



Review Paper

Wellbeing among university students during the COVID-19 pandemic: a systematic review of longitudinal studies

Anaïs Lemyre ^{a, *}, Emma Palmer-Cooper ^b, Jane P. Messina ^a^a School of Geography and the Environment, University of Oxford, OX1 3QY, United Kingdom^b Centre for Innovation in Mental Health, School of Psychology, University of Southampton, SO17 1PS, United Kingdom

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ABSTRACT

Objectives: The objectives of this study were to investigate the wellbeing trajectories of university students during the COVID-19 pandemic and identify associated protective factors. Results from the study aimed to inform wellbeing-promotion strategies and crisis-response plans in university settings.

Study design: Systematic review.

Methods: A review of articles published in English language was conducted in PubMed, PsycINFO, Scopus, Web of Science, and ERIC databases from 1 December 2019 to 15 December 2022. Longitudinal and repeated cross-sectional studies that assessed wellbeing among university students during the COVID-19 pandemic using a validated instrument were included. Article and data extraction were performed by the primary reviewer, with a random subset verified by a second reviewer. Study quality was assessed using the National Institutes of Health 'Quality Assessment Tool for Observational Cohort and Cross-Sectional Studies'.

Results: Of 6651 titles screened without duplicates, 181 underwent full-text review, of which 19 were included in the current study (15 longitudinal and 4 repeated cross-sectional studies, with a total of 19,206 participants). A significant decrease in the wellbeing of university students was observed across studies during the early stages of the pandemic compared to prepandemic times; however, mixed findings were found in later phases of the pandemic, with some studies presenting an improvement in wellbeing, others no change, and two studies finding impairments. Overall, wellbeing was greater among males and was also associated with socioeconomic status, more sleep and physical activity, greater social connectedness, less alcohol use, and less social media activity.

Conclusion: The study showed varying wellbeing trajectories across different periods of the COVID-19 pandemic. Results provide relevant information for researchers, public health professionals, and higher education institutions in charge of promoting student wellbeing and crisis preparedness.

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Introduction

Concern for the mental health and wellbeing of university students has steadily increased over the last decade.^{1,2} Marked by a high proportion of students (>30%) meeting cut-off norms for depression and anxiety³ and a rising demand for mental health support and professional services,⁴ the situation has been described as a 'mental health crisis' in universities.⁵ The emergence

of the COVID-19 pandemic introduced new challenges, particularly affecting students' daily lives and study programmes. As universities closed their doors and transitioned to remote learning and campuses and residences severely restricted in-person contact and socialisation, students contended with important disruptions to studies, financial pressures, reductions in peer support, and isolations.⁶ Evidence points to a widespread deterioration in mental health and wellbeing across the general population at the beginning of the pandemic, with university students particularly being impacted.^{7–9} While pandemic research efforts often assessed the most serious impacts of COVID-19, such as mortality and serious mental health disorders, less severe mental health difficulties and low wellbeing also represented a burden of great concern.¹⁰ As

* Corresponding author.

E-mail addresses: anaïs.lemyre@ouce.ox.ac.uk (A. Lemyre), e.c.palmer-cooper@soton.ac.uk (E. Palmer-Cooper), jane.messina@ouce.ox.ac.uk (J.P. Messina).

students experience a rare setting where educational, social, and living situations largely overlap, the impact of the pandemic was compounded. Understanding how university students coped and adapted over time and across pandemic phases is key to ensuring better wellbeing promotion in times of crisis and beyond. Specifically, the pandemic revealed the population subgroups that were most in need of tailored attention and protective factors associated to wellbeing. The pandemic also allowed comparisons of wellbeing correlates in COVID-19 and non-COVID-19 times, helping to target wellbeing promotion strategies in times of crisis, with the inclusion of health and socialisation considerations.

