

RESEARCH

Open Access



Socioeconomic characteristics, health and wellbeing of nonbinary adolescents in a Southern European City

Lucía Artazcoz^{1,2,3,4*} , Juli Carrere^{1,2,3}, Katherine Pérez^{1,2,3} , Esther Sánchez-Ledesma^{1,2,3} , Gemma Serral^{1,2,3} and Maria José López^{1,2,3,4}

Abstract

Background Research on the health and well-being of non-binary adolescents is limited, with most studies conducted in Anglo-Saxon and Northern European countries, often relying on non-representative samples. This study aimed to: (1) compare the socioeconomic characteristics of cisgender and nonbinary adolescents in secondary education; (2) examine differences in experiences of discrimination and problematic relationships with family and peers; (3) compare substance use between cisgender and nonbinary adolescents; and (4) analyze gender identity differences in health and wellbeing outcomes.

Methods This cross-sectional study used data from the 2021 FRESC Health Survey on Adolescence in Barcelona. The survey is based on a representative sample of secondary education students aged 13–19. The final sample size consisted of 3,272 individuals (62 identified as nonbinary). Respondents answered questions covering experiences of discrimination, problematic relationships, substance use, and a wide range of health and well-being variables. Logistic regression models, adjusted for socioeconomic variables, were used to test the associations between gender identity and the various health-related variables.

Results In the sample, 1.9% identified as nonbinary (2.6% among those assigned female at birth and 1.2% among those assigned male at birth). Nonbinary individuals were younger, more likely to have a lower socioeconomic status, live in single-mother households, and have a mother born outside Catalonia. Overall, nearly all health-related outcomes, except for substance use, were worse for cisgender girls but, particularly, for nonbinary individuals, compared to cisgender boys.

Conclusion Cisgender girls and, especially, nonbinary adolescents report lower well-being compared to cisgender boys across a range of well-being domains. These findings highlight the importance of expanding research on nonbinary adolescents and incorporating questions about gender identity in health surveys, while also distinguishing between cisgender boys and girls. Additionally, targeted interventions are essential to support young people in expressing and living authentically in alignment with their gender identity.

Keywords Gender identity, Social factors, Social discrimination, Family relations, Mental health

*Correspondence:
Lucía Artazcoz
lartazco@aspb.cat

Full list of author information is available at the end of the article



© The Author(s) 2025. **Open Access** This article is licensed under a Creative Commons Attribution-NonCommercial-NoDerivatives 4.0 International License, which permits any non-commercial use, sharing, distribution and reproduction in any medium or format, as long as you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons licence, and indicate if you modified the licensed material. You do not have permission under this licence to share adapted material derived from this article or parts of it. The images or other third party material in this article are included in the article's Creative Commons licence, unless indicated otherwise in a credit line to the material. If material is not included in the article's Creative Commons licence and your intended use is not permitted by statutory regulation or exceeds the permitted use, you will need to obtain permission directly from the copyright holder. To view a copy of this licence, visit <http://creativecommons.org/licenses/by-nc-nd/4.0/>.

Background

A growing number of children and adolescents describe themselves as transgender or gender diverse (TGD), meaning their gender identities or expressions differ from their sex assigned at birth [1]. The increase in TGD individuals among younger people can be attributed to several factors, including sociopolitical advancements and a reduction in cultural stigma which have resulted in a more visible and supported younger TGD population [2, 3].

A small but increasing number of studies on TGD youth suggest that, compared with cisgender people (individuals whose sex assigned at birth matches their gender), they are at substantially elevated risk for various negative health outcomes [4–7]. They also face higher rates of family rejection, peer victimization, and discrimination [7].

While several studies have highlighted the inequalities in health between TGD and cisgender people, most of this research has examined TGD individuals as a single group often due to sample size constraints [8]. This approach assumes no differences within the TGD population. However, young people identifying as nonbinary, who make up a significant minority of the population, often experience lower levels of support and higher rates of abuse and victimization compared to their transgender binary and cisgender peers, as well as elevated rates of depression, anxiety, and suicidal ideation [5, 9, 10]. Despite these challenges, the nonbinary population remains a poorly studied group [11].

Most previous studies have compared TGD individuals to cisgender individuals without differentiating between cisgender males and females [10, 12–15], despite widely reported consistent gender differences across many health outcomes [16, 17]. Additionally, most studies on TGD and health status among adolescents have been conducted in Anglo-Saxon and Northern European countries, particularly in the US [7, 18, 19], but social and cultural circumstances can differ significantly among countries, potentially leading to different results. Furthermore, many of these studies are not based on representative samples [7] and often examine only a limited range of health outcomes.

Gender roles and gender identity have both immediate and long-term influences on adolescent development, resources, opportunities, and ultimately, adolescent and adult health [20]. Research on the health of nonbinary adolescents is particularly important, because adolescence is a developmental period in which mental health problems rise sharply [21] and involves heightened risk for substance use and associated adverse consequences [22].

