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Association Between Socioeconomic Position and Depression, Anxiety and Eating Disorders in University Students: A Systematic Review

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Abstract

The high prevalence of mental disorders in university students emphasizes the need to explore contributing factors. While socioeconomic position affects mental health in the general population, it is crucial to investigate if the same applies to university students. MEDLINE-Ovid, Embase-Ovid and PsycINFO databases were searched. All original peer-reviewed observational studies quantifying the association between socioeconomic position and depression, anxiety or eating disorders were included without language or date restrictions. After initial screening, eligible studies were selected, data was extracted using a spreadsheet, and their quality was assessed with the Newcastle–Ottawa scale. The results were synthesized narratively. Seventy-eight of 20,465 records identified were included. Most studies were published in English and originated from high and upper-middle-income countries. The most common socioeconomic indicators were family socioeconomic status/class, financial stress, and parental education. Most studies found a positive association between socioeconomic indicators and depressive and anxiety symptoms, but not eating disorders. The quality of the studies was mixed, with a small proportion using validated measurement tools and appropriate sample sizes. This study highlights the importance of measuring socioeconomic position accurately and applying new methods that can reveal the causal pathways and interactions of multiple identities that shape mental health disparities for the university student population.
Preregistration A protocol for this review was registered in PROSPERO (CRD42022247394).

Keywords University students · College students · Socioeconomic position · Depression · Anxiety · Eating disorders

Introduction

The high prevalence of mental health issues among university students, potentially exacerbated by the COVID-19 pandemic, underscores the need to understand factors that may contribute to this vulnerability. Previous studies indicate that a combination of genetic, biological, environmental, and psychological factors may be responsible for mental health outcomes in university students (Byrd & McKinney, 2012; Liu et al., 2019), but it remains unclear if socioeconomic position (SEP) is associated with depressive, anxiety symptoms or eating disorders (ED). The current study examines the relationship between socioeconomic position and depressive symptoms, anxiety symptoms, and eating disorders in university students. The aims are to review studies on the link between socioeconomic position and common mental disorders and eating disorders, and to evaluate if socioeconomic position predicts a higher risk of developing these disorders during university.

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The prevalence of mental disorders such as depressive symptoms is higher among university students compared to the general population or non-university students. Most university students are in the emerging adulthood period, this life course stage coincides with the onset of anxiety, depressive symptoms and eating disorders (Arnett, 2007; Beesdo et al., 2010; Potterton et al., 2020). Moreover, the prevalence of mental health problems among university students appears to be increasing (Acharya et al., 2018). This growing issue is especially relevant from a public health perspective, considering the sustained increase in enrollment of students from socioeconomically disadvantaged backgrounds in higher education (UNESCO, 2017).

Furthermore, university students have been identified as a population that may be at increased risk for mental health problems caused by the COVID-19 pandemic. According to some studies, university students had the highest pooled prevalence of depression (Yuan et al., 2022) and anxiety (Yuan et al., 2022; Zhang et al., 2022) compared to healthcare workers and the general population. In addition, many systematic reviews report an increase in common mental disorders in this population during the pandemic (Deng et al., 2021; Li et al., 2021; Liyanage et al., 2021).

Socioeconomic position is an aggregate concept encompassing resource-based and prestige-based measures. Resource-based measures refer to material and social resources such as income, wealth, and education; terms describing inadequate resources include "poverty" and "deprivation." Prestige-based measures refer to one's social hierarchy rank or status, typically evaluated by access to goods, services, knowledge, and occupational prestige, income, and education. Socioeconomic position can be measured at the individual, household, and neighborhood level (Krieger et al., 1997) and some measurement of socioeconomic position can be more adequate for different stages of the life course (Galobardes et al., 2006a, 2006b).

Low socioeconomic position are associated with various social and health problems (Marmot & Bell, 2012), including higher levels of common mental disorders such depression (Lorant et al., 2003; Lund et al., 2018; Ridley et al., 2020) and anxiety (Lund et al., 2018; Ridley et al., 2020) in the general population. However, studies on eating disorders (anorexia, bulimia and binge eating) have found these conditions present across socioeconomic backgrounds, with no consistent evidence that eating disorders are diseases of affluence in the general population (Huryk et al., 2021). Some studies specifically among university students though have found that those of lower socioeconomic status had a greater prevalence of positive eating disorders screens compared to those of higher socioeconomic status (Burke et al., 2023).

Current Study

Many research studies have examined the association between measures of socioeconomic position and mental health outcomes in the general population. However, the relationship between socioeconomic position and specific mental disorders such as depression, anxiety, and eating disorders has not been systematically reviewed in university students, even though this is a population at increased risk for developing these mental health problems. Given the increased vulnerability of university students, a systematic review investigating the links between measures of socioeconomic position and depressive symptoms, anxiety, and eating disorders in this group is timely. This systematic review aims to synthesize the existing evidence on the relationship between socioeconomic position and depressive, anxiety symptoms and eating disorders in university students. The first objective is to review studies examining associations between socioeconomic position and common mental disorders and eating disorders among university students, and the second objective is to evaluate the evidence on whether socioeconomic position is a longitudinal predictor for the increased risk of developing mental illness during university.

Methods

A protocol for this review was registered in PROSPERO (CRD42022247394). Procedures for this systematic review were conducted following the Preferred Reporting Items for Systematic Review and Meta-Analysis (PRISMA) statement (Page et al., 2021). A PRISMA checklist is included in Online Resource 1.

Eligibility Criteria

To be included, studies needed to fulfil these criteria: a) be published in a peer-reviewed journal article; b) constitute an original peer-reviewed observational study (cross-sectional, case–control and cohort); c) Include undergraduate students population, without distinction of sex, nationality, ethnicity or field of study d) Papers including at least one of the following outcomes: common mental disorders (depressive and anxiety symptoms) and eating disorders (binge eating, anorexia and bulimia); the outcomes specified above must have been assessed with validated instruments based on the subjective report of the same participants (i.e., self-administered questionnaires) or trained observers (i.e., clinical interviews); e) The article explicitly states to estimate the association of socioeconomic position with at least one of these outcomes separately and to quantify these relationships. To

ensure comprehensive coverage of the scientific literature, a broad definition of SEP was used, including individual, family or area level. No language or time restrictions were applied.

Articles were excluded if: (a) participants are students of secondary education, vocational or technical school; (b) include only participants with a medical condition or disability; (c) studies that combined both undergraduate and postgraduate students and where data was not stratified for undergraduate students alone; (d) clinical trials of any kind; (e) socioeconomic position was only included as an adjustment in the model.

Search

Embase, MEDLINE (Ovid interface), EMBASE (Ovid interface) and PsycINFO (OVID interface) were searched from inception to April 12th, 2022, for peer-reviewed journal articles fitting the inclusion/exclusion criteria. The search followed these broad themes: "university students" AND "mental disorders" AND socioeconomic position", including subject headings and synonyms of each included keyword. Full details of the search strategy can be found in Online Resource 2.

Study Selection

Titles and abstracts of articles were screened in full by one reviewer (SM). Four reviewers (DL, IL, CC, EM) additionally screened a 40% sample of the records. To ensure good calibration in screening, all reviewers screened the same 50 articles before starting the process and disagreements were reviewed. During the screening process, meetings were established every two weeks to resolve queries from the reviewers. Full texts of abstracts included by any author at this stage were then reviewed against inclusion criteria (SM, DL, IL, CC, EM), and 50% were checked by a second reviewer (SM). A third reviewer (MP) was consulted in case of any disagreements. Screening of records and selected studies were handled using Rayyan (Ouzzani et al., 2016). To ensure the reliability of our data extraction process, inter-rater agreement was assessed using Cohen's Kappa (κ) statistic. The kappa coefficient for the inter-rater agreement was found to be $\kappa = 0.62$ for the title and abstract and $\kappa = 0.79$ for the full-text screening, indicating substantial agreement beyond what would be expected by random chance. All disagreements were solved via consensus.

