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The associations of childhood adversities and mental disorders with suicidal thoughts and behaviors - Results from the World Mental Health International College Student Initiative

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ABSTRACT

Objective: To investigate the associations of demographic variables, childhood adversities (CAs), and mental disorders (MDx) with onset, transition, and persistence of suicidal thoughts and behaviors (STB) among first-year university students.

Method: Poisson regression models within a discrete-time survival framework were constructed using web-based self-report survey data from 72,288 incoming university students across 18 countries (response rate=20.9%; median age=19 years, 57.9% female, 1.4% transgender, 21.0% non-heterosexual). These models examined the associations of four demographic variables, five CAs, and eight MDx with STB outcomes.

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Results: Lifetime prevalence of suicidal ideation, plans, and attempts was 47.0%, 26.0%, and 9.6%, respectively; 12-month estimates were 30.6%, 14.0%, and 2.3%. In unadjusted analyses, associations were strongest between lifetime onset of suicidal ideation and CAs (RR range 4.4–7.0), particularly parental psychopathology (relative risk [RR]=7.0 [95% CI 6.5–7.7]), followed by MDx (RR range 1.3–3.0). Of the demographic subgroups, transgender students had highest risk of STB (lifetime ideation onset RR=2.4 [2.3–2.6]; ideation-to-attempt transition RR=1.5 [1.3–1.8]). In fully adjusted models, strongest predictors of lifetime ideation onset were emotional abuse (RR=2.1 [1.9–2.2]), major depressive disorder (RR=2.0 [1.9–2.1]), and bipolar disorder (RR=1.8 [1.6–2.0]). Ideation-to-attempt transition remained most strongly associated with panic disorder (RR=1.5 [1.3–1.7]), bipolar disorder (RR=1.4 [1.2–1.7]), and sexual abuse (RR=1.4 [1.2–1.7]). Most predictors were significantly but weakly associated with persistence of ideation and plan, while only physical abuse remained associated with repeated suicide attempts (RR=1.3 [1.0–1.8]).
Conclusion: CAs and MDx are strong predictors of both onset of and transition within the STB spectrum, underscoring the importance of implementing early-life prevention interventions.

1. Introduction

Adolescence is a high-risk period for suicidal thoughts and behaviors (STB; Biswas et al., 2020; Nock et al., 2013), with 21–50% of those with adolescent-onset STB continuing into young adulthood (Steinhausen et al., 2006; Thompson et al., 2009). This transition often includes university entry, which occurs for 43% of young people globally and nearly 80% in high-income countries (World Bank Group, 2023). Up to one-third (32.7%) of young people experience STB before entering university (Mortier et al., 2018b, 2018c), with many persisting into the university years (Mortier et al., 2017; Wilcox et al., 2010). Early-life STB is linked to lower academic performance (De Luca et al., 2016; John et al., 2022), university drop-out (Mortier et al., 2018a), and long-term adverse outcomes, including mental and physical health issues, unemployment, and poor quality of life (Chartier et al., 2022; Goldman-Mellor et al., 2014; Reinherz et al., 2006). Identifying risk factors during this critical transition is essential for prevention efforts.

Key risk domains for youth STB include childhood adversities (CAs; Angelakis et al., 2020, 2019; Bruffaerts et al., 2010; Hughes et al., 2017) and mental disorders (MDx; Gili et al., 2019; Richardson et al., 2024). Most STB research has examined suicidal ideation and attempts separately, with few studies assessing how risk factors predict attempts beyond ideation. This is critical, as a minority (between 2.6 and 37.0%) of individuals with suicidal ideation attempt suicide (Haregu et al., 2023; McHugh et al., 2019) and distinct mechanisms underlie these outcomes (Jollant and Leon, 2024). Existing studies suggest that demographic factors (e.g., gender, sexual orientation; Kohnepoushi et al., 2023; Mars et al., 2019; Mortier et al., 2018b; Shahsavar and Choudhury, 2025), CAs (e.g., parental psychopathology and abuse; Angelakis et al., 2020; Mars et al., 2019; Mortier et al., 2022; Romanelli et al., 2022; Shahsavar and Choudhury, 2025), and MDx (e.g., depression, anxiety, behavioral disorders, substance use; Auerbach et al., 2019; Krantz et al., 2024; Mars et al., 2019; Romanelli et al., 2022; Shahsavar and Choudhury, 2025) may influence the transition from ideation to attempt. However, findings are inconsistent due to small sample sizes (Jollant and Leon, 2024; Mars et al., 2019), highlighting the need for well-powered studies on how CAs and MDx shape STB trajectories.

This study addresses these gaps using data from the World Mental Health International College Student (WMH-ICS) initiative (Cuijpers et al., 2019), a series of coordinated cross-national needs assessment surveys of first-year university students. Expanding on earlier reports using 2014–2017 DSM-IV surveys (Mortier et al., 2022, 2018b), this analysis draws from DSM-5 surveys (2017–2023) involving 72,288 students across 71 universities in 18 countries. We constructed multivariable models to assess associations between demographic variables, five types of CAs, eight MDx, and lifetime onset, transition, and persistence of STB.

2. Methods

2.1. Participants and procedures

Online surveys were carried out between 2017 and 2023 in a convenience sample of 71 universities across 18 countries (Australia, Belgium, Canada, Chile, China, France, Germany, Kenya, Mexico, Netherlands, New Zealand, Northern Ireland, Republic of Ireland, Romania, Saudi Arabia, South Africa, Spain, and Sweden). Although the recruitment method varied by institution (**Supplementary Table 1**), attempts were generally made to recruit 100% of first-year students via emails provided by participating universities requesting participation in a confidential online survey of student mental health. Participants were provided with a study description, an informed consent script, and university contact details for questions. Incentives, which differed across countries (e.g., raffles for store credit coupons, movie passes, cash), were offered in 11 of the 18 countries to encourage survey completion (**Supplementary Table 1**). Informed consent was required before administering the survey. Reminder emails were used to increase response rates, which averaged 20.8% across surveys and ranged between 65.4% in Mexico and 2.8% in Kenya. Within-country sample sizes ranged between $n = 11{,}607$ in the Netherlands and $n = 333$ in Kenya. Ethics approval details are posted at https://www.hcp.med.harvard.edu/wmh/ftpdir/IRB_EthicsApproval_WMH-ICS_DSM-5.pdf

2.2. Measures

The self-report questionnaire was developed in English and translated into local languages using a translation, back-translation, and harmonization protocol to maximize cross-national equivalence building on the standard World Health Organization (WHO) protocol.

