



Trends in eating disorder risk among U.S. college students, 2013–2021

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ABSTRACT

Despite concerns about rising rates of mental health problems among college students in recent years, little is known about trends in eating disorder (ED). This study examined data from the 2013–2020/2021 Healthy Minds Study (HMS), a large study of US college students ($N = 267,599$). Students completed the SCOFF scale, a validated measure of ED symptoms. From 2013 to 2020/2021 the prevalence of ED risk increased significantly from 15% to 28% (13% increase, 95% CI, 12.2–13.9) with young, female, and Hispanic students experiencing the largest increases. ED risk increased significantly by 3 percentage points (95% CI, 1.7–4.2) during the COVID-19 pandemic.

1. Introduction

Eating disorders (EDs) including anorexia nervosa, bulimia nervosa, and binge eating disorder tend to emerge in adolescence and young adulthood (Ward et al., 2019) and are associated with high mortality risk (Arcelus et al., 2011), significant healthcare costs (van Hoeken and Hoek, 2020; Watson et al., 2018), and reduced quality of life (van Hoeken and Hoek, 2020). Excess mortality among those with EDs has been attributed to high suicide risk, and risk of medical complications and chronic conditions including cardiovascular disease, diabetes, and heart failure (Iwajomo et al., 2021).

The median age-of-onset of EDs occurs from age 18 to 21 years (Hudson et al., 2007; Ward et al., 2019) and a high prevalence of ED symptoms such as binge eating, dietary restraint, purging behavior, and weight concerns has been found among US college students (Eisenberg et al., 2011; Lipson and Sonnevile, 2017). Although the prevalence of ED symptoms has been documented, it is unclear whether ED risk has increased among students in recent years. This is an important gap as psychiatric conditions that are highly comorbid with EDs such as depression and anxiety (Swinbourne et al., 2012) have increased sharply among adolescents, young adults (Daly, 2021) and college students (Duffy et al., 2019) over the past decade.

Further, there is evidence that during the COVID-19 pandemic the imposition of physical distancing, restrictions on social activities, and lockdown measures, may have increased mental health problems particularly among young adults (Daly et al., 2020). Increases in comfort

food consumption (Salazar-Fernández et al., 2021) and ED (Tavolacci et al., 2021) have been documented among students, albeit in convenience samples, during the pandemic. Research using representative student samples is needed to understand recent trends in EDs.

This study therefore aimed to identify whether ED risk has increased among US college students by drawing on representative data to estimate temporal trends in the prevalence of ED risk across age, sex, and race/ethnicity groups between 2013 and 2021, including during the COVID-19 pandemic.

2. Methods

2.1. Study population

The sample was comprised of 267,599 U.S. college students who participated in the Healthy Minds Study (HMS) between 2013 and 2021. The HMS is an annual, web-based, mental health screening study of student populations (Healthy Minds Network, 2022). A random sample of 4000 students at large institutions, or all students at small institutions, were selected to participate and the response rate among students averaged 21% (Healthy Minds Network, 2022).

Institutions elect to take part in the HMS and the institutions and students that make up the HMS differ from year-to-year. To help ensure consistency in the characteristics of students sampled we took two steps. First, to ensure student samples continue to be representative of institutions, non-response bias was adjusted for using probability weights

Abbreviations: ED, eating disorder; HMS, Healthy Minds Study.

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derived from the gender, academic level, race/ethnicity and grade point average of non-responders obtained via administrative data from participating institutions. Second, in line with prior research (Duffy et al., 2019) we restricted our analyses to students enrolled in bachelor's degree programs, which represents the largest group of students in terms of degree type. This assisted in enhancing comparability of the student samples examined over time.

The students who took part were aged ≥ 18 years and provided informed consent. This study involved secondary analysis of anonymized microdata files and did not require institutional approval from the Maynooth University Social Research Ethics Sub-Committee.

2.2. Materials

2.2.1. Eating disorder risk

ED risk was measured using the SCOFF, a widely used valid and reliable screening tool that was first included in the HMS in 2013 (Mond et al., 2008; Morgan et al., 1999). The SCOFF is comprised of five "yes/no" questions assessing purging behavior, rapid weight loss, body image disruption, and concerns about food and losing control overeating (questions detailed in Table S1). Elevated ED risk is indicated by a score of ≥ 2 positive responses. This cut-off score has been shown to have high sensitivity (0.86) and specificity (0.83) for the detection of eating disorders in the general population (Kutz et al., 2020).