Data Extraction

A data extraction sheet was developed, pilot-tested on five randomly selected eligible studies and refined accordingly. Two authors independently extracted data from selected studies (SM, DL, IL, CC, EM) and entered them into an electronic spreadsheet (see Online Resource 3). All data entries were compared between authors, and disagreements were solved by discussing with a third author (MP). Information extracted included: Study name, country, study design, survey year, before or during the COVID-19 pandemic, sampling technique, sample size, response rate, the proportion of female participants, mean age, student's field of study, socioeconomic position, outcomes, and instruments used, crude and adjusted statistics, confidence intervals (CIs), covariates, p-values and direction of the association.

Risk of Bias in Individual Studies

The risk of bias was assessed using the Newcastle–Ottawa scale (NOS; (Wells et al., 2014); this scale uses eight items, categorized into three domains of potential bias (selection of study group, comparability of the groups and the ascertainment of the exposure/outcome). Two NOS versions were used: NOS for cohort studies and one modified for cross-sectional studies (Herzog et al., 2013). The modified scale assessed study quality based on eight domains, including (1) sample representativeness (inclusion of all subjects or use of random sampling), (2) sample size (justified and satisfactory), (3) non-respondents (Comparability between respondents and non-respondents, and satisfactory response rate), (4) valid measurement tools (validated or described), (5) study controls by gender, (6) study controls by age, and (7) assessment of the outcome (appropriate and clearly described statistical tests). The overall quality score ranged from 0 to 5 for selection (4 first domains), 0–2 for comparability (5 and 6 domains), and 0–3 for outcome (7 and 8 domains). Two authors independently evaluated the risk of bias and entered them into an electronic spreadsheet (SM, DL, IL, CC, EM).

Synthesis of the Results

A narrative and structured synthesis of the data of the included studies was carried out. Study characteristics (study design, country, country income group, instruments, sampling technique, conducted during the COVID-19 pandemic) and results were tabulated to facilitate the presentation of the information and compare patterns.

The studies were stratified by poverty indicator, mental disorder, and those that conducted the unadjusted and adjusted analysis. Using these stratifications, the percentage of studies that showed positive, null, and negative relationships between categories of socioeconomic position (individual, family, and area /neighborhood level) and mental disorder variables was determined.

Results

Of the 20,465 records obtained, 20,110 were excluded after screening titles and abstracts, and the full texts of 329 manuscripts were reviewed for eligibility. Seventy-eight articles were included in the narrative synthesis. Most excluded articles were because they did not quantify the association between a socioeconomic variable and a mental health outcome (N = 58) or because they did not report an effect size (N = 52). The entire selection process is presented in the PRISMA flowchart (Fig. 1).

Study Characteristics

The characteristics of our included studies are tabulated in Table 1. Most of the studies were published in English (95%). The publication period ranged from 2004 to 2022; 46% of the studies were published during the last three years (2020 to 2022), and 16 (21%) were explicitly conducted during the COVID-19 Pandemic. Most of the studies were carried out in Asia (36%), followed by Europe (24%), and 76% were conducted in high and upper-middle-income countries. Most studies originated from China (n = 14), followed by the United States (n = 10), Turkey (n = 5) and the United Kingdom (n = 4).

