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Lifetime and 12-month treatment for mental disorders and suicidal thoughts and behaviors among first year college students

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Abstract

Objectives: Mental disorders and suicidal thoughts and behaviors (STB) are common and burdensome among college students. Although available evidence suggests that only a small proportion of the students with these conditions receive treatment, broad-based data on patterns of treatment are lacking. The aim of this study is to examine the receipt of mental health treatment among college students cross-nationally.

Methods: Web-based self-report surveys were obtained from 13,984 first year students from 19 colleges in eight countries across the world as part of the World Health Organization's World Mental Health–International College Student Initiative. The survey assessed lifetime and 12-month common mental disorders/STB and treatment of these conditions.

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Results: Lifetime and 12-month treatment rates were very low, with estimates of 25.3–36.3% for mental disorders and 29.5–36.1% for STB. Treatment was positively associated with STB severity. However, even among severe cases, lifetime and 12-month treatment rates were never higher than 60.0% and 45.1%, respectively.

Conclusions: High unmet need for treatment of mental disorders and STB exists among college students. In order to resolve the problem of high unmet need, a reallocation of resources may focus on innovative, low-threshold, inexpensive, and scalable interventions.

KEYWORDS

affective disorders, anxiety, college students, health service, suicide

1 | INTRODUCTION

Mental disorders are common and impairing conditions among college students worldwide, with 12-month estimates of 1/5 to 1/3 meeting criteria for a diagnostic and statistical manual, fourth edition (DSM-IV) mental disorder (Auerbach et al., 2016, in press). Mental disorders are often associated with suicidal thoughts and behaviors (STB; including suicidal ideation, plans, and attempts); prior studies indicate that mental disorders are associated with a threefold to fourfold increased risk in STBs (Nock et al., 2008). Mental disorders and/or STB among students specifically are associated with adverse outcomes such as lower academic functioning (Bruffaerts et al., 2018), relationship dysfunction (Kerr & Capaldi, 2011), or labor market marginalization (Niederkrotenthaler et al., 2017). These long-term adverse outcomes may be mediated by mental health problems that exist during the college years, as these years constitute a peak period for the first onset of a broad range of mental disorders. Over the past decades, a number of college prevention programs have been established to reduce the high burden of emotional problems; however, these programs generally shown small effect sizes (Harrod, Goss, Stallones, & DiGuiseppi, 2014; Reavley & Jorm, 2010). Further, a number of psychological treatments have clearly demonstrated the ability to treat mental disorders and STB (Cuijpers et al., 2016; Linehan et al., 2006); yet available data suggest that many students with mental disorders or STB rarely seek treatment (Auerbach et al., 2016; Eisenberg, Hunt, Speer, & Zivin, 2011; Han et al., 2016). Among U.S. college students with 12-month mental disorders, as few as 18% report having used mental health services in the past year (Blanco et al., 2008) and another study of U.S. college students found that only 51% of students with suicidal ideation received any type of treatment in the past year (Downs & Eisenberg, 2012). Low treatment rates in college are counterintuitive, as treatment seeking is higher among younger people (Wang et al., 2007), and importantly, many colleges have a student health center or other facilities that provide low-threshold access to professional care (McBride, Van Orman, Wera, & Leine, 2013).

Although available data suggest that the treatment gap for mental disorders and STB is high among college students, these prior studies have several limitations. First, most studies are confined to a limited number of countries such as the United States (Eisenberg et al., 2011), China (Liu et al., 2017), Northern Ireland (McLafferty et al., 2017), or France (Verger, Guagliardo, Gilbert, Rouillon, & Kovess-Masfety, 2010). Second, many studies restrict their samples to specific college departments (e.g., psychology and medicine—Sun et al., 2017). Third, and critically, the vast majority of studies have not assessed lifetime treatment (for an exception, see Arria et al., 2011), thereby confounding whether students first entered treatment prior to or after arrival at college.

2 | METHODS

The current report used data collected in the WHO World Mental Health International College Student (WMH-ICS) Initiative (http://www.hcp.med.harvard.edu/wmh/college_student_survey.php). The WHO-ICS was initiated to obtain accurate longitudinal information about the prevalence and correlates of mental, substance, and behavioral disorders among college students throughout the world. The initial phase of the initiative, which is the focus of the current report, involves carrying out surveys with incoming first year college students to estimate prevalence of mental disorders, associated impairments, adverse social and academic consequences, and patterns of help seeking. The specific aims of the current report are to (a) estimate the proportion of respondents with either lifetime or 12-month mental disorders and/or STB who received some form of treatment; (b) examine the types of disorders and levels of STB most likely to receive treatment; and (c) examine multivariate socio-demographic and college-related correlates of treatment.

2.1 | Samples

The WMH-ICS surveys were administered in a convenience sample of 19 colleges and universities (seven private, 12 public; henceforth referred to as "colleges") in eight countries (Australia, Belgium, Germany, Mexico, Northern Ireland, South Africa, Spain, and the United States). Web-based self-report questionnaires were administered to representative samples of incoming freshmen across these countries between October 2014 and February 2017. A total of 14,371 questionnaires were completed, with sample sizes ranging from a low of 633 in Australia to a high of 4,580 in Belgium. The weighted (by achieved sample size) mean response rate across all surveys was 45.5%. An overview of the sample design in each participating country is provided in Data S1. The sample for the analyses reported here was restricted to students identifying as male or female who were full-time students (n = 13,984). Students excluded from analyses included those with missing information on gender and full-time status (n = 35), who did not identify as male or female (n = 50), or who reported part-time status (n = 302).

2.2 | Procedures

All incoming freshmen were invited to participate in a web-based self-report health survey. The initial mode of contact varied across colleges. The survey was part of a health evaluation in some colleges, part of the registration process in others, and a stand-alone survey administered to students via their student email addresses in still others. In all cases other than in Mexico, potential respondents were invited to participate and initial nonrespondents were recontacted through a series of personalized reminder emails containing unique electronic links to the survey. The situation was different in Mexico, where students were invited to participate in conjunction with mandatory activities, which varied from school to school (e.g., student health evaluations and tutoring sessions), with time set aside for completing the survey during the sessions. In the other countries, 10 colleges implemented conditional incentives in the final stages of refusal conversion (e.g., a raffle for store credit coupons and movie passes). In addition, one site (Spain) used an "end-game strategy" in which a random sample of nonrespondents at the end of the normal recruitment period was offered incentives for participation. Respondents to these end-game interviews given a weight equal to 1/p, where p represented the proportion of nonrespondents at the end of the normal recruitment period that was included in the end game, to adjust for the undersampling of these hard-to-recruit respondents. Informed consent was obtained before administering the questionnaires in all countries. Procedures for obtaining informed consent and protecting human participants were approved and monitored for compliance by the institutional review boards of the organizations coordinating the surveys in each country.

2.3 | Measures

2.3.1 | Seeking professional treatment for mental disorders

All respondents were asked whether they ever got psychological counseling or medication for an emotional or substance problem, as well as the age of the first and last time they received medication or counseling (Hoge et al., 2004; Kessler & Ustun, 2004; Ursano, 2012).

