



# Suicidality in clinic-referred transgender adolescents

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## Abstract

Gender and sexually diverse adolescents have been reported to be at an elevated risk for suicidal thoughts and behaviors. For transgender adolescents, there has been variation in source of ascertainment and how suicidality was measured, including the time-frame (e.g., past 6 months, lifetime). In studies of clinic-referred samples of transgender adolescents, none utilized any type of comparison or control group. The present study examined suicidality in transgender adolescents (M age, 15.99 years) seen at specialty clinics in Toronto, Canada, Amsterdam, the Netherlands, and London, UK (total  $N=2771$ ). Suicidality was measured using two items from the Child Behavior Checklist (CBCL) and the Youth Self-Report (YSR). The CBCL/YSR referred and non-referred standardization samples from both the U.S. and the Netherlands were used for comparative purposes. Multiple linear regression analyses showed that there was significant between-clinic variation in suicidality on both the CBCL and the YSR; in addition, suicidality was consistently higher among birth-assigned females and strongly associated with degree of general behavioral and emotional problems. Compared to the U.S. and Dutch CBCL/YSR standardization samples, the relative risk of suicidality was somewhat higher than referred adolescents but substantially higher than non-referred adolescents. The results were discussed in relation to both gender identity specific and more general risk factors for suicidality.

**Keywords** Gender dysphoria · Adolescents · Transgender · Suicidality · Child Behavior Checklist · Youth Self-Report

## Introduction

Across the life-span, transgender people, including those with a diagnosis of gender dysphoria (GD), have been shown to report more mental health problems, on average, than non-clinical cisgender people (for reviews on adults, see [1–4]). In baseline assessment studies on mental health problems in clinic-referred samples, both children and adolescents with GD show rates of difficulties that are, on average, at least comparable in degree to that of clinical controls (for reviews, see [5–9]).

In the literature on lesbian, gay, and bisexual (LGB) youth, there is frequent reference to an elevated rate of suicidality (in both thoughts and behaviors) (e.g., [10–14]). In recent years, empirical research has also examined the risk of suicidality among adolescents with GD, which has received a considerable amount of media attention, as occurred, for example, after the suicide of U.S. transgender teen Leelah

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Alcorn in December 2014, putatively related to the parent's non-acceptance of her female gender identity [15]).<sup>1</sup>

Studies of suicidality among adolescents who self-identify as transgender (or some alternative gender different from the assigned gender at birth) or who have been diagnosed with GD include non-representative community samples, representative samples of high school students, and samples from specialized gender identity clinics. In these studies, suicidality has been measured in different ways, including (1) self-report of suicidal ideation, (2) self-harming behavior, and (3) suicide attempts in response to specific questions, with different time frames (e.g., in the past 2 weeks, life-time) or via coding of case file information in clinical samples.

In an early study, based on data collected between 2001 and 2003, Grossman and D'Augelli [22] recruited a convenience sample of 55 self-identified 15–21-year-old transgender adolescents from two social and recreation service agencies for LGBT adolescents in New York City. A total of 45% reported that they had “seriously thought” about suicide and 26% reported a suicide attempt. In a more recent study, based on data collected in 2013–2014, Veale et al. [23] sampled 199–231 14–18-year-old Canadian adolescents (80% birth-assigned females) who self-identified as “trans.” Source of recruitment varied, including transgender and “queer” community groups, social media sites, and pediatric endocrinology clinics. A comparison group consisted of 29,832 14–18-year-old adolescents from the 2013 British Columbia Adolescent Health Survey (BCAHS) who were sampled from randomly selected high school classrooms. In the trans sample, 65% reported suicidal ideation in the past year compared to 13% in the BCAHS; the corresponding percentages for self-harm and suicide attempts in the past year were 75% vs. 17% and 36% vs. 7%, respectively.<sup>2</sup> In another study, Toomey et al. [24] sampled 377 transgender and 118,844 male and female high school students who participated in the U.S.-based Profiles of Student Life: Attitudes and Behavior Study between 2012 and 2015. Students were asked if they had ever tried to kill themselves, with response options of either No or Yes (once, twice or more than two times). For the birth-assigned female transgender students ( $n = 175$ ), the percentage who answered “Yes” was 50.8%, which was notably higher than the 17.6% of the female control students ( $n = 60,973$ ); of the birth-assigned male transgender students

( $n = 202$ ), 29.9% answered “Yes” compared to 9.8% of the male control students ( $n = 57,871$ ) (for a similar study, see Thoma et al. [25]).

Suicidality information obtained in non-representative samples should, of course, be viewed with some caution because the participants may not be representative of all adolescents who self-identify as transgender or some alternative gender, which could result in either under- or over-estimates of prevalence. In recent years, there have been several, large-scale studies on suicidality drawn from representative samples of high school students. In two studies, self-reported suicidal ideation over the past 12 months for transgender students was 33.7% (total  $n = 280$ ) [26] and 43.9% (total  $n = 2273$ ) [27]; M. M. Johns, personal communication, December 23, 2019] compared to 18.8% ( $n = 25,213$ ) and 15.7% ( $n = 97,810$ ), respectively, of the non-transgender students.<sup>3</sup> In two studies, self-reported self-harm over the past 12 months for transgender students was 45.3% (total  $n = 95$ ) [29] and 55.0% (total  $n = 1941$ ) [30] L. A. Taliaferro, personal communication, December 20, 2019] compared to 23.4% (total  $n = 7710$ ) and 14.3% (total  $n = 74,134$ ) for the non-transgender students, respectively.<sup>4</sup> For self-reported suicide attempts over the past 12 months, the percentage for the transgender students was 19.8% in Clark et al. [29] and 34.6% ( $n = 1069$ ) in Johns et al. [27] compared to 4.1% and 7.4% ( $n = 67,711$ ), respectively, in the non-transgender students. In Taliaferro et al. [31], the percentage of transgender students (total  $n = 1635$ ) who reported both self-harm and a suicide attempt over the past 12 months was 18.0%.

To date, there have been at least 17 studies that have reported on suicidality among clinic-referred adolescents with GD (see Appendix). As shown in the Appendix, the sample sizes ranged from 31 to 1082, with a median of 78. Most of these studies ascertained rates of suicidality over the client's lifetime, with fewer studies using a “current” or more recent timeframe. Not surprisingly, almost all the studies found higher rates of suicidal ideation than suicidal behaviors. For example, Nahata et al. [42] reported a lifetime prevalence of 74.7% for suicidal ideation compared to a lifetime prevalence of 30.4% for suicide attempts. In contrast, Moyer et al. [47] reported a prevalence of 35.9% for suicidal ideation for the 2 weeks prior to the assessment and Becker et al. [34] reported a prevalence of 11.8% for “current” suicide attempts.

<sup>1</sup> Obtaining data on the prevalence of completed suicides in both gender and sexual minority populations is a complex endeavor (see [16–19] and Gil-Peterson [20], p. ix). Clark et al. [21] have provided important new data, along with a thoughtful consideration of methodological challenges.

<sup>2</sup> The total trans sample in Veale et al. [23] was 300, but 69–101 participants did not answer the questions about suicidality (J. F. Veale, personal communication, January 3, 2017).