Fig. 1 PRISMA flowchart

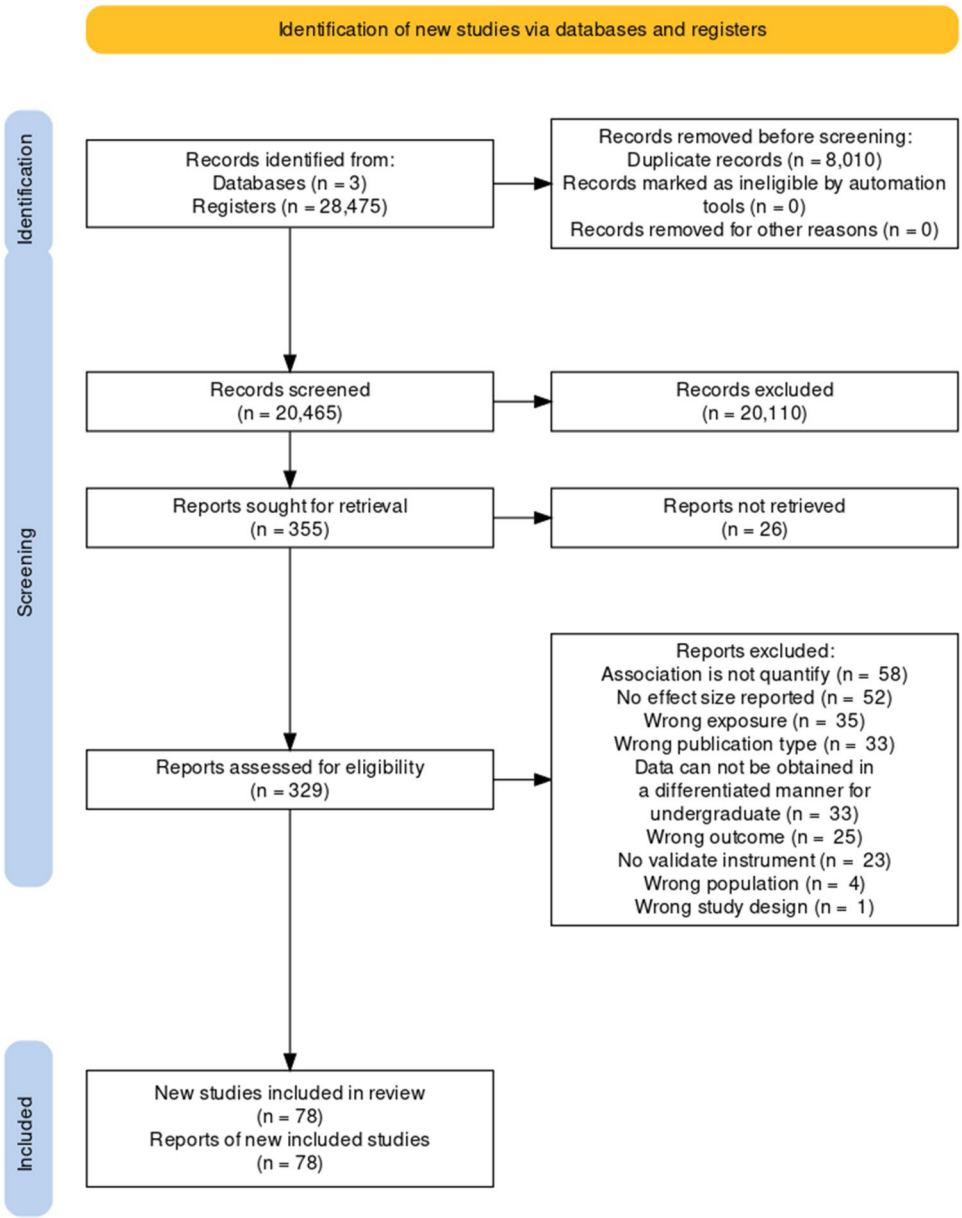

Table 1 Study characteristics

Article	Language	Study design	Country	Study region	Country income group	Survey year baseline	Survey follow-up (months)	Covid	Sampling technique	Sample size	Response rate (%)	Age	% females	Field of study	Outcome	Instruments	SEP exposure
Wahed et al., 2017	English	Cross-sectional	Egypt	Middle East and North Africa	Lower-middle	2015		Before Covid-19	Census	442	88.40%	20.15 (1.9)	61.1%	Medical Students	ANX	DASS-21	FSES
Ahmad et al., 2021	English	Cross-sectional	Malaysia	Asia	Upper-middle	2019–2020		Before Covid-19	Random	663	No reported	21.98 (1122)	67.6%	Mixed Field of Studies	DEP, ANX	DASS-21	FI
Ahmed et al., 2020	English	Cross-sectional	Ethiopia	Sub-Saharan Africa	Low	2016		Before Covid-19	Random	556	94.90%	21.21 (1.99)	35.3%	Mixed Field of Studies	DEP	BDI-II	DI
Al saadi et al., 2017	English	Cross-sectional	Syria	Middle East and North Africa	Low	2015		Before Covid-19	Non-random	350	No reported	No reported	57.7%	Medical Students	DEP, ANX	DASS-21	SFS
Al-modallal, 2015	English	Cross-sectional	Jordan	Middle East and North Africa	Upper-middle	No reported		Before Covid-19	Non-random	97	No reported	21.1 (1.02)	100%	Not reported	DEP	CED-D	PE, PEM, HI
Aldhmadi et al., 2021	English	Cross-sectional	Saudi Arabia	Middle East and North Africa	High	2020		During Covid-19	Non-random	418	No reported	20.2 (1.8)	47.1%	Not reported	DEP	CED-D	HI
Amr et al., 2013	English	Cross-sectional	Saudi Arabia	Middle East and North Africa	High	2010		Before Covid-19	Random	1,696	No reported	20.9 (1.9)	36.8%	Mixed Field of Studies	DEP	PHD-9	FS
Andrews & wilding, 2004	English	Cross-sectional	United Kingdom	Europe and Central Asia	High	2002		Before Covid-19	Census	351	39.44%	60% less than 21	64.0%	Mixed Field of Studies	DEP	HADS	FS
Aylie et al., 2020	English	Cross-sectional	Ethiopia	Sub-Saharan Africa	Low	2020		During Covid-19	Random	314	97.50%	22.58 (2.8)	63.4%	Mixed Field of Studies	ANX	DASS-21	HI
Bert et al., 2020	English	Cross-sectional	Italy	Europe and Central Asia	High	2018		Before Covid-19	Non-random	2,513	28%	22* (IQR = 4)	61.3%	Medical Students	DEP	BDI-II	FSES
Bostanci et al., 2015	English	Cross-sectional	Turkey	Europe and Central Asia	Upper-middle	1999–2000		Before Covid-19	Random	489	No reported	20.4 (1.8)	41.3%	Mixed Field of Studies	DEP	BDI	PE, HI, FSES
Cao et al., 2020	English	Cross-sectional	China	Asia	Upper-middle	2020		During Covid-19	Random	7,143	100%	No reported	69.7%	Medical Students	ANX	GAD-7	HI
Celik et al., 2015	English	Cross-sectional	Turkey	Europe and Central Asia	Upper-middle	2014		Before Covid-19	Census	310	71.10%	21.4 (1.86)	No reported	Nursing Students	ED	EAT-42	PEMP, PEMPM, FSES
Chen et al., 2013	English	Cross-sectional	China	Asia	Upper-middle	2007/2008		Before Covid-19	Random	5,245	87.40%	21.3 (2.2)	51.1%	Mixed Field of Studies	DEP	BDI, SCID-I/P	PEM, HI
Cheung et al., 2016	English	Cross-sectional	China	Asia	Upper-middle	2015–2016		Before Covid-19	Census	661	52.60%	18–22 (0.34)	72.5%	Nursing Students	DEP, ANX	DASS-21	FS
Costa et al., 2010	English	Cross-sectional	Brazil	Latin America and the Caribbean	Upper-middle	2006		Before Covid-19	Census	254	86.60%	20.2 (2.75)	100%	Mixed Field of Studies	ED	EAT-26	HI

Table 1 (continued)

Article	Language	Study design	Country	Study region	Country income group	Survey year baseline	Survey follow-up (months)	Covid	Sampling technique	Sample size	Response rate (%)	Age	% females	Field of study	Outcome	Instruments	SEP exposure
Diaz-jimenez et al., 2020	English	Cross-sectional	Spain	Europe and Central Asia	High	2020		During Covid-19	Non-random	365	20%	23.22 (6.16)	90.1%	Other field of study	ANX	DASS-21	HI
Din et al., 2019	English	Cross-sectional	Pakistan	Asia	Lower-middle	2016–2017		Before Covid-19	Non-random	672	No reported	21.7 (2)	56.0%	Not reported	ED	EAT-26	PE, PEM, SFS
Ediz et al., 2017	English	Cross-sectional	Turkey	Europe and Central Asia	Upper-middle	2010–2011		Before Covid-19	Census	928	69.40%	21.99 (2.37)	49.4%	Medical Students	DEP	DASS-42	FSES
El-gilany et al., 2019	English	Cross-sectional	Egypt	Middle East and North Africa	Lower-middle	2016–2017		Before Covid-19	Random	900	81.90%	No reported	53.2%	Medical Students	DEP	SCL-90-R	FSES
Elsawy et al., 2020	English	Cross-sectional	Egypt	Middle East and North Africa	Lower-middle	2016		Before Covid-19	Random	390	100%	Range 20–27	50.0%	Medical Students	DEP	BDI-II	SFS
Fu et al., 2021	English	Cross-sectional	China	Asia	Upper-middle	2020		During Covid-19	Non-random	89,588	No reported	Range 18–30	56.3%	Mixed Field of Studies	ANX	GAD-7	PE. FSES
Furegato et al., 2010	Portuguese	Cross-sectional	Brazil	Latin America and the Caribbean	Upper-middle	2007		Before Covid-19	Census	114	85%	62.3% between 20 -24	82.5%	Nursing Students	DEP	BDI	FSES
Gao et al., 2021	English	Cross-sectional	China	Asia	Upper-middle	2019		Before Covid-19	Non-random	1,017	No reported	19* (IQR, 18 to 19)	77.8%	Mixed Field of Studies	DEP	PHQ-9	HI
Grace, 2020	English	Cross-sectional	United States	North America	High	2019		Before Covid-19	Non-random	995	No reported	24.61 (3.22)	55.6%	Mixed Field of Studies	DEP	CES-D	FGS, HI
Horgan et al., 2018	English	Cross-sectional	Ireland	Europe and Central Asia	High	No reported		Before Covid-19	Census	220	10%	91% between 18–24	81.0%	Not reported	DEP	CES-D	FS
Hubbard et al., 2018	English	Cross-sectional	United States	North America	High	2017–2018		Before Covid-19	Non-random	564	No reported	19.6 (1.2)	67.2%	Mixed Field of Studies	DEP, ANX, ED	SASS	FS
Ibrahim et al., 2012	English	Cross-sectional	Egypt	Middle East and North Africa	Lower-middle	2003–2004		Before Covid-19	Random	988	83.30%	19.3 (1.8)	48.1%	Mixed Field of Studies	DEP	HDRS	PE, PEM, PEMP, PEMPM, HI, FSES, HC
Ibrahim et al., 2013	English	Cross-sectional	United Kingdom	Europe and Central Asia	High	2009–2010		Before Covid-19	Non-random	923	No reported	20* (IQR = 3)	73.2%	Mixed Field of Studies	DEP	ZDS	PE, PEM, PEMP, PEMPM, FSES, RD
Johnson, 2020	English	Cross-sectional	United States	North America	High	2018		Before Covid-19	Non-random	219	No reported	89.4% between 18–24	75.7%	Mixed Field of Studies	ANX	GAD-7	HC, FI
Kabir et al., 2021	English	Cross-sectional	India	Asia	Lower-middle	2020		During Covid-19	Non-random	200	No reported	23.22 (2.31)	78.5%	Dental Students	DEP	CES-D	FS