This study, conducted with a representative sample of adolescents from Barcelona, aims to: (1) compare the

socioeconomic characteristics of cisgender and nonbinary adolescents in secondary education; (2) examine differences in experiences of discrimination and problematic relationships with family and peers based on gender identity; (3) compare substance use between cisgender and nonbinary adolescents; and (4) analyze gender identity differences in health and wellbeing outcomes.

Methods

Study population

This is a cross-sectional study based on the 2021 FRESC Health Survey on Adolescence in Barcelona, the capital of the Catalonia region in northeastern Spain, with a population of around 1.7 million inhabitants. The FRESC is a periodic health survey conducted in Barcelona every four years since the 1990s. It is based on a representative sample of secondary education students aged 13–19. A stratified random sampling method was used, with the classroom as the sampling unit. The sample includes students in students in 8th ($n=1,120$), 10th ($n=1,062$), and 12th ($n=1,108$) grades, aged 13–19 years ($n=3,290$). The students in the participating schools completed an anonymous, virtual, self-administered questionnaire in a classroom setting. This was done in the presence of research team members who coordinated with school tutors to clarify any doubts and ensure the correct completion of the survey during a 45-minute session. The response rate was 88.9%. Details of the survey are reported elsewhere [23].

For the purposes of this study, we excluded transgender boys and girls due to the small sample size ($n=18$). The final sample under analysis included 1,635 cisgender boys, 1,575 cisgender girls, and 62 nonbinary individuals, 43 of them assigned female at birth (AFAB).

Variables

Gender identity

Two questions were used to inquire about sex assigned at birth and current gender identity (boys, girls or nonbinary). Sex assigned at birth was assessed with the question, ‘Which is your sex?’ offering two options: boy and girl. Current gender identity was assessed with the question, ‘What gender do you identify with?’ providing three options: boy, girl, and nonbinary. Students whose sex assigned at birth matched their gender identity were considered cisgender, while those with a binary gender identity that did not match their assigned sex were classified as transgender boys or girls. Those who identified as nonbinary were categorized as nonbinary. In total, five gender identities were identified: cisgender girls, cisgender boys, transgender girls, transgender boys, and nonbinary individuals.

Socioeconomic characteristics

Socioeconomic characteristics included age (continuous), students' socioeconomic status (SES), place of birth of the students, their mothers, and fathers, and family structure. SES was measured with the Family Affluence Scale (FAS), an individual measure based on a set of questions related to the economic capacity of the student's family. In this edition of the survey, the updated version of the scale, FAS III, was used [24].

The questions asked to obtain the FAS pertain to the conditions of the adolescents' homes and refer to specific physical conditions of the home, access to the Internet and a computer, and vacations. Each of the four questions contributes to a total FAS score, which defines three socioeconomic levels: (1) low socioeconomic level (total FAS score between 0 and 3); (2) medium socioeconomic level (total FAS score between 4 and 5); and (3) high socioeconomic level (total FAS score between 6 and 7).

The place of birth for students and their parents was categorized into four groups: Barcelona, the rest of Catalonia, the rest of Spain, and other places. Family structure was categorized into six groups: living with both mother and father, in a single-mother family, in a single-father family, with mother and her partner, with father and his partner, and with people other than parents.

Discrimination data were collected through a question about different reasons for discrimination experienced in the last 12 months: country of birth or ethnicity, gender, sexual orientation, appearance, age, or a mental health problem. The responses were categorized into "Never" or "Ever," with "Ever" encompassing "ever," "many times," and "constantly."

Problematic relationships

Family relationships were assessed with the question, "How are your relationships with your family usually?" with five response options. Responses categorized as "Very good" and "Good" were considered "good," while "Fair," "Poor," and "Very poor" were categorized as "poor." Peer victimization was assessed with three questions about experiences at school or on the way to school in the last 12 months: (1) "Have you been laughed at or insulted?" (2) "Have you been beaten, attacked, or threatened?" (3) "Have your classmates marginalized or rejected you?" Responses were dichotomized into "Never" and "Ever," with "Ever" including instances from one to four or more occurrences.

Substance use

Four dichotomic questions about consumption of substances were included: daily smoking, having been drunk at least once in the last year, having tried cannabis at some point in their lives, and having tried cocaine at some point in their lives.

Health outcomes

Self-perceived health status was elicited by asking the respondents to describe their general health as "excellent," "very good," "good," "fair," or "poor." Responses were categorized into poor (poor or fair) versus good health (good, very good or excellent). This indicator has been shown to be stable and valid across adolescence and young adulthood, correlating with both physical and emotional dimensions of well-being [25–27]. Its use is supported by major international health surveys (e.g., WHO and Health Behavior in School-aged Children) due to its reliability, cross-cultural comparability, and efficiency [26].

Mental health was assessed using the Strengths and Difficulties Questionnaire (SDQ) [28]. This instrument comprises 25 items divided into five subscales. Each subscale has a total score range of 0 to 10. For the first four subscales (emotional symptoms, conduct problems, hyperactivity, and peer problems), a higher score indicates more problems, whereas for the prosocial behavior subscale, a lower score indicates more problems. All subscales were categorized according to recommended cut-off points into three categories: normal, borderline, and abnormal.