Wellbeing is a multidimensional construct encompassing positive emotions and mood, and the experience of positive functioning, fulfilment and life satisfaction.¹¹ It is best conceptualised as existing along a continuum from low to high. It takes root in strength-based and salutogenic approaches and lends itself well to health promotion as attention is often placed on encouraging protective factors for optimal functioning.¹² In fact, wellbeing constitutes one of the United Nations sustainable development goals¹³ and is a key outcome of interest for the World Health Organization (WHO).¹⁴

As the COVID-19 pandemic unfolded, studies began to empirically document the psychological status of students. The majority of studies used cross-sectional designs and focused on risk factors for mental health conditions, such as anxiety and depression. As a result, emerging systematic reviews primarily synthesised findings on mental health disorders.^{15–20} To date, most reviews were conducted during the early phase of the pandemic and provided results from all continents combined. Few reviews focussed on wellbeing,²¹ or addressed trajectories or changes in wellbeing throughout the duration of the pandemic, or looked at associated protective factors for adaptation among students.

The current review focussed specifically on the notion of wellbeing. The first objective consisted of systematically synthesising available evidence on trajectories of wellbeing across time among university students during the COVID-19 pandemic. The second objective was to identify associated protective factors. As such, the review included longitudinal and repeated cross-sectional studies with validated wellbeing outcomes. Taking into consideration that wellbeing is, in part, culturally determined²² and the importance of comparable higher education settings to favour lessons for wellbeing promotion, this review focussed on English-speaking countries sharing similarities in terms of culture, values and beliefs, education, government structure, economy, and public systems; namely, Australia, Canada, Ireland, New Zealand, the UK, and the US (sometimes referred to as the ‘Anglosphere’).^{23,24}

Methods

The current systematic review followed the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) statement²⁵ (see Appendix Table A1 in the supplementary material). The study was registered on Prospective Register of Systematic Reviews (PROSPERO) (CRD42022383941).

Search strategy

Searches were conducted in PubMed, PsycINFO, Scopus, Web of Science, and ERIC databases to retrieve relevant peer-reviewed publications. Databases were searched from 1 December 2019 to 15 December 2022. References of the included studies were scanned, and an additional manual search on Google Scholar was conducted in February 2023. The search included 3 headings: (1) University students; (2) Wellbeing; and (3) COVID-19. See Appendix Table A2 in the supplementary material for search terms.

Study eligibility

The titles and abstracts of retrieved articles were screened by the primary reviewer, and a random 25% subset was independently screened by a second reviewer. Discrepancies were resolved with a third reviewer.

Study inclusion criteria were as follows: (1) longitudinal or repeated cross-sectional in design, with a minimum of one data point during the COVID-19 pandemic; (2) assessing wellbeing using a validated instrument; and (3) conducted among university students. The eligibility of instruments was based on a previous systematic review of English-language wellbeing-assessment tools.²⁶ Studies from six countries were included; namely, Australia, Canada, Ireland, New Zealand, the UK, and the US.

Study exclusion criteria were as follows: (1) presented wellbeing data not assessed via validated scales; (2) presented wellbeing data stemming from recall retrospective assessments; or (3) assessed the effectiveness of interventions.

Quality assessment

The quality and risk bias of included studies was assessed using the National Institutes of Health ‘Quality Assessment Tool for Observational Cohort and Cross-Sectional Studies’²⁷ (Appendix Table A3 in the supplementary material).

Data extraction and synthesis

Data extraction included name of first author and year of publication, study design, COVID-19 period, sample characteristics (i.e. sample size, mean age, sociodemographic characteristics), attrition and response rate, wellbeing-assessment tool, wellbeing scores (mean [M] and standard deviation [SD]), assessment of score changes, covariates, and findings. Data extraction was undertaken by the primary reviewer, with a 10% sample verified for accuracy by a second reviewer.

Results

Search results

A total of 8094 articles were initially identified. Following removal of duplicates, 6651 articles remained. After title and abstract screening, 6470 articles were removed due to other population type, location, design, timeline, and outcome. The remaining 181 articles were assessed in full for eligibility. Finally, 19 studies met all inclusion criteria (Fig. 1).