2.3.2 | Mental disorders

Due to the size and logistical complexities of the surveys, it was impossible to administer an in-depth psychiatric diagnostic interview to each student. Instead, the survey instrument consisted of a broad range of short validated self-report screening scales. These included the CIDI Screening Scales (Kessler et al., 2013; Kessler & Ustun, 2004) for lifetime and 12-month major depressive episode, mania/hypomania, generalized anxiety disorder (GAD), panic disorder, and drug use disorder (abuse or dependence either on cannabis, cocaine, or any other street drug, or on a prescription drug either used without a prescription or used more than prescribed to get high, buzzed, or numbed out) and the AUDIT screening scale for alcohol use disorder (Saunders, Aasland, Babor, de la Fuente, & Grant, 1993). The CIDI-SC scales have concordance with blinded clinical diagnoses in the range area under the curve (AUC) = 0.70–0.78 (Kessler et al., 2013). In line with a prior recommendation (Babor, Higgins-Biddle, Saunders, & Monteiro, 2001), we defined alcohol use disorder (abuse or dependence) in the AUDIT as either having a total score of 16+ or a score 8–15 with 4+ on the AUDIT dependence questions. This version of AUDIT scoring has concordance with clinical diagnosis in the range AUC = 0.78–0.91 (Reinert & Allen, 2002). Additional items taken from the CIDI (Kessler & Ustun, 2004) were used to assess age of onset of each disorder and number of months with symptoms in the past year. Please note that validation studies of our self-report screening scales have not yet been carried out in samples of college students.

2.3.3 | Suicidal thoughts and behaviors

A modified version of the Columbia Suicidal Severity Rating Scale (Posner et al., 2011) was used to assess STB, including suicidal ideation ("Did you ever wish you were dead or would go to sleep and never wake up?" and "Did you ever in your life have thoughts of killing yourself?"), suicide plans ("Did you ever think about how you might kill yourself [e.g., taking pills, shooting yourself] or work out a plan of how to kill yourself?"), and suicide attempts ("Have you ever made a suicide attempt [i.e., purposefully hurt yourself with at least some intent to die]?"). Among those who indicated to have had lifetime STB, we also asked whether this occurred in the past 12 months.

2.3.4 | Socio-demographic predictors

Gender was assessed by asking respondents whether they identified themselves as male, female, transgender (male-to-female/female-to-male), or "other." Respondent age was categorized into three categories (18 years/19 years/20 or more years old). Parental educational level was assessed for father and mother separately and was categorized into high (university graduate or more), medium (some

postsecondary education), and low (secondary school or less) based on the highest-of-both parents' educational level. Parental marital status was dichotomized into "parents not married or parent(s) deceased" versus "parents married and both alive." Respondents were asked about the urbanicity of the place they were raised (small city/large city/town or village/suburbs/rural area) and their religious background (categorized into Christian/Other religion/No religion). Sexual orientation was classified into the categories heterosexual; gay or lesbian, bisexual, asexual, not sure, and other. Additional questions were asked about the extent to which respondents reported being attracted to men and women and the gender(s) of people they had sex with (if any) in the past 5 years. Respondents were categorized into the following categories: heterosexual with no same-sex attraction, heterosexual with some same-sex attraction, nonheterosexual without same-sex sexual intercourse, and nonheterosexual with same-sex sexual intercourse.

2.3.5 | College-related predictors

Respondents were asked where they ranked academically compared with other students at the time of their high school graduation (from top 5% to bottom 10%; categorized into quartiles) and what their most important reason was for going to a university. Based on the results of a tetrachoric factor analysis (details available on request), the most important reason to go to a university was categorized into extrinsic reasons (i.e., "family wanted me to," "my friends were going," "teachers advised me to," and "I did not want to get a job right away") versus intrinsic reasons ("to achieve a degree," "I enjoy learning and studying," "to study a subject that really interests me," "to improve job prospects generally," and "to train for specific type of job"). Respondents were also asked where they were living during the first semester of the academic year (parents', other relative's, or own home/university or college hall of residence/shared house, apartment, or flat/private hall of residence/other) and if they expect to work in a student job.

2.4 | Analysis

All analyses were conducted with SAS version 9.4 (SAS Institute Inc., 2010). Data were weighted to adjust for differences between survey respondents and nonrespondents on whatever socio-demographic information was made available about the student body by university officials using poststratification weights (Groves & Couper, 1998). Item-level missing data in the completed surveys were imputed using the method of multiple imputation (MI) by chained equations (Van Buren, 2012). Four kinds of item-missing data were imputed simultaneously in this way. The first was a 50% random subsampling of the drug use section in Belgium, which was done to reduce interview length. The second was the complete absence of the panic disorder section in Mexico, Northern Ireland, and South Africa due to a skip logic error. The third was the complete absence of some socio-demographic variables in Australia, Belgium, and Spain because of a decision by school administrators not to assess those variables (sexual orientation, current living situation, expected student job, and most important reason for going to college in all these countries; parent education and marital status in Australia and Belgium; religion in Australia; and self-reported high school ranking in Belgium). The fourth was item-level skips or invalid responses to individual questions throughout the survey. The latter was less than 0.1% for lifetime disorders, 0.0–2.3% for 12-month disorders other than AUD, and in the range 3.0–9.3% (3.8–7.0% interquartile range) for AUD, 0.0–12.0% (interquartile range 1.9–2.7%) for disorder age-of-onset, 0.0–24.6% (interquartile range 2.4–8.8%) for disorder persistence, 1.8–25.4% (interquartile range 8.8–24.1%) for most important reasons for attending college, 1.0–10.8% (interquartile range 3.0–3.4%) for high school ranking, and 0.0–7.0% for the other socio-demographic and college-related variables. Cross tabulations were used to estimate the prevalence of treatment seeking among those with 12-month mental disorder and STB and are reported as weighted within-country proportions, with associated MI-adjusted standard errors obtained through the Taylor series linearization method. To obtain pooled estimates of prevalence across countries, each country was given an equal sum of weights.

Logistic regression analyses were used to identify mental disorders, number of mental disorders, and STB as predictors for treatment seeking, both lifetime and 12-month. Both bivariate (in which only one predictor was considered at a time) and multivariate analyses (in which all predictors were considered simultaneously) were performed; all analyses additionally adjusted for socio-demographic (gender, age, parental educational level, parental marital status, place raised, religion, sexual orientation, and current living situation), college-related predictors (expected to work on a student job, academic performance in high school, and most important reason to go to university), and country membership. A series of multivariate models was evaluated including combinations of the following predictor blocks: (a) separate dummy variables for each of the six types of mental disorder, (b) a variable indicating number of mental disorders (ranging from zero to six), (c) dummy variables indicating exactly one, exactly two, and three or more mental disorders, and (d) type of STB. This approach allowed us to investigate whether treatment seeking is best explained by additive models (including only type of mental disorders and/or STB) or interactive models (including type of mental disorders and/or STB, as well as the *number* of disorders). Akaike's information criterion and AUC were used to select the final and best-fitting models. Regression coefficients and their MI-based standard errors were exponentiated to create odds ratios (ORs) and associated 95% confidence intervals.

