage of adolescents who self-identified as transgender in the New Zealand study was much lower, at 1.2%.²⁶ This suggests that self-identification as transgender may be a closer approximation to a formal diagnosis of gender dysphoria than simply reporting the wish to be of the other gender. However, if one only includes cases on the YSR in which a response of '2' (very true or often true) is counted, then the discrepancy is markedly reduced; only 3% of referred girls rated the item with a '2,' a percentage much more closer to the 1.2% prevalence of self-identification as transgender in the New Zealand study.

Sex ratio and sexual orientation

Historically, the sex ratio among adolescents with gender dysphoria also favoured boys over girls, but the ratio was less skewed than it was for children.²³ However, Aitken *et al.*⁶ reported that, starting in the mid-2000s, there appeared to be a shift in the sex ratio from one favouring boys (2.11 : 1, before 2006) to one favouring girls (1 : 1.76, 2006–13) in a Canadian sample. This altered sex ratio was not found in a control sample of adolescents referred for other clinical problems (2.22 : 1, before 2006 and 1.96 : 1, 2006–13). This inversion in the sex ratio was confirmed in an analysis of a Dutch sample of adolescents with gender dysphoria (1.41 : 1 between 1989 and 2005 vs 1 : 1.72 between 2006 and 2013). Other contemporary samples of adolescents with gender dysphoria have also reported sex ratios favouring girls over boy.⁶ In Finland, for example, Kaltiala-Heino *et al.*²⁸ reported an astonishing sex ratio of 1 : 6.83 of adolescent boys to girls (with girls representing 87% of the sample). Although these studies suggest consistency with the Aitken *et al.*⁶ data, it should be noted that these new samples come from recently established gender identity clinics, so it is unknown if the sex ratio would have also favoured girls before the mid-2000s.

Sexual orientation, whether it is defined in relation to fantasies, attractions, behaviours or as a self-identity, begins to consolidate during adolescence. From an epidemiological perspective, one can ask if sexual orientation is associated in a reliable way with other variables among clients diagnosed with gender dysphoria. In a Canadian adolescent sample,²⁹ it was found that the majority of birth-assigned females had a predominately gynephilic sexual orientation (i.e. sexually attracted to birth-assigned females) in fantasy (75.7%) than a predominately androphilic (i.e. sexually attracted to birth-assigned males) or bisexual sexual orientation (24.3%). In contrast, birth-assigned males had a more equal distribution in the percentage classified as androphilic (55.0%) vs gynephilic (45.0%) in fantasy. A similar finding was reported in a Dutch sample of adolescents diagnosed with gender dysphoria.³⁰ From a healthcare perspective, this information is important in that when a clinician works with an adolescent

who is experiencing gender dysphoria, exploration of sexual orientation can be helpful in giving the adolescent a therapeutic space to think about their gender identity in relation to their sexual orientation and how this will affect their choice of romantic partners.

Sexual orientation among adolescents with gender dysphoria is also related to the degree of gender-variant behaviour in childhood. In the Canadian study, for example, adolescents who were sexually attracted to members of their own birth sex recalled more gender-variant behaviour in childhood than those who were bisexual or sexually attracted to members of the other birth sex.²⁹

Incidence

There appears to be a new subgroup of adolescents who self-identify as transgender (and may well meet the DSM-5 diagnostic criteria for gender dysphoria). This putative new subgroup consists primarily of birth-assigned females, described by Littman³¹ as displaying 'rapid-onset' gender dysphoria. There is a virtual absence of childhood indicators of gender dysphoria and its abrupt appearance seems to be strongly associated with Internet contact with other transgender youth and a 'clustering' of recently 'out' transgender youth within the peer group. If these preliminary clinical findings are replicated, they could well represent an example of a bona fide example of an increase in cumulative incidence over a relatively short period of time.