Study characteristics

Studies, grouped by wellbeing-outcome and COVID-19 period, are summarised in Table 1. Fifteen studies were longitudinal,^{28–42} and four followed a repeated cross-sectional design.^{43–46} All data originated from self-reported questionnaires. Seven studies focussed on student subpopulations: undergraduates,^{32,36,42} first year students,^{28,45} and psychology students.^{30,33} In all studies, participant recruitment was opportunistic through the use of advertisements, social media, and emails. Studies were primarily undertaken within a single university (17 studies), whereas one study used data from four universities,³⁹ and another used data from two universities.⁴³ Five studies offered students course credits for their participation.^{29–31,43,45} Study sample size varied from 58 to 3693 students, and attrition varied from 14% to 86%. Three studies were from Australia,^{31,44,45} four from Canada,^{29,35,37,43} one from New Zealand,⁴² five from the UK,^{33,38,40,41,46} and six from the

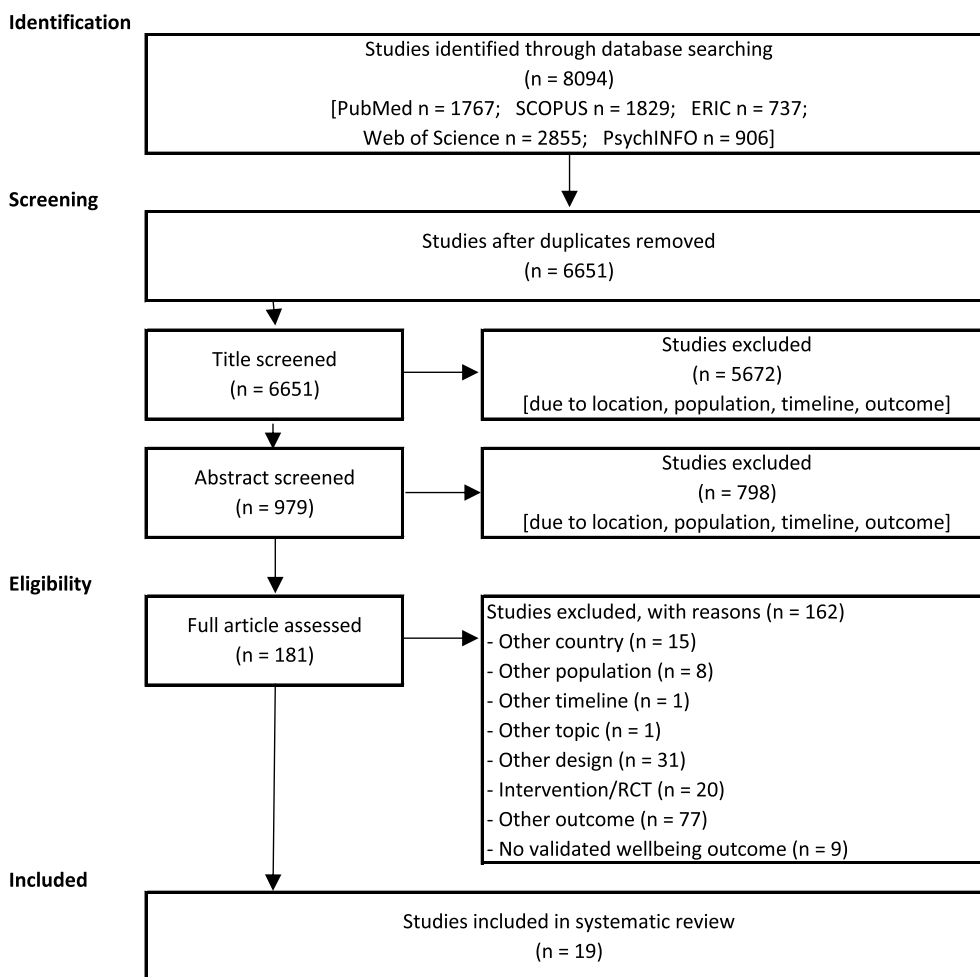


Fig. 1. PRISMA flow chart.

US,^{28,30,32,34,36,39} In terms of timeline, ten studies compared well-being with prepandemic data,^{30,33–36,40,41,43,45,46} seven studies investigated two timepoints within the early stages of the pandemic (March to December 2020),^{28,29,31,32,37,42,44} and four studies included 2021 data.^{38,39,45,46} All outcome information provided in the studies is summarised and is presented in Table 1, including wellbeing scores (M and SD) and wellbeing changes. See Appendix Table A4 in the supplementary material for a summary of the validated wellbeing assessment tools.

Findings on wellbeing trajectories

While wellbeing was longitudinally assessed in all 19 studies, not all studies covered the same periods or statistically compared wellbeing scores.