All results were pooled across countries using a fixed effects modeling (FEM) approach by including dummy control variables for country. Due to variable within-country sample sizes, no attempt was made to search for variation in associations across countries. We chose FEM instead of a multilevel modeling approach to account for the nested structure of the data because our focus is on pooled within-group associations between individual-level predictors and outcomes rather than geographic variation in mean outcome scores. In a situation of this sort, FEM is preferable because it yields estimates of individual-level associations

comparable with multilevel analysis without the restrictive, and in our case incorrect, assumption in the latter approach that the aggregate units (i.e., countries and universities within countries) represent random samples from the population of all such units (Goldstein, 2010).

Finally, we estimated bivariate and multivariate models with socio-demographic variables, college-related variables, and country membership as predictors for seeking treatment, adjusting for the predicted probabilities. This enabled us to estimate the effect of the socio-demographic and college-related predictors on seeking treatment above and beyond the clinical likelihood of seeking treatment. In addition, we tested all two-way interactions between the predicted probabilities on the one hand and socio-demographic variables, college-related variables, and country membership on the other hand. Statistical significance in all analyses was evaluated using two-sided MI-based tests with significance level α set at 0.05.

3 | RESULTS

3.1 | Socio-demographic description of the sample and students' expectations for college

The final sample included 13,984 students (58.4% female; mean age = 19.33, *SD* = 0.59). Most of the students have highly educated parents (57.2%) and identify as Christian (57.3%).

3.2 | Lifetime and 12-month prevalence of mental disorders and STB

As reported in previous WMH-ICS publications (Auerbach et al., 2018; Mortier et al., 2018) and in a prior report in this issue (Auerbach et al., 2018), around one third of participants met criteria for lifetime mental disorder (mostly major depressive episode [MDE] [21.2%] or

TABLE 1 Treatment[a] of mental disorders and suicidal thoughts and behaviors (STB) in the WMH-ICS (*n* = 13,984)

	Lifetime		12-Month	
Category	Prevalence % (SE)	Treatment % (SE)	Prevalence % (SE)	Treatment % (SE)
Full sample	100.0 (0.0)	19.8 (0.5)	100.0 (0.0)	11.3 (0.4)
Mental disorders and STB				
Any mental disorder[b]	35.3 (0.6)	36.3 (1.1)	31.4 (0.6)	25.3 (1.1)
Any STB[c]	32.7 (0.6)	36.1 (1.2)	17.2 (0.5)	29.5 (1.6)
Any mental disorder and any STB	20.6 (0.5)	47.0 (1.6)	11.7 (0.4)	37.7 (2.1)
Any mental disorder or any STB	47.5 (0.6)	31.5 (0.9)	36.9 (0.6)	23.3 (1.0)
Any mental disorder and no STB	14.8 (0.5)	21.3 (1.4)	19.7 (0.5)	17.9 (1.2)
Any STB and no mental disorder	12.2 (0.4)	17.8 (1.5)	11.7 (0.4)	37.7 (2.1)
No mental disorder or STB	52.5 (0.6)	9.1 (0.5)	63.1 (0.6)	4.2 (0.3)
Type of mental disorder				
Major depressive episode	21.2 (0.5)	43.2 (1.5)	18.5 (0.5)	30.2 (1.5)
Generalized anxiety disorder	18.6 (0.5)	45.0 (1.6)	16.7 (0.5)	32.6 (1.6)
Panic disorder	5.0 (0.3)	59.8 (3.3)	4.5 (0.3)	42.0 (3.8)
Broad mania	3.5 (0.2)	41.0 (3.6)	3.1 (0.2)	25.8 (3.5)
Alcohol abuse or dependence	6.8 (0.3)	29.4 (2.5)	6.3 (0.3)	19.8 (2.4)
Drug abuse or dependence	5.1 (0.3)	42.4 (3.5)	3.0 (0.2)	32.6 (4.2)
Number of disorders				
None	64.7 (0.6)	10.7 (0.5)	68.6 (0.6)	4.8 (0.4)
Exactly one mental disorder	18.4 (0.5)	24.1 (1.4)	17.2 (0.5)	16.2 (1.2)
Exactly two mental disorders	11.0 (0.4)	44.0 (2.1)	9.4 (0.4)	33.1 (2.2)
Three or more mental disorders	5.8 (0.3)	60.0 (3.0)	4.8 (0.3)	42.3 (3.4)
STB				
Never	67.3 (0.6)	11.8 (0.5)	82.8 (0.5)	7.5 (0.4)
Ideation only	14.8 (0.5)	24.5 (1.5)	8.4 (0.4)	19.9 (1.9)
Plan, no attempts	13.6 (0.5)	41.9 (1.9)	7.8 (0.4)	37.8 (2.6)
Planned or unplanned attempt	4.3 (0.3)	57.5 (3.4)	1.0 (0.1)	45.1 (7.0)

Note. To obtain pooled estimates of prevalence, each country was given an equal sum of weights. SE: standard error.

[a]Respondents with age of last treatment lower than the minimum age of onset across the six mental disorders and suicidal outcomes under study (*n* = 174; 1.2% of the full sample) are coded as not having received treatment.

[b]Any out of the six types of mental disorders under study.

[c]Any out of the three STB outcomes under study.

GAD [18.6%]—Table 1) or reported lifetime STB (mostly suicidal ideation [14.8%]). Approximately one student in five had both STB and mental disorder in their lifetime; whereas approximately half of the students never experienced any mental disorder nor STB. If we look at prevalence estimates in the past 12 months (Table 1), a similar picture emerges: Almost a third of the students meet criteria for a mental disorder (mostly MDE [18.5%] or GAD [16.7%]), with STB being remarkably less common (estimates between 1.1% and 8.4%). Around one in 10 have both STB and mental disorders in the past year, and around six in 10 do not meet criteria for a mental disorder or STB. More detailed information on the occurrence of mental disorder and STB in the sample can be found in Auerbach et al. (2018) and Mortier et al. (2018) or in the earlier paper in this special issue (Auerbach et al., 2018).

3.3 | Lifetime treatment rates for mental disorders and STB

An average of 19.8% of the total WMH-ICS sample had used services for emotional problems or substance use-related problems ever in their life (Table 1). Approximately 36% of students with any life mental disorder and a similar proportion (i.e., 36.1%) who engaged in STB at some time in the past received some form of treatment for emotional problems in the past year. The estimate of lifetime treatment among those without a lifetime disorder or STB was 9.1%. Those with higher severity accessed care at higher rates. For example, 60.0% of those with three or more lifetime mental disorders reported lifetime treatment, compared with 24.5% among those with one lifetime mental disorder. If we look at types of disorders, panic disorder (59.8%) and GAD (45.0%) were the disorders that yielded the highest lifetime treatment rates among college students. Lowest treatment rates were found among students with alcohol abuse or dependence (29.4%). Similarly, lifetime treatment rates for STB were estimated in the 24.5–41.9% range for those with suicidal thoughts (i.e., suicide ideation or plan) and 57.5% of those who made a suicide attempt.