<sup>3</sup> Jackman et al. [28] also reported suicidality data from a subset of the sample reported in Johns et al. [27]

<sup>4</sup> This percentage was based only on participants who self-identified as transgender but not those who self-identified as genderqueer, gender fluid, etc.

## Explanations for suicidality risk

Several reasons for this apparent elevation in suicidality among transgender adolescents have been considered. One explanation is that GD is inherently distressing, which leads to suicidal thoughts and/or behaviors [9]. A second possibility is that an elevation in suicidality is the direct result of social stigma, such as social ostracism within the peer group or within-family rejection due to the expression of gender-variant behavior, as posited by minority stress theory (e.g., [64, 65]). Indeed, there is evidence that gender-variant behavior per se is associated with suicidality risk in adolescents, even after controlling for confounding factors such as sexual orientation [66]. Lastly, a third possibility is that such thoughts and behaviors are related to more general behavioral and emotional problems, which could increase the vulnerability for suicidality. These more general problems could be related to generic risk factors, such as an underlying biological vulnerability or psychosocial family processes (e.g., [67–69]), unrelated to GD per se.

## Current study

Although the clinic-based studies certainly suggest an elevated rate of suicidal ideation and behaviors, there are two important limitations to the extant findings: non-clinical comparison groups were almost never employed and, more importantly, a clinical comparison group was not employed in any of the specialized gender identity clinic samples. Thus, there is a compelling need to document how rates of suicidality in adolescents referred for GD compare to (mental health) clinical controls and non-clinical controls.

There are two exceptions, both of which consisted of transgender adolescents seen clinically, but not in specialized gender identity clinics: the study by Becerra-Culqui et al. [43] consisted of adolescent patients (defined as ages 10–17 years) seen at one of three Kaiser Permanente health-care sites in the U.S. and classified as “transgender” or “gender-nonconforming” ( $n = 1082$ ) based on ICD-9 codes any time between 2006 and 2014. Becerra-Culqui et al. examined suicidal ideation and behavior for two time periods (at any time prior to the date of assessment and 6 months before the date of assessment). Compared to 10,654 reference males (10 per proband) and 10,662 females (10 per proband) (matched on the basis of several variables, such as year of birth, site, etc.) who were seen for any other reason other than gender identity (i.e., for either mental health or physical health issues), prevalence ratio estimates for both suicidal ideation and behavior were substantially higher in the transgender/gender-nonconforming group (see Becerra-Culqui et al. [43], Table 3). In Becerra-Culqui et al., however, it is not clear what percentage of the referent group adolescents were being seen for mental health vs.

non-mental health reasons. In general, then, there is a clear need to document how rates of suicidality in adolescents referred for GD compare to (mental health) clinical controls and non-clinical controls.

The other study by Bettis et al. [50] consisted of 31 transgender adolescents admitted to a psychiatric inpatient unit in 2017 or 2018 who were compared to 473 cisgender males and females (consisting of both heterosexual and non-heterosexual youth) admitted to the same unit. Compared to the cisgender youth, Bettis et al. found that the transgender youth had a significantly higher score on a past-month dimensional measure of suicidal ideation but did not differ significantly on measures of non-suicidal self-injury and suicide attempts. Thus, this study found mixed evidence for a higher rate of suicidality among transgender youth compared to a clinical comparison group; of course, because the sample consisted of adolescents admitted to an inpatient psychiatric unit, the generality of the findings to transgender youth in general should be done with caution.

The aim of the present study, therefore, was to assess systematically the prevalence of suicidal thoughts and behaviors from three clinic-referred samples of adolescents with GD—from Toronto (Ontario, Canada), Amsterdam (the Netherlands), and London (UK)—by both parent-report and self-report. We used a metric of suicidality by extracting two items from two standardized behavior problem questionnaires—the parent-report Child Behavior Checklist (CBCL) and the Youth Self-Report (YSR). We tested for cross-national differences in suicidality between the three clinics. In addition, we tested for other correlates of suicidality, including demographic variables (e.g., birth-assigned sex, age at assessment, and year of assessment), poor peer relations, and number of behavioral and emotional problems in general. In addition, and to address the matter of specificity [70], we also compared the percentage of adolescents with GD who, either by parent-report or self-report, endorsed suicidality with the CBCL/YSR referred and non-referred standardization samples from the U.S. and the Netherlands. Use of the standardization samples allowed us to test for the specificity of suicidality among adolescents with GD vs. a characteristic of clinic-referred adolescents in general, which would be an example of equifinality [71] (see also Garber and Hollon [70]).

## Method

### Participants

The sample consisted of 2771 adolescents (age 13 years or older;  $M$  age, 15.99 years;  $SD = 1.20$ ) referred and assessed for GD at one of three clinic sites between 1978 and 2017 ( $M$  year of assessment, 2013.06;  $SD = 5.21$ ); the Gender

Identity Service at the Centre for Addiction and Mental Health (CAMH) in Toronto, Ontario ( $n=260$ ); the Center of Expertise on Gender Dysphoria at the Amsterdam University Medical Centers, VUmc site in Amsterdam, the Netherlands ( $n=266$ ), and the Gender Identity Development Service at the Tavistock and Portman National Health Service Trust in London, UK ( $n=2245$ ).<sup>5</sup> As shown in Table 1, the London cohort consisted of adolescents assessed, on average, in more recent years and the disproportionate number of cases from this clinic reflects the marked increase in adolescents referred for GD during this period of time [73–75]. By clinician interview, all adolescents met DSM-III, DSM-III-R, DSM-IV or DSM-5 criteria either for Gender Identity Disorder/Gender Dysphoria or Gender Identity Disorder Not Otherwise Specified.<sup>6</sup>

## Measures

### Demographics

Six demographic variables were coded: (1) birth-assigned sex; (2) age at assessment; (3) year of assessment; (4) Full-Scale IQ; (5) parents' marital status; and (6) parents' social class (Table 1). We assessed IQ using the American or Dutch versions of the Wechsler Intelligence Scale for Children or the Wechsler Adult Intelligence Scale (IQ data were not available for the London clinic adolescents). Marital status of the parents was categorized as either living with both biological parents (or with adoptive parents from birth) or all other categories (e.g., single parent, separated, divorced, widowed, reconstituted, living in a group home, etc.). Parents' social class was categorized using the method described in Cohen-Kettenis et al. [76]. In the Toronto clinic, the Hollingshead's [77] Four-Factor Index of Social Status was used, classifying individuals on a five-point scale ranging from I (major

business and professional) to V (unskilled laborers, menial service workers). In the Amsterdam clinic, a 5-point scale was used for both parents, where 1 = university degree and 5 = Grade 8 (primary school or less). To make these two methods of assessment comparable, the Hollingshead's ratings for the Toronto sample were coded where a social class ranking of I = 1, II–III = 2, and IV–V = 3. For the Amsterdam sample, an education rating (averaged across both parents) was coded as 1.0–2.0 = 1, 2.5–3.5 = 2, and 4.0–5.0 = 3. Parents' marital status and social class were not available for the London clinic adolescents.