Pre- and during-COVID-19 periods

Most studies compared the early COVID-19 period with pre-COVID-19 data. Overwhelmingly, results showed a significant reduction in wellbeing during the early stages of the pandemic compared to prepandemic times. This impairment was observed across different wellbeing outcomes, including mental wellbeing (Short/Warwick–Edinburgh Mental Wellbeing Scale [S/WEMWBS]),^{33,40,41,45} overall wellbeing (Well-Being 5),³⁴ and positive affect (Positive and Negative Affect Schedule [PANAS]).³⁶ The impairment was also shown on sadness (PANAS-Expanded [PANAS-

X]) in one study among those without pre-existing mental health concerns.³⁵ While 7 of the 10 studies with prepandemic data showed significant reductions in wellbeing, one article reported no significant changes in mental wellbeing (SWEMWBS),⁴⁶ and another showed no differences in life satisfaction (Satisfaction with Life Scale [SWLS]), self-esteem, (Rosenberg self-esteem scale [RSES]) or optimism (LOT-R).⁴³ One study with prepandemic data did not report the direction of change in wellbeing over time.³⁰

Within the early pandemic period

Longitudinal comparisons in three studies within the first 10 months of the pandemic (March to December 2020) revealed mixed wellbeing trajectories. One study showed a significant improvement in general wellbeing (WHO-5) from March 2020 to May 2020.⁴² Conversely, during the September semester in 2020, one study showed constant satisfaction with life (SWLS),²⁸ whereas another showed a decrease in subjective wellbeing (SWB).²⁹ Of note, four studies within the early pandemic phase did not report testing changes in wellbeing scores.

Across the late pandemic period

With the evolution of the COVID-19 pandemic in 2021, mixed wellbeing trends were documented. Two repeated cross-sectional studies observed diverging trajectories. In Australia, mental wellbeing (SWEMWBS) was greater among the 2021 cohort than among the 2020 and 2019 cohorts;⁴⁵ however, in the UK, mental

Table 1
Table of included studies ($n = 19$).

Study	Design	COVID-19 period	Sample characteristics	Wellbeing-assessment tool	Wellbeing results	Change ^a	Key variables	Key findings
Dimmock et al., 2022 ³¹	Longitudinal T1: April 2020 T2: May 2020 T3: May 2020 T4: June 2020 T5: June 2020 T6: July 2020	Early pandemic	$n = 127$ 24.7 <i>M</i> age 74% Female 83% Australian nationality Attrition: >76%	SWEMWBS	Means not available	n/a	Social interaction	Increases in social interactions were associated with greater wellbeing.
Evans et al., 2021 ³³	Longitudinal T1: Oct 2019 T2: April-May 2020	Pre- and during-Covid	$n = 254$ 19.76 <i>M</i> age 86% Female 65% White Attrition: 16%	SWEMWBS	T1: $M = 23.04$; $SD = 4.96$ T2: $M = 21.12$; $SD = 4.87$ Repeated measure ANOVA $P < 0.001$	↓	Alcohol use, sleep, COVID-19 experience	Significant decrease in mental wellbeing. Significant reduction in alcohol use. No significant changes in sleep quality.
Bennett et al., 2022 ⁴⁶	Repeated cross sectional T1: May 2019 T2: June-July 2020 T3: April-June 2021	Pre- and during-Covid and late pandemic	T1: 82% under 25; 69% Female; 79% White; $n = 2637$ T2: 79% under 25; 65% Female; 66% White; $n = 3693$ T3: 82% under 25; 63% Female; 75% White; $n = 2772$ Response rate: 9–13%	SWEMWBS	SWEMWBS: ≤ 19.5 (low mental wellbeing) T1: 49% T2: 49% T3: 56% OR: 1.27 [95% CI: 1.14–1.43] 2021 compared to 2019	2019–2020 → 2020–2021 ↓	Demographic, history of mental health condition	The odds of students reporting lower levels of mental wellbeing significantly increased by 27% in 2021 compared to 2019. Key risk factors for low mental wellbeing included identifying as a minority ethnicity, gender or sexuality and having a previously diagnosed mental health difficulty in regression analyses.
Dingle et al., 2022 ⁴⁵	Repeated cross sectional T1: 2019 T2: 2020 T3: 2021	Pre- and during-Covid and late pandemic	T1: <i>M</i> age: 19.9; 69% Female; 50% Australian; $n = 475$ T2: <i>M</i> age: 19.5; 74% Female; 58% Australian; $n = 399$ T3: <i>M</i> age: 20.7; 76% Female; 54% Australian; $n = 365$ Response rate: n/a	SWEMWBS	Means not available	2019–2020 ↓ 2020–2021 ↑	Social support, university belonging	Mental wellbeing was greater among the 2021 cohort than among the 2020 and 2019 cohorts. Higher university belonging and social support were significantly correlated to greater mental wellbeing.
Owens et al., 2022 ³⁸	Longitudinal T1: Dec. 2020 T2: Jan. 2021	Late pandemic	$n = 254$ 21.12 <i>M</i> age 73% Female Attrition: 35%	SWEMWBS	Means not available Paired t -test $P = 0.45$	→	Demographic, sleep	No significant change in mental wellbeing. Significant decrease in sleep disturbance.
Savage et al., 2020 ⁴⁰	Longitudinal T1: Oct. 2019 T2: Jan. 2020 T3: March 2020 T4: April 2020	Pre- and during-Covid	$n = 214$ 65% aged under 22 years 72% Female 82% White Attrition: 86%	WEMWBS	Means not available ANCOVA $P < 0.001$	↓	Demographic, physical activity, sedentary behaviours, history of mental health condition	Significant decrease in mental wellbeing. No significant correlation between change in MVPA or change in sedentary behaviours, and change in mental wellbeing. History of diagnosed mental health condition was significantly associated with lower levels of mental wellbeing.
Savage et al., 2021 ⁴¹	Longitudinal T1: Oct. 2019 T2: Oct. 2020	Pre- and during-COVID	$n = 255$ 70% aged under 22 years	WEMWBS	T1: $M = 45.2$ T2: $M = 42.3$	↓	Demographic, physical activity, sedentary behaviours	Significant decrease in mental wellbeing. Significant reduction in