3.4 | Bivariate and multivariate correlates of lifetime treatment

In bivariate models (Table 2), all mental disorders (median OR = 3.3) and all STB (median OR = 4.3) were associated with increased odds of lifetime treatment. Specifically, suicide attempt and panic disorder were strongly related to lifetime treatment (OR > 5). The best-fitting regression model to predict lifetime treatment was the multivariate additive model that includes both type of mental disorder and STB, but not number of disorders (Table 2, Multivariate Model 4). In this model, it is clear that both mental disorders (median OR = 2.1) and STB (median OR = 2.6) were directly related to increased odds of receiving treatment. The individual disorder most strongly related to lifetime treatment was panic disorder (OR = 2.9); for STB, this was suicide attempt (OR = 3.4). Remarkably, although we found a clear gradient between the number of mental disorders and lifetime treatment in bivariate models, this effect lost statistical significance in multivariate models. This suggests that having multiple disorders (vs. only one disorder) does not convey a subadditive synergistic effect on seeking treatment.

We also investigated multivariate socio-demographic predictors of lifetime treatment (among those with lifetime disorders or lifetime STB—Table 3) and found that being 20 or older (OR = 1.8), being female (OR = 1.4), having parents who were either not married or where one of the parents deceased (OR = 1.6), or nonheterosexual oriented without same-sex intercourse (OR = 1.4) systematically increased the odds of receiving treatment. Students with lifetime mental disorders and/or STB whose parents had low educational attainment were significantly less likely to seek help (OR = 0.6). College-related factors were not significantly associated with lifetime treatment nor was religious affiliation. None of the two-way interactions between the predicted probabilities and socio-demographic correlates reached statistical significance (results available on request); F -test evaluating the model including two-way interactions versus the reduced model without interactions F (ndf,ddf)[p value] = 0.99 (31,136)[0.50]).

3.5 | 12-Month treatment rates for mental disorders and STB

Table 1 shows that an average of 11.3% of the total WMH-ICS sample had used services in the past year, with higher rates for those with disorders/STB: 25.3% of students with any 12-month mental disorder and 29.5% who engaged in STB in the past year received some form of treatment in the same time span. The estimate of treatment among those without a 12-month disorder or STB was 4.2%. Similar to what we found for lifetime treatment, those with higher severity accessed care at higher rates. For example, 42.3% of those with three or more 12-month mental disorders reported 12-month treatment, compared with only 16.2% among those with one mental disorder. Students with panic disorder (42.0%), GAD (32.6%) but also drug abuse/dependence (32.6%) report the highest treatment rates, those with alcohol abuse/dependence the lowest (19.8%). Similarly, treatment rates for STB were estimated in the 19.9–37.8% range for those with suicidal thoughts (i.e., suicide ideation or plan) but were higher (i.e., 45.1%) in those who made a suicide attempt.

3.6 | Bivariate and multivariate predictors of 12-month treatment

In bivariate models (Table 4), all mental disorders (median OR = 4.4) and all STB within the past year (median OR = 5.3) were associated with receiving treatment in the same time span. Specifically, suicide attempt (OR = 8.2) and GAD (OR = 5.4) yielded the highest odds for treatment. The best-fitting regression model for 12-month treatment was the multivariate interactive model including both type of mental disorder and number of mental disorders, as well as STB, resulting in multivariate median ORs of 3.2 for mental disorders and 2.5 for STB. Interestingly, in bivariate models, we observed a clear gradient between the number of mental disorders and receiving treatment, but the multivariate models suggest a subadditive effect, that is, a (borderline significant) *negative* trend between number of disorders and seeking treatment (F = 2.99 (2,272), p = 0.05). Interestingly,

TABLE 2 Lifetime mental disorders and lifetime suicidal thoughts and behaviors (STB) as predictors for lifetime treatment[a]

		Lifetime treatment				
Category	Prevalence[b] % (SE)	Bivariate[c] aOR [95% CI]	Multivariate 1[d] aOR [95% CI]	Multivariate 2[d] aOR [95% CI]	Multivariate 3[d] aOR [95% CI]	Multivariate 4[d] aOR [95% CI]
Type of lifetime mental disorder						
Major depressive episode	21.2 (0.5)	4.2 [3.6, 4.7]*	2.7 [2.3, 3.1]*	2.8 [2.3, 3.4]*	2.7 [2.3, 3.3]*	2.0 [1.8, 2.4]*
Generalized anxiety disorder	18.6 (0.5)	4.1 [3.6, 4.7]*	2.3 [1.9, 2.7]*	2.4 [2.0, 3.0]*	2.3 [1.8, 2.9]*	2.1 [1.8, 2.5]*
Panic disorder	5.0 (0.3)	5.1 [3.8, 6.9]*	3.0 [2.2, 4.2]*	3.2 [2.2, 4.7]*	3.1 [2.1, 4.6]*	2.9 [2.1, 3.9]*
Broad mania	3.5 (0.2)	2.3 [1.8, 2.9]*	1.0 [0.7, 1.3]	1.0 [0.7, 1.4]	1.0 [0.7, 1.5]	0.8 [0.6, 1.1]
Alcohol abuse or dependence	6.8 (0.3)	1.4 [1.1, 1.7]*	1.0 [0.8, 1.3]	1.1 [0.8, 1.4]	1.1 [0.8, 1.4]	1.0 [0.8, 1.3]
Drug abuse or dependence	5.1 (0.3)	2.4 [1.9, 3.1]*	1.9 [1.4, 2.5]*	2.0 [1.5, 2.8]*	2.0 [1.4, 2.7]*	1.8 [1.3, 2.4]*
F (ndf,ddf)[*p* value][e]			98.19 (6,782) [<0.01]*	29.81 (6,310) [<0.01]*	27.84 (6,349) [<0.01]*	59.74 (6,477) [<0.01]*
Number of lifetime disorders (con.)		2.1 [1.9, 2.2]*		0.9 [0.8, 1.1]		
Number of lifetime disorders (cat.)						
None	64.7 (0.6)	(Ref)			(Ref)	
Exactly one mental disorder	18.4 (0.5)	2.2 [1.9, 2.6]*				
Exactly two mental disorders	11.0 (0.4)	5.2 [4.4, 6.2]*			1.0 [0.7, 1.4]	
Three or more mental disorders	5.8 (0.3)	9.2 [7.1, 12.1]*			0.9 [0.5, 1.5]	
F (ndf,ddf)[*p* value][f]		173.02 (3,542) [<0.01]*			0.25 (2,350)[0.78]	
Lifetime STB						
Never	67.3 (0.6)	(Ref)				(Ref)
Ideation only	14.8 (0.5)	2.2 [1.9, 2.6]*				1.7 [1.4, 1.9]*
Plan, no attempts	13.6 (0.5)	4.3 [3.6, 5.1]*				2.6 [2.2, 3.2]*
Planned or unplanned attempts	4.3 (0.3)	6.5 [5.0, 8.3]*				3.4 [2.5, 4.5]*
F (ndf,ddf)[*p* value][f]		144.43 (3,4303) [<0.01]*				46.65 (3,1080) [<0.01]*
Model fit						
Akaike information criterion			10,880.9	10,881.4	10,882.9	10,679.2
Area under the curve			0.754	0.754	0.754	0.764

Note. aOR: adjusted odds ratio; cat.: categorical; CI: confidence interval; con.: continuous; SE: standard error.

[a]Respondents with age of last treatment lower than the minimum age of onset across the six mental disorders and suicidal outcomes under study are coded as not having received treatment.

[b]To obtain pooled estimates of prevalence, each country was given an equal sum of weights.