Additionally, a total difficulties score was calculated by summing the scores of the emotional, conduct, hyperactivity, and peer problems subscales, yielding a range between 0 and 40. A higher total difficulties score indicates a greater likelihood of mental health problems. Based on the total score, the variable was categorized into normal SDQ (score 0–15), borderline SDQ (score 16–19), and abnormal SDQ (score 20–40). Subsequently, each subscale and the global mental health score were dichotomized. The "abnormal" category was considered indicative of a problem, while the "borderline" and "normal" categories were combined into a single "normal" category.

Experience of sadness and hopelessness was measured with a single question about feeling sad or hopeless, based on a "Yes" response to the question: "During the past 12 months, did you ever feel so sad or hopeless almost every day for 2 weeks or more in a row that you stopped doing some usual activities?" [29].

Life satisfaction was assessed with a single question: "In general, how satisfied are you with your life?" Responses were measured with a scale from 0 (not at all satisfied) to 10 (completely satisfied). The responses were grouped into four levels (from 0 to 4, very low, points, from 5 to 6 points, low, from 7 to 8 points, high, and from 9 to 10 points, very high) [30]. For our analysis, we dichotomized the variable into "Dissatisfied," which includes "Very low" and "Low" categories, and "Satisfied," which includes "High" and "Very high" categories.

Data analysis

First, gender identity differences in socioeconomic characteristics were examined using chi-square tests for categorical variables and analysis of variance (ANOVA) for age at the bivariate level. Second, multiple logistic regression models, adjusted for all socioeconomic variables, were fitted to test the association between gender identity and various health-related variables, calculating adjusted odds ratios (aOR) and confidence intervals (CI).

Results

Sample characteristics

In the sample, 1.9% identified as nonbinary, with 2.6% among those AFAB and 1.2% among those assigned male at birth (AMAB). Table 1 presents the socioeconomic characteristics of the study sample by gender identity. Nonbinary individuals were younger, more likely to have

a lower socioeconomic status, to live in a single-mother household, and to have a mother who was not born in Catalonia.

Discrimination and problematic relationships

Both cisgender girls and nonbinary individuals were more likely to experience discrimination for all reasons, except ethnicity or country of birth, compared to cisgender boys. However, the magnitude of the association was notably higher among nonbinary adolescents (Table 2).

Additionally, cisgender girls and nonbinary individuals were more likely to have poor relationships with their families than cisgender boys, with an aOR of 1.48 (95% CI: 1.24–1.77) for cisgender girls and 4.11 (95% CI: 2.43–6.98) for nonbinary individuals. Nonbinary youth were also more likely to be laughed at or insulted (aOR = 2.40, 95% CI: 1.39–4.16) and to be marginalized (aOR = 2.95,

Table 1 Socioeconomic characteristics of the sample by gender identity (%). Barcelona 2021

	Cisgender girls N=1,635	Cisgender boys N=1,575	Nonbinary N=62	p
Mean age (SD)	15.51 (1.84)	15.33 (1.81)	15.11 (1.90)	0.008
Socioeconomic status (missing values = 4)				0.007
High (FAS = 6–7)	23.4	25.5	21.0	
Medium (FAS = 4–5)	58.3	55.4	43.5	
Low (FAS = 0–3)	18.3	19.1	35.5	
Family structure (missing values = 2)				< 0.001
Living with parents	69.3	69.4	61.3	
Single-mother family	19.4	17.6	29.0	
Single-father family	2.4	3.1	0.0	
Living with mother and her partner	3.7	1.7	3.2	
Living with father and his partner	0.6	0.6	1.6	
Living with no parents	4.6	7.6	4.8	
Student's place of birth (missing values = 0)				0.083
Barcelona	78.4	78.6	71.0	
Rest of Catalonia	5.6	7.1	6.5	
Rest of Spain	2.1	2.8	4.8	
Other countries	13.6	11.2	16.1	
Don't know	0.3	0.3	1.6	
Mother's place of birth (missing values = 0)				0.018
Barcelona	57.5	55.5	35.5	
Rest of Catalonia	7.5	7.8	9.7	
Rest of Spain	8.1	7.9	14.5	
Other countries	25.6	26.6	35.5	
Don't know	0.9	1.9	3.2	
Not applicable	0.4	0.3	1.6	
Father's place of birth (missing values = 0)				0.766
Barcelona	52.1	50.3	40.4	
Rest of Catalonia	8.9	9.2	11.3	
Rest of Spain	10.4	11.3	16.1	
Other countries	25.2	25.6	29.0	
Don't know	2.5	2.9	1.6	
Not applicable	0.9	0.7	1.6	

Representative sample of the students at secondary school in Barcelona. 2021 FRESC Health Survey on Adolescence in Barcelona

p values compare cisgender girls, cisgender boys and nonbinary people

Table 2 Multivariate association between discrimination for various causes and gender identity. Barcelona, 2021