			76% Female 82% White Attrition: 73%		Linear mixed-model $P < 0.001$			physical activity and significant increase in sedentary behaviours. Changes in sedentary behaviour negatively affected changes in mental wellbeing in regression analyses.
Ang et al., 2022 ²⁸	Longitudinal T1: Sept. 2020 T2: Oct. 2020	Early pandemic	$n = 408$ 17.97 <i>M</i> age 71% Female 41% Asian American Attrition: 14%	SWLS	T1: $M = 22.33$, $SD = 6.97$ T1: $M = 22.18$, $SD = 7.03$ Direction of change not statistically assessed	n/a	Demographic, hope, gratitude, COVID-19 experience	Controlling for age, gender, ethnicity, and T1 life satisfaction, T1 hope, and gratitude were associated with T2 life satisfaction increases in regression analyses. COVID-19 experience correlated with lower life satisfaction.
Audet et al., 2021 ²⁹	Longitudinal T1: Sept. 2020 T2: Dec. 2020	Early pandemic	$n = 167$ 19.75 <i>M</i> age 88% Female 56% European decent Attrition: 52%	SWLS and Scale of affect, combined and standardized	T1: $M = 4.54$, $SD = 0.96$ ↓ T1: $M = 4.18$, $SD = 0.97$ Paired <i>t</i> -test $P < 0.001$		Personality	Significant decrease in wellbeing. Openness to experience significantly associated with increases in subjective wellbeing in regression analyses.
Bono et al., 2020 ³⁰	Longitudinal T1: Jan.-March 2020 T2: April-May 2020	Pre- and during-Covid	$n = 86$ 19.38 <i>M</i> age 81% Female 79% Latin Attrition: n/a	PANAS, combined and standardised (Subjective Wellbeing)	Means not available	n/a	Demographic, grit, gratitude, COVID-19 experience	Controlling for sex, life event stress, social desirability, parental education, and T1 subjective wellbeing, T1 grit and gratitude were associated with T2 subjective wellbeing increases in regression analyses. COVID-19 experience correlated with lower subjective wellbeing.
Smith et al., 2022 ⁴³	Repeated cross sectional T1: March 2019 T2: Jan.-Feb. 2020 T3: Oct.-Nov. 2020	Pre- and during-COVID	19.20 <i>M</i> age 80% Female T1: $n = 283$ T2: $n = 264$ T3: $n = 502$ Response rate: n/a	SWLS RSES LOT-R	T1: SWLS $M = 21.8$, $SD = 6.9$ T2: SWLS $M = 21.9$, $SD = 6.8$ T1: RSES $M = 22.0$, $SD = 5.9$ T2: RSES $M = 21.8$, $SD = 5.7$ T1: LOT-R $M = 12.3$ $SD = 4.6$ T2: LOT-R $M = 12.2$ $SD = 4.6$ ANOVA $P > 0.05$	→	Demographic	No significant changes in satisfaction with life, self-esteem, or optimism over time.
Hasratian et al., 2021 ³⁶	Longitudinal T1: Aug.-Dec. 2019 T2: April-May 2020	Pre- and during-COVID	$n = 58$ 19.67 <i>M</i> age 74% Female 72% Caucasian Attrition: 67%	PANAS	T1: $M = 27.44$; $SD = 8.51$ T2: $M = 24.35$; $SD = 8.87$ Paired <i>t</i> -test $P < 0.001$	↓	Alcohol use, COVID-19 experience	Significant decrease in PANAS Positive. Significant reduction in alcohol use.
Hamza et al., 2021 ³⁵	Longitudinal T1: May 2019 T2: May 2020	Pre- and during-Covid	$n = 733$ 18.52 <i>M</i> age 74% Female	Positive and Negative Affect Schedule - Expanded (PANAS - X)	T1: $M = 2.46$; $SD = 1.03$ ↓ T2: $M = 2.58$; $SD = 1.04$ Repeated measure		Demographic, history of mental health condition	Students with pre-existing mental health concerns showed decreasing sadness between 2019 and 2020, (continued on next page)