[c]Bivariate models adjust for socio-demographic (gender, age, parental educational level, parental marital status, place raised, religion, sexual orientation, and current living situation), college-related predictors (expected to work on a student job, academic performance in high school, and most important reason to go to university), and country membership.

[d]Multivariate models adjust for socio-demographic (gender, age, parental educational level, parental marital status, place raised, religion, sexual orientation, and current living situation), college-related predictors (expected to work on a student job, academic performance in high school, and most important reason to go to university), country membership, and for predictors shown in the rows.

[e] *F* -test to evaluate joint significance of six types of mental disorders. ddf: denominator degrees of freedom; Ndf: numerator degrees of freedom.

[f] *F* -test to evaluate joint significance of categorical predictor levels. ddf: denominator degrees of freedom; Ndf: numerator degrees of freedom.

students with three or more mental disorders had 60% *lower* odds of treatment (Table 4).

The multivariate socio-demographic predictors of treatment among those with 12-month disorders or 12-month STB (Table 5) show that the strength of the ORs is moderate, with being female (OR = 1.6), being 20 or older (OR = 1.5), not having a religious affiliation (OR = 1.3), or having parents who were either not married or where one of the parents deceased (OR = 1.3) as independent predictors of 12-month treatment. Further, compared with students with heterosexual orientation (without any same-sex attraction), those with heterosexual orientation (with some same-sex attraction; OR = 1.4) and those with nonheterosexual orientation (without same-sex intercourse; OR = 1.7) were more likely to seek help. In addition, lower parental education was associated to lower odds

TABLE 3 Socio-demographic correlates of lifetime treatment[a]

Correlates	Prevalence[b]	Bivariate[b] aOR [95% CI]	Multivariate[c] aOR [95% CI]
Belgium	12.5 (0.4)	(Ref)	(Ref)
Australia	12.5 (0.7)	1.1 [0.8, 1.6]	0.9 [0.7, 1.4]
Germany	12.5 (0.6)	0.7 [0.5, 0.9]*	0.6 [0.4, 0.9]*
Mexico	12.5 (0.4)	1.2 [0.9, 1.4]	1.1 [0.9, 1.4]
Northern Ireland	12.5 (0.6)	1.3 [0.9, 1.8]	1.3 [0.9, 1.8]
South Africa	12.5 (0.6)	1.2 [0.9, 1.6]	1.0 [0.7, 1.4]
Spain	12.5 (0.6)	0.5 [0.3, 0.6]*	0.5 [0.4, 0.7]*
United States	12.5 (0.7)	1.4 [1.1, 1.9]*	1.2 [0.8, 1.7]
F (ndf,ddf)[*p* value][d]		9.78 (7,36970)[<0.01]*	6.39 (7,4861)[<0.01]*
Being female	58.4 (0.9)	1.3 [1.1, 1.6]*	1.4 [1.2, 1.7]*
Age 20+	24.8 (0.8)	1.6 [1.4, 2.0]*	1.8 [1.5, 2.3]*
Age 19	25.5 (0.8)	1.1 [0.9, 1.3]	1.1 [0.9, 1.4]
Age 18	49.7 (0.9)	(Ref)	(Ref)
F (ndf,ddf)[*p* value][d]		12.52 (2,636)[<0.01]*	14.89 (2,646)[<0.01]*
Parental education low	18.8 (0.8)	0.6 [0.5, 0.7]*	0.6 [0.5, 0.7]*
Parental education medium	24.0 (0.8)	0.8 [0.6, 1.0]*	0.9 [0.7, 1.0]
Parental education high	57.2 (1.0)	(Ref)	(Ref)
F (ndf,ddf)[*p* value][d]		12.29 (2,505)[<0.01]*	11.95 (2,583)[<0.01]*
Parents not married or parent(s) deceased	29.9 (0.9)	1.7 [1.5, 2.0]*	1.6 [1.4, 2.0]*
Place raised rural area	7.2 (0.5)	1.0 [0.7, 1.4]	1.0 [0.7, 1.4]
Place raised suburbs	17.8 (0.8)	1.3 [1.0, 1.7]*	1.1 [0.8, 1.5]
Place raised town/village	21.2 (0.8)	0.8 [0.7, 1.0]	0.9 [0.7, 1.2]
Place raised large city	25.9 (0.9)	1.1 [0.9, 1.3]	1.0 [0.8, 1.3]
Place raised small city	27.9 (0.9)	(Ref)	(Ref)
F (ndf,ddf)[*p* value][d]		3.11 (4,389)[0.02]*	0.44 (4,344)[0.78]
Another religion	7.4 (0.6)	1.1 [0.8, 1.6]	1.0 [0.7, 1.4]
No religion	35.3 (1.0)	0.9 [0.8, 1.1]	1.1 [0.9, 1.3]
Christian	57.3 (1.0)	(Ref)	(Ref)
F (ndf,ddf)[*p* value][d]		0.73 (2,442)[0.48]	0.33 (2,1330)[0.72]
Nonheterosexual with same-sex sexual intercourse	8.6 (0.6)	1.2 [0.9, 1.7]	1.2 [0.8, 1.7]
Nonheterosexual without same-sex sexual intercourse	11.7 (0.7)	1.4 [1.1, 1.9]*	1.4 [1.0, 1.9]*
Heterosexual—some same-sex attraction	17.4 (0.7)	1.2 [1.0, 1.5]*	1.2 [1.0, 1.4]
Heterosexual—no same-sex attraction	62.3 (1.0)	(Ref)	(Ref)
F (ndf,ddf)[*p* value][d]		2.34 (3,92)[0.08]	1.65 (3,110)[0.18]
Other	1.8 (0.3)	0.7 [0.4, 1.3]	0.7 [0.4, 1.4]
Private hall of residence	3.3 (0.4)	1.0 [0.6, 1.7]	0.9 [0.5, 1.5]
Shared house or apartment/flat	11.0 (0.6)	0.9 [0.7, 1.1]	0.9 [0.7, 1.2]
University or college hall of residence	28.9 (1.0)	1.3 [1.1, 1.6]*	1.1 [0.8, 1.5]
Parents or other relative or own home	55.0 (1.1)	(Ref)	(Ref)
F (ndf,ddf)[*p* value][d]		2.97 (4,217)[0.02]*	0.70 (4,295)[0.59]
Expected to work on a student job	71.4 (0.9)	1.4 [1.2, 1.7]*	1.2 [1.0, 1.5]
Self-reported ranking high school bottom 70%	25.0 (0.8)	0.9 [0.7, 1.1]	0.8 [0.7, 1.1]
Self-reported ranking high school top 30 to 10%	30.0 (0.9)	1.0 [0.8, 1.3]	0.9 [0.7, 1.2]
Self-reported ranking high school top 10 to 5%	21.5 (0.8)	1.0 [0.8, 1.3]	1.0 [0.8, 1.3]
Self-reported ranking high school top 5%	23.6 (0.8)	(Ref)	(Ref)
F (ndf,ddf)[*p* value][d]		0.94 (3,305)[0.42]	1.38 (3,539)[0.25]
Most important reason to go to college extrinsic	11.2 (0.7)	1.2 [0.9, 1.6]	1.2 [0.9, 1.6]

Note. Analyses are restricted to the subsample of respondents with any lifetime mental disorder or any lifetime suicidal thoughts or behaviors (47.5% of the full sample). aOR: adjusted odds ratio; cat.: categorical; CI: confidence interval; con.: continuous; SE: standard error.