Adults with gender dysphoria

Epidemiological studies

During the 1970s and early 1980s, the epidemiology of psychiatric disorders began to be studied with the use of standardised and structured interview schedules. The Diagnostic Interview Schedule (DIS), which was crafted around DSM-III diagnoses, included a module on Transsexualism (the diagnostic term for adolescents and adults at that time). As it turned out, Robins *et al.*³² reported that questions pertaining to Transsexualism were 'omitted' because they 'had not been cleared by NIMH [National Institute of Mental Health] for submission to [the] OMB [the US Office of Management and Budget]' (p. 388). Thus, in the 1980s, the US studies on DIS prevalence did not contain any specific information on Transsexualism.

In the late 1980s, Hwu *et al.*³³ used the DIS in Taiwan to examine the prevalence of Transsexualism for 11 004 adults ranging in age from 18–64+ years. Depending on geographic area, lifetime prevalence ranged from 0.3 to 2.0/1000, with a higher prevalence for females than for males (range, 0.7–4.2/1000 vs 0–0.4/1000). One year prevalence ranged from 0 to 1.0/1000. In the early 1990s, Stefánsson *et al.*³⁴ reported prevalence data on 862 Icelanders at the age of 55–57 years, who were all born in 1931. Lifetime prevalence was 0.1% and point-prevalence (1 month to 1 year) was 0.0%.

Clinic-based studies

In my view, these two early prevalence studies have received little attention or acknowledgement. For many years, the most common strategy regarding prevalence was more quasi-epidemiological in form; the number of adults seeking out clinical care at specialised gender identity clinics in a particular

country or the number of such patients approved for, or already receiving, cross-sex or 'gender-affirming' hormonal treatment, etc.³⁵ As part of the preparation for the 7th revision of the Standards of Care issued by the World Professional Association for Transgender Health,³⁶ Zucker and Lawrence¹¹ reviewed this quasi-epidemiological literature on prevalence and identified 25 relevant studies. It was probably on the basis of some of the early studies that the DSM-IV,³⁷ which was published in 1994, stated that the prevalence was 1:30 000 adult males (0.000033) and 1:100 000 adult females (0.000010).

Zucker and Lawrence¹¹ noted that population-based data from European countries provided the best estimates of the prevalence of gender dysphoria in Western societies. In Belgium, for example, the prevalence of transsexualism, defined as having undergone sex reassignment, was 1:12 900 for adult males and 1:33 800 for adult females.³⁸ Data from the Netherlands were similar: 1:11 900 adult males and 1:30 400 adult females.³⁹

Since 2014, three new studies have been published: Dhejne *et al.*⁴⁰ reported a point prevalence in December 2010 of 1:7750 adult males and 1:13 120 females in Sweden who had applied for a legal name change. Judge *et al.*⁴¹ reported a prevalence of 1:10 154 adult males and 1:27 668 adult females referred for hormonal treatment in Ireland. Becerra-Fernández *et al.*⁴ reported a prevalence of 1:3205 adult males and 1:7752 adult females in the autonomous region of Madrid who received a diagnosis of Transsexualism at a specialised gender identity unit for the years 2007–15. Arcelus *et al.*¹⁰ provided a meta-analytic review of 21 studies (many of which were included in Zucker and Lawrence¹¹) and concluded that the prevalence of 'transsexualism' in (predominately) adult males was 1:14 705 and 1:38 461 (predominately) adult females. Of the three new studies, two were well within the range reported by Arcelus *et al.*,¹⁰ whereas the Madrid study indicated a higher prevalence.