### Suicidality

We used Items 18 and 91 from the CBCL [78] and the YSR [72] to measure suicidality. Item 18 reads as “Deliberately harms self or attempts suicide” (CBCL) or “I deliberately try to hurt or kill myself” (YSR); Item 91 reads as “Talks about killing self” (CBCL) or “I think about killing myself” (YSR). Like all CBCL/YSR items, they were rated on a 3-point response scale, where 0 = not true, 1 = somewhat or sometimes true, and 2 = very true or often true. The parent or adolescent was asked to make such ratings for “now or within the past 6 months.” For the Dutch adolescents, the Dutch translations of the CBCL and YSR were used [79, 80]. For both the CBCL and YSR, we calculated a simple sum score of the two items or dichotomized each item as either present (rated as a 1 or a 2) or absent (rated as a 0). Based on the 2001 CBCL and YSR U.S. standardization sample and the Dutch standardization sample, it seemed reasonable to create a composite score: the within-scale correlation between the two suicidality items ranged between 0.39 and 0.62 for referred males and females and between –0.00 and 0.46 for non-referred males and females (7/8 correlations significant at  $p < 0.001$ ). For the Dutch CBCL and YSR standardization samples, the within-scale correlations between the two suicidality items ranged between 0.40–0.63 for referred males and females and between –0.00 and –0.69 for non-referred males and females (7/8 correlations significant at  $p < 0.001$ ). The two non-significant correlations were likely due to floor effects (see also Van Meter et al. [81]).<sup>7</sup>

In the present study, we calculated the correlation between the CBCL and YSR suicidality sum score as a function of clinic and birth-assigned sex. In the Toronto sample, the correlation for the birth-assigned males ( $r=0.12$ ) was not significant, but was significant for the birth-assigned females ( $r=0.52$ ,  $p < 0.001$ ). In the Amsterdam sample, the correlation for the birth-assigned males ( $r=0.61$ ) and

<sup>5</sup> The Toronto clinic was established in 1975 at the Clarke Institute of Psychiatry (now the Centre for Addiction and Mental Health). In the Toronto clinic, the CBCL was first administered as part of an assessment protocol in 1980 and the YSR in 1986 (the year it became available for use) [72]. The Amsterdam clinic was established in 1987 at the University Medical Center Utrecht in Utrecht. It moved to Amsterdam in 2002. In the Dutch clinic, the CBCL was used from 1990 on and the YSR was first administered as part of an assessment protocol in 1993. The London clinic was established in 1989 at St. George's Hospital in London and moved to the Tavistock and Portman NHS Trust in 1996. When the London clinic became nationally funded in 2009, the CBCL and YSR became part of a routine data base (D. Di Ceglie, personal communication, June 2, 2020).

<sup>6</sup> DSM-III, DSM-III-R, DSM-IV, DSM-IV-TR or DSM-5 were used, depending on the year of assessment. In DSM-III and III-R, the diagnostic term was Transsexualism, not Gender Identity Disorder, which was first used as the diagnostic term in the DSM-IV. In this article, we use the DSM-5 diagnostic label of Gender Dysphoria.

<sup>7</sup> These correlations were calculated based on the raw CBCL/YSR standardization data which were provided by T. M. Achenbach for the U.S. samples and F. C. Verhulst for the Dutch samples

**Table 1** Demographic, CBCL, and YSR Parameters as a Function of Clinic

Variable		Clinic			<i>F, t or <math>\chi^2</math></i>	<i>p</i>	
		Toronto ( <i>N</i> =260)	Amsterdam ( <i>N</i> =266)	London ( <i>N</i> =2245)			
Age (in years)	M	16.66	15.91	15.93	44.92	<0.001	
	SD	1.75	1.42	1.07			
Birth-assigned sex	Male	<i>N</i> (%)	129 (49.6)	123 (46.2)	685 (30.5)	58.29	<0.001
	Female	<i>N</i> (%)	131 (50.4)	143 (53.8)	1560 (69.5)		
Year of assessment	M	2004.72	2004.87	2014.99	1988.55	<0.001	
	SD	7.59	5.77	1.77			
	Range	1978–2012	1990–2012	2009–2017			
Full-Scale IQ <sup>a</sup>	M	102.08	97.16	–	2.84	0.005	
	SD	18.85	16.37	–			
	N	248	185	–			
Social Class <sup>b</sup>	1–2	<i>N</i> (%)	201 (77.3)	171 (78.1)	–	<1	ns
	3	<i>N</i> (%)	59 (22.7)	48 (21.9)	–		
Parent's marital status <sup>c</sup>	Both Parents	<i>N</i> (%)	116 (44.6)	117 (51.1)	–	<1	ns
	Other	<i>N</i> (%)	144 (55.4)	112 (48.9)	–		
CBCL Gender	0: <i>N</i> (%)	13 (5.8)	16 (6.4)	25 (1.8)	24.74	<0.001	
Item 110 (0 vs. 1 or 2)	1–2: <i>N</i> (%)	211 (94.1)	233 (93.5)	1399 (98.2)			
YSR Gender	0: <i>N</i> (%)	10 (4.2)	8 (3.3)	27 (2.0)	5.09	0.078	
Item 110 (0 vs. 1 or 2)	1–2: <i>N</i> (%)	228 (95.7)	233 (96.6)	1337 (98.0)			
CBCL Poor Peer Relations Scale (Sum) <sup>d</sup>	M	2.42	1.38	1.60	30.64	<0.001	
	SD	1.88	1.57	1.60			
	N	239	250	1594			
YSR Poor Peer Relations Scale (Sum) <sup>d</sup>	M	2.09	1.40	2.04	16.10	<0.001	
	SD	1.68	1.49	1.70			
	N	244	242	1553			
CBCL sum of items <sup>e</sup>	M	59.51	47.48	49.24	13.48	<0.001	
	SD	30.91	27.32	30.15			
	N	240	250	1603			
YSR sum of items <sup>f</sup>	M	63.92	52.93	68.24	29.31	<0.001	
	SD	27.19	24.59	30.21			
	N	244	242	1562			
CBCL sum of suicidality items <sup>g</sup>	M	0.83	0.43	0.98	26.21	<0.001	
	SD	1.09	0.75	1.17			
	N	237	250	1562			
YSR sum of suicidality items <sup>g</sup>	M	0.82	0.57	1.29	43.40	<0.001	
	SD	1.06	0.93	1.33			
	N	244	242	1515			

The *N*/cell varies due to missing data. For example, in some instances, we had data only from the CBCL or, in other cases, only data from the YSR. In the Toronto sample, CBCL and YSR data were both not available for 13 additional adolescents, yielding a completion rate of 95.2%. In the Amsterdam sample, CBCL and YSR data were both not available for 62 additional adolescents, yielding a completion rate of 81.0%. In the London sample, CBCL and YSR data were both not available for 574 additional adolescents, yielding a completion rate of 79.6%

<sup>a</sup>Participants were administered age-appropriate versions of the Wechsler scales

<sup>b</sup>Hollingshead's [77] Four-Factor Index of Social Status (absolute range, 8–66), which is based on educational level and occupation. Categories I–II (40–66), III (30–39), and V (8–29), where I = “Major business and professional” and V = “Unskilled laborers, menial service workers.” In the table, Categories I–III were coded as 1–2 and Categories IV–V were coded as 3, corresponding to Categories 1–2 and Category 3 for parental education in the Dutch sample, respectively

<sup>c</sup>For marital status, the category “Other” included the following family constellations: single parent, separated, divorced, widowed, reconstituted (e.g., mother and step-father), living in a group home, etc.