Table 1 (continued)

Article	Language	Study design	Country	Study region	Country income group	Survey year baseline	Survey follow-up (months)	Covid	Sampling technique	Sample size	Response rate (%)	Age	% females	Field of study	Outcome	Instruments	SEP exposure
Kamberi et al., 2019	English	Cross-sectional	Kosovo	Europe and Central Asia	Upper-middle	2015–2016		Before Covid-19	Random	676	No reported	21.54 (7.44)	66.4%	Mixed Field of Studies	ANX	BAI	HI
Karyotaki et al., 2020	English	Cross-sectional	Australia, Belgium, Germany, Hong Kong, Mexico, Northern Ireland, South Africa, Spain, and the United States	Multiple Regions		2014–2018		Before Covid-19	Non-random	20,842	45.60%	57.6% between 16–18	54.7%	Mixed Field of Studies	DEP, ANX	CIDI-SC	FS
Kilinc et al., 2020	English	Cross-sectional	Turkey	Europe and Central Asia	Upper-middle	2018		Before Covid-19	Random	1,004	No reported	21.14 (1.81)	68.4%	Mixed Field of Studies	DEP	BDI	PEM, SFS
Kim, h. R. & kim e. J., 2021	English	Cross-sectional	South Korea	Asia	High	2020		During Covid-19	Non-random	488	No reported	63.9% between 25–30	58.2%	Not reported	DEP	PHQ-9	HI
Kundu et al., 2021	English	Cross-sectional	India	Asia	Lower-middle	2019		Before Covid-19	Non-random	323	93.08%	22.66 (0.93)	34.4%	Stem Students	DEP	PHQ-9	PE, PEMP, PEMPM, HI
Lee et al., 2021	English	Cross-sectional	United States	North America	High	2020		During Covid-19	Census	1,412	11.14%	95% below 25	72.7%	Mixed Field of Studies	DEP, ANX	PROMIS, GAD-7	FGS, HI
Lelisho et al., 2022	English	Cross-sectional	Ethiopia	Sub-Saharan Africa	Low	2020		During Covid-19	Non-random	779	No reported	No reported	61.0%	Mixed Field of Studies	DEP	CES-D	DI
Lemon et al., 2022	English	Cross-sectional	United States	North America	High	2014		Before Covid-19	Random	666	51.2%	20.56 (1.93)	69.2%	Not reported	DEP	PHQ-9	PE
Lerman et al., 2020	English	Cross-sectional	United States	North America	High	2018		Before Covid-19	Census	488	19.10%	No reported	60.1%	Dental Students	DEP	PHQ-9	FS
Li et al., 2021	English	Cross-sectional	China	Asia	Upper-middle	2020		During Covid-19	Non-random	6,348	97.66%	No reported	90.4%	Nursing Students	DEP, ANX	PHQ-9, GAD-7	FSES
Guerrero-lopez et al., 2013	Spanish	Cross-sectional	Mexico	Latin America and the Caribbean	Upper-middle	2007		Before Covid-19	Random	455	88%	18.32 (1.17)	69.5%	Medical Students	DEP	CED-D	SFS
Lowe et al., 2009	English	Cross-sectional	Jamaica	Latin America and the Caribbean	Upper-middle	2005–2006		Before Covid-19	Non-random	502	9.77%	23.4 (7.4)	72.8%	Mixed Field of Studies	DEP	BSD	PEM
Mclafferty et al., 2017	English	Cross-sectional	United Kingdom (Northern Ireland)	Europe and Central Asia	High	2015		Before Covid-19	All subject	739	16.95%	20.69 (5.313)	62.5%	Mixed Field of Studies	DEP	WMH-CIDI	SFS

Table 1 (continued)

Article	Language	Study design	Country	Study region	Country income group	Survey year baseline	Survey follow-up (months)	Covid	Sampling technique	Sample size	Response rate (%)	Age	% females	Field of study	Outcome	Instruments	SEP exposure
Mikolajczyk et al., 2008	English	Cross-sectional	Germany, Denmark, Poland and Bulgaria	Europe and Central Asia		2005		Before Covid-19	Random	2,146	Polish and Bulgarian: 95%, German: 70%, Danish: 60%	No reported	Germany: 58.3%, Denmark: 55.4%, Poland: 70.7%, Bulgaria: 68.4%	Mixed field of studies	DEP	M-BDI	SFS
Naeimi et al., 2016	English	Cross-sectional	Iran	Asia	Lower-middle	2015		Before Covid-19	Random	430	95%	No reported	68.8%	Medical Students	ED	EAT-26	PE, PEM
Naser et al., 2021	English	Cross-sectional	Jordan	Asia	Upper-middle	No reported		Before Covid-19	Non-random	1,582	No reported	No reported	57.3%	Mixed Field of Studies	DEP, ANX	PHQ-9, GAD-7	HI
Nguyen et al., 2018	English	Cross-sectional	Vietnam	Asia	Lower-middle	2016		Before Covid-19	Random	1,319	100%	No reported	71.9%	Medical Students	DEP	CES-D	PE, PEM, FS
Oh et al., 2022	English	Cross-sectional	United States	North America	High	2021		During Covid-19	Random	96,376	14%	Range 18–34	No reported	Not reported	DEP, ANX	PHQ-9, GAD-7	FI
Pan et al., 2016	English	Cross-sectional	China	Asia	Upper-middle	2013–2014		Before Covid-19	Random	9,010	89.95%	20.7 (1.6)	61.0%	Mixed Field of Studies	DEP	BDI	PE, HI
Paudel et al., 2020	English	Cross-sectional	Nepal	Asia	Lower-middle	2017		Before Covid-19	Random	681	90.70%	20.39 (1.57)	62.3%	Mixed Field of Studies	DEP, ANX	DASS-21	PE, PEM
Pengpid & peltzer., 2018	English	Cross-sectional	Indonesia, Malaysia, Myanmar, Thailand and Vietnam	Asia		2015		Before Covid-19	Random	3,148	0.867	20.5 (1.6)	63.3%	Not reported	ED	EAT-26	FSES
Phomprasith et al., 2022	English	Cross-sectional	Thailand	Asia	Upper-middle	2018–2019		Before Covid-19	Census	706	48.90%	20.6 (2)	48.7%	Medical Students	DEP	PHQ-9,	SFS,FS
Richardson et al., 2017	English	Longitudinal	United Kingdom	Europe and Central Asia	High	2011- 2012	24 (3 follow-up points every 3/4 months)	Before Covid-19	Non-random	454 (Baseline)	38.1% (all four-time points)	19.9 (17–57)	77.9%	Mixed Field of Studies	DEP, ANX	CES-D	FSES, FS
Richardson et al., 2015	English	Longitudinal	United Kingdom	Europe and Central Asia	High	2011–2012	24 (3 follow-up points every 3/4 months)	Before Covid-19	Non-random	444 (Baseline)	38.7% (all four-time points)	19.9 (17–57)	77.5%	Mixed Field of Studies	ED	EAT-26	FSES, FS
Roh et al., 2010	English	Cross-sectional	South Korea	Asia	High	2006–2007		Before Covid-19	Non-random	7,357	0.522	No reported	37.5%	Medical Students	DEP	MINI-PR	FS
Rolland et al., 2022	English	Cross-sectional	France	Europe and Central Asia	High	2021		During Covid-19	Census	11,754	15.30%	14% between 18–20, 36% between 21–23, 30% between 24–26	71.0%	Medical Students	DEP	CIDI-SF	FS