	%	aOR (95% CI)
Country of birth (n = 535; missing values = 18)		
Cisgender boys	17.0	1
Cisgender girls	14.3	0.80 (0.65–0.98) ^a
Nonbinary	14.5	0.67 (0.31–1.44)
Gender (n = 821; missing values = 18)		
Cisgender boys	7.9	1
Cisgender girls	39.6	7.81 (6.32–9.65) ^c
Nonbinary	58.1	18.02 (10.36–31.33) ^c
Sexual orientation (n = 381; missing values = 18)		
Cisgender boys	7.8	1
Cisgender girls	12.5	1.67 (1.32–2.12) ^c
Nonbinary	64.5	20.58 (11.73–36.13) ^c
Appearance (n = 1546; missing values = 18)		
Cisgender boys	38.6	1
Cisgender girls	52.9	1.84 (1.60–2.13) ^c
Nonbinary	62.9	2.67 (1.56–4.56) ^c
Age (n = 680; missing values = 18)		
Cisgender boys	15.7	1
Cisgender girls	23.9	1.70 (1.42–2.04) ^c
Nonbinary	35.5	3.11 (1.80–5.38) ^c
Mental health problems (n = 246 missing values = 18)		
Cisgender boys	4.3	1
Cisgender girls	9.1	2.28 (1.68–3.08) ^c
Nonbinary	35.5	14.40 (7.88–26.31) ^c

Note: model is adjusted for age, socioeconomic status, family structure, place of birth of student, mother and father. 2021 FRESC Health Survey on Adolescence in Barcelona

^a $p < 0.05$; ^b $p < 0.01$, ^c $p < 0.001$

Table 3 Multivariate associations between poor relationships and gender identity. Barcelona 2021

	%	aOR (95% CI)
Poor family relationships (n = 724; missing values = 13)		
Cisgender boys	17.7	1
Cisgender girls	24.0	1.48 (1.24–1.77) ^c
Nonbinary	48.4	4.11 (2.43–6.98) ^c
Peer victimization		
Laughed at or insulted (n = 532; missing values = 21)		
Cisgender boys	18.8	1
Cisgender girls	20.1	1.14 (0.96–1.37)
Nonbinary	37.1	2.40 (1.39–4.16) ^b
Beaten, threatened or attacked (n = 140; missing values = 21)		
Cisgender boys	10.8	1
Cisgender girls	4.7	0.42 (0.32–0.56) ^c
Nonbinary	11.3	1.09 (0.48–2.46)
Marginated (n = 397; missing values = 21)		
Cisgender boys	14.4	1
Cisgender girls	19.7	1.54 (1.27–1.86) ^c
Nonbinary	33.9	2.95 (1.68–5.19) ^c

Note: model is adjusted for age, socioeconomic status, family structure, place of birth of student, mother and father. 2021 FRESC Health Survey on Adolescence in Barcelona

^a $p < 0.05$; ^b $p < 0.01$, ^c $p < 0.001$

Table 4 Multivariate associations between consumption of substances and gender identity. Barcelona 2021

	%	aOR (95% CI)
Current smoker (n = 313; missing values = 0)		
Cisgender boys	6.5	1
Cisgender girls	10.7	1.70 (1.30–2.23) ^a
Nonbinary	6.5	1.14 (0.37–3.39)
Drunk in the last 12 months (n = 2251; missing values = 52)		
Cisgender boys	48.5	1
Cisgender girls	57.4	1.09 (0.93–1.29)
Nonbinary	54.1	0.99 (0.55–3.24)
Hashish ever in life (n = 918; missing values = 54)		
Cisgender boys	26.6	1
Cisgender girls	27.8	0.93 (0.78–1.12)
Nonbinary	21.3	0.83 (0.41–1.80)
Cocaine ever in life (n = 67; missing values = 54)		
Cisgender boys	2.9	1
Cisgender girls	1.0	0.33 (0.18–0.59) ^a
Nonbinary	1.6	0.53 (0.07–4.05)

Note: model is adjusted for age, socioeconomic status, family structure, place of birth of student, mother and father. 2021 Survey of risk factors in secondary school students of Barcelona

^a $p < 0.05$; ^b $p < 0.01$, ^c $p < 0.001$

95% CI: 1.68–5.19) by peers at school but no differences were found for being beaten (Table 3).

Substance use

No significant differences were found between cisgender boys and nonbinary individuals regarding smoking, having been drunk at least once in the past year, or ever using hashish or cocaine. However, cisgender girls were more likely to be current smokers compared to cisgender boys. Conversely, cisgender girls were less likely than cisgender boys to have ever consumed cocaine (Table 4).

Health and wellbeing

For all health and wellbeing outcomes examined, except for conduct problems and peer relationship problems among cisgender girls and lack of prosocial behavior among nonbinary individuals, cisgender girls and nonbinary adolescents had poorer results, with the magnitude of the associations being significantly higher among nonbinary adolescents. Life dissatisfaction was more common among cisgender girls (aOR = 1.95, 95% CI: 1.66–2.30) and especially among nonbinary individuals (aOR = 5.67, 95% CI: 3.32–9.71) (Table 5) [Table 5].