[a]Respondents with age of last treatment lower than the minimum age of onset across the six mental disorders and suicidal outcomes under study are coded as not having received treatment.

[b]Bivariate models adjust for the predicted probabilities calculated using the coefficients of the clinical predictors in the final model shown in Table 2 (last column).

[c]Multivariate models adjust for the predicted probabilities calculated using the coefficients of the clinical predictors in the final model shown in Table 2 (last column) and for the predictors shown in the rows.

[d] *F* -test to evaluate joint significance of categorical predictor levels. ddf: denominator degrees of freedom; Ndf: numerator degrees of freedom.

TABLE 4 Twelve-month mental disorders and 12-month suicidal thoughts and behaviors (STB) as predictors for 12-month treatment[a]

		12-Month treatment				
Correlates	**Prevalence[b] % (SE)**	**Bivariate[c] aOR [95% CI]**	**Multivariate 1[d] aOR [95% CI]**	**Multivariate 2[d] aOR [95% CI]**	**Multivariate 3[d] aOR [95% CI]**	**Multivariate 4[d] aOR [95% CI]**
Type of 12-month mental disorder						
Major depressive episode	18.5 (0.5)	5.2 [4.4, 6.2]*	3.0 [2.4, 3.6]*	3.7 [2.9, 4.9]*	3.4 [2.6, 4.5]*	2.7 [2.1, 3.6]*
Generalized anxiety disorder	16.7 (0.5)	5.4 [4.5, 6.4]*	2.9 [2.3, 3.5]*	3.8 [2.9, 4.9]*	3.4 [2.6, 4.4]*	3.2 [2.4, 4.2]*
Panic disorder	4.5 (0.3)	5.1 [3.6, 7.1]*	2.5 [1.7, 3.7]*	3.3 [2.0, 5.2]*	3.4 [2.1, 5.4]*	3.3 [2.1, 5.4]*
Broad mania	3.1 (0.2)	2.6 [1.9, 3.6]*	0.8 [0.6, 1.3]	1.2 [0.7, 1.9]	1.2 [0.7, 1.9]	1.0 [0.6, 1.7]
Alcohol abuse or dependence	6.3 (0.3)	1.7 [1.3, 2.3]*	1.2 [0.9, 1.7]	1.5 [1.1, 2.1]*	1.5 [1.1, 2.1]*	1.4 [1.0, 2.0]
Drug abuse or dependence	3.0 (0.2)	3.6 [2.5, 5.2]*	2.6 [1.7, 4.0]*	3.4 [2.2, 5.4]*	3.2 [2.1, 5.1]*	3.1 [1.9, 4.8]*
F (ndf,ddf)[*p* value][e]			77.82 (6,238) [<0.01]*	28.05 (6,318) [<0.01]*	23.59 (6,334) [<0.01]*	18.99 (6,262) [<0.01]*
Number of 12-month mental disorders (con.)		2.3 [2.1, 2.5]*		0.8 [0.6, 0.9]*		
Number of 12-month disorders (cat.)						
None	68.6 (0.6)					
Exactly one mental disorder	17.2 (0.5)	3.2 [2.6, 4.0]*				
Exactly two mental disorders	9.4 (0.4)	8.0 [6.4, 10.1]*			0.8 [0.5, 1.2]	0.8 [0.5, 1.2]
Three or more mental disorders	4.8 (0.3)	12.1 [8.8, 16.5]*			0.4 [0.2, 0.8]*	0.4 [0.2, 0.9]*
F (ndf,ddf)[*p* value][f]		132.46 (3,168) [<0.01]*			3.47 (2,287) [0.03]*	2.99 (2,272) [0.05]
12-Month STB						
Never	82.8 (0.5)					
Ideation only	8.4 (0.4)	2.6 [2.1, 3.3]*				1.6 [1.3, 2.1]*
Plan, no attempts	7.8 (0.4)	5.3 [4.2, 6.6]*				2.5 [1.9, 3.3]*
Planned or unplanned attempts	1.0 (0.1)	8.2 [4.4, 15.4]*				3.0 [1.3, 6.6]*
F (ndf,ddf)[*p* value][f]		74.73 (3,224) [<0.01]*				16.43 (3,273) [<0.01]*
Model fit						
Akaike information criterion			6,832.2	6,822.8	6,821.1	6,743.5
Area under the curve			0.787	0.788	0.788	0.796

Note. aOR: adjusted odds ratio; cat.: categorical; CI: confidence interval; con.: continuous; SE: standard error.

[a]Respondents with age of last treatment lower than the minimum age of onset across the six mental disorders and suicidal outcomes under study are coded as not having received treatment.

[b]To obtain pooled estimates of prevalence, each country was given an equal sum of weights.

[c]Bivariate models adjust for socio-demographic (gender, age, parental educational level, parental marital status, place raised, religion, sexual orientation, and current living situation), college-related predictors (expected to work on a student job, academic performance in high school, and most important reason to go to university), and country membership.

[d]Multivariate models adjust for socio-demographic (gender, age, parental educational level, parental marital status, place raised, religion, sexual orientation, and current living situation), college-related predictors (expected to work on a student job, academic performance in high school, and most important reason to go to university), country membership, and for predictors shown in the rows.

[e] *F* -test to evaluate joint significance of six types of mental disorders. ddf: denominator degrees of freedom; Ndf: numerator degrees of freedom.

[f] *F* -test to evaluate joint significance of categorical predictor levels. ddf: denominator degrees of freedom; Ndf: numerator degrees of freedom.

of seeking treatment (ORs 0.6–0.7). We also found two college-related variables that were independently associated with the odds of 12-month treatment. First, compared with those still living with their family, students living in a college hall were more likely to be in treatment (OR = 1.4). Second, students with lower ranking in high school had markedly lower odds of seeking treatment (OR = 0.7), compared with those in the highest ranking. None of the two-way interactions between the predicted probabilities and socio-demographic correlates reached statistical significance (results available on request); *F* -test evaluating the model including two-way interactions versus the reduced model without interactions *F* (ndf,ddf)[*p* value] = 0.25 (31,55) [1.00]).

4 | DISCUSSION

This cross-national survey of college students in 19 colleges revealed that most students with either mental disorders and/or STB do not receive mental health treatment. In general, unmet need for mental disorders and STB among emerging adults in college is concerning. Unmet need was lower among those with mood or anxiety disorders as well as with more severe STB.