Table 1 (continued)

Study	Design	COVID-19 period	Sample characteristics	Wellbeing-assessment tool	Wellbeing results	Change ^a	Key variables	Key findings
Dubar et al., 2021 ³²	Longitudinal T1: May–June 2020 T2: Sept.–Oct. 2020	Early pandemic	31% East Asian Attrition: 24% <i>n</i> = 344 21.8 M age 64% Female 66% White Attrition: 44%	General Well-being Schedule (GWB)	ANOVA with mental health history <i>P</i> < 0.001 T1: <i>M</i> = 50.3; <i>SD</i> = 14.0 T2: <i>M</i> = 49.5; <i>SD</i> = 14.0 Direction of change not statistically assessed	n/a	Demographic, social media use, sleep, COVID-19 experience	whereas students without pre-existing mental health concerns showed increasing sadness between 2019 and 2020. Problematic use of social media and COVID-19 experience were significantly correlated with lower general wellbeing. Greater sleep duration was significantly correlated with greater general wellbeing. Significant decrease in wellbeing.
Hagemeier and Dowling-McClay, 2021 ³⁴	Longitudinal T1: Jan. 2020 T17: weekly	Pre- and during-COVID	<i>n</i> = 74 24 M age 65% Female 70% White Response rate: n/a	The Well-being 5	T1: <i>M</i> = 5.42; <i>SD</i> = 0.87 T17: <i>M</i> = 4.62; <i>SD</i> = 1.41 Paired <i>t</i> -test <i>P</i> < 0.001	↓	Demographic	Significant decrease in wellbeing.
Levine et al., 2021 ³⁷	Longitudinal T1: April 2020 T2: May 2020	Early pandemic	<i>n</i> = 235 20.82 M age 83% Female 46% European descent Attrition: n/a	Scale of affect	T1: <i>M</i> = 3.50; <i>SD</i> = 1.08 T2: <i>M</i> = 3.95; <i>SD</i> = 1.28 Direction of change not statistically assessed	n/a	Demographic	Changes in scale of affect not assessed
Liu et al., 2021 ⁴⁴	Repeated cross sectional T1: May 2020 T2: July 2020 T3: Aug. 2020 T4: Oct. 2020 T5: Dec. 2020	Early pandemic	22 M age 71% Female 41% White/European T1: <i>n</i> = 1689 T2: <i>n</i> = 940 T3: <i>n</i> = 595 T4: <i>n</i> = 407 T5: <i>n</i> = 342 Response rate: 5%	World Health Organization Well-Being Index (WHO-5)	Means not available	n/a	Demographic, resilience, emotional support, COVID-19 experience	Physical status, emotional support and resilience were positively associated to greater general wellbeing in regression analyses. COVID-19 experience associated with lower wellbeing in regression analyses. Significant increase in wellbeing.
Slykerman et al., 2022 ⁴²	Longitudinal T1: March 2020 T2: May 2020	Early pandemic	<i>n</i> = 391 Attrition: 19%	World Health Organization Well-Being Index (WHO-5)	T1: <i>M</i> = 12.89; <i>SD</i> = 4.30 T2: <i>M</i> = 13.36; <i>SD</i> = 4.54 Paired <i>t</i> -test <i>P</i> = 0.03	↑	Demographic	Significant increase in wellbeing.
Pasupathi et al., 2022 ³⁹	Longitudinal T1: April–May 2020 T2: Aug. 2020 T3: Oct. 2020 T4: April–May 2021	Late pandemic	<i>n</i> = 243 18.75 M age 71% Cisgender women 66% Caucasian/White Attrition: 62%	Ryff PWB	T1: <i>M</i> = 4.16; <i>SD</i> = 0.68 T2: <i>M</i> = 4.19; <i>SD</i> = 0.71 T3: <i>M</i> = 4.09; <i>SD</i> = 0.72 T4: <i>M</i> = 4.05; <i>SD</i> = 0.71 Significance level not reported; no within-person effect	→	Alcohol use, COVID-19 experience	There were between-person, but not within-person, effects for psychological wellbeing. Alcohol use and COVID-19 experiences correlated to lower psychological wellbeing.