<sup>d</sup>Absolute range, 0–6

<sup>e</sup>Absolute range, 0–232. The sum of the two suicidality items and Item 110 were removed in the calculation of this score



**Table 1** (continued)

<sup>†</sup>Absolute range, 0–200. The sum of the two suicidality items and Item 110 were removed in the calculation of this score

<sup>§</sup>Absolute range, 0–4

birth-assigned females ( $r=0.63$ ) were both significant,  $ps < 0.001$ . In the London sample, the correlation for the birth-assigned males ( $r=0.02$ ) and birth-assigned females ( $r=0.07$ ) were both not significant. This variation in parent–youth concordance for suicidality provides good reason to analyze the CBCL and YSR data separately rather than combining ratings across the parent and youth.

### Other CBCL and YSR Metrics

From the CBCL and YSR, we coded three other metrics: (1) the percentage of cases in which the CBCL/YSR Item 110 (“Wishes to be of opposite sex”/ “I wish I were of the opposite sex”) was rated as a 1 or a 2; (2) a Poor Peer Relations scale (Items 25, 38, and 48) (for details, see Zucker et al. [82]), and (3) a sum behavior problem score of all items rated as a 1 or a 2 (minus the sum of the two suicidality items, the sum of the poor peer relations items, and the gender identity item).

### Procedure

Since the year 2000, the Toronto and Amsterdam clinics have recommended puberty suppression treatment (GnRH analogues) for about two-thirds of the referred adolescents (see Cohen-Kettenis et al. [83] and Zucker et al. [84]), but only after completion of the baseline assessment. In the London clinic, puberty suppression could be recommended, when appropriate, during the years of data collection (see Costa et al. [85]). In all three clinics, demographic information and the other measures used in this study were obtained at the time of a baseline assessment, i.e., prior to any hormonal treatment for GD.

### Statistical Analysis

For the demographic and CBCL/YSR data, we compared the adolescents from the three clinics using either parametric or non-parametric statistics. In addition, we provide comparative analyses using the referred and non-referred CBCL and YSR U.S. and Dutch standardization samples. For the U.S. standardization data, two data sets were available: the 1991 standardization sample and the 2001 standardization sample [72, 86]. For completeness, we provide relevant information from both of these samples. However, we will use the 2001 standardization data for the narrative comparisons described below for two reasons: these data were collected closer to the mean year of assessment of the adolescents with GD

(see Table 1) and because we were able to remove from this sample the referred and non-referred adolescents for whom Item 110 on the CBCL and YSR was rated as a 1 or a 2. Unfortunately, it was not possible to do this for the earlier U.S. standardization sample. For the Dutch standardization sample, we used new data reported on by Tick, van der Ende, and Verhulst [87, 88]. We calculated risk ratios for suicidality to compare the rate between the gender-dysphoric adolescents and the referred and non-referred adolescents in the standardization samples. We then conducted multiple linear regression analyses (with pairwise deletion) to identify whether there were any predictors of suicidality on the CBCL and the YSR in the data set.

## Results

### Demographic and General Child Behavior Checklist/ Youth Self-Report Metrics

Table 1 shows the demographic variables as a function of clinic. On average, the Toronto clinic adolescents were significantly older than both the Amsterdam and London clinic adolescents. The percentage of birth-assigned females in the London clinic was significantly higher than the percentage in the Toronto and Amsterdam clinics. As noted earlier, the year of assessment for the London clinic adolescents was, on average, significantly more recent than both the Toronto and Amsterdam adolescents. For IQ, social class, and parent’s marital status, data were available only from the Toronto and Amsterdam clinics. On average, the adolescents from the Toronto clinic had a significantly higher IQ than the adolescents from the Netherlands but did not differ significantly with regard to parent’s social class or marital status.

With regard to the sum of all behavior problems on the CBCL and YSR, there were significant between-clinic differences. On the CBCL, the adolescents from the Toronto clinic had, on average, more behavior problems than the adolescents from the London clinic who, in turn had more behavior problems than the adolescents from the Amsterdam clinic. On the YSR, the adolescents from the London clinic had, on average, more behavior problems than the adolescents from the Toronto clinic who, in turn, had more behavior problems than the adolescents from the Amsterdam clinic. On the CBCL (poor) peer relations scale, the adolescents from the Toronto clinic had, on average, a higher score than the adolescents from both the Amsterdam and the London clinic. On the YSR (poor) peer relations scale,

**Table 2** Percent Endorsement (Ratings of 1 or 2) of CBCL and YSR Suicidality Items 18 (Behavior) and 91 (Ideation) as a Function of Clinic and Birth-Assigned Sex

Variable	Adolescents with Gender Dysphoria		Standardization Groups			
	Birth-Assigned Males	Birth-Assigned Females	Non-Referred Boys <sup>a</sup>	Non-Referred Girls <sup>a</sup>	Referred Boys <sup>a</sup>	Referred Girls <sup>a</sup>
CBCL Item 18	%N		0.0/0.6/0.3 450/361/367	1.0/1.8/1.6 459/329/383	9.0/16.0/7.7 450/350/480	18.0/31.1/17.6 459/312/564
Toronto	%/N	29.2/120				
Amsterdam	%/N	8.6/116				
London	%/N	30.3/479				
CBCL Item 91	%N		2.0/1.4/2.4 450/361/368	4.0/2.7/2.6 459/329/383	15.0/22.9/17.9 450/350/474	22.0/34.9/22.5 459/312/560
Toronto	%/N	39.2/120				
Amsterdam	%/N	22.4/116				
London	%/N	31.7/479				
YSR Item 18	%N		3.0/3.0/2.2 388/338/271	9.0/3.5/3.9 391/285/305	9.0/10.2/7.5 366/333/440	32.0/24.3/20.0 349/276/495
Toronto	%/N	23.5/119				
Amsterdam	%/N	14.5/110				
London	%/N	41.3/281				
YSR Item 91	%N		7.0/3.3/1.5 388/338/272	18.0/7.7/4.3 391/285/305	18.0/14.4/14.2 366/333/438	40.0/31.2/24.3 349/276/493
Toronto	%/N	41.2/119				
Amsterdam	%/N	27.3/110				
London	%/N	49.1/283				

<sup>a</sup>The first two values in each cell represent U.S. standardization data (from 1991 and 2001, respectively); the third value in each cell represents Dutch standardization data

U.S. standardization data from Achenbach [78, Appendix D] Achenbach and Edelbrock [72, Appendix E], and Achenbach and Rescorla [86]. For the 2001 standardization samples, raw data for the CBCL and YSR were provided by T. M. Achenbach in an SPSS file. For the Dutch standardization samples, raw data for the CBCL and YSR were provided by J. van der Ende in an SPSS file. For the YSR data, the percentages were calculated for adolescents 13–18 years of age (data from 11–12 year-olds were not included). In the 2001 U.S. data set, we did not include referred and non-referred youth where Item 110 (“Wishes to be of opposite sex”) was scored as a 1 or a 2. We did the same for the Dutch standardization samples

the adolescents from the Toronto clinic and the London clinic had, on average, a higher score than the adolescents from the Amsterdam clinic. For the CBCL gender identity item, the percentage of adolescents from the London clinic who received a rating of a 1 or a 2 was significantly higher than the percentage of adolescents from the Toronto and Amsterdam clinics, although in all clinics the percentage was  $\geq 93\%$ . On the YSR, the between-clinic difference was not significant, with all percentages  $\geq 95\%$ .