2.2.1. Suicidal thoughts and behaviors (STB)

A modified version of the Columbia Suicide Severity Rating Scale (C-SSRS)(Posner et al., 2011) was used to assess three STB outcomes, i.e., suicidal ideation (*Did you ever wish you were dead or would go to sleep and never wake up?, Did you ever have thoughts of killing yourself?*), suicide plans (*Did you ever think about how you might kill yourself or work out a plan of how to kill yourself*?), and suicide attempts (*Did you ever purposefully hurt yourself with at least some intent to die*?). In addition, the time course of each STB outcome was assessed (age of onset [AoO], number of lifetime years with STB, and number of months in the past 12 months with STB), using items taken from the Self-Injurious Thoughts and Behaviors Interview (SITBI; Nock et al., 2007). Lifetime STB transition rates included transition from ideation to plan (i.e., the number of students with a lifetime suicide plan among students with lifetime suicidal ideation), transition from ideation to attempt (i.e., the number of students with a lifetime suicide attempt among students with lifetime suicidal ideation), transition from ideation to attempt without plan (i.e., the number of students with a lifetime suicide attempt among students

with lifetime suicidal ideation without suicide plan as of the first attempt), and transition from plan to attempt (i.e., the number of students with a lifetime suicide attempt among students with lifetime suicidal ideation with suicide plan as of the first attempt) and were expressed as proportions; 12-month transition rates were defined accordingly. Finally, we operationalized STB persistence as the ratio of 12-month to lifetime prevalence, separately for ideation, plans, and attempts.

2.2.2. Mental disorders (MDx)

Lifetime prevalence of DSM-5 generalized anxiety disorder, major depressive disorder, and panic disorder was assessed with the Composite International Diagnostic Interview Screening Scales, Version 3.2 (CIDI-SC; Kessler et al., 2013a). Diagnoses based on CIDI-SC have been shown to have good concordance with diagnoses based on blinded clinical reappraisal interviews (Kessler et al., 2013a, 2013b). Lifetime assessments of bipolar I/II disorder and drug use disorder were based on the Composite International Diagnostic Interview for DSM-5 (CIDI-5) modified for self-report administration. Although only one clinical reappraisal study has assessed CIDI-5 so far, concordance of diagnoses with diagnoses based on blinded clinical reappraisal interviews was consistently good (AU-ROC=0.67–0.75; Khaled et al., 2024).

Three other mental disorders were assessed with brief specialized dimensional screening scales: post-traumatic stress disorder (PTSD) with the 4-Item Short-Form of the PTSD Checklist for DSM-5 (PCL-5; Weathers et al., 2013); attention-deficit/hyperactivity disorder (ADHD) with the Adult Self-Report Scale-V1.1 (ASRS-V1.1) Screener (Kessler et al., 2007); and alcohol use disorder (AUD) with the Alcohol Use Disorders Identification Test (AUDIT; Babor et al., 1992). The PCL-5 is a widely used and validated PTSD screening scale (Georgescu et al., 2024; Hansen et al., 2023; Kramer et al., 2023). Diagnoses obtained by using a cutpoint of 5+ on the 4-Item Short-Form PCL-5 (each item scored in the range 0–4 for a total score of 0–16) have good concordance with DSM-5 diagnoses in the full PCL-5 (AU-ROC=0.98; Zuromski et al., 2019). The ASRS-V1.1 Screener is a widely used and validated 6-item screening scale of adult ADHD; each item scored 0–4 for a total score of 0–24; Ziobrowski et al., 2023) that assesses symptoms over a 6-month recall period. Diagnoses obtained by using a cutpoint of 14+ have been shown to have good concordance with blinded clinical diagnoses in multiple clinical reappraisal studies (Kessler et al., 2007, 2005). Last, the AUDIT, a widely used and validated 10-question screening scale for AUD (each item scored 0–4, for a total score of 0–40), assesses symptoms over a 12-month period. We used the standard AUDIT scoring rules for possible dependence (either a score of 16 or more on the 0–40 total AUDIT or a score of 8–15 on the total AUDIT in conjunction with a score of 4+ on the AUDIT dependence subscale), which have had high concordance with blinded clinical diagnoses of AUD in prior research (AU-ROC=0.91; Toner et al., 2019). However, as more recent studies suggest that a lower threshold might be preferable for university students, we also included AUDIT scores for likely abuse (8+ on the total AUDIT).

Lifetime prevalence was assessed for six MDx. Respondents were asked lifetime diagnostic stem questions and then, if affirmative, were asked to focus on the time in their life when the symptoms were most severe. The symptom questions were asked about that worst time, which could differ among respondents across MDx. Respondents screening positive for lifetime prevalence were then asked about AOO and a single question (i.e., rather than repeating all symptom questions) about 12-month prevalence. In contrast, attention-deficit/hyperactivity disorder and alcohol use disorder were assessed only for the past 6 months or 12 months, respectively.

2.2.3. Childhood adversities (CAs)

Five CAs were assessed, comprising parental psychopathology, physical abuse, emotional abuse, sexual abuse, and neglect. Parental psychopathology was assessed with five questions adapted from the Adverse Childhood Experiences (ACEs) survey (Dube et al., 2001) regarding how often up through age 17 one or more of the respondent's parents or the people who raised the respondents had *"any serious emotional or mental health problems, any serious alcohol or drug problems, attempted or died by suicide, were involved in criminal activities,* or *were violent to each other"*. Response categories for each question were *never, rarely, sometimes, often*, and *very often.* These responses were assigned scores between 0 and 4, summed, and transformed it into a 0-to-1 scale for analysis, where 0 indicated never experiencing the CA and 1 indicated experiencing it very often.

The remaining four types of CAs were assessed with eight questions, two for each type, adapted from the Childhood Trauma Questionnaire - Short Form (CTQ-SF; Bernstein et al., 2003) and the Army STARRS Survey (Stein et al., 2018). Each series asked a general question followed by a more specific question. Physical abuse: *"How often were you physically abused at home as a child? How often did a family member hit you so hard that it left bruises or marks?"* Emotional abuse: *"How often were you emotionally abused at home as a child? How often did a family member repeatedly say hurtful or insulting things to you?"* Sexual abuse: *"How often were you sexually abused at home as a child? How often did a family member touch you or make you touch them in a sexual way against your will?"* Neglect: *How often were you seriously neglected at home as a child? How often did you have to do chores too hard or dangerous for your age?"* The same response categories were used as the parental psychopathology questions, and responses to the questions in each scale were likewise transformed into a dichotomous scale for analysis.