Table 1 (continued)

Article	Language	Study design	Country	Study region	Country income group	Survey year baseline	Survey follow-up (months)	Covid	Sampling technique	Sample size	Response rate (%)	Age	% females	Field of study	Outcome	Instruments	SEP exposure
Safer et al., 2020	English	Cross-sectional	Tunisia	Middle East and North Africa	Lower-middle	2013–2014		Before Covid-19	Non-random	974	No reported	22.8 (2.2)	70.0%	Mixed Field of Studies	ED	SCOFF	FS
Salami & walker, 2014	English	Cross-sectional	United States	North America	High	No reported		Before Covid-19	Non-random	133	No reported	19.41 (2.39)	63.7%	Psychology Students	DEP, ANX	BSI	FSES
Santangelo et al., 2022	English	Cross-sectional	Italy	Europe and Central Asia	High	2020		During Covid-19	Census	525	No reported	21.83 (3.83)	70.3%	Nursing Students	DEP	QIDS-SR16	SFS
Shao et al., 2020	English	Cross-sectional	China	Asia	Upper-middle	2018		Before Covid-19	Census	2,057	No reported	19.76 (1.17)	70.7%	Medical Students	DEP, ANX	ZUNG-SDS	PE, PEM, HI, FS
Simic-vukomanovic et al., 2016	English	Cross-sectional	Serbia	Europe and Central Asia	Upper-middle	2013, 2014		Before Covid-19	Random	1,968	98.60%	21.04 (2.23)	65.2%	Mixed Field of Studies	DEP	BDI	FSES
Steptoe et al., 2007	English	Cross-sectional	24 countries	Multiple Regions		No reported		Before Covid-19	Non-random	17,348	No reported	Range 17–30	56.7%	Mixed Field of Studies	DEP	BDI	PE, FSES
Sun et al., 2011	English	Cross-sectional	China	Asia	Upper-middle	No reported		Before Covid-19	Census	10,374	92.05%	19.63 (1.28)	53.8%	Medical Students	DEP, ANX	BDI, BAI	FSES
Tayefi et al., 2020	English	Cross-sectional	Iran	Asia	Lower-middle	2017–2018		Before Covid-19	Non-random	560	95%	21.2 (5.3)	55.4%	Mixed Field of Studies	DEP, ANX	BDI	PE, PEM
Tran et al., 2018	English	Cross-sectional	United States	North America	High	No reported		Before Covid-19	Non-random	304	No reported	20.98 (4.91)	71.7%	Not reported	ANX	GAD-7	FS
Tuyen et al., 2019	English	Cross-sectional	Vietnam	Asia	Lower-middle	2018		Before Covid-19	Random	405	100%	20.2 (19–27)	66.4%	Mixed Field of Studies	DEP	CES-D	FSES
Unsal et al., 2010	Turkish	Cross-sectional	Turkey	Europe and Central Asia	Upper-middle	2009–2009		Before Covid-19	Census	816	86.30%	20.7 (1.8)	28.1%	Mixed Field of Studies	ED	EAT-40	FSES
Van de velde et al., 2021	English	Cross-sectional	26 countries	Multiple Regions		2020		During Covid-19	Non-random	20,103	No reported	78.3% below 26	73.9%	Mixed Field of Studies	DEP	CES-D	PE, FS
Van der walt et al., 2020	English	Cross-sectional	South Africa	Sub-Saharan Africa	Upper-middle	2018		Before Covid-19	Census	473	35.25%	22* (IQR, 20 to 30)	70.4%	Medical Students	DEP, ANX	PHQ-9, HADS-A	HI
Vergara et al., 2013	Spanish	Cross-sectional	Colombia	Latin America and the Caribbean	Upper-middle	2011		Before Covid-19	Random	251	No reported	20.2 (2.7)	62.6%	Dental Students	DEP, ANX	DASS-21	HI, FS
Verger et al., 2010	English	Cross-sectional	France	Europe and Central Asia	High	2005–2006		Before Covid-19	Random	1,743	71.00%	19.4	62.5%	Mixed Field of Studies	DEP, ANX	CIDI-SF	PEMP, DI
Worthen et al., 2021	English	Cross-sectional	United States	North America	High	2018		Before Covid-19	Non-random	338	85%	22.00 (3.24)	77.8%	Mixed Field of Studies	DEP	PHQ-9	FGS, SFS
Yang et al., 2021	English	Cross-sectional	China	Asia	Upper-middle	No reported		During Covid-19	Random	1,807	94.90%	20.25 (1.54)	55.9%	Medical Students	DEP	BDI-II	FSES
Yu et al., 2021	English	Cross-sectional	China	Asia	Upper-middle	2020		During Covid-19	Non-random	1,681	94.70%	No reported (NA)	64.8%	Mixed Field of Studies	DEP	CES-D	DI

Table 1 (continued)

Article	Language	Study design	Country	Study region	Country income group	Survey year baseline	Survey follow-up (months)	Covid	Sampling technique	Sample size	Response rate (%)	Age	% females	Field of study	Outcome	Instruments	SEP exposure
Yu et al., 2015	English	Cross-sectional	China	Asia	Upper-middle	No reported		Before Covid-19	Random	4,582	88.80%	20.79 (1.507)	49.8%	Mixed Field of Studies	DEP	BDI	PE, PEM, FSES
Zhai et al., 2016	English	Cross-sectional	China	Asia	Upper-middle	No reported		Before Covid-19	Random	5,180	91.30%	21.32 (2.2)	49.0%	Mixed Field of Studies	DEP	BDI	PE, PEMP, FSES
Zhao & yiyue, 2018	English	Cross-sectional	China	Asia	Upper-middle	2017		Before Covid-19	Random	1,177	98%	No reported (NA)	68.5%	Mixed Field of Studies	DEP	CES-D	PEM