2.2.2. Demographics

Participants reported their age in years (coded as 18–21, 22+), sex (male, female), race/ethnicity (Hispanic, and non-Hispanic White, non-Hispanic Black, non-Hispanic Asian, Other), and living arrangements (reside with parents/guardian/relatives, other accommodation). Living with parents/guardians/relatives was of interest given the potential impact of living with family during the pandemic

2.3. Statistical analysis

All available survey waves from 2013 to 2020/2021 were included in our analyses. To estimate the overall percentage-point changes in the prevalence of ED risk from 2013 to 2020/2021 we used logistic regression analysis followed by the Stata margins and lincom post-estimation commands, with statistical significance defined as 2-sided, $P < 0.05$. Interactions between survey year and participant age, sex, and

race/ethnicity, and living arrangements were estimated to assess whether changes in the prevalence of ED risk from 2013 to 2020/2021 differed by demographic characteristics.

To investigate the potential impact of the pandemic, we estimated ED risk as a function of linear and quadratic time terms (where time = survey year – 2013). A pandemic dummy variable (0 = 2013 to 2019, 1 = 2020/2021 college year) was included in the model to capture the extent to which ED risk in 2020/2021 deviated from the general time trend for this measure.

Analyses were carried out using Stata 17 and incorporated sampling weights to ensure that estimates were representative of the full college populations sampled.

3. Results

In the HMS sample the prevalence of ED risk increased from 14.9% (95% CI, 14.2–15.7) in 2013 to 28% (95% CI 27.5–28.4) in 2020/2021, a statistically significant increase of 13 percentage points (95% CI, 12.2–13.9) (Table 1, Fig. S1a). ED risk increased significantly by 7.7% (95% CI, 6.7–8.7) between 2013 and 2016/2017 and by 5.4% (95% CI, 4.6–6.2) between 2016/2017 and 2020/2021.

Significant increases in the prevalence of ED risk between 2013 and 2020/2021 were observed across all demographic groups examined (see Table 1). Females experienced a 13.3% (95% CI: 12.1–14.5) increase in ED risk that was larger than the increase experienced by males (11.2%, 95% CI: 10.0–12.5) by 2.1 percentage points (95% CI, 0.3–3.8) (Fig. S1b). Hispanic participants experienced an increase in ED risk that was 7.2 percentage points (95% CI, 2.1–12.3) larger than the increase experienced by Black participants (see Fig. S1c). Increases in ED risk were 2.8 percentage points (95% CI, 0.7–4.8) larger for participants aged 18–21 compared to those aged 22+. Increases in ED risk did not differ as a function of participant living arrangements.

Our examination of the time trend in ED risk identified a significant quadratic trend whereby ED risk increased sharply immediately after 2013 and then less rapidly in the years approaching 2020/2021 (Table S2, Fig. S2). The pandemic dummy variable was statistically significant and indicated that ED risk increased by 3.0% (95% CI, 1.7–4.2) during the COVID-19 pandemic in 2020/2021 over and above the measure's time trend (Table S2, Fig. S2).

Table 1

Estimated changes in the prevalence of eating disorder risk among U.S. college students enrolled in bachelor's degrees between 2013 and 2020–21 by sociodemographic characteristics.

Demographic characteristic	2013 survey wave (N = 12,556)		2020/2021 survey wave (N = 77,947)		Change in ED risk% (95% CI) ^a	Percentage increase ^b
	% of sample	ED risk% (95% CI) ^a	% of sample	ED risk% (95% CI) ^a		
Overall sample	–	14.9 (14.2 to 15.7)	–	28.0 (27.5 to 28.4)	13.0 (12.2 to 13.9)	87.2
<i>Age group</i>						
Age 18–21 years	76.4	14.8 (13.9 to 15.7)	70.7	28.6 (28.1 to 29.2)	13.8 (12.8 to 14.9)	93.2
Age 22+ years	23.6	15.3 (13.8 to 16.7)	29.3	26.3 (25.4 to 27.2)	11.1 (9.4 to 12.8)	72.5
<i>Sex</i>						
Male	45.3	7.9 (7.0 to 8.9)	40.4	19.1 (18.4 to 19.9)	11.2 (10.0 to 12.5)	141.8
Female	54.7	20.7 (19.6 to 21.8)	59.6	33.9 (33.4 to 34.5)	13.3 (12.1 to 14.5)	64.3
<i>Race/ethnicity</i>						
Hispanic	7.9	16.9 (14.5 to 19.2)	11.2	32.9 (31.5 to 34.4)	16.1 (13.3 to 18.9)	95.3
Non-Hispanic White	70.8	13.6 (12.7 to 14.5)	65.7	27.9 (27.3 to 28.4)	14.3 (13.2 to 15.4)	105.1
Non-Hispanic Black	4.5	12.3 (8.3 to 16.3)	12.2	21.2 (19.8 to 22.6)	8.9 (4.6 to 13.1)	72.4
Non-Hispanic Asian	12.5	21.8 (19.7 to 23.9)	8.3	31.1 (29.6 to 32.7)	9.3 (6.7 to 11.9)	42.7
Other race/ethnicity	4.2	16.4 (12.4 to 20.3)	2.6	30.8 (27.5 to 34.1)	14.4 (9.3 to 19.6)	87.8
<i>Living arrangements</i>						
Live with parents/relatives	11.9	17.3 (15.4 to 19.3)	29.6	28.4 (27.6 to 29.3)	11.1 (9.0 to 13.2)	64.2
Other accommodation ^c	88.1	14.6 (13.8 to 15.4)	70.4	27.8 (27.2 to 28.3)	13.2 (12.2 to 14.2)	90.4