2.2.4. Demographic variables

The demographic characteristics included: respondent age (18–36+ years old), assigned sex at birth (male, female), gender identity (male, female, another gender), sexual orientation (heterosexual/straight, gay/lesbian, other), and parent education (highest education of either parent dichotomized into university degree vs. less than university degree). Dichotomous variables were created for sexual orientation (heterosexual vs. non-heterosexual) and gender (cisgender vs. transgender, based on alignment between gender identity and assigned sex at birth). As neither gender identity nor sexual orientation was assessed in Saudi Arabia, gender identity was set equal to sex at birth, and sexual orientation was set equal to heterosexual in that survey.

2.3. Data analysis

A calibration weight was used to adjust for differential within-university response rates by student age and sex at birth. Multiple imputation (MI) by chained equations (Van Buuren and Groothuis-Oudshoorn, 2011) was then used to adjust for within-survey item non-response, missing data due to minor skip logic errors in a few surveys, and random internal subsampling of survey sections.

Simple mean calculations were used to estimate lifetime STB prevalence and transition rates within the STB spectrum, 12-month prevalence and transition rates, and 12-month persistence. Persistence analyses focused on respondents whose AoO occurred at least two years prior to age-at-interview, as some proportion of respondents with more recent AoO would necessarily be 12-month cases due to onsets occurring less than 12 months before interview (e.g., onset near the end of age 18 for a respondent who only recently turned 19 at the time of survey).

Multivariable Poisson regression models were used to examine associations of socio-demographic variables, CAs, and MDx with STB outcomes, i.e., with lifetime suicidal ideation, with the transition from ideation to plans and attempts, and with persistence of lifetime STB. Exponentiated Poisson regression coefficients are reported here as risk ratios (RRs) with 95% confidence intervals.

The models were estimated in a person-year discrete-time survival framework where year of life was treated as a continuous control variable, the STB outcomes were defined dichotomously, and person-years beyond the year of STB onset were censored (Singer and Willett, 1993). Persistence models, finally, were estimated to predict 12-month

prevalence among lifetime cases at the person-level, using AoO and time-since-onset (i.e., number of years between AoO and age-at-interview) as separate control variables and, as noted above, focusing analysis on respondents with AoO 2+ years prior to age-at-interview. We repeated all final multivariable STB and STB persistence models by geographic region (i.e., Americas, Europe, Asia/Pacific, and Middle East/Africa). Clustering of observations within universities was taken into consideration when estimating standard errors. Regression models included control variables for country, year of survey, and whether students were surveyed in the first three months of the academic year, generating pooled within-country/within-year regression coefficients. Design-based standard errors and F tests taking into consideration clustering and weighting were used to evaluate statistical significance. Design-based standard errors were obtained using SAS (V15.2). Stata/MP (V18) was used to estimate multivariable Poisson models with robust variance estimates to adjust for design effects (Chen et al., 2018). All significance tests were initially evaluated using 0.05-level two-sided design-based tests. The multiple testing problem, which leads to increased risk of Type I errors, was addressed by evaluating significance of full predictor sets in each multivariable model and interpreting individually significant coefficients only if the total model was significant. In addition, significance testing in the final multivariable models was controlled for false discovery rate (FDR) on a model-by-model basis, with FDR set at 5% using the Benjamini-Hochberg procedure (Benjamini and Hochberg, 1995).

3. Results

3.1. Sample characteristics

The weighted (by sample size) mean response rate across surveys was 20.9% and ranged between 2.8% in Kenya and 65.4% in Mexico (inter-quartile range [IQR]=8.3–27.9%; **Supplementary Table 1**). The n = 72,288 respondents had a median age-at-interview of 19 (IQR=18–21). Overall, 57.9% were female at birth (**Supplementary Table 2**). Most were cisgender (98.6%) and heterosexual (79.0%). Close to half of respondents had at least one parent with a university degree (45.7%).

3.2. STB prevalence, age of onset, transition rates, and persistence

Lifetime prevalence of ideation, plans, and attempts were 47.0%, 26.0%, and 9.6%, respectively (Table 1). Comparable 12-month estimates were 30.6%, 14.0%, and 2.3%. More than half (55.4%) of students with lifetime ideation made the transition to a suicide plan, and slightly less than one-third (29.5%) of students reporting a lifetime suicide plan made the transition to an attempt. Attempts among students with lifetime ideation without plan were less frequent (9.9%). The median AoO of lifetime suicidal ideation and plan was 15 years (Q3=17), and slightly higher for attempts (16 years; Q3 = 18). Projected STB AoO curves up to age 30 years (Fig. 1) show relatively low risk for STB onset before age 12, followed by a steep increase up to age 17, and a moderate decline in slope thereafter. Persistence estimates for suicidal ideation, plans, and attempts were 64.0%, 51.7%, and 18.6%, respectively (Table 1).

3.3. Associations between demographic variables, CAs and MDx with lifetime suicidal ideation onset and with transition from ideation to plan and attempt

Univariable models in Table 2 show that lifetime onset of suicidal ideation and subsequent transitions to plan or attempt were most strongly associated with CA types (RR range 2.1–7.0), especially parental psychopathology (RR range 2.4–7.0), and with having 3+ CAs (RR range 2.0–4.5) or 3+ MDx (RR range 2.4–4.6). These associations were substantially stronger for ideation onset (RR range 4.4–7.0) than for transitioning from ideation to plan (RR range 2.0–2.7) or ideation to attempt (RR range 2.1–2.6). MDx were also consistently associated with ideation onset (RR range=1.3–3.0) and, to a lesser extent, with STB transitions (RR range=1.2–1.9).

Multivariable models showed that nearly all variables had significant independent associations with ideation onset and subsequent STB transitions, though association strength attenuated substantially compared to univariable models, particularly for the CAs. Sequential multivariable modelling (**Supplementary Tables 4–6**) indicated that the attenuation of associations with CAs was primarily due to the mutual adjustment among CAs, to adjustment for demographic variables, and to a lesser extent, to adjustment for MDx. Notably, having experienced multiple CAs exhibited synergistic associations (i.e., stronger than the sum of individual CA associations), especially with ideation onset. In contrast, the combined association of multiple MDx with ideation onset and transitions was subadditive (i.e., weaker than the sum of individual MDx associations).

Further inspection of multivariable models in Table 2 showed that all outcomes were significantly associated with identifying as transgender (RR range 1.2–1.3) and having a non-heterosexual sexual orientation

Table 1
Prevalence, age of onset, and persistence of suicidal thoughts and behaviors (n = 72,288)[a].