In a different approach to sampling, Blosnich *et al.*⁴² ascertained the prevalence of Gender Identity Disorder among US veterans who sought services at the Veterans Health Administration (VHA). Blosnich *et al.* noted that 95% of all VHA patients are birth-assigned males.⁴² Using ICD-9 diagnostic codes for Gender Identity Disorder in Adolescents or Adults or Gender Identity Disorder Not Otherwise Specified, the prevalence of patients who received these codes between 2002 and 2011 ranged from 1:8143 (in 2003) to 1:4370 (in 2011), which are clearly higher than in the speciality-clinic numbers reported on most recently by Arcelus *et al.*¹⁰ These upper-bound estimates are likely due, in part, to the fact that the denominator was based on veterans who sought out services at the VHA, not the entire population of military personnel. Another study by Proctor *et al.*⁴³ using similar diagnostic codes reported on the prevalence of Gender Identity Disorder among US patients (age range, 20–85+ years) seeking services via the US Medicare Program in 2013. Of ~52.4 million de-duplicated claims, 4098 individuals (~1:12 800) were judged to be 'transgender...beneficiaries' (S. C. Haffer, personal communication, May 16, 2017). This is a lower-bound estimate because not all beneficiaries would have been marked with gender identity ICD-9 codes. Unfortunately, Proctor *et al.* did not have information on birth-assigned sex of the patients with a gender identity-related ICD-9 diagnosis.⁴³

Sex ratio and sexual orientation

From the clinic-based studies, it is apparent that the prevalence of male-to-female transsexualism is consistently higher than it is in female-to-male transsexualism in adults. The sex ratios can be examined in summary tables provided by Zucker and Lawrence¹¹ (Table 3), Gomez-Gil *et al.*⁴⁴ (Table 1), Arcelus *et al.*¹⁰ (Table 2), and Becerra-Fernández *et al.*⁴ (Table 1).

If these estimates reflect, even in a crude way, sex differences in true prevalence, one can ask why gender dysphoria is more common in biological males than in biological females. As noted above for adolescents, the explanation is likely related to sex differences in sexual orientation variation, as summarised in detail by Lawrence⁴⁵ and collated in Zucker and Lawrence¹¹ (Table 3). In the early 1980s, for example, Sørensen and Hertoft⁴⁶ reported from Denmark that 100% of their female-to-male clients were gynephilic, but only 67% of their male-to-female clients were androphilic. In a more recent Danish study, Simonsen *et al.*⁴⁷ found that 86% of their female-to-male clients were gynephilic, but only 44.8% of their male-to-female clients were androphilic at the time gender-affirming surgery was approved. Although this sex × sexual orientation difference is the modal pattern, there are important regional and cultural variations. For example, in North America, it is very common to find this sexual orientation variation among biological males with gender dysphoria; in contrast, in Spain (as an example), male-to-female clients have been found to be almost exclusively androphilic (90%), a percentage that was similar to the percentage of female-to-male clients who were exclusively gynephilic (94%).⁴⁴

Awareness of this sexual orientation subtype pattern is important, not only for clinical matters (as noted above for adolescents), but it is also relevant to theory regarding causal mechanisms, including, for example, recent structural MRI studies examining sex-dimorphic neural variations in adults with gender dysphoria.⁴⁸

Self-identification as transgender and gender-non-conforming

There are now some new studies that have asked representative samples of adults if they self-identify as transgender or some alternative to the male–female binary. Veale⁴⁹ gauged the prevalence of transsexualism in New Zealand based on the number of individuals, 15 years of age and older, who requested, for example, an 'X' on their passport instead of M (for male) or F (for female) after they had been living as a member of the opposite sex and had made a legal name change. On this basis, Veale reported a higher prevalence rate of 1:3630 in males and 1:22 714 in females.⁴⁹ In the US, Conron *et al.*⁵⁰ examined a probability sample of 28 176 adults (age range, 18–64 years) who participated in a telephone health survey in the state of Massachusetts between 2007 and 2009. They found that 0.5% of the adults considered themselves to be 'transgender' (e.g. 'a person born into a male body, but who feels female or lives as a woman'). Flores *et al.*⁵¹ and Crissman *et al.*⁵² utilised 2014 data from the Centers for Disease Control Behavioural Risk Factor Surveillance System (total $n = 151\,456$) and found that 0.5–0.6% of the adults

sampled from 19 states answered ‘Yes’ to the question ‘Do you consider yourself to be transgender?’. The male:female sex ratio was 2.43:1 for those self-identifying as transgender. Finally, Meerwijk and Sevelius⁵³ reported on the prevalence of self-identification as transgender based on 12 US surveys conducted between 2007 and 2015, and reported a value of 0.4% (1 in every 250 adults). Although not epidemiological in nature, some recent studies have also used the ‘two-step’ method in identifying adults whose sex assigned at birth does not match their current gender identity; this strategy may be useful in new population-based studies.^{54–56}