Discussion

Overall, nearly all health-related outcomes, except for substance use, were worse for cisgender girls and, more prominently, for nonbinary individuals compared to cisgender boys. This study has produced four main findings: (1) nonbinary individuals tended to be younger, more likely to have a lower SES, to live in single-mother

Table 5 Multivariate association between health outcomes and gender identity. Barcelona, 2021

	%	aOR (95% CI)
Poor self-perceived health status (<i>n</i> = 355; missing values = 9)		
Cisgender boys	6.4	1
Cisgender girls	12.9	2.15 (1.66–2.77) ^c
Nonbinary	30.6	6.03 (3.31–10.98) ^c
Emotional problems (<i>n</i> = 669; missing values = 13)		
Cisgender boys	8.2	1
Cisgender girls	30.0	4.84 (3.92–5.98) ^c
Nonbinary	46.8	8.93 (5.21–15.32) ^c
Conduct problems (<i>n</i> = 466; missing values = 13)		
Cisgender boys	13.7	1
Cisgender girls	12.9	0.98 (0.79–1.20)
Nonbinary	32.3	2.85 (1.62–5.00) ^c
Hyperactivity/Inattention (<i>n</i> = 933; missing values = 13)		
Cisgender boys	25.7	1
Cisgender girls	29.2	1.19 (1.01–1.39) ^a
Nonbinary	43.5	2.27 (1.35–3.83) ^b
Peer relationship problems (<i>n</i> = 134; missing values = 13)		
Cisgender boys	4.2	1
Cisgender girls	2.9	0.71 (0.48–1.05)
Nonbinary	14.5	3.44 (1.58–7.50) ^b
Non-prosocial behaviour (<i>n</i> = 375; missing values = 13)		
Cisgender boys	14.9	1
Cisgender girls	6.9	0.42 (0.33–0.53) ^c
Nonbinary	17.7	1.12 (0.57–2.22)
Poor global mental health (SDQ scoring) [<i>n</i> = 533; missing values = 13]		
Cisgender boys	10.9	1
Cisgender girls	19.1	1.98 (1.61–2.43) ^c
Nonbinary	48.4	6.93 (4.06–11.83) ^c
Experience of sadness or hopelessness (<i>n</i> = 1059; missing values = 9)		
Cisgender boys	20.0	1
Cisgender girls	40.5	2.79 (2.37–3.28) ^c
Nonbinary	51.6	4.24 (2.51–7.16) ^c
Life dissatisfaction (<i>n</i> = 976; missing values = 13)		
Cisgender boys	21.4	1
Cisgender girls	34.8	1.95 (1.66–2.30) ^c
Nonbinary	61.3	5.67 (3.32–9.71) ^c

Note: model is adjusted for age, socioeconomic status, family structure, place of birth of student, mother and father. 2021 FRESC Health Survey on Adolescence in Barcelona

^a*p* < 0.05; ^b*p* < 0.01, ^c*p* < 0.001

households, and to have a mother born outside Catalonia; (2) nonbinary adolescents experienced significantly higher levels of discrimination from almost all sources and reported poorer family relationships as well as higher levels of victimization at school compared to their cisgender peers; (3) nearly all indicators related to poor health and life satisfaction were significantly worse among nonbinary individuals; however, (4) there were no differences in substance use between nonbinary individuals and cisgender boys.

Socioeconomic characteristics

Individuals AFAB were significantly more likely to identify as nonbinary, a pattern consistent with other studies based on representative samples of secondary school students [12, 14]. This finding aligns with research indicating that adolescent boys are generally less motivated to challenge the unequal gender norms that benefit them, whereas girls are more likely to recognize and challenge the ways in which these norms disadvantage them [20]. A study based on the EU LGBTI Survey II found that, among youths, AMAB individuals experience greater difficulties in sharing their LGBT identity compared to those AFAB. The authors attributed this finding to the higher social cost associated with transgressing cis-heterosexist stereotypes linked to manhood, compared to those associated with womanhood [31]. While some increases in the social acceptance of nonbinary identities have been observed, nonbinary individuals continue to face challenges related to visibility and social recognition [32].

Nonbinary individuals were younger than their cisgender peers, which is consistent with findings from other studies based on similar samples [12, 14]. This trend can be attributed to the increasing visibility and acceptance of nonconforming gender identities, particularly among adolescents and young people [1, 33, 34].

Earlier research on TGD in adolescent population studies has rarely focused specifically on socioeconomic characteristics of TGD in youth [12]. In this study, nonbinary individuals were more likely to experience adverse family characteristics, including lower SES, a higher frequency of living in single-mother households, and having mothers born outside Catalonia. These findings align with a Finnish study showing that transgender and nonbinary adolescents faced lower maternal education, parental unemployment, not living with both parents, and lack of family resources [12]. Similarly, a Swedish study found nonbinary youth more likely to worry about family economy and were less able to afford leisure activities [35], while a Minnesota study linked nonconforming identities among adolescents to economic hardship [14].

While nonbinary identity in adolescents may reflect a response to social situations with less power and fewer opportunities compared to privileged groups, this remains speculative and requires further research.