	Lifetime[b]		Age-of-onset		12-month[c]		Persistence[d]		
	%	(SE)	Median	IQR	%	(SE)	%	(SE)	(n)
I. STB prevalence									
Ideation	47.0	(0.2)	15	13–17	30.6	(0.5)	64.0	(0.9)	(72,288)
Plan	26.0	(0.7)	15	13–17	14.0	(0.3)	51.7	(0.6)	(72,288)
Attempt	9.6	(1.7)	16	14–18	2.3	(0.3)	18.6	(1.0)	(72,288)
II. STB transition rates									
Plan among students with ideation	55.4	(1.5)	15	13–17	45.7	(0.7)	–	–	(34,443)
Attempt among students with ideation	20.4	(3.7)	16	14–18	7.6	(0.9)	–	–	(34,443)
Attempt among students with ideation without plan	9.9	(5.8)	15	13–17	1.8	(1.0)	–	–	(15,819)
Attempt among students with ideation with plan	29.5	(2.2)	16	14–18	14.6	(1.0)	–	–	(18,624)

Abbreviations: SE, standard error; STB, suicidal thoughts and behaviors; IQR, interquartile range.

[a] Data were multiply imputed, m = 30.

[b] Lifetime STB transition rates are: lifetime plans among students with lifetime ideation, lifetime attempts among students with lifetime ideation, lifetime attempts among students with lifetime ideation with no plan as of the first attempt, and lifetime attempts among students with lifetime ideation with a plan before the first attempt.

[c] 12-month STB transition rates are: 12-month plans among students with 12-month ideation, 12-month attempts among students with 12-month ideation, 12-month attempts among students with 12-month ideation with no 12-month plan, and 12-month attempts among students with 12-month ideation with a 12-month plan.

[d] Persistence of ideation or plans is defined as having the STB in the past 12 months and onset at least 2 years prior, or onset in the prior year and having the STB for 2 years. Persistence of attempt is defined as having the STB in the past 12 months and onset at least 2 years prior. Students with onset in the current year or onset in the prior year with only 1 year of duration are excluded from persistence analysis.

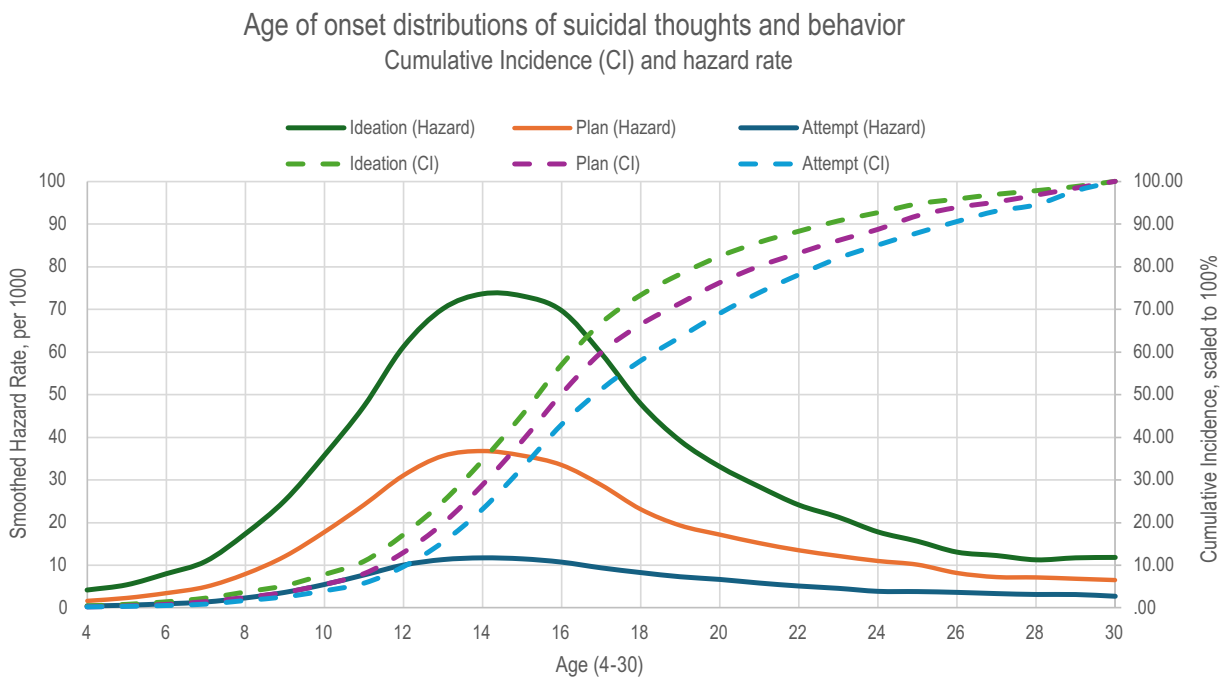

Fig. 1. Age-of-onset distributions and cumulative incidence of suicidal thoughts and behaviors.
Abbreviations: CI ; Cumulative Incidence; ideation, suicidal ideation; plan, suicide plan; attempt, suicide attempt, $N = 72{,}288$. Data was multiply imputed, $m = 30$. Only imputation 1 used.

(RR range=1.2–1.5), independent from CAs or MDx. Emotional abuse was the CA most strongly associated with ideation onset (RR=2.1) and transitioning to plan (RR=1.5), while neglect and abuse (RR range 1.2–1.4), especially sexual abuse (RR=1.4), were significantly associated with transitioning to attempt. Among MDx, major depressive disorder and BD were most strongly associated with ideation onset and transition to plan (RR range 1.4–2.0), while transition to attempt was most strongly associated with panic disorder (RR=1.5), bipolar disorder (RR=1.4), and drug use disorder (RR=1.3).

Supplementary Tables 11–13 present final multivariable models, overall and stratified by region, with significance testing adjusted for FDR. Of the 52 initially significant RRs, 48 remained significant after FDR adjustment. Neglect was no longer significantly associated with ideation onset, sexual abuse with transition to plan, and transgender identity and physical abuse with transition to attempt. Main results were broadly consistent across regions, though some RRs varied and did not consistently reach significance regionally. Notably, females in Europe showed reduced risk for both ideation onset and transition to plan (RR=0.9 [95%CI 0.9–1.0]). In Asia, no associations were observed between parental psychopathology, sexual abuse, or drug use disorder and ideation onset; the association between bipolar disorder and transition to plan was weak and non-significant (RR=1.3 [95%CI 0.9–1.8]); and no association was found between sexual abuse and transition to attempt. Additionally, no associations were observed between emotional abuse and transition to attempt in the Americas, or between neglect and this transition in the Middle East/Africa.