In the Netherlands, Kuyper and Wijsen⁵⁷ reported that 4.6% of adult males and 3.2% of adult females self-reported an ‘ambivalent’ gender identity (self-identification as equal between one’s own gender and the other gender), which was higher than the 1.1% of adult males and 0.8% of adult females who self-reported an ‘incongruent’ gender identity, with the latter definition more in line with how gender dysphoria is defined in the DSM-5. When Kuyper and Wijsen counted only those individuals who also wanted some type of biomedical treatment, the percentage dropped to 0.6% of adult males and 0.2% of adult females.⁵⁷ In a similar study from Belgium, Van Caenegem *et al.*⁵⁸ reported that 2.2% of adult males and 1.9% of adult females reported ‘gender ambivalent’ feelings (feeling like both a man and a woman) and 0.7% of adult males and 0.6% of adult females reported ‘gender incongruent’ feelings (feeling more like the other gender than one’s own gender).

Conclusions

Epidemiological and quasi-epidemiological research over the past few decades can help us evaluate the statements in DSM-III and DSM-III-R that ‘transsexualism’ is ‘apparently rare’ or ‘apparently uncommon’. If we use the recent data summarised by Arcelus *et al.* (1:14 705 adult males and 1:38 461 adult females),¹⁰ perhaps these descriptors are reasonable, as vague as they were. But the most recent datasets suggest that the prevalence has increased, which is probably why the DSM-5⁵⁹ reported the prevalence for male-to-female gender dysphoria to be between 5 and 14 per 1000 adult males (0.015–0.014) and 2 and 3 per 1000 adult females (0.002–0.003) for female-to-male gender dysphoria. It remains unclear, however, if the increase in prevalence reflects a bona fide change or simply a greater comfort in people ‘coming out’ as transgender because of increasing social acceptance and depathologisation, and a greater awareness of therapeutic options, including not only psychological support in social transition but also in biomedical care (more specialists who provide gender-affirming hormonal and surgical treatments). It is also unclear if there has been any kind of bona fide increase in incidence.

The recent studies using a broader definition of ‘caseness’ (i.e. self-identification as transgender or gender non-conforming) are, perhaps, the most remarkable development over the past decade; this may be an even more telling social marker of a greater societal acceptance of individuals who reject as a social identity the traditional male–female gender binary. If ~1 in 200 adults in the US, for example, self-identify as transgender, this would hardly qualify as rare or uncommon – the percentage is similar to the percentage of US adults who are vegans.⁶⁰ Indeed,

the pulse of contemporary social life (Facebook) provides more than 70 non-binary gender options.⁶¹

There is, however, one critical methodological issue that requires additional research exploration; namely, the stability of a transgender or non-binary gender identity. It is unclear, for example, what percentage of adolescents or adults who self-identify as transgender or some other gender-variant identity status (e.g. ‘genderqueer’) will retain this self-labelled identity over the life course. We know, for example, that young sexual minority adults (especially women) appear to show rather marked fluctuations in their sexual identity (e.g. from lesbian to bisexual or lesbian to unlabelled or from bisexual to lesbian or from unlabelled to lesbian, and even lesbian to heterosexual),^{62,63} so one could hypothesise that variant gender identities might show a similar fluctuation. Some recent data on sexual identity fluidity suggest that this becomes less common in older adults,⁶⁴ so it might be reasonable to predict that fluctuations in gender-variant identities will be more common in both adolescents and young adults. In any case, over the next few years, it will be important to understand the clinical care needs of individuals who do not simply ‘cross’ the gender binary from one end to the other, but are somewhere in-between.⁶⁵

Conflicts of interest

The author declares no conflicts of interest.

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