## Suicidality

### Child Behavior Checklist (parent-report)

For the suicidality composite based on parent-report, the adolescents from the Toronto and London clinics had, on average, a higher score than the adolescents from the

Amsterdam clinic (Table 1). Table 2 shows the percentage of the adolescents from the Toronto, Amsterdam, and London clinics, by birth-assigned sex, whose parents (predominately mothers) rated the two CBCL suicidality items as either a 1 or a 2. Table 2 also shows the percentages for both referred and non-referred adolescents in the U.S. and Dutch standardization samples. Across the three clinics, endorsement of Item 91 (suicidal ideation) ranged from 22.4 to 39.2% and endorsement of Item 18 (suicidal behavior) ranged from 8.6 to 50.8%.

Table 2 also shows the percentage of parents who rated the two CBCL suicidality items as either a 1 or a 2 in the U.S. (2001) and Dutch standardization samples, by birth-assigned sex, for referred and non-referred adolescents, respectively. For the referred samples, endorsement of Item 91 (suicidal ideation) ranged from 17.9 to 34.9% and endorsement of Item 18 (suicidal behavior) ranged from 7.7

**Table 3** Relative risk in suicidality between the adolescents with gender dysphoria and the referred and non-referred adolescents in the CBCL and YSR U.S. and Dutch standardization samples

Suicidality items				
Clinic	CBCL-18	CBCL-91	YSR-18	YSR-91
	Suicidal behavior	Suicidal thoughts	Suicidal behavior	Suicidal thoughts
<i>Toronto</i> <sup>a</sup>				
Birth-assigned transgender males vs. U.S. referred males	1.82:1	1.71:1	2.30:1	2.86:1
Birth-assigned transgender males vs. U.S. non-referred males	48.66:1	28.00:1	7.83:1	12.48:1
Referred males vs. non-referred males	26.66:1	16.35:1	3.40:1	4.36:1
Birth-assigned transgender females vs. U.S. referred females	0.99:1	0.93:1	1.38:1	1.28:1
Birth-assigned transgender females vs. U.S. non-referred females	17.11:1	12.03:1	9.60:1	5.19:1
Referred females vs. non-referred females	17.27:1	12.92:1	6.94:1	4.05:1
<i>Amsterdam</i>				
Birth-assigned transgender males vs. Dutch referred males	1.11:1	1.25:1	1.93:1	1.92:1
Birth-assigned transgender males vs. Dutch non-referred males	28.66:1	9.33:1	6.59:1	18.20:1
Referred males vs. non-referred males	25.66:1	7.45:1	3.40:1	9.46:1
Birth-assigned transgender females vs. Dutch referred females	0.97:1	1.19:1	1.29:1	1.12:1
Birth-assigned transgender females vs. Dutch non-referred females	10.75:1	10.34:1	6.61:1	6.34:1
Referred females vs. non-referred females	11.00:1	8.65:1	5.12:1	5.65:1
<i>London</i> <sup>b</sup>				
Birth-assigned transgender males vs. Dutch referred males	3.93:1	1.77:1	5.50:1	3.45:1
Birth-assigned transgender males vs. Dutch non-referred males	11.00:1	12.19:1	18.77:1	32.73:1
Birth-assigned transgender females vs. Dutch referred females	2.88:1	1.48:1	2.26:1	2.27:1
Birth-assigned transgender females vs. Dutch non-referred females	31.75:1	12.84:1	11.58:1	12.86:1

<sup>a</sup>Because there are no CBCL standardization data from Canada, we used the U.S. standardization data for comparative purposes

<sup>b</sup>Because there are no CBCL standardization data from the United Kingdom, we used the Dutch standardization data for comparative purposes

to 31.1%. For the non-referred samples, endorsement of Item 91 ranged from 1.4 to 2.7% and endorsement of Item 18 ranged from 0.6 to 1.8%.

### Youth Self-Report

For the suicidality composite based on self-report, the adolescents from the London clinic had, on average, a higher score than the adolescents from the Toronto clinic who, in turn, had a higher score than the adolescents from the Amsterdam clinic (Table 1). Table 2 shows the percentage of the adolescents from the Toronto, Amsterdam, and London clinics, by birth-assigned sex, who rated the two YSR suicidality items as either a 1 or a 2. Table 2 also shows the percentages for both referred and non-referred adolescents in the U.S. and Dutch standardization samples. Across the three clinics, endorsement of Item 91 (suicidal ideation) ranged from 27.3 to 55.3% and endorsement of Item 18 (suicidal behavior) ranged from 14.5 to 45.2%.

Table 2 also shows the percentage of adolescents who rated the two YSR suicidality items as either a 1 or a 2 in the 2001 U.S. and Dutch standardization samples, by

birth-assigned sex, for referred and non-referred adolescents, respectively. For the referred samples, endorsement of Item 91 (suicidal ideation) ranged from 14.4 to 31.2% and endorsement of Item 18 (suicidal behavior) ranged from 7.5 to 24.3%. For the non-referred samples, endorsement of Item 91 ranged from 1.5 to 7.7% and endorsement of Item 18 ranged from 2.2 to 3.9%.

### Relative risk between the three clinic samples and the referred and non-referred standardization samples

When the percentage data from the three clinics were compared to the percentage data in the referred and non-referred standardization samples, it was apparent that the percentages were relatively similar to the referred samples, but markedly higher than the non-referred samples. Table 3 provides a comparative analysis of these data. Of 24 comparisons with the referred standardization sample, there were 21 instances in which the percentage was higher among the transgender adolescents.

In the Toronto clinic, the relative risk on the CBCL and YSR suicidality items, when compared to the referred



samples, ranged from around parity (e.g., 0.93:1 for the birth-assigned female transgender adolescents vs. referred females for CBCL Item 91) to 2.86:1 (birth-assigned male transgender adolescents vs. referred males for YSR Item 91). When compared to the non-referred sample, the range was between 5.19:1 (birth-assigned female transgender adolescents vs. non-referred females for YSR Item 91) and 48.66:1 (birth-assigned male transgender adolescents vs. non-referred males for CBCL Item 18). For example, for CBCL Item 91, the birth-assigned male transgender adolescents were 1.71 times more likely to express suicidal ideation compared to the referred males in the standardization sample but 28 times more likely to express suicidal ideation compared to the non-referred males in the standardization sample. Referred males in the standardization sample were 16.35 times more likely to express suicidal ideation compared to the non-referred males.

In the Amsterdam clinic, the relative risk of the difference on the CBCL and YSR suicidality items, when compared to the referred samples, ranged from 0.97:1 (birth-assigned female transgender adolescents vs. referred females for CBCL Item 18) to 1.93:1 (birth-assigned male transgender adolescents vs. referred males for YSR Item 18). When compared to the non-referred sample, the range was between 6.34:1 (birth-assigned female transgender adolescents vs. non-referred females for YSR Item 91) and 28.66:1 (birth-assigned male transgender adolescents vs. non-referred males for CBCL Item 18). For example, for CBCL Item 91, the birth-assigned male transgender adolescents were 1.25 times more likely to express suicidal ideation compared to the referred males in the standardization sample but 9.33 times more likely to express suicidal ideation compared to the non-referred males in the standardization sample. Referred males from the standardization sample were 7.45 times more likely to express suicidal ideation compared to the non-referred males.