Estimates are from weighted data.

^a Estimates are from marginal effects calculated after logistic regression with robust standard errors.

^b Percentage increase in depression levels from 2013 to 2020/2021 ($[\text{Change in ED risk} \times 100] / [\text{2013 ED risk levels}]$).

^c Includes campus residence hall or apartment, on- or off-campus co-operative housing, other university housing, non-university off-campus housing, and fraternity or sorority house.

4. Discussion

In a sample of over 260,000 US undergraduate students the prevalence of ED risk rose from 15% in 2013 to 28% in 2020/2021. This increase is concerning given the range of adverse physical and mental health outcomes associated with disordered eating (Arcelus et al., 2011; van Hoeken and Hoek, 2020; Hudson et al., 2007; Iwajomo et al., 2021; Watson et al., 2018). This substantial rise in ED risk occurred alongside marked increases in mood and suicide-related pathology among adolescent and young adult populations in the US since 2010 (Daly, 2021; Duffy et al., 2019; Keyes et al., 2019; Twenge et al., 2019).

In the current study, increases in ED risk were particularly pronounced among younger, female, and Hispanic students. Affective disorders, which are highly comorbid with EDs (Swinbourne et al., 2012), have also risen most sharply among young females in the US over the past decade (Daly, 2021; Keyes et al., 2019; Twenge et al., 2019). An understanding of the factors underpinning increases in ED symptoms is now needed. Such risk factors are manifold and may include increases in affective disorders, body weight and perceived weight, and rising technology and social media usage (Daly, 2021; Duffy et al., 2019; Haynes et al., 2018).

We also examined the rate of change in ED risk over the study period and found a rapidly increasing then slowing increase in ED risk between 2013 and 2018/2019. This was followed by a notable 3 percentage point increase in ED risk during the COVID-19 pandemic that occurred over and above the general time trend in ED risk. Understanding the contextual factors (e.g. lockdown periods, financial strain, move to online learning, reduced social support) that exacerbated ED risk at this time is crucial and will help inform college mental health programming.

This study is limited in several respects. First, while random sampling was used the response rate was relatively low (21%) and the use of non-response weights generated using administrative data provide only a partial correction for non-response bias. Second, year-to-year changes in the characteristics and makeup of institutions electing to participate in the HMS may impact changes in prevalence over time. We restricted our analyses to students completing bachelor's degree programs to counter this possibility. It is also important to note that the proportion of variation in mental health attributable to institution-level differences has been found to be extremely small in the HMS (Lipson et al., 2015), suggesting institutional characteristics may not have markedly influenced the study estimates. Third, while the SCOFF is a well-validated screening measure for the detection of EDs (Kutz et al., 2020; Mond et al., 2008; Morgan et al., 1999), estimates derived from diagnostic instruments and clinical evaluation are needed to establish time trends in specific EDs.

These findings highlight the importance of ED screening and intervention programs on college campuses and also the need for early prevention and intervention efforts to tackle ED symptoms in advance of college entry (Le et al., 2017; Watson et al., 2016).

Data availability

The data that support the study findings are available on request from the Health Minds Study team (<https://healthymindsnetwork.org/>).

CRedit authorship contribution statement

Michael Daly: Conceptualization, Methodology, Formal analysis, Data curation, Writing – original draft, Writing – review & editing, Visualization. **Erin Costigan:** Conceptualization, Methodology, Writing – original draft, Writing – review & editing.

Declaration of Competing Interest

No conflicts of interest reported.

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Supplementary materials

Supplementary material associated with this article can be found, in the online version, at doi:[10.1016/j.psychres.2022.114882](https://doi.org/10.1016/j.psychres.2022.114882).

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