Abbreviations: n/a, not available; *M*, mean; *SD*, standard deviation; S/WEMWBS, Short/Warwick–Edinburgh Mental Wellbeing Scale; ANOVA, analysis of variance; OR, odds ratio; MVPA, moderate-to-vigorous physical activity; SWLS, Satisfaction with Life Scale; PANAS, Positive and Negative Affect Schedule; RSES, Rosenberg self-esteem scale; LOTR, Life Orientation Test-Revised; PWB, psychological wellbeing.

^a An upward arrow indicates an improvement in wellbeing, a downward arrow indicates an impairment in wellbeing and a horizontal arrow indicates no changes in wellbeing.

wellbeing (SWEMWBS) was significantly lower among the 2021 cohort than among the 2020 and 2019 cohorts.⁴⁶ It should be noted that these trends may relate to the epidemiology and counter-measures of each country. In two other longitudinal studies in the UK and the US, no significant changes in mental wellbeing (SWEMWBS) from December 2020 to January 2021³⁸ and no changes in psychological wellbeing (PWB) from May 2020 to May 2021 were observed.³⁹

Findings on wellbeing and sociodemographic factors

Eight studies presented data on the relationship between sociodemographic factors and wellbeing outcomes. Generally, males reported greater overall wellbeing (GWB)³² and mental wellbeing (S/WEMWBS) than females.^{38,40,46} Mixed findings were observed for ethnicity, with some studies reporting no significant association with overall wellbeing (GWB)³² and others finding an association between low wellbeing and individuals identifying as a minority ethnicity⁴⁶ or as White/European.⁴⁴ Interestingly, in regression analyses of change in mental wellbeing (WEMWBS) and life satisfaction (SWLS), neither gender nor ethnicity was a significant predictor.^{28,41} Individuals who reported a heterosexual sexual orientation reported general wellbeing (GWB)³² and mental wellbeing (SWEMWBS).⁴⁶ Given the narrow age range of participants in the studies, only three articles tested age in regression analyses, all reporting no link with mental wellbeing (SWEMWBS)^{38,46} and life satisfaction (SWLS).²⁸ Lastly, and importantly, a lower socioeconomic background was associated with lower SWB³⁰ and lower mental wellbeing (SWEMWBS).⁴⁶ Only one study explored living arrangements and found no wellbeing differences between those living alone vs. in shared spaces.³²

Findings on wellbeing and psychological resources

Four studies looked at the role of individual psychological factors. Controlling for baseline, hope, and gratitude were associated with increases in life satisfaction (SWLS),²⁸ and similarly grit and gratitude predicted increases in SWB.³⁰ In addition, taking into account baseline outcome measures, 'Openness to experiences' was also significantly associated with increases in SWB.²⁹ Lastly, Brief Resilience Scale (BRS) was associated with greater psychological wellbeing (WHO-5) during the COVID-19 pandemic.⁴⁴