In the London clinic, the relative risk on the CBCL and YSR suicidality items, when compared to the referred samples, ranged from 1.48:1 (birth-assigned female transgender adolescents vs. referred females for CBCL Item 91) to 5.50:1 (birth-assigned transgender males vs. referred males for YSR Item 18). When compared to the non-referred sample, the range was between 11.00:1 (birth-assigned male transgender adolescents vs. non-referred males for CBCL Item 18) and 32.73:1 (birth-assigned male transgender adolescents vs. non-referred males for YSR Item 91). For example, for CBCL Item 91, the birth-assigned male transgender adolescents were 5.50 times more likely to express suicidal ideation compared to the referred males in the standardization sample but 18.77 times more likely to express suicidal ideation compared to the non-referred males in the standardization sample.

## Predictors of Suicidality: Multiple Regression Analyses

To examine predictors of suicidality for the transgender adolescents, we performed multiple linear regression analysis separately for the CBCL and YSR data, contrasting the three clinics (Toronto vs. Amsterdam, Toronto vs. London, and Amsterdam vs. London). For the Toronto vs. Amsterdam contrasts, there were nine predictor variables: clinic, birth-assigned sex, year of assessment, age at assessment, full-scale IQ, parent's marital status, parent's social class, poor peer relations, and the sum of all other behavioral and emotional problems (minus the three items from the poor peer relations scale, the two suicidality items, and the gender identity item). For the Toronto vs. London and Amsterdam vs. London contrasts, there were six predictor variables: clinic, birth-assigned sex, year of assessment, age at assessment, poor peer relations, and the sum of all other behavioral and emotional problems. The criterion variable was the sum of the two suicidality items.

## Child Behavior Checklist

Tables 4, 5, 6 show the results for the three contrasts. For the Toronto–Amsterdam contrast (Table 4), there were five significant predictors: clinic, birth-assigned sex, parent's marital status, parent's social class, and general behavioral and emotional problems (year of assessment had a *p* value of 0.056). The adolescents from the Toronto clinic had higher reports of suicidality than the adolescents from the Amsterdam clinic. A higher degree of suicidality was also associated with birth-assigned female transgender adolescents, adolescents who lived in a family configuration classified as “Other” (see Table 1), a lower social class background, and more behavioral and emotional problems in general. For the Toronto–London contrast (Table 5), there were three significant predictors: clinic, birth-assigned sex, and general behavioral and emotional problems. The adolescents from the London clinic had a higher degree of suicidality than the adolescents from the Toronto clinic. A higher degree of suicidality was also associated with birth-assigned female transgender adolescents and more behavioral and emotional problems in general. For the Amsterdam–London contrast (Table 6), there were three significant predictors: clinic, birth-assigned sex, and general behavioral and emotional problems. The adolescents from the London clinic had higher reports of suicidality than the adolescents from the Amsterdam clinic. A higher degree of suicidality was also associated with birth-assigned female adolescents and more behavioral and emotional problems in general.

**Table 4** Predictors of CBCL Suicidality (Toronto vs. Amsterdam)

Predictor	$\beta$	<i>B</i>	SE	<i>t</i>	<i>p</i>	95% CI
Clinic	−0.136	−0.260	0.092	−2.81	0.005	−0.441, −0.078
Birth-assigned sex	0.089	0.170	0.087	1.96	0.050	0.000, 0.341
YOA	−0.087	−0.013	0.007	−1.92	0.056	−0.025, 0.000
Age at assessment	0.000	0.000	0.027	<1	ns	
Full-scale IQ	−0.021	−0.001	0.003	<1	ns	
Parent's marital status	−0.104	−0.200	.089	−2.24	0.026	−0.375, −0.025
Parent's social class	0.115	0.266	0.114	2.33	0.020	0.042, 0.490
Poor peer relations	0.030	0.016	.030	<1	ns	
General behavior problems	0.414	0.014	0.002	7.64	<0.001	0.011, 0.018

Clinic (0=Toronto, 1=Amsterdam); Sex (1=Assigned male at birth; 2=Assigned female at birth); Parent's marital status (0=Two-parents; 1=Other); Parent's social class (0=Middle to High; 1=Low, as in Table 1)

YOA Year of assessment

**Table 5** Predictors of CBCL Suicidality (Toronto vs. London)

Predictor	$\beta$	<i>B</i>	SE	<i>t</i>	<i>p</i>	95% CI
Clinic	0.120	0.207	0.051	4.06	<0.001	0.107, 0.307
Birth-assigned sex	0.103	0.254	0.050	5.10	<0.001	0.157, 0.352
YOA	−0.055	−0.014	0.007	−1.88	0.059	−0.029, 0.001
Age at assessment	0.036	0.035	0.019	1.77	0.076	−0.004, 0.073
Poor peer relations	0.034	0.024	0.017	1.39	ns	
General behavior problems	0.528	0.021	0.001	21.94	<0.001	0.019, 0.023

Clinic (1=Toronto, 2=London); Sex (1=Assigned male at birth; 2=Assigned female at birth)

YOA Year of assessment

**Table 6** Predictors of CBCL Suicidality (Amsterdam vs. London)

Predictor	$\beta$	<i>B</i>	SE	<i>t</i>	<i>p</i>	95% CI
Clinic	0.163	0.540	0.104	5.19	<0.001	0.336, 0.744
Birth-assigned sex	0.104	0.252	0.048	5.21	<0.001	0.157, 0.347
YOA	−0.047	−0.013	0.008	−1.50	ns	
Age at assessment	0.026	0.026	0.020	1.32	ns	
Poor peer relations	0.024	0.017	0.017	0.98	ns	
General behavior problems	0.523	0.021	0.001	22.00	<0.001	0.019, 0.023

Clinic (1=Amsterdam, 2=London); Sex (1=Assigned male at birth; 2=Assigned female at birth)

YOA Year of assessment

## Youth Self-Report

Tables 7, 8, 9 show the results for the three contrasts. For the Toronto–Amsterdam contrast (Table 7), clinic was not significant, but three other predictors were significant: birth-assigned sex, poor peer relations, and general behavioral and emotional problems. A higher degree of suicidality was associated with birth-assigned female transgender adolescents, poor peer relations, and more behavioral and emotional problems in general. For the Toronto–London contrast (Table 8), there were two significant predictors: clinic and general behavioral and emotional problems. The

adolescents from the London clinic had higher reports of suicidality than the adolescents from the Toronto clinic and a higher degree of suicidality was also associated with more behavioral and emotional problems in general. For the Amsterdam–London contrast (Table 9), there were two significant predictors: clinic and general behavioral and emotional problems. The adolescents from the London clinic reported a higher degree of suicidality than the adolescents from the Amsterdam clinic and a higher degree of suicidality was also associated with more behavioral and emotional problems in general.