3.4. Associations of CAs and MDx with STB persistence

With few exceptions, all variables in univariable models were weakly yet significantly associated with each of the three STB persistence outcomes, with RRs between 0.9 and 2.0 (Table 3). Associations were strongest for CA types, and were consistently stronger with repetition of attempts, compared to persistence of ideation and plans, especially for emotional abuse (RR=1.9) and physical abuse (RR=1.8). MDx were also more strongly associated with repetition of attempts than with persistence of ideation and plans, especially generalized anxiety disorder (RR= 1.6) and panic disorder (RR= 1.6).

Multivariable models showed that many variables had independent associations with persistence of ideation and plan, though association strength attenuated substantially compared to univariable models (see **Supplementary Tables 8–10** for an overview of sequential multivariable modelling). Persistence of ideation and plan was associated with identifying as transgender (RR=1.1), non-heterosexual sexual orientation (RR=1.1), younger STB AoO (RR=1.0), and longer time since STB onset (RR=1.0). Multiple CAs showed slight synergistic associations, while no additional association was observed for multiple MDx, above and beyond the additive associations of individual MDx types. No significant associations were found with repetition of suicide attempts, except physical abuse (RR=1.3).

Supplementary Tables 14–16 present the final multivariable models, both overall and stratified by region, with significance testing adjusted for FDR. All 15 initially significant RRs for ideation persistence remained significant after FDR adjustment; however, only 8 of 15 did so for persistence of plan, and 1 of 2 for persistence of attempt. Results were broadly consistent across regions, with significant RRs generally ranging from 1.0 to 1.2. Nonetheless, many associations identified in the overall model did not consistently reach significance in regional analyses, particularly for persistence of plan and attempt.

4. Discussion

Prevalence estimates for STB in our study, which analyzed data from the 2017–2023 period, are consistently higher than those reported in a previous WMH-ICS initiative report (Mortier et al., 2018b) analyzing data from the 2014–2017 period. Specifically, we observed higher rates of both lifetime (ideation 47.0% vs. 32.7%; plan 26.0% vs. 17.5%; attempt 9.6% vs. 4.3%) and 12-month STB (ideation 30.6 vs. 17.2%; plan 14.0 vs. 8.8%; attempt 2.3 vs. 1.0%). This may be due to the inclusion of more countries and universities and a lower response rate in the current study (20.9% vs. 45.5%), as survey participation has been weakly but negatively associated with STB prevalence estimates (Mortier et al., 2018c), though calibration weights adjusted for non-response bias. These findings align with concerns about rising youth

Table 2
The associations of demographic variables, childhood adversities, and mental disorders with lifetime ideation and the transition from lifetime ideation to plan and attempt[a].

	Lifetime ideation (n = 72,288)				Lifetime plan among students with ideation (n = 34,443)				Lifetime attempt among students with ideation (n = 34,443)[c]			
	Univariable[b]		Multivariable[d]		Univariable[b]		Multivariable[d]		Univariable[b]		Multivariable[d]	
	RR	(95% CI)	RR	(95% CI)	RR	(95% CI)	RR	(95% CI)	RR	(95% CI)	RR	(95% CI)
I. Demographic variables												
Female sex at birth	1.3*	(1.3–1.3)	1.1*	(1.1–1.1)	1.1*	(1.1–1.2)	1.0	(1.0–1.0)	1.4*	(1.3–1.5)	1.2*	(1.1–1.3)
Transgender	2.4*	(2.3–2.6)	1.3*	(1.2–1.4)	1.7*	(1.5–1.8)	1.2*	(1.1–1.3)	1.5*	(1.3–1.8)	1.2*	(1.0–1.4)
Non-heterosexual	2.1*	(2.0–2.1)	1.5*	(1.5–1.6)	1.5*	(1.5–1.6)	1.3*	(1.3–1.4)	1.4*	(1.3–1.6)	1.2*	(1.1–1.3)
At least one parent university graduate	1.1*	(1.0–1.1)	1.1*	(1.1–1.2)	1.0*	(1.0–1.1)	1.1*	(1.0–1.1)	1.0	(0.9–1.0)	1.0	(1.0–1.1)
II. Childhood adversity types[e]												
Parental psychopathology	7.0*	(6.5–7.7)	1.3*	(1.2–1.4)	2.4*	(2.2–2.7)	1.0	(0.9–1.2)	2.4*	(1.7–3.4)	1.0	(0.9–1.2)
Physical abuse	5.1*	(4.9–5.4)	1.0	(1.0–1.1)	2.3*	(2.1–2.5)	1.1*	(1.0–1.2)	2.2*	(1.7–2.9)	1.2*	(1.0–1.3)
Emotional abuse	5.4*	(5.2–5.6)	2.1*	(1.9–2.2)	2.4*	(2.2–2.6)	1.5*	(1.4–1.7)	2.3*	(1.7–3.2)	1.3*	(1.1–1.6)
Sexual abuse	4.4*	(4.0–4.9)	1.2*	(1.0–1.3)	2.1*	(1.9–2.4)	1.1*	(1.0–1.3)	2.6*	(2.0–3.5)	1.4*	(1.2–1.7)
Neglect	4.8*	(4.6–5.1)	0.9*	(0.8–1.0)	2.2*	(2.0–2.4)	1.0	(0.9–1.1)	2.5*	(1.8–3.4)	1.3*	(1.1–1.5)
III. Number of childhood adversities												
Exactly 1	2.1*	(2.0–2.3)	–	–	1.2*	(1.1–1.3)	–	–	1.2*	(1.0–1.4)	–	–
Exactly 2	3.2*	(3.0–3.4)	1.5*	(1.4–1.6)	1.5*	(1.4–1.7)	1.1*	(1.0–1.2)	1.5*	(1.3–1.8)	1.1*	(1.0–1.3)
3+	4.5*	(4.3–4.7)	1.6*	(1.5–1.7)	2.0*	(1.9–2.2)	1.2*	(1.1–1.3)	2.1*	(1.6–2.8)	1.2*	(1.1–1.4)
IV. Temporally primary lifetime mental disorder types[f]												
Major depressive disorder	2.9*	(2.8–3.0)	2.0*	(1.9–2.1)	1.7*	(1.6–1.8)	1.4*	(1.3–1.5)	1.4*	(1.2–1.5)	1.2*	(1.1–1.3)
Bipolar disorder	2.6*	(2.4–2.8)	1.8*	(1.6–2.0)	1.8*	(1.7–2.0)	1.6*	(1.4–1.7)	1.7*	(1.4–2.1)	1.4*	(1.2–1.7)
Generalized anxiety disorder	3.0*	(2.9–3.1)	1.5*	(1.4–1.7)	1.8*	(1.7–1.9)	1.3*	(1.2–1.4)	1.7*	(1.4–2.0)	1.2*	(1.1–1.4)
Panic disorder	2.5*	(2.4–2.7)	1.5*	(1.4–1.6)	1.8*	(1.7–1.9)	1.4*	(1.3–1.5)	1.9*	(1.6–2.2)	1.5*	(1.3–1.7)
Post-traumatic stress disorder	2.5*	(2.4–2.6)	1.7*	(1.6–1.8)	1.6*	(1.5–1.7)	1.3*	(1.2–1.4)	1.5*	(1.3–1.7)	1.2*	(1.1–1.3)
Attention-deficit/hyperactivity disorder	2.1*	(2.0–2.3)	1.4*	(1.3–1.5)	1.5*	(1.4–1.6)	1.2*	(1.1–1.2)	1.3*	(1.2–1.5)	1.0	(0.9–1.1)
Drug use disorder	1.7*	(1.6–1.8)	1.2*	(1.1–1.3)	1.5*	(1.3–1.6)	1.1*	(1.0–1.3)	1.5*	(1.3–1.8)	1.3*	(1.1–1.5)
Alcohol use disorder	1.3*	(1.2–1.4)	1.3*	(1.2–1.3)	1.4*	(1.3–1.5)	1.3*	(1.2–1.4)	1.2*	(1.1–1.3)	1.1	(1.0–1.2)
V. Number of temporally primary lifetime mental disorders												
Exactly 1	2.3*	(2.2–2.4)	–	–	1.6*	(1.5–1.7)	–	–	1.4*	(1.3–1.6)	–	–
Exactly 2	3.4*	(3.3–3.6)	0.8*	(0.8–0.9)	2.1*	(2.0–2.2)	1.0	(0.9–1.1)	1.8*	(1.5–2.2)	1.0	(0.9–1.2)
3+	4.6*	(4.4–4.8)	0.5*	(0.4–0.5)	2.7*	(2.5–2.8)	0.8*	(0.7–0.9)	2.4*	(1.9–3.0)	0.9	(0.7–1.1)