Our results should be interpreted in light of the limitations noted in previous papers on this issue. First, the response rates were not optimal in all countries. Although it has been shown that the association between response rate and nonresponse bias is not necessarily

TABLE 5 Socio-demographic correlates of 12-month treatment[a]

Correlates	Prevalence[b]	Bivariate[b] aOR [95% CI]	Multivariate[c] aOR [95% CI]
Belgium	12.5 (0.4)	(Ref)	(Ref)
Australia	12.5 (0.8)	1.5 [0.9, 2.6]	1.4 [0.8, 2.3]
Germany	12.5 (0.7)	0.7 [0.5, 1.1]	0.7 [0.5, 1.2]
Mexico	12.5 (0.4)	0.7 [0.5, 0.9]*	0.8 [0.6, 1.1]
Northern Ireland	12.5 (0.7)	1.1 [0.7, 1.7]	1.2 [0.8, 2.0]
South Africa	12.5 (0.7)	1.5 [1.0, 2.3]*	1.3 [0.9, 2.1]
Spain	12.5 (0.7)	0.6 [0.4, 0.9]*	0.7 [0.4, 1.0]
United States	12.5 (0.8)	2.1 [1.4, 3.2]*	1.3 [0.8, 2.0]
F (ndf,ddf)[*p* value][d]		6.25 (7,86)[<0.01]*	1.96 (7,136)[0.06]
Being female	59.8 (1.0)	1.7 [1.2, 2.3]*	1.6 [1.2, 2.2]*
Age 20+	23.9 (0.9)	1.2 [0.9, 1.6]	1.5 [1.1, 2.0]*
Age 19	25.8 (0.9)	0.9 [0.7, 1.1]	1.0 [0.8, 1.3]
Age 18[b]	50.3 (1.0)	(Ref)	(Ref)
F (ndf,ddf)[*p* value][d]		2.18 (2,413)[0.11]	4.44 (2,443)[0.01]*
Parental education low	18.4 (0.9)	0.6 [0.4, 0.8]*	0.6 [0.4, 0.9]*
Parental education medium	24.7 (1.0)	0.6 [0.5, 0.8]*	0.7 [0.6, 0.9]*
Parental education high	56.9 (1.1)	(Ref)	(Ref)
F (ndf,ddf)[*p* value][d]		9.55 (2,171)[<0.01]*	5.54 (2,236)[<0.01]*
Parents not married or parent(s) deceased	30.7 (1.0)	1.4 [1.1, 1.7]*	1.3 [1.0, 1.6]*
Place raised rural area	7.8 (0.6)	1.0 [0.7, 1.5]	0.9 [0.6, 1.4]
Place raised suburbs	17.9 (0.9)	2.1 [1.6, 2.8]*	1.2 [0.8, 1.6]
Place raised town/village	20.4 (0.9)	0.9 [0.7, 1.3]	0.8 [0.6, 1.2]
Place raised large city	26.3 (1.0)	1.1 [0.8, 1.4]	0.9 [0.7, 1.3]
Place raised small city	27.6 (1.0)	(Ref)	(Ref)
F (ndf,ddf)[*p* value][d]		7.15 (4,175)[<0.01]*	0.76 (4,256)[0.55]
Another religion	7.7 (0.7)	1.5 [1.0, 2.2]	1.0 [0.7, 1.5]
No religion	35.1 (1.1)	1.4 [1.1, 1.7]*	1.3 [1.0, 1.6]*
Christian	57.2 (1.1)	(Ref)	(Ref)
F (ndf,ddf)[*p* value][d]		4.30 (2,125)[0.02]*	2.03 (2,156)[0.13]
Nonheterosexual with same-sex sexual intercourse	8.9 (0.6)	1.4 [0.9, 2.2]	1.2 [0.8, 1.9]
Nonheterosexual without same-sex sexual intercourse	12.5 (0.9)	2.2 [1.5, 3.2]*	1.7 [1.2, 2.6]*
Heterosexual—some same-sex attraction	18.0 (0.8)	1.7 [1.3, 2.3]*	1.4 [1.1, 1.9]*
Heterosexual—no same-sex attraction	60.7 (1.2)	(Ref)	(Ref)
F (ndf,ddf)[*p* value][d]		5.61 (3,42)[<0.01]*	3.13 (3,72)[0.03]*
Other	1.5 (0.3)	0.8 [0.3, 1.9]	0.8 [0.3, 1.9]
Private hall of residence	3.4 (0.4)	0.8 [0.4, 1.6]	0.8 [0.4, 1.5]
Shared house or apartment/flat	11.3 (0.7)	0.8 [0.6, 1.1]	0.9 [0.6, 1.2]
University or college hall of residence	29.4 (1.1)	2.1 [1.6, 2.7]*	1.4 [1.0, 2.0]*
Parents or other relative or own home	54.3 (1.2)	(Ref)	(Ref)
F (ndf,ddf)[*p* value][d]		9.82 (4,81)[<0.01]*	1.98 (4,110)[0.10]
Expected to work on a student job	71.6 (1.0)	1.2 [0.9, 1.5]	1.2 [0.9, 1.5]
Self-reported ranking high school bottom 70%	25.4 (0.9)	0.7 [0.5, 0.9]*	0.7 [0.5, 1.0]*
Self-reported ranking high school top 30 to 10%	30.8 (1.0)	0.8 [0.6, 1.0]	0.7 [0.6, 1.0]*
Self-reported ranking high school top 10 to 5%	21.6 (0.9)	0.8 [0.6, 1.1]	0.8 [0.6, 1.1]
Self-reported ranking high school top 5%	22.2 (0.8)	(Ref)	(Ref)
F (ndf,ddf)[*p* value][d]		2.63 (3,189)[0.05]	2.13 (3,246)[0.10]
Most important reason to go to college extrinsic	11.0 (0.8)	0.8 [0.6, 1.2]	0.9 [0.6, 1.4]

Note. Analyses are restricted to the subsample of respondents with any 12-month mental disorder or any 12-month suicidal thoughts or behaviors (36.9% of the full sample). aOR: adjusted odds ratio; cat.: categorical; CI: confidence interval; con.: continuous; SE: standard error.

[a]Respondents with age of last treatment lower than the minimum age of onset across the six mental disorders and suicidal outcomes under study are coded as not having received treatment.

[b]Bivariate models adjust for the predicted probabilities calculated using the coefficients of the clinical predictors in the final model shown in Table 4 (last column).

[c]Multivariate models adjust for the predicted probabilities calculated using the coefficients of the clinical predictors in the final model shown in Table 4 (last column) and for the predictors shown in the rows.

[d] *F* -test to evaluate joint significance of categorical predictor levels. ddf: denominator degrees of freedom; Ndf: numerator degrees of freedom.

strong (Groves, 2006), recent additions warn of potential overestimation of mental disorders and STB when response rates are low (Mortier et al., 2017). The difference in response rates across countries may be partially explained by the different methodologies used across universities to recruit students. It is important to stress, however, that all students were eligible for participation. Second, college students who did not speak the dominant language(s) of the university sufficiently were not included in this study. Third, the treatment modules used in the WMH-ICS ask for treatment for emotional or substance abuse problems and not for STB per se. Although we did control for country differences, STB may not always be considered as an emotional or psychological problem and, hence, not be a behavior for which to seek help (despite being clinically warranted). Moreover, the information we gathered on treatment access did not include information about the adequacy or effectiveness of the treatment received nor the extent to which treatment availabilities were either affordable or accessible.