**Table 7** Predictors of YSR Suicidality (Toronto vs. Amsterdam)

Predictor	$\beta$	<i>B</i>	SE	<i>t</i>	<i>p</i>	95% CI
Clinic	−0.017	−0.035	0.089	<1	ns	
Birth-assigned sex	0.105	0.212	0.087	2.43	0.015	0.041, 0.383
YOA	0.005	0.001	0.007	<1	ns	
Age at assessment	−0.028	−0.017	0.027	<1	ns	
Full-scale IQ	−0.011	−0.001	0.003	<1	ns	
Parent's marital status	0.011	0.022	0.089	<1	ns	
Parent's social class	−0.011	−0.028	0.114	<1	ns	
Poor peer relations	0.106	0.066	0.031	2.12	0.034	0.005, 0.127
General behavior problems	0.495	0.020	0.002	10.25	<.001	0.016, 0.024

Clinic (0=Toronto, 1=Amsterdam); Sex (1 = Assigned male at birth; 2=Assigned female at birth); Parent's marital status (0=Two-parents; 1=Other); Parent's social class (0=Middle to High; 1=Low, as in Table 1)

YOA Year of assessment

**Table 8** Predictors of YSR Suicidality (Toronto vs. London)

Predictor	$\beta$	<i>B</i>	SE	<i>t</i>	<i>p</i>	95% CI
Clinic	0.107	0.203	0.057	3.55	<0.001	0.091, 0.315
Birth-assigned sex	0.035	0.097	0.055	1.77	0.077	−0.204, 0.010
YOA	−0.023	−0.007	0.009	<1	ns	
Age at assessment	.014	.015	0.022	<1	ns	
Poor peer relations	−0.025	−0.019	0.018	−1.09	ns	
General behavior problems	0.589	0.027	0.001	25.89	<0.001	0.025, 0.029

Clinic (1 = Toronto, 2 = London); Sex (1 = Assigned male at birth; 2 = Assigned female at birth)

YOA Year of assessment

**Table 9** Predictors of YSR Suicidality (Amsterdam vs. London)

Predictor	$\beta$	<i>B</i>	SE	<i>t</i>	<i>p</i>	95% CI
Clinic	0.087	0.331	0.120	2.76	0.006	0.096, 0.566
Birth-assigned sex	0.026	0.073	0.054	1.35	ns	
YOA	0.000	0.000	0.010	<1	ns	
Age at assessment	0.027	0.031	0.022	1.39	ns	
Poor peer relations	−0.033	−0.025	0.018	−1.41	ns	
General behavior problems	0.599	0.028	0.001	26.17	<.001	0.026, 0.030

Clinic (1 = Amsterdam, 2 = London); Sex (1 = Assigned male at birth; 2 = Assigned female at birth)

YOA Year of assessment

## Discussion

Using a two-item, continuous composite measure of suicidality derived from the CBCL and YSR, the multiple regression analyses showed significant between-clinic effects for five of the six contrasts, even with all of the other predictors entered into the equations controlled for. This between-clinic variation (by birth-assigned sex) can also be seen in the descriptive data shown in Table 2 for both suicidality items on the CBCL and YSR. That there was some between-clinic variation is consistent with other

clinic-based studies listed in the Appendix. For example, across four studies that assessed suicidal ideation “currently” [34, 43, 47–49] the percentages ranged from 6.2 [43] to 42.2% [34]. Similarly, across eight studies that assessed “lifetime” suicide attempts [33, 35, 36, 38–40, 42, 48, 49], the percentages ranged from 14 [48] to 30.4% [42], not including the inpatient sample of Bettis et al. [50].

Notwithstanding the between-clinic variation, it was apparent that the transgender adolescents from the three clinics were all somewhat higher in their suicidality rate when compared to the referred adolescents in the

standardization samples and, more importantly, substantially higher than the non-referred adolescents. Whereas prior clinic-based studies on suicidality lacked any type of comparison group of adolescents, our use of the CBCL and YSR standardization data allowed us to put the suicidality data in a comparative perspective. From the risk ratio analyses (Table 3), this finding is consistent with various studies which show that adolescents diagnosed with GD have, on average, a greater number of behavioral and emotional problems in general when compared to non-referred adolescents, but relatively similar to adolescents seen clinically for other types of mental health issues [89–92].

Apart from between-clinic effects, the multiple regression analyses included eight (for the Toronto–Amsterdam contrasts) or five other predictor variables (for the Toronto–London and Amsterdam–London contrasts). Of these, birth-assigned sex (four of six contrasts) and general behavioral and emotional problems (six of six contrasts) were the most consistent predictors of suicidality. With regard to birth-assigned sex, the higher rate of suicidality among birth-assigned females was evident on both the CBCL and YSR in all three clinics in the majority of comparisons and in all between-sex comparisons in the U.S. and Dutch referred and non-referred standardization data. This pattern is consistent with many other studies which have shown that suicidality is more common among birth-assigned female adolescents than it is among birth-assigned male adolescents [93].

The analyses showed quite clearly that the sum of general behavioral and emotional problems was strongly related to degree of suicidality. For the Toronto–Amsterdam contrasts, parent’s marital status and social class were also significant predictors for the CBCL suicidality metric, but not on the YSR. It is of interest to note that none of the six contrasts found evidence of a significant effect at  $p \leq 0.05$  for year of assessment with regard to degree of suicidality. In recent years, there has been a remarkable increase in the number of adolescents seeking out mental health services for GD [73, 75, 94] and a corresponding increase in the number of hospital-based clinics to care for these adolescents [95]. The increase in number of referrals might be related to the increasing acceptance/destigmatization of transgender adolescents in the culture at large, which could lead to the prediction that adolescents seen in more recent years would have lower suicidality scores. Yet, at least in our data set, we did not find any strong evidence that more recently assessed adolescents were any less suicidal than adolescents seen many years ago. This finding is entirely consistent with Liu et al.’s [96] meta-analysis regarding correlates of non-suicidal self-injury (NSSI) among predominantly community samples of lesbian, gay, bisexual, and transgender adolescents and adults. In their meta-analysis of studies published between 2005 and 2020, Liu et al. found that the rate of

NSSI did not change over time and remained elevated compared to cisgender, heterosexual controls.

One strength of our study was its large sample size, which was higher than all of the prior studies listed in the Appendix combined. Although the Toronto and Amsterdam clinics contributed much smaller sample sizes than the London clinic, their respective numbers were still larger than 15 of the 16 clinic-based studies listed in the Appendix. A second strength was the use of a standardized metric of suicidality and our capacity to compare our data with the CBCL and YSR standardization samples. Although the suicidality metric might be deemed crude, at least one study has established its external validity [81]. One specific limitation of the CBCL/YSR suicidality metric is the ambiguous wording of Item 18 (“Deliberately harms self or attempts suicide”/“I deliberately try to hurt or kill myself”): it, no doubt, captures non-suicidal self-injury, bona fide suicide attempts or both. Future studies would benefit from more sensitive, dimensional measures that use multiple items with a broader severity range, such as the Suicidal Ideation Questionnaire–Jr. [97], the Self-Injurious Thoughts and Behavior Interview [98], the Columbia Suicide Screen [99] or the use of the proposed criteria for Suicidal Behavior Disorder and Non-suicidal Self-Injury provided in the Conditions for Further Study section of the DSM-5 [100].