Discrimination and problematic relationships

As expected, discrimination for various reasons and poor family relationships were more frequent among cisgender girls, but these problems were particularly pronounced among nonbinary individuals, who were also more likely to experience victimization by their peers. Previous studies have documented elevated rates of discrimination, violence, and victimization among TGD secondary

school students compared to their cisgender peers [4, 7, 8, 11, 36, 37]. A study conducted in Spain, using a non-representative sample of individuals aged 14–25, found that nonbinary individuals received the least support from family and friends, faced a higher risk of cyberbullying, and reported more feelings of isolation and unhappiness compared to cisgender and binary transgender individuals [13].

Substance use

Many studies have reported that TGD youth may be particularly prone to substance use [8, 14, 37, 38]. However, in this study, there were no differences in substance use between nonbinary individuals and cisgender boys. In contrast, cisgender girls were more likely to smoke but less likely to consume cocaine. These findings highlight the importance of considering gender differences in substance use patterns among cisgender adolescents, as well as the importance of conducting cross-national comparisons to better understand the contextual factors associated with gender identity, substance use, and health status.

Health and wellbeing

Compared to cisgender boys, almost all the health outcomes analyzed were more frequent among cisgender girls and, particularly, among nonbinary individuals. The current gender system ascribes greater value to men and things considered masculine than to women or things considered feminine. It also grants less legitimacy to gender identities or expressions that do not conform to the strict dichotomy of acceptable behavior for men and women. Individuals who deviate from prevailing gender expectations may experience discrimination and social sanctioning [16]. TGD experience of higher prevalence of discrimination, victimization and family and peer rejection have been demonstrated to be related to poor mental health outcomes particularly among young people [39, 40].

A study based on a representative sample of 15–18-year-old Spanish adolescents found that nonbinary transgender adolescents reported the lowest levels of perceived excellent health, the highest frequency of psychological and physical complaints, and a lower sense of coherence compared with both cisgender and binary transgender adolescents. Similarly, nonbinary adolescents showed lower levels of life satisfaction and health-related quality of life compared to their cisgender peers [10]. However, these results were based on a bivariate analysis, were not adjusted for socioeconomic characteristics and did not distinguish between cisgender girls and boys.

Strengths and limitations

This study is, to our knowledge, the first to compare a wide range of socioeconomic and health outcomes between cisgender and nonbinary adolescents using a large, representative sample of secondary school students in a Southern European city.

Unlike many earlier studies, it compares the socioeconomic characteristics of cisgender and nonbinary students, revealing that nonbinary individuals are more frequently exposed to unfavorable social conditions. In contrast to many previous studies that treat TGD individuals as a single group, this research specifically focuses on nonbinary individuals. Unlike earlier research, it distinguishes between cisgender boys and cisgender girls, finding poorer health-related outcomes among cisgender girls. Additionally, it examines a comprehensive set of health and wellbeing indicators using a multivariate analysis that adjusts for socioeconomic characteristics, yielding consistent results across most outcomes.

As this study uses a cross-sectional design, it cannot infer causation or the direction of associations. Yet, although reverse causation cannot be entirely ruled out, it is unlikely that poor health or weak relationships would lead to a nonbinary gender identity. Rather, it is more plausible that the nonbinary identity, along with the discrimination and marginalization these individuals experience, contributes to poorer health outcomes and poor relationships with family and peers.

Another limitation of this study is that the FRESC survey only allowed participants to identify as cisgender, transgender (binary), or nonbinary. As a result, it was not possible to specifically identify or analyze other gender-diverse identities, such as agender, gender fluid, or other non-cisnormative identities. Future health surveys should include separate questions for sex and gender identity, expanded response options, and considering the domain being assessed and the intention behind asking [41].

Conclusions

Nonbinary secondary school students in Barcelona were more frequently AFAB, tend to be younger, of lower socioeconomic status, living in single-mother households, and have mothers who were not born in Catalonia. Overall, nearly all health-related outcomes, except for substance use, were worse for cisgender girls but, particularly, for nonbinary individuals, compared to cisgender boys.

These results underscore the need to expand research on nonbinary adolescents and to include questions about gender identity in health surveys. Additionally, they emphasize the importance of distinguishing between cisgender boys and cisgender girls, given the consistent gender differences observed across various health and

well-being outcomes. Furthermore, structural policies and interventions that support youth in expressing and living in accordance with their gender identity are needed in schools, families, and health care settings.

Acknowledgements

None.

Author contributions

L.A. contributed to the conception, design, analysis, interpretation of data, and drafting of the article; J.C. made a substantial contribution to the design, interpretation of data, and drafting of the article; K.P. contributed to the conception, design and interpretation of data; E.S.L. made a substantial contribution to the design, data acquisition, analysis and interpretation of data; G.S. made a substantial contribution to the design, data acquisition, analysis and interpretation of data; M.J.L. made a significant contribution to the conception, analysis and interpretation of data. All authors were actively involved in drafting or revising the work critically for important intellectual content and approved the version to be published.

Funding

This study was partially funded Department of Research and Universities of the Generalitat de Catalunya (AGAUR), N. 2021 SGR 01462.