Abbreviations: SE, standard error; RR, risk ratio; 95% CI, 95% confidence interval of RR.

[a] Risk ratios and results are from multivariable discrete-time survival models with person-year as the unit of analysis, log link function, Poisson distribution, and robust standard errors. Data was multiply imputed, $m = 30$.

[b] All univariable models controlled for person-year and survey year.

[c] None of the interactions of lifetime suicide plan with each of the included predictor variables in predicting the transition from lifetime ideation to attempt were significant (see Supplementary Table 7); we therefore present the model predicting the transition from lifetime ideation to attempt controlling for the presence of a plan.

[d] Multivariable models controlled for all variables shown in the rows, and for survey year, country, whether the survey occurred in the first 3 months of the year, and a categorical predictor variable for each year of life.

[e] Childhood adversities are categorical with 5 levels: Never (0), Rarely (0.25), Sometimes (0.5), Often (0.75), Very Often (1.0).

[f] The prior disorder indicators are lagged by one year; the indicator is set in the year after onset.

[*] Significant difference, $p < .05$, two-tailed test.

STB, especially among females, potentially linked to the COVID-19 pandemic (Bersia et al., 2022; CDC, 2025; García-Fernández et al., 2023; Gracia et al., 2021; Moscoso et al., 2024), and other factors such as increased social media use and screen time, cyberbullying, reduced sleep, earlier puberty onset, economic uncertainty, or climate anxiety (Hamilton et al., 2024; Hickman et al., 2021; Keyes and Platt, 2024; Leventhal et al., 2021; Marengo et al., 2024; Twenge et al., 2019, 2018). However, our data do not permit direct evaluation of the pandemic's impact due to variations in survey timing across sites.

Consistent with a recent umbrella review of adolescents and young adults (Richardson et al., 2024), we found increased STB risk among female, non-heterosexual, and transgender people. Our previous WMH-ICS report (Mortier et al., 2018b) identified strong associations of STB with female gender and non-heterosexual orientation, particularly for transitions from ideation to attempt. Unlike the earlier study, the current sample was sufficiently large to examine transgender status. We found that risk for STB was particularly elevated in this subgroup, with a risk ratio (or relative risk [RR]) of 2.4, which indicates a 2.4-fold (or 140%) higher risk of suicidal ideation onset compared to peers that do not identify as transgender. We also found that transgender students have a 1.2-fold increased risk of ideation persistence, and a 1.5-fold increased risk of transitioning to suicide attempt; however, it is important to highlight that, due to the large sample size of our study, relatively modest RRs also reached statistical significance, and only RR $\geq$2.0 are usually considered clinically relevant (Andrade, 2015). These associations remained significant after adjusting for CAs and MDx, suggesting additional transgender-specific STB risk factors, such as gender dysphoria (Dhejne et al., 2016) and exposure to stigma and discrimination (Bird et al., 2024; Testa et al., 2017), resulting in a state of heightened vigilance and related psychological distress (Choo et al., 2024). Protective factors like social and family support, LGBTQ+ community connectedness, and school safety warrant further exploration (Gower et al., 2018; Taliaferro et al., 2018).

Our study confirms previous research on the elevated risk for STB among adolescents and young people who experienced CAs and MDx (Gili et al., 2019; Richardson et al., 2024). The comprehensive analyses conducted in our study revealed that, of all predictor variables included in this study, exposure to parental psychopathology, childhood abuse and neglect was most strongly associated with suicidal ideation onset (RRs range 4.4–7.0 in univariable models) and STB severity, including increased risk of the transition from ideation to plan or attempt (RRs range 2.1–2.6 in univariable models), and to a lesser extent, increased risk for persistence of STB (RRs range 1.2–1.9). These detrimental effects were only partially explained in adjusted models by the higher

Table 3
The associations of demographic variables, childhood adversities, and temporally prior mental disorders with STB persistence[a,b].