## Conclusions

In general, our data would support the view that transgender adolescents should be routinely screened for the presence of suicidal ideation and behavior, much like referred adolescents at large. For transgender adolescents who experience suicidality, a clinical assessment can then attempt to formulate possible determinants, such as: (1) a response to the distress associated with GD; (2) a response to social experiences pertaining to within-family and/or peer-related rejection, consistent with the minority stress model as originally formulated by Meyer [65]; (3) an indicator or sign for the presence of other mental health problems (e.g., a mood disorder); and/or (4) a family history that might confer an underlying risk (e.g., a history of suicidality in first-degree relatives).

Although our data suggest that elevated rates of suicidality are a clinical issue requiring attention in some transgender adolescents, it should, of course, be noted that the majority of the adolescents, either by parent-report or self-report, did not report such thoughts or behaviors (as was also the case in the referred standardization samples). It is, therefore, important to understand the factors that contribute to individual differences in suicidality, just as it is required for understanding the substantial variation that transgender adolescents show with regard to psychopathology in general [101]. Along the same lines, it is also important to recognize

that putative risk factors associated with suicidality show important variation among adolescents diagnosed with GD or who self-identify as transgender.

In the Perez-Brumer et al. [26] study, for example, the mean Victimization score for the transgender high school students was only 0.92 (absolute range, 0–9), suggesting that victimization experiences were not particularly frequent. In previous studies, it has been shown that poor peer relations (in the form of “bullying”) is elevated among adolescents with GD compared to non-clinical controls (e.g., [90]) or transgender high school students compared to cisgender high school students (e.g., [27]). Yet, in the present study, the poor peer relations metric was a significant predictor of suicidality in only one of the six contrasts in the multiple regression analyses, probably, because it was “wiped out” by the general behavior problem metric, a pattern that was also found in a community sample of gender-nonconforming children [102]. Similarly, in Perez-Brumer et al. [26], a more substantial predictor of suicidality was a positive response to a question pertaining to depression, which is quite consistent with our finding of a very strong association between behavioral and emotional problems in general and suicidality, and consistent with other studies [31, 53, 54, 103]. As shown elsewhere, on both the CBCL and the YSR, clinic-referred transgender adolescents have poorer peer relations than non-referred adolescents using the same metric that was employed in the present study [92, Table 4]. Nonetheless, this is not meant to minimize the importance in evaluating the quality of peer relationships among transgender adolescents and, as noted by MacMullin et al. [102] the CBCL/YSR metric of poor peer relations has its limitations, as it was developed as a form of secondary data analysis. Lastly, attention to protective factors for suicidality, such as within-family support or to intra-individual resilience parameters, would be important to examine [3, 30, 104–106]. Further research into these protective and predictive factors should be used to develop transgender-specific and adequate suicide prevention initiatives [107].

### Compliance with Ethical Standards

**Conflict of interest** On behalf of all authors, the corresponding author states that there is no conflict of interest.

**Ethical approval** Use of the data from the CAMH site received ethics approval (CAMH Research Ethics Board, Protocol No. 228–2012 and 089–2013), but ethics approval from the Amsterdam and London clinics was not required because the CBCL and YSR were deemed as routine outcome measures. Therefore, this study was performed in accordance with the ethical standards laid down in the 1964 Declaration of Helsinki and its later amendments.

## Appendix

### Clinic-Based Studies of Suicidality in Transgender Adolescents.

Study/year of Publication	N	Metric	Source	Time frame
Di Ceglie et al. [32]	69	Self-harm: 23%	Chart review	Lifetime
		Self-injurious behavior: 22%		
Skagerberg et al. [33] <sup>a</sup>	97	Suicidal ideation: 17.1%	Chart review	Lifetime
		Self-harm: 32.3%	YSR	
		Suicide attempts: 16.1%		
Becker et al. [34]	40	Suicidal ideation: 42.2%	Chart review	Current
		Self-harm: 26.5%		Current
		Suicide attempts: 11.8%		Current
		Combined: 51.5%		Lifetime
Khatchadourian et al. [35]	84	Suicide attempts: 12%	Chart review	Lifetime
Chapman et al. [36]	43	Suicidal ideation: 51.2%	Self-report	Lifetime
		Self-harm: 41.9%		
		Suicide attempts: 16.3%		
Kaltiali et al. [37]	47	Suicidal ideation and self-harm (combined): 53%	Chart review	Unclear
Olson et al. [38]	49	Suicidal ideation: 51%	Self-report	Lifetime
		Suicide attempts: 30%		Lifetime
Holt et al. [39]	177	Suicidal ideation: 39.5%	Chart review	Lifetime
		Self-harm: 44.1%		
		Suicide attempts: 15.8%		



Study/year of Publication	N	Metric	Source	Time frame	Study/year of Publication	N	Metric	Source	Time frame
Peterson et al. [40]	89	Self-harm: 41.8% Suicide attempts: 30.3%	Chart review	Lifetime	Bettis et al. [50]	31	Suicidal ideation <sup>d</sup>	Self-injurious Thoughts and Behaviors Inventory	Past month
Fisher et al. [41]	46	Multi-Attitude Suicide Tendency Scale Suicidal ideation: 86.9% Suicide attempts: 13.0%	Self-report	Unclear Unclear			Non-suicidal self-injury: 70.1% Suicide attempt: 54.83%	Questionnaire-Jr Suicidal Ideation Self-report	Past 12-month frequency Lifetime Lifetime
Nahata et al. [42]	79	Suicidal ideation: 74.7% Self-harm: 55.7% Suicide attempts: 30.4%	Chart review	Lifetime					
Becerra-Culqui et al. [43] <sup>b</sup>	1082	Suicidal ideation: 6.2% Suicidal ideation: 9.2% Self-harm: 3.2% Self-harm: 6.0%	Chart review (ICD-9 code)	Prior 6 months Lifetime Prior 6 months Lifetime					
Brocksmith et al. [44] (see also Chen et al. [45])	78	“Suicidality”: 10.2%	Chart review	Unclear					
Allen et al. [46]	47	Ask Suicide-Screening Questions (n=4) <sup>c</sup>	Self-report	“past few weeks”					
Moyer et al. [47]	79	Suicidal ideation: 35.9%	Patient Health Questionnaire for depression (PHQ-9)	Past 2 weeks					
Sorbara [48] (see also Chiniara et al. [49])	300	Suicidal ideation: 47.3% “Active” suicidal ideation: 12.3% Self-harm: 34.6% Suicide attempts: 14.0%	Chart review	Lifetime Current Lifetime Lifetime					

With the exception of Becerra-Culqui et al. [43]), Becker et al. [34], and Nahata et al. [42]), the table does not include mixed samples of children and adolescents [51–56] or of adolescents and young adults [57–63]. Inclusion of children would likely result in lower percentages for suicidal behavior. Surace et al. [61] reported a meta-analysis of lifetime prevalence of suicidal ideation and behavior in samples of “gender non-conforming” children, adolescents, and adults. Regarding adolescents, their meta-analysis, for reasons that are unclear, did not capture at least 11 of the clinic-based studies [32, 34–38, 40, 41, 44, 46–48] that we report on in this Appendix. For prior reviews, see [62, 63].

<sup>a</sup>Percentages extracted from Table 3.

<sup>b</sup>Data from two healthcare systems in the United States, but the clients were not necessarily seen in a specialized gender identity clinic.

<sup>c</sup>Percentages per item not reported.

<sup>d</sup>Dimensional multi-item measure (frequency/severity); percentage data not reported.

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