ANX Anxiety, *DEP* Depression, *ED* Eating Disorders, *BAI* Beck Anxiety Inventory, *BDI* Beck Depressive inventory, *BDI-II* Beck Depressive inventory II, *BSD* Brief Screen for Depression, *BSI* Brief Symptom Inventory, *CES-D* Centre for Epidemiologic Studies, *CIDI-SC* International Diagnostic Interview Screening Scale, *CIDI-SF* The World Health Organization Composite International Diagnostic Interview short-form, *DASS-21* Depression Anxiety Stress 21 item Scale, *DASS-42* Depression Anxiety Stress 42-item Scale, *EAT-26* Eating Attitudes Test - 26 Item, *EAT-40* Eating Attitudes Test - 40 Item, *EAT-42* Eating Attitudes Test - 42 Item, *GAD-7* General Anxiety Disorder 7-item scale, *HADS* Hospital Anxiety and Depression Scale, *HADS-A* Hospital Anxiety Depression Scale-Anxiety, *HDRS* Hamilton Rating Scale, *M-BDI* Modification of the Beck Depression Inventory (M-BDI), *MINI-PR* Patient-rated Mini International Neuropsychiatric Interview, *PHD-9* Patient Health Questionnaire, *PROMIS* Patient-Reported Outcomes Measurement Information System Depression Short Form, *QIDS-SR16* Quick Inventory of Depressive Symptomatology Self-Report Questionnaire, *SASS* Symptoms and Assets Screening Scale, *SCL-90-R* Symptoms Checklist 90 Revised, *SCOFF* Sick-Control-One stone-Fat-Food Questionnaire, *WMH-CIDI* Adapted World Mental Health Composite International Diagnostic Interview,(WMH-CIDI), *ZDS* Short version of the Zagazig Depression Scale, *ZUNG-SDS* Zung Self-Rating Depression Scale, *SCID-I/P* Structured Clinical Interview Axis I Disorders, Patient Version, *DI* Disposable Income / Pocket Money, *FG* First-Generation Students, *FI* Food insecurity, *FS* Financial stress, *FSES* Family Socioeconomic Status / Class, *HC* Housing Condition / Crowding, *HI* Household Income, *PE* Parental Education (Father or both/any), *PEM* Parental Education (mother), *PEMP* Parental Employment (father or both/any), *PEMPM* Parental Employment (mother), *RD* Relative Deprivation, *SFS* Individual Subjective financial status

All studies adopted a cross-sectional design except for two studies using a longitudinal design (Richardson et al., 2015, 2017). The included studies' median number of students with valid responses was 739 (range 97–96,376), with a median female representation of 64% (range 28.1–100%). The median response rate to the survey was 83%; the range was 9.8% to 100% within the studies that reported the response rate. Most of the studies used a convenience sample (42%), followed by studies using random samples (37%) and census sampling (21%). Furthermore, 41 studies collected data from a sample of a mixed field of students, while medical, nursing and dental were targeted in 17, 9 and 3 studies, respectively.

Mental Disorders Measures

Sixty-two studies evaluated depressive symptoms, 26 anxiety symptoms and nine eating disorders. Various tools were used to evaluate mental disorders. For depressive symptoms, the most common scale was Beck's Depression Inventory (BDI/BDI-II, n = 15), Center for Epidemiologic Studies Depression Scale (CES-D, n = 13) and Patient Health Questionnaire-9 (PHQ-9, n = 12). For anxiety symptoms, was the General Anxiety Disorder-7 (GAD-7, n = 9) and the Depression, Anxiety and Stress Scale – 21 (DASS-2, n = 8), and for eating disorders, was the Eating Attitudes Test (EAT-26, n = 5). Only one study used clinical interviews with diagnoses (Chen et al., 2013).

Socioeconomic Position Measures

A total of 127 socioeconomic indicators were used across the 78 studies (Table 2 and Online Resource 4). The most used indicator was family socioeconomic status/class (n = 23), followed by household income (n = 20) and financial stress (n = 19). There was variation in the number of measures studied, with 49 studies using one indicator, 18 using two, and 11 using three or more. Only 30 (23%) of the total indicators used standardized or validated measurements. Sixty measurements were described in the methods but were not validated, and 37 indicators were not described in any study section.

Cross-Sectional Associations Between SEP and Mental Disorders

Most studies found a positive association, in which lower socioeconomic position is related to higher levels of depressive and anxiety symptoms, but not eating disorders. Using unadjusted and adjusted analysis, the percentage of studies showing a positive association for depressive symptoms was 78% and 63%, respectively, whereas for anxiety symptoms, it

was 50% and 64%. Regarding eating disorders, 60% and 45% reported no associations, respectively (see Table 3).

Socioeconomic Position and Depressive Symptoms.

In both unadjusted and adjusted analyses, the indicators most consistently positively associated with depressive symptoms were mother's education, household income, family socioeconomic status/class, and financial stress. Father's education/higher education of one parent showed a positive association with depressive symptoms in unadjusted models (6 of 7 studies); however, in the unadjusted models when other variables were controlled for in multivariable analysis, most associations (10 of 13 studies) were non-significant. A similar tendency occurred with parental employment (father or mother), where significant associations dropped in adjusted models.

A few studies (n = 4) explored the association between depressive symptoms and area /neighborhood level or food insecurity variables. Except for one study that showed a negative correlation between the number of persons per room and depressive symptoms in the adjusted model (Ibrahim et al., 2012), most studies reported a positive association between a lower socioeconomic position and depressive symptoms. The variable disposable income/pocket money has a positive association for 3 of 4 studies in adjusted models.

Socioeconomic Position and Anxiety Symptoms.

The association between socioeconomic indicators and anxiety symptoms showed more variation compared to depressive symptoms, with 50% of unadjusted models and 64% of adjusted models showing a positive association. There were also fewer studies exploring anxiety symptoms compared to depressive symptoms in both unadjusted (14 vs. 49) and adjusted (25 vs. 78) models. Studies investigating mother's education (n = 2) and mother's employment (n = 1) consistently found positive associations across all models, meaning lower SEP was associated with higher anxiety symptoms. Similarly, family socioeconomic status/class (4 of 6 adjusted studies) and household income (4 of 6 unadjusted, 2 of 4 adjusted studies) also showed a positive association between lower SEP and higher anxiety symptoms.

There was no clear association between anxiety symptoms and first-generation students or father's education. Moreover, the few studies on food insecurity (n = 3) and housing/overcrowding (n = 1) found significant positive relationships with anxiety symptoms. Unlike with depressive symptoms, most studies found no association between financial stress and anxiety symptoms (2 of 3 unadjusted, 3 of 5 adjusted).

Socioeconomic Position and Eating Disorders.

The evidence for an association between eating disorders and socioeconomic position indicators was inconclusive, with mixed findings. Across unadjusted and adjusted models, 50% of associations were null, 25% positive, and 25% negative. One study found a bidirectional relationship between family socioeconomic status/class and eating disorders, meaning both high and low socioeconomic status were eating disorder risk factors compared to medium socioeconomic status (Ünsal et al., 2010).

Longitudinal Associations Between SEP and Mental Disorders

Only 2 studies report longitudinal associations between SEP and mental disorders. Richardson et al. (2017) found greater financial difficulties predicted worsening anxiety at 3–4 months, while anxiety predicted worsening finances, implying a bidirectional relationship. The authors did not find a longitudinal link between economic difficulties and depression, or between depression, anxiety, and family affluence.

On the other hand, other longitudinal study found greater baseline financial difficulties and lower family affluence independently predicted more severe eating attitudes up to a year later after controlling for baseline eating attitudes and demographics. When examined by gender, these relationships were only significant for women. (Richardson et al., 2015).

Risk of Bias Within Studies

Table 4 and Online Resource 5 include the NOS assessment findings. Study quality was mixed. For cross-sectional studies, the mean selection quality score was 2.2 out of 5, though 10 of 76 studies scored 4 or higher. Only 18.4% used validated exposure measures, and 65.8% lacked appropriate or justifiable sample sizes. Regarding comparability, 38.2% did not adjust for age and gender, while 36.8% adjusted for both. All but one study (Chen et al., 2013) used self-report versus blinded clinical outcome measures. Exposure-outcome association measurement was adequate and clear in 61.8% of articles. The two articles with longitudinal design had higher quality, with NOS scores of 4, 2, and 2 across the three dimensions.