	Lifetime persistence of ideation (n = 31,123)				Lifetime persistence of plan (n = 17,306)				Lifetime persistence of attempt (n = 5907)			
	Univariable[c]		Multivariable[d]		Univariable[c]		Multivariable[d]		Univariable[c]		Multivariable[d]	
	RR	(95% CI)	RR	(95%CI)	RR	(95%CI)	RR	(95%CI)	RR	(95%CI)	RR	(95%CI)
I. Demographic variables												
Female sex at birth	1.1*	(1.0–1.1)	1.0	(1.0–1.0)	1.0	(1.0–1.1)	1.0	(0.9–1.0)	1.1	(0.9–1.3)	1.0	(0.9–1.3)
Transgender	1.2*	(1.2–1.3)	1.1*	(1.0–1.1)	1.3*	(1.2–1.4)	1.1*	(1.0–1.2)	1.2	(0.9–1.7)	1.0	(0.7–1.4)
Non-heterosexual	1.2*	(1.1–1.2)	1.1*	(1.1–1.1)	1.2*	(1.2–1.2)	1.1*	(1.1–1.2)	1.3*	(1.1–1.5)	1.1	(1.0–1.3)
At least one parent university graduate	1.0	(1.0–1.0)	1.0	(1.0–1.0)	1.0	(1.0–1.0)	1.0	(1.0–1.0)	0.9	(0.8–1.1)	0.9	(0.8–1.0)
Age-of-onset	1.0	(1.0–1.0)	1.0*	(1.0–1.0)	1.0	(1.0–1.0)	1.0*	(1.0–1.0)	1.0	(1.0-0.1.0)	1.0	(0.9–1.0)
Time since onset	1.0*	(1.0–1.0)	1.0*	(1.0–1.0)	1.0*	(1.0–1.0)	1.0*	(1.0–1.0)	0.9*	(0.9–1.0)	0.9*	(0.9–1.0)
II. Childhood adversity types[e]												
Parental psychopathology	1.3*	(1.3–1.4)	1.0	(0.9–1.1)	1.5*	(1.4–1.6)	1.0	(0.9–1.1)	1.7*	(1.2–2.3)	0.9	(0.6–1.3)
Physical abuse	1.3*	(1.2–1.3)	1.0	(1.0–1.1)	1.4*	(1.3–1.5)	1.1*	(1.0–1.2)	1.8*	(1.4–2.3)	1.3*	(1.0–1.8)
Emotional abuse	1.3*	(1.3–1.4)	1.2*	(1.1–1.2)	1.5*	(1.4–1.5)	1.2*	(1.1–1.3)	1.9*	(1.5–2.3)	1.2	(1.0–1.6)
Sexual abuse	1.2*	(1.2–1.3)	1.0	(1.0–1.1)	1.3*	(1.2–1.4)	1.1	(1.0–1.2)	1.5*	(1.1–2.0)	1.1	(0.8–1.5)
Neglect	1.3*	(1.3–1.4)	1.1*	(1.0–1.1)	1.4*	(1.3–1.5)	1.1*	(1.0–1.2)	1.7*	(1.3–2.1)	1.1	(0.9–1.5)
III. Number of childhood adversities												
Exactly 1	1.1*	(1.1–1.2)	–	–	1.1*	(1.1–1.3)	–	–	1.2	(0.8–1.7)	–	–
Exactly 2	1.2*	(1.1–1.3)	1.1*	(1.0–1.1)	1.3*	(1.2–1.4)	1.1	(1.0–1.1)	1.3	(0.9–1.9)	1.1	(0.8–1.4)
3+	1.2*	(1.2–1.4)	1.1*	(1.0–1.1)	1.4*	(1.3–1.5)	1.1*	(1.0–1.2)	1.8*	(1.3–2.5)	1.2	(0.9–1.6)
IV. Temporally primary lifetime mental disorder types[f]												
Major depressive disorder	1.1*	(1.1–1.2)	1.1*	(1.0–1.1)	1.2*	(1.1–1.2)	1.1*	(1.0–1.2)	1.3*	(1.1–1.5)	1.0	(0.8–1.2)
Bipolar disorder	1.2*	(1.1–1.2)	1.1*	(1.0–1.2)	1.2*	(1.1–1.3)	1.1*	(1.0–1.2)	1.3*	(1.0–1.7)	1.0	(0.7–1.3)
Generalized anxiety disorder	1.2*	(1.1–1.2)	1.1*	(1.0–1.1)	1.3*	(1.3–1.4)	1.1*	(1.1–1.2)	1.6*	(1.4–1.8)	1.2	(1.0–1.4)
Panic disorder	1.2*	(1.1–1.2)	1.1*	(1.0–1.1)	1.2*	(1.2–1.3)	1.1*	(1.0–1.1)	1.6*	(1.3–1.9)	1.2	(1.0–1.5)
Post-traumatic stress disorder	1.1*	(1.1–1.2)	1.1*	(1.0–1.1)	1.2*	(1.2–1.3)	1.1*	(1.0–1.2)	1.4*	(1.1–1.7)	1.0	(0.8–1.3)
Attention-deficit/hyperactivity disorder	1.2*	(1.1–1.2)	1.1*	(1.1–1.1)	1.3*	(1.2–1.3)	1.1*	(1.1–1.2)	1.3*	(1.1–1.6))	1.0	(0.9–1.3)
Drug use disorder	1.1*	(1.0–1.1)	1.0	(0.9–1.1)	1.2*	(1.1–1.2)	1.0	(0.9–1.1)	1.4*	(1.1–1.7)	1.1	(0.9–1.4)
Alcohol use disorder	1.1*	(1.0–1.1)	1.1*	(1.0–1.1)	1.2*	(1.1–1.2)	1.1*	(1.0–1.2)	1.3*	(1.1–1.6)	1.0	(0.8–1.3)
V. Number of temporally primary lifetime mental disorders												
Exactly 1	1.1*	(1.1–1.2)	–	–	1.2*	(1.1–1.3)	–	–	1.2	(0.9–1.6)	–	–
Exactly 2	1.2*	(1.2–1.2)	1.0	(0.9–1.0)	1.3*	(1.2–1.4)	1.0	(0.9–1.1)	1.5*	(1.1–1.9)	1.1	(0.9–1.5)
3+	1.3*	(1.3–1.4)	1.0	(0.9–1.0)	1.5*	(1.5–1.6)	1.0	(0.9–1.1)	2.0*	(1.5–2.6)	1.2	(0.8–1.8)

Abbreviations: STB; suicidal thoughts and behaviors; RR, risk ratio; 95% CI, 95% confidence interval of RR.

[a] Risk ratios and results are from multivariable models with log link function, Poisson distribution, and robust standard errors. Data were multiply imputed, $m = 30$.

[b] Persistence of ideation or plan is defined as having the outcome in the past 12 months and lifetime onset at least 2 years prior. Persistence of suicide attempts is defined as having an attempt in the past 12-months among respondents with a first lifetime attempt at least two years ago.

[c] All univariable models controlled for person-year and survey year.

[d] Multivariable models controlled for all variables shown in the rows, and for survey year, country, whether the survey occurred in the first 3 months of the year, and a categorical predictor variable for each year of life.