Data availability

Data from the 2021 FRESC survey are available upon reasonable request (contact: lartazco@aspb.cat).

Declarations

Ethics approval and consent to participate

The FRESC survey is included in the Statistical Plan of Catalonia with the registration number: 09 01 03. This Plan is a law approved by the Parliament of Catalonia for the purpose of ordering and planning the official statistics of Catalonia (Generalitat de Catalunya. Llei 5/2016, del 23 de desembre, del Pla estadístic de Catalunya 2017–2020 i de modificació de la Llei 23/1998, d'Estadística de Catalunya [Llei 5/2016, of December 23, on the Statistical Plan of Catalonia 2017–2020 and amending Law 23/1998, on statistics. 2017]). According to it, as this is a secondary analysis of publicly available anonymized data, this research is exempt from Institutional Review Board review.

Competing interests

The authors declare no competing interests.

Author details

¹Agència de Salut Pública de Barcelona, Pl. Lesseps 1, Barcelona 08023, Catalonia, Spain

²Institut de Recerca Sant Pau (IR SANT PAU), Sant Quintí 77, Barcelona 08041, Catalonia, Spain

³CIBER de Epidemiología y Salud Pública (CIBERESP), Av. Monforte de Lemos, 3-5, Madrid 28029, Spain

⁴Department of Experimental and Health Sciences, Universitat Pompeu Fabra, Doctor Aiguader 88, Barcelona 08003, Catalonia, Spain

Received: 2 December 2024 / Accepted: 7 May 2025

Published online: 26 May 2025

References

- Diamond LM. Gender fluidity and nonbinary gender identities among children and adolescents. *Child Dev Perspect*. 2020;14:110–5.
- Pang KC, De Graaf NM, Chew D, Hoq M, Keith DR, Carmichael P, et al. Association of media coverage of transgender and gender diverse issues with rates of referral of transgender children and adolescents to specialist gender clinics in the UK and Australia. *JAMA Netw Open*. 2020;3:1–10.
- Zhang Q, Goodman M, Adams N, Corneil T, Hashemi L, Kreukels B, et al. Epidemiological considerations in transgender health: A systematic review with focus on higher quality data. *Int J Transgender Heal*. 2020;21:125–37.
- Mackie G, Lambert K, Patlamazoglou L. The mental health of transgender young people in secondary schools: A scoping review. *School Ment Health*. 2021;13:13–27.
- Marquez J, Humphrey N, Black L, Cutts M, Khanna D. Gender and sexual identity-based inequalities in adolescent wellbeing: findings from the #bee-well study. *BMC Public Health*. 2023;23:1–19.
- Sares-Jáske L, Czimbalmos M, Majlander S, Siukola R, Klemetti R, Luopa P, et al. Gendered differences in experiences of bullying and mental health among transgender and cisgender youth. *J Youth Adolesc*. 2023;52:1531–48.
- Wittlin NM, Kuper LE, Olson KR. Mental health of transgender and gender diverse youth. *Annu Rev Clin Psychol*. 2023;19:207–32.
- Price-Feeney M, Green AE, Dorison S. Understanding the mental health of transgender and nonbinary youth. *J Adolesc Heal*. 2020;66:684–90.
- Chew D, Tollit M, Poulakis Z, Zwickl S, Cheung AS, Pang KC. Youths with a non-binary gender identity: a review of their sociodemographic and clinical profile. *Lancet Child Adolesc Heal*. 2020;4:322–30.
- Ciria-Barreiro E, Moreno-Maldonado C, Rivera F, Moreno C. A comparative study of health and Well-being among cisgender and binary and nonbinary transgender adolescents in Spain. *LGBT Heal*. 2019;8:536–44.
- Commone C, Pistella J, Pellegrini V, Baiocco R. Nonbinary people in the family context: a systematic review and meta-analysis. *Int J Transgender Heal*. 2024. <https://doi.org/10.1080/26895269.2024.2310540>.
- Kaltiala R, Heino E, Marttunen M, Fröjd S. Family characteristics, transgender identity and emotional symptoms in adolescence: A population survey study. *Int J Environ Res Public Health*. 2023;20.
- Aparicio-García ME, Díaz-Ramiro EM, Rubio-Valdehita S, López-Núñez MI, García-Nieto I. Health and well-being of cisgender, transgender and non-binary young people. *Int J Environ Res Public Health*. 2018;15.
- Eisenberg ME, Gower AL, McMorris BJ, Rider GN, Shea G, Coleman E. Risk and protective factors in the lives of transgender/gender nonconforming adolescents. *J Adolesc Heal*. 2017;61:521–6.
- Liu M, Patel VR, Reisner SL, Keuroghlian AS. Health status and mental health of transgender and Gender-Diverse adults. *JAMA Intern Med*. 2024;8–10.
- Heise L, Greene ME, Oppen N, Stavropoulou M, Harper C, Nascimento M, et al. Gender inequality and restrictive gender norms: framing the challenges to health. *Lancet*. 2019;393:2440–54.
- Blum RW, Mmari K, Moreau C. It begins at 10: how gender expectations shape early adolescence around the world. *J Adolesc Heal*. 2017;61:53–4.
- Russell ST, Fish JN. Mental health in lesbian, gay, bisexual, and transgender (LGBT) youth. *Annu Rev Clin Psychol*. 2016;12:465–87.
- Wilson C, Cariola LA. LGBTQI + Youth and mental health: A systematic review of qualitative research. *Adolesc Res Rev*. 2020;5:187–211.
- Kågesten A, Gibbs S, Blum RW, Moreau C, Chandra-Mouli V, Herbert A, et al. Understanding factors that shape gender attitudes in early adolescence globally: A mixed-methods systematic review. *PLoS ONE*. 2016;11:1–36.
- Negri V, Odier T. Depression in adolescence. *Lancet*. 2012;379:1056–67.
- Gray KM, Squeglia LM. Research review: what have we learned about adolescent substance use? *J Child Psychol Psychiatry Allied Discip*. 2018;59:618–27.
- Sánchez-Ledesma E, Serral G, López MJ, Pérez. Katherine. Manual metodològic - FRESC 2021. Barcelona: Agència de Salut Pública de Barcelona; 2022.
- Hartley JEK, Levin K, Currie C. A new version of the HBSC family affluence Scale - FAS III: Scottish qualitative findings from the international FAS development study. *Child Indic Res*. 2016;9:233–45.
- Fosse NE, Haas SA. Validity and stability of Self-reported health among adolescents in a longitudinal, nationally representative survey. *Pediatrics*. 2009;123:e496–501.
- Boardman JD. Self-rated health among U.S. Adolescents. *J Adolesc Heal*. 2006;38:401–8.
- Breidablik HJ, Meland E, Lydersen S. Self-rated health during adolescence: stability and predictors of change (Young-HUNT study, Norway). *Eur J Public Health*. 2009;19:73–8.
- Goodman R, Ford T, Simmons H, Gatward R, Meltzer H. Using the strengths and difficulties questionnaire (SDQ) to screen for child psychiatric disorders in a community sample. *Int Rev Psychiatry*. 2003;15:166–72.
- Verlenden J, Pampati S, Heim Viox M, Brenner N, Licitis L, Dittus P, et al. Measuring adolescent mental health at the population level using a Single-Item Indicator of experiences of sadness and hopelessness: A Cross-Sectional study (Preprint). *JMIR Public Heal Surveill*. 2024;8:e54288.
- Jovanović V. The validity of the satisfaction with life scale in adolescents and a comparison with single-item life satisfaction measures: a preliminary study. *Qual Life Res*. 2016;25:3173–80.