Fourth, our data are based on the results of a screening instrument that assesses a limited range of mental disorders and STB. This means that some burdensome conditions (such as psychosis) or other relevant conditions associated with mental health (such as tobacco use) were not included in the WMH-ICS core assessment. In addition, the screening instrument precludes detailed assessments on important socio-demographic predictors (e.g., detailed family situation at time of survey). Fifth, this study is limited to the use of cross-sectional data, adjusting for a limited range of basic socio-demographic and college-related correlates. Future studies may include additional predictor domains to investigate patterns of service use throughout the academic career and investigate all possible two-way interactions between predictors. Sixth, the implementation of MI to address missing data comes at the cost of a reduced number of variable levels that can be included in both imputation and analysis models. For instance, this precluded a more fine-grained analysis of STB outcomes (e.g., passive vs. active suicidal ideation) or predictors of service use STB correlates (e.g., parental marital status vs. parental loss). Future studies on larger samples should address this issue.

Notwithstanding these limitations, our study confirms the high level of unmet need for mental disorders and STB in college populations, across countries included in this WMH-ICS Initiative. On balance, this unmet need is roughly the same for mental disorders as for STB, with only 25–30% of first year college students with a mental disorder/STB receiving any treatment in a given year. Our data confirm previous reports on the use of services among college students, although our estimates on treatment utilization are somewhat on the lower end of what is generally found in the United States (Han et al., 2016; Hunt & Eisenberg, 2010), Europe (McLafferty et al., 2017; Verger et al., 2010), and Asia (Liu et al., 2017). Despite the observed unmet need, the presence of mental disorders/STB remains a strong predictor of treatment. Rates vary significantly across types of disorders, but specifically, anxiety disorders (i.e., panic disorder and GAD) yield the highest treatment rates in our study, as previously found in a U.S. study (Eisenberg et al., 2011). This is interesting because in *nonstudents* (both in general populations and aged-matched peers), it appears that depression is more likely associated with higher treatment odds than anxiety disorders (Bergeron, Poirier, Fournier, Roberge, & Barrette, 2005). That anxiety disorders yield higher treatment receipt in college than depression is to some extent counterintuitive. After all, depression remains one of the most burdensome disorders in college, as confirmed with international data (Alonso et al., 2018; Rotenstein et al., 2016). Our data contradict the conventional ideas that mood disorders are generally the impetus for receiving mental health care in college, as found in a recent U.S. study (Pedrelli, Borsari, Lipson, Heinze, & Eisenberg, 2016) and that depression is worldwide among the most highly treated mental disorders with the lowest delays in help seeking (Wang et al., 2007; Wang, Berglund, Olfson, & Kessler, 2004).

Low treatment rates for alcohol use disorders are not surprising but are somewhat higher than mostly reported previously in U.S. students (Lee, Martins, & Lee, 2015; Wu, Pilowsky, Schlenger, & Hasin, 2007) and general populations worldwide (Wang et al., 2007). Specifically for a college population, low treatment of alcohol problems may be related to the fact that most alcohol use disorders have their general onset *in* and not *prior to* college (Auerbach et al., 2016), probably related to the culture of alcohol on campuses. In addition, we also know that only a low proportion of adults make treatment contact in the same year of the disorder onset (Wang et al., 2004). This is because people with alcohol use disorders are oftentimes lacking a need for treatment until their disorders become highly debilitating (Kaskutas, Weisner, & Caetano, 1997). In addition, among those who were receiving services, the specificity of treatment was generally low, as found in the 2014 National Survey on Drug Use and Health from the United States, showing that only 8% in the 18–25 age group received specialized treatment for substance use problems (Substance Abuse and Mental Health Services Administration, 2015). In contrast to what we found for alcohol use disorders, around one third of the first year students with drug use disorders (estimated at 3% of the sample) received treatment in the past year, with four in 10 receiving treatment in their lifetime. This is a far higher estimate than commonly believed based on U.S. findings (Blanco et al., 2008). One explanation may be that, because of the high comorbidity between mental disorders and substance use disorders, students may have been seeking treatment for their emotional problems and not for their substance abuse problems per se. As far as we know, our study is the first one that assessed treatment rates of first year students with drug use disorders separately and independent from the presence of alcohol use disorders. The National Epidemiologic Survey on Alcohol and Related Conditions provides some comparison of treatment rates for drug use disorders (although on a general population level), reporting lifetime treatment rates of 31% for their general population sample (Melchior, Prokofyeva, Younès, Surkan, & Martins, 2014).

Our data do not show a clear and direct gradient between mental disorder severity and treatment odds. In descriptive and bivariate analyses, we did find such an association but multivariate models failed to retain statistical significance. We even found subadditive effects in students with multiple mental disorders. This suggests that the presence of comorbid mental disorders is not equal to a higher perceived need for treatment, especially not among college students.

Or it may be that students do have a level of perceived need but are actually impeded by stigma. In contrast, we did find a clear and direct gradient between STB severity and treatment, in both bivariate and multivariate approaches. But even in the case that higher suicidality is associated with higher treatment odds, a far more important finding is the vast unmet need for STB among suicidal college populations that appears to be even larger than unmet need for STB in the general population. The proportion of suicidal persons from general populations worldwide that received treatment in a given year was estimated at approximately 39% (Bruffaerts et al., 2011) compared with approximately 20% in the present study. This may be an artifact because of the difference in populations or the fact that our study only included first year students. Indeed, it may be that we would find higher treatment rates for STB in the postgraduate years, consistent with the finding that structural barriers to seeking help for STB decrease with age (Bruffaerts et al., 2011). This should be further investigated in longitudinal designs.

If we look at nonclinical correlates of treatment, we confirm existing knowledge from the United States on treatment rates being higher in female students and those older than 18 years and lower in students with lower educated parents (Blanco et al., 2008). Further, two out of three sexual minority groups have systematically higher odds of being treated, independent of whether they have mental disorders or STB. This finding has been mostly explained by increased levels of psychological distress among sexual minorities (Dunbar, Sontag-Padilla, Ramchand, Seelam, & Stein, 2017). It may also be that barriers and reasons in favor of seeking treatment function differently in sexual minorities. The fact that nonheterosexual and heterosexual students with same-sex attraction make up a significant proportion of college students (i.e., around four in 10 first year students), more investigation is needed regarding help-seeking processes and receipt of treatment, especially against the background of an overall lack of knowledge and scientific research on sexual minority groups in college.

In an era where great emphasis lies on the prevention of mental disorders and STB among young people worldwide, this first cross-national, college-based study of treatment for mental disorders and STB holds some important implications. Clinicians, policymakers, university officials, and students should be aware of the significance of the high degree of unmet need among first year college students across the world. The personal and psychological significance of the transition between high school and college consists of a shift in responsibilities, a change of social environments (Evans, Forney, Guido, Patton, & Renn, 2009), markedly higher levels of emotional distress (Towbes & Cohen, 1996), and increased odds of mental disorders and STB. To decrease the large proportions of untreated students with mental disorders/STB—and thus to prevent a further progression of mental illness in college—specific actions may be needed to expand or reallocate treatment resources to increase treatment access. To this end, innovative low-cost and low-threshold interventions (such as guided or unguided internet- and mobile-based interventions) could be approaches to reduce college-related stress and might potentially attract students with emotional problems who would not otherwise seek help (Harrer et al., 2018).

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DECLARATION OF INTEREST STATEMENT

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SUPPORTING INFORMATION

Additional supporting information may be found online in the Supporting Information section at the end of the article.

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