[e] Childhood adversities are categorical with 5 levels: Never (0), Rarely (0.25), Sometimes (0.5), Often (0.75), Very Often (1.0).

[f] The prior disorder indicators disregard onsets that occur in the same year or after the onset of the STB.

[*] Significant difference, $p < .05$, two-tailed test.

prevalence of MDx associated with CA exposure. Notably, parental psychopathology's strong association with STB (RR=7.0) weakened after adjusting for other CAs, suggesting indirect effects through increased exposure to abuse and neglect, consistent with general population studies on the intergenerational transmission of childhood maltreatment (Greene et al., 2020) and suicide risk (Ranning et al., 2022). These findings align with toxic stress models (Shonkoff et al., 2012), i.e., the dysregulated stress response when a child or adolescent experiences adversity, which results in a profound disruption of brain architecture development, an increased risk for emotional dysregulation, maladaptive cognitive patterns, and difficulties in establishing healthy relationships. Research in community-based samples has also shown that the interplay between CA type, exposure duration, and developmental timing is important to explain onset of adolescent STB (Farooq et al., 2024; Khan et al., 2015), providing a focus for further research.

Our study extends previous knowledge by showing that certain CAs and MDx were differentially associated with STB depending on which part of the STB severity spectrum was being investigated. First, in line with research on MDx in the general population (Nock et al., 2009), mood disorders were most strongly associated with ideation onset in adjusted models (RR=2.0 for major depressive disorder, and RR=1.8 for bipolar disorder), while panic disorder (RR=1.9) and bipolar disorder (RR=1.7) were most strongly associated with the transition from ideation to attempt. Second, of all CAs under study, emotional abuse was most strongly associated in adjusted models with onset of suicidal ideation (RR=2.1) and plans (RR=1.5), and to a lesser extent with persistence of these outcomes (RR=1.2 for both). Retrospective studies among adolescents and college students suggest that the association of childhood emotional abuse with suicidal ideation may be mediated by factors such as depression, rumination, experiential avoidance, and deviant peer affiliation (Wang et al., 2023, 2022). Additionally, a four-wave longitudinal study of Chinese elementary school students identified a bidirectional relationship: emotional abuse led to increased self-disgust, which in turn reinforced a cycle wherein self-disgust and suicidal ideation heightened risk of further emotional abuse (Gong and Zhou, 2025). Third, exposure to emotional abuse, sexual abuse, and neglect were most strongly associated with ideation-to-attempt transition in adjusted models, although effect sizes were modest (RR range 1.3–1.4). The role of emotional abuse in STB onset and persistence is understudied (Angelakis et al., 2019; Castellví et al., 2017) although recent community-based studies among Chinese adolescents (He et al., 2024), as well as Canadian (Bader and Frank, 2024) and Australian adults (Kisely et al., 2024), suggest that impact of emotional abuse on suicide risk may equal those of physical and sexual abuse. Fourth, physical abuse showed a unique multivariate association with repetition

of attempts. It has been proposed that an increased capability to attempt suicide, consisting in an increased pain tolerance and reduced fear of death, can be acquired through the repeated exposure to physically painful and/or fear-inducing experiences, such as physical abuse, although empirical evidence is mixed (Burke et al., 2018; Klonsky and May 2015; Smith et al., 2010).

Several limitations of the study deserve attention. First, response rates were not optimal, which may reduce external validity of findings. Although the empirical association between response rate and non-response bias is weak (Groves, 2006), there may be risk for over-estimation of STB when response rates are low. Second, nondisclosure (De Luca et al., 2014) may have led to underestimation of STB; however, computerized self-report screening measures might be related with higher self-disclosure, as opposed to face-to-face or telephone interviews. Third, we combined passive and active suicidal ideation into a single dichotomous outcome, leading to higher estimates of suicidal ideation, compared to active ideation only. Previous research has shown that both forms of ideation are distinguishable yet highly correlated constructs (Wastler et al., 2023) and challenges the notion that passive precedes active ideation in a linear, temporal progression (Spangenberg et al., 2025). Inclusion of passive suicidal ideation is conceptually justified, as meta-analytic evidence indicates that it shares significant clinical overlap with active ideation; both are associated with mental disorders, psychological factors linked to suicide, and increased risk of suicide attempts and death (Liu et al., 2020). Future research using our dataset could explore differences in correlates between passive and active ideation, as well as transitions between these forms of ideation and other suicide-related outcomes (e.g., plan and attempt). Fourth, this is a cross-sectional study and future studies should use longitudinal designs to replicate our findings. While we assessed time of onset of all MDx included in this study, no information on the timing of CAs was collected, precluding establishing temporality between CAs and STB. Because of this limitation, the associations we found might partially represent associations temporally prior to STB with the subsequent occurrence of CA exposure. Fifth, mental disorders were assessed using self-report screening instruments rather than full diagnostic interviews. While these scales are well-validated and widely used in population-based research, their prevalence estimates might differ from those obtained through clinical diagnostic assessments. Sixth, the translation of the survey into multiple languages may have introduced subtle cross-cultural differences in survey item interpretation, potentially affecting the comparability of responses across countries. Seventh, our study included a limited number of countries and colleges, which may constrain generalizability of findings to other populations of first-year students. Notably, no participants from the United States were included, although much of existing college student STB research has been conducted in U.S. settings (Mortier et al., 2018c). Finally, data on gender identity and sexual orientation were not available for the Saudi Arabia sample. To enable inclusion in multivariable models, we coded gender identity as sex assigned at birth and sexual orientation as heterosexual, allowing the Saudi Arabia data to contribute information on other key variables such as CAs and MDx.

The high prevalence of STB among university students underscores the need for enhanced suicide prevention efforts, particularly in early life (David and Fodor, 2023). Universities may serve as key intervention points, given their centralized student services (Harrod et al., 2014; Hasking et al., 2024). Effective prevention must consider intersecting risk factors such as sex, gender identity, sexual orientation, and cumulative CA (Hughes et al., 2023), which can create biosocial feedback loops leading to worsening outcomes (Rod et al., 2020; Singer et al., 2017).

Data availability

The data analyzed in this study is subject to the following licenses/restrictions: The WMH-ICS data sharing agreement limits access of this data to members of the consortium. The participant data and statistical analysis plan used for this study are available upon reasonable request from the corresponding author (Jordi Alonso) as long as the main objective of the data sharing request is replicating the analysis and findings as reported in this paper.

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A complete list of all within-country and cross-national WMH-ICS publications can be found at http://www.hcp.med.harvard.edu/wmh/college_student_survey.php

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