31. Vandendriessche C, Cohen D. Social factors behind the AFAB predominance in LGBT youths: evidence from a large European survey. *Eur Child Adolesc Psychiatry*. 2024. <https://doi.org/10.1007/s00787-024-02595-4>.
32. Monro S. Non-binary and Genderqueer: an overview of the field. *Int J Transgenderism*. 2019;20:126–31.
33. McKechnie DGJ, O'Nions E, Bailey J, Hobbs L, Gillespie F, Petersen I. Transgender identity in young people and adults recorded in UK primary care electronic patient records: retrospective, dynamic, cohort study. *BMJ Med*. 2023;2:e000499.
34. Meerwijk EL, Sevelius JM. Transgender population size in the united States: A meta-regression of population-based probability samples. *Am J Public Health*. 2017;107:e1–8.
35. Durbeej N, Abrahamsson N, Papadopoulos FC, Beijer K, Salari R, Sarkadi A. Outside the norm: mental health, school adjustment and community engagement in non-binary youth. *Scand J Public Health*. 2021;49:529–38.
36. Kosciw JG, Clark CM, Truong NL, Zongrone AD. The 2019 National school climate survey. New York: GLSEN; 2019.
37. Johns MM, Lowry R, Andrzejewski J, Barrios LC, Demissie Z, McManus T, et al. Transgender identity and experiences of violence victimization, substance use, suicide risk, and sexual risk behaviors among high school Students — 19 States and large urban school districts, 2017. *MMWR Morb Mortal Wkly Rep*. 2019;68:67–71.
38. Day JK, Fish JN, Perez-Brumer A, Hatzenbuehler ML, Russell ST. Transgender youth substance use disparities: results from a Population-Based sample. *J Adolesc Heal*. 2017;61:729–35.
39. Hatchel T, Valido A, De Pedro KT, Huang Y, Espelage DL. Minority stress among transgender adolescents: the role of peer victimization, school belonging, and ethnicity. *J Child Fam Stud*. 2019;28:2467–76.
40. Becerra-Culqui TA, Liu Y, Nash R, Cromwell L, Flanders WD, Getahun D et al. Mental health of transgender and gender nonconforming youth compared with their peers. *Pediatrics*. 2018;141.
41. Young SK, Bond MA. A scoping review of the structuring of questions about sexual orientation and gender identity. *J Community Psychol*. 2023;51:2592–617.

Publisher's note

Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.