Discussion

Although university students are a population at high risk for mental disorders such as depression, anxiety and eating disorders (ED), there remains a gap in understanding which

risk factors produce an increased vulnerability in this group. This study focused on examining the association and predictive role of socioeconomic position variables with three key mental health outcomes among university students: depressive, anxiety symptoms, and ED. Exploring the effects of socioeconomic position on these mental health outcomes could help identify factors that put certain groups of students at greater risk. This can inform targeted interventions and programs aimed at addressing potential mental health disparities among university students based on socioeconomic position.

Most research found a significant positive association (lower SEP with higher levels of mental disorders) between socioeconomic position variables and depressive and anxiety symptoms, but findings were mixed for eating disorders. The indicators with the most consistently positive associations with depressive symptoms was the mother's education. These results underscore the importance of future research considering the measurement of parental education separately and not as a single variable where only the most educated parent is considered. In addition, most studies found no association between financial stress and anxiety, contrary to what one would expect, and thus warrant further investigation. Regarding eating disorders, there was no discernible relationship with any indicator of socioeconomic position. These results are consistent with other studies addressing this phenomenon in clinical and general settings (Mitchison & Hay, 2014), and reinforce that the stereotype that eating disorders are a disease of affluence is baseless. Furthermore, some studies indicate that, while higher socioeconomic position does not predict illness, it does predict higher rates of treatment seeking among students who are ill (Sonneville & Lipson, 2018). As a result, it is central to develop more equitable and accessible treatment options for university students with eating disorders.

Limitations of the Studies

There are several limitations in the studies selected for this systematic review that may affect the interpretation of the results. First, given the high heterogeneity of outcome measures and predictors and control variables, it was inadequate to perform a meta-analysis, which limits the study's conclusions regarding the effect size of the associations reported. Second, because studies demonstrating a positive association are more likely to be published than those showing null associations, publication bias may have played a role in the results of this review (Dwan et al., 2008). Third, the control variables used in the multiple regression models were very heterogeneous, and only some studies presented unadjusted

Table 2 Characteristics of socioeconomic position measures

Socioeconomic measures	Indicator's level	Total	Validated instruments	Described	No described	% Validated instrument	Categorical variable	Continuous variable
1. First-Generation Students	Family	3	0	3	0	0	3	0
2. Parental Education (Father or both/any)	Family	18	2	10	6	11	16	2
3. Parental Education (mother)	Family	14	2	7	5	14	11	3
4. Parental Employment (father or both/any)	Family	6	2	2	2	33	6	0
5. Parental Employment (mother)	Family	4	2	1	1	50	4	0
6. Household Income	Family	20	1	15	4	5	13	7
7. Family Socioeconomic Status / Class	Family	23	9	6	8	39	20	3
8. Individual Subjective financial status	Individual	10	1	5	4	10	8	2
9. Financial stress	Individual	19	5	9	5	26	13	6
10. Disposable Income / Pocket Money	Individual	4	0	2	2	0	4	0
11. Relative Deprivation	Area level/ neighborhood	1	1	0	0	100	1	0
12. Food insecurity		3	3	0	0	100	2	1
13. Housing Condition / Crowding	Area level/ neighborhood	2	2	0	0	100	2	0
Total		127	30	60	37	23	103	24

associations, making comparing results more challenging. Forth, the vast majority of the studies found were cross-sectional, which hindered possible interpretations of causal mechanisms of socioeconomic position measures with the examinate mental disorders.

Finally, while most studies provided a detailed description of the instruments for measuring mental health outcomes, the same did not apply to socioeconomic variables. Less than a quarter of the indicators used previously validated instruments and about a third of the studies did not provide any documentation on the conceptualization and measurement of socioeconomic indicators. Furthermore, none of the studies presented instruments specifically designed for the student population. This lack of accountability or paucity of critical thinking about how socioeconomic position is understood and operationalized in mental health research is consistent with previous literature investigating the association between poverty and mental disorders in the general population (Cooper et al., 2012).

Limitations of the Current Review

This review has some limitations. Firstly, the study focused only on articles published in peer-reviewed journals; due to a limitation of time and the large number of articles no systematic review of the grey literature was conducted, excluding grey literature may introduce publication bias, that may affect the validity and generalizability of the systematic review findings. Furthermore, even though the review included three important and comprehensive databases on the subject, the restriction to only these datasets raise the possibility that some studies may have been missed. This limitation stems from the potential exclusion of pertinent studies that may be indexed in databases beyond the scope of our selection. Lastly, due to limited capacity, this review only examined depressive, anxiety symptoms, and eating disorders, leaving out other prevalent mental health issues in this population, such as alcohol and other substance use disorders.

Future Research

According to the results of this research, there is much room for improvement in measuring socioeconomic indicators for mental health research. The existing measures often fail to capture the complex and multidimensional nature of poverty, resulting in an incomplete or inaccurate understanding of the association with mental disorders and a lack of comparability between studies. Therefore, there is a need to develop more comprehensive and relevant measures to assess socioeconomic position in the context of university students' mental health. Such measures would help researchers better understand the relationship between mental health and socioeconomic position in this population and help policymakers and universities design cost-effective interventions focused on at-risk populations to address this pressing issue.

In addition, when measuring socioeconomic position, it is essential to consider the unique characteristics of university students, as traditional measures used in the general population may not accurately reflect their level of privilege or disadvantage. This population faces specific risk factors that require targeted interventions. The stress and strain of the university experience, coupled with academic performance demands, can contribute to aggregate inequities in mental health outcomes. Therefore, it is essential to develop appropriate measures to help identify at-risk populations that may benefit from university mental health support programs. By doing so, it can be promoted that all university students have equal opportunities to achieve their full academic potential while maintaining good mental health.

On the other hand, it would be beneficial to incorporate new methodologies for analyzing mental health disparities in university students. Most studies used unadjusted or adjusted linear or logistic regressions to assess associations between socioeconomic position and mental disorders. This approach ignores the fact that people have multiple identities or social positions. The intersectional approach is a framework that recognizes the complex and intersecting nature of social identities and discrimination experiences. This approach considers the unique experiences of individuals who may face discrimination on multiple grounds, such as race, gender, and socioeconomic status (Collins, 2015). Researchers can gain a more nuanced understanding of how multiple identities intersect to produce health and wellbeing inequalities by applying this approach to the study of socioeconomic disparities in university students. Methods such as a multilevel approach (Evans et al., 2018), latent class analysis (Goodwin et al., 2018) could be used by researchers to analyze associations between the various identities and discrimination experiences that individuals may face, as well as how these experiences intersect to produce inequalities. Mediation analysis (MacKinnon, 2012) could also be used to understand pathways and explore the underlying mechanisms through which socioeconomic position affects mental disorders.

Finally, the vast majority of the studies in this review were cross-sectional. Future researchers should prioritize using longitudinal methodologies to determine whether socioeconomic position is a risk factor for developing mental illness during university studies.

Table 3 Proportion of studies showing positive, null, and negative associations between socioeconomic measures and depression, anxiety and eating disorders

	Association	Depression							Anxiety							Eating disorders						
		Total	Positive		Null		Negative		Total	Positive		Null		Negative		Total	Positive		Null		Negative	
			n	%	n	%	n	%		n	%	n	%	n	%		n	%	n	%	n	%
1. First-Generation Students	Unadjusted	2	1	50	1	50	0	0	1	0	0	1	100	0	0	0						
	Adjusted	1	0	0	1	100	0	0	0							0						
2. Parental Education (Father or both/any)	Unadjusted	7	6	86	1	14	0	0	2	1	50	1	50	0	0	1	0	0	0	0	1	100
	Adjusted	13	3	23	10	77	0	0	3	1	33	1	33	1	33	1	0	0	1	100	0	0
3. Parental Education (mother)	Unadjusted	6	6	100	0	0	0	0	0							1	0	0	0	0	1	100
	Adjusted	10	8	70	2	20	0	0	2	2	100	0	0	0	0	2	0	0	1	50	1	50
4. Parental Employment (father or both/any)	Unadjusted	2	2	100	0	0	0	0	0							0						
	Adjusted	4	2	50	2	50	0	0	1	1	100	0	0	0	0	1	0	0	1	100	0	0
5. Parental Employment (mother)	Unadjusted	2	2	100	0	0	0	0	0							0						
	Adjusted	3	0	0	3	100	0	0	0							1	0	0	1	100	0	0
6. Household Income	Unadjusted	6	4	67	2	33	0	0	6	4	67	2	33	0	0	1	0	0	1	100	0	0
	Adjusted	10	6	60	2	20	2	20	4	2	50	2	50	0	0	0						
7. Family Socioeconomic Status / Class	Unadjusted	8	6	75	2	25	0	0	0							0						
	Adjusted	11	9	82	1	9	1	9	6	4	67	1	17	1	17	4	2	50	1	25	1	25
8. Individual Subjective financial status	Unadjusted	4	3	75	1	25	0	0	1	0	0	1	100	0	0	0						
	Adjusted	5	5	100	0	0	0	0	1	1	100	0	0	0	0	1	1	100	0	0	0	0
9. Financial stress	Unadjusted	8	6	75	2	25	0	0	3	1	33	2	67	0	0	2	0	0	2	100	0	0
	Adjusted	15	12	80	3	20	0	0	5	2	40	3	60	0	0	1	1	100	0	0	0	0
10. Housing Condition / Crowding	Unadjusted	1	0	0	0	0	1	100	0							0						
	Adjusted	1	0	0	0	0	1	100	1	1	100	0	0	0	0	0						
11. Relative Deprivation	Unadjusted	1	1	100	0	0	0	0	0							0						
	Adjusted	1	1	100	0	0	0	0	0							0						
12. Food insecurity	Unadjusted	1	1	100	0	0	0	0	1	1	100	0	0	0	0	0						
	Adjusted	1	1	100	0	0	0	0	2	2	100	0	0	0	0	0						
13. Disposable Income / Pocket Money	Unadjusted	1	0	0	0	0	1	100	0							0						
	Adjusted	4	3	75	0	0	1	25	0							0						
Total	Unadjusted	49	38	78	9	18	2	4	14	7	50	7	50	0	0	5	0	0	3	60	2	40
Total	Adjusted	79	50	63	24	30	5	6	25	16	64	7	28	2	8	11	4	36	5	45	2	18
Total	Both	128	88	69	33	26	7	5	39	23	59	14	36	2	5	16	4	25	8	50	4	25

Note. For logistic regressions models, a significant association (positive or negative) is considered when at least one category (level) has a significant association. A positive association is when a lower socioeconomic status is significantly associated with higher levels of mental disorders irrespective of the scale and direction the original study uses

Table 4 Risk of bias in individual studies

Study	Selection	Comparability	Outcome
Cross-sectional			
Wahed et al., 2017	****	**	**
Ahmad et al., 2021	****	*	*
Ahmed et al., 2020	**		*
Al Saadi et al., 2017	**	*	*
Al-Modallal, 2015	**	*	*
Aldhmadi et al., 2021	***	**	*
Amr et al., 2013	*	*	*
Andrews & Wilding, 2004	**	**	*
Aylie et al., 2020	***	*	**
Bert et al., 2020	**	**	**
Bostanci et al., 2015	***		**
Cao et al., 2020	***		*
Celik et al., 2015	*		*
Chen et al., 2013	***	*	**
Cheung et al., 2016	**		**
Costa et al., 2010	***		**
Diaz-Jimenez et al., 2020	*		**
Din et al., 2019		**	*
Ediz et al., 2017	*		**
El-Gilany et al., 2019	***	*	*
Elsawy et al., 2020	***	*	**
Fu et al., 2021	*	**	**
Furegato et al., 2010	***		**
Gao et al., 2021	*	**	*
Grace, 2020	**	**	*
Horgan et al., 2018	*		**
Hubbard et al., 2018	***		*
Ibrahim et al., 2012	****	**	**
Ibrahim et al., 2013	****	**	**
Johnson, 2020	***		*
Kabir et al., 2021	**		**
Kamberi et al., 2019	**		**
Karyotaki et al., 2020	***	**	**
Kilinc et al., 2020	**		*
Kim, H. R. & Kim E. J., 2021	**	*	**
Kundu et al., 2021	***	*	**
Lee et al., 2021	**		*
Lelisho et al., 2022	*	*	**
Lemon et al., 2022	***	**	**
Lerman et al., 2020	**		**
Li et al., 2021	*	*	**
Guerrero-López et al., 2013	**		**
Lowe et al., 2009		*	*
McLafferty et al., 2017	**		*
Mikolajczyk et al., 2008	**		**
Naeimi et al., 2016	**		**
Naser et al., 2021	*		**
Nguyen et al., 2018	***	**	**
Oh et al., 2022	***	**	*
Pan et al., 2016	*	**	**
Paudel et al., 2020	**		*
Pengpid & Peltzer., 2018	**	**	**
Phomprasith et al., 2022	*	**	*
Roh et al., 2010	**	**	**
Rolland et al., 2022	**	**	**
Safer et al., 2020	*		**
Salami & Walker, 2014	***	*	**
Santangelo et al., 2022	*	**	**
Shao et al., 2020	**	**	**
Simic-Vukomanovic et al., 2016	*		*
Steptoe et al., 2007	**	**	*
Sun et al., 2011	**	**	**
Tayefi et al., 2020	**		**
Tran et al., 2018	***	*	*
Tuyen et al., 2019	*****		**
Unsal et al., 2010	**	*	**
Van de Velde et al., 2021	**	**	*
Van Der Walt et al., 2020	**	*	**
Vergara et al., 2013	***		*
Verger et al., 2010	****	**	*
Worthen et al., 2021	****	**	**
Yang et al., 2021	****		**
Yu et al., 2021	**	*	**
Yu et al., 2015	**	**	*
Zhai et al., 2016	**	**	*
Zhao & Yiyue, 2018	***	*	**
Longitudinal			
Richardson et al., 2017	****	**	**
Richardson et al., 2015	****	**	**

The results of the NOS assessments are presented, where the quantity of asterisks (*) obtained accounts for the quality of the study. Thus, the greater the number of asterisks, the better the quality of the study according to the ranges established for each domain (Selection = 0 to 5; Comparability = 0 to 2; and Outcome = 0 to 3)

Conclusion

Research on factors associated with mental health outcomes in university students has increased in recent years also in light of the covid-19 pandemic. In this context a review that evaluates systematically the association and predictive role of socioeconomic position and mental health outcomes is timely. This review examines the evidence on how socioeconomic position variables are related to three mental health outcomes: depressive symptoms, anxiety symptoms, and eating disorders. The review shows that most of the studies found a positive association between socioeconomic position and depressive and anxiety symptoms, meaning that students

from lower socioeconomic backgrounds tend to have more mental health problems. However, the association between socioeconomic position and eating disorders was not consistent across studies. The review also identifies some limitations in the measurement and analysis of socioeconomic factors in this population.

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Data availability All project data are provided in the online supplementary materials.

Declarations

Conflict of interest The authors report no conflict of interests.

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