Three studies with pre- and during-COVID-19 data explored the relationship between history of mental health diagnosis and wellbeing. In regression analyses, having a history of diagnosed mental health difficulty was significantly associated with lower levels of mental wellbeing (S/WEMWBS).^{40,46} Importantly, these students nevertheless reported an improvement in wellbeing outcomes throughout the duration of the pandemic.^{35,46}

Findings on wellbeing and modifiable lifestyle behaviours

Seven studies investigated the relationship between modifiable lifestyle behaviours and wellbeing.

Among these, three studies examined the role of physical health and activity. One study observed significant decreases in moderate-to-vigorous physical activity (MVPA) and significant increases in sedentary behaviours during the pandemic compared to prepandemic times.⁴⁰ Analyses of association revealed mixed findings: in one study, no significant correlations were identified between changes in activity (MVPA) and changes in mental wellbeing (WEMWBS).⁴⁰ In contrast, in a similar subset of students, changes in sedentary behaviour negatively predicted changes in mental wellbeing (WEMWBS).⁴¹ Also, a higher physical health level was

positively associated with psychological wellbeing (WHO-5) in regression analyses.⁴⁴

Three studies investigated alcohol and substance use. Two studies found significant reductions in alcohol or substance use at the start of the pandemic (April to May 2020) in university students compared to before the pandemic (end of 2019).^{33,36} One study found alcohol use to be negatively correlated with PWB.³⁹

Three studies looked at sleep. No significant changes in sleep quality were found in students in pre- versus during-COVID-19 periods.³³ One study reported sleep disturbances diminished from December 2020 to January 2021, but this may have been confounded by the university holiday break.³⁸ Greater sleep duration was significantly correlated with greater general wellbeing (GWB) during the pandemic.³²

Social connectedness was investigated in terms of university belonging, social support, emotional support, and social interactions. In all studies, increases in social connectedness resulted in greater wellbeing outcomes.^{31,44,45} For instance, greater university belonging and social support were significantly correlated with higher mental wellbeing (SWEMWBS).⁴⁵ Furthermore, greater emotional support was positively associated with psychological wellbeing (WHO-5), while social isolation had the largest negative effect in regression analyses.⁴⁴ One study examined social media activity; problematic use was significantly correlated with lower general wellbeing (GWB) during the pandemic.³²

Findings on wellbeing and COVID-19 experiences

While all studies took place during the pandemic, only seven investigated the role of COVID-19-related experiences and stressors beyond the broad COVID-19 context. Findings revealed that negative COVID-19 experiences, such as having to self-isolate or quarantine, being infected with COVID-19 and losing a job due to COVID-19, were significantly correlated with lower wellbeing outcomes, including life satisfaction (SWLS),²⁸ SWB,³⁰ PWB,³⁹ and general wellbeing (GWB/WHO-5).^{32,44} One study in the US described a reduction in COVID-19-related stressors from May 2020 to May 2021.³⁹ Of note, three studies investigated COVID-19-related fear and worry. Fear of COVID-19 (FCV-19S) was greater among females.³⁶ In two studies, students reported being more worried about family members being infected with COVID-19 than themselves;^{33,44} however, correlations with wellbeing were not reported.

Discussion

In total, 19 studies were included in the current review to investigate wellbeing in a longitudinal manner during the COVID-19 pandemic in university students.

In the early phase of the COVID-19 pandemic, at a time when restrictions were high and included lockdowns with stay-at-home orders, results revealed a significant reduction in wellbeing compared to before the pandemic.^{33–36,40,41,45} In later stages of the COVID-19 pandemic, results did not show consistent worsening of wellbeing, with some studies reporting either improvements,⁴⁵ no changes,^{38,39} or impairments.^{29,46} Importantly, the COVID-19 context varied greatly during later phases of the pandemic. In one study, no changes in wellbeing were reported during a period of lockdown;³⁸ however, others reported improvements and impairments when restrictions were lifted.^{29,45,46} Beyond differences in the COVID-19 context, these different trajectories reflect the variety of student experiences during the pandemic. The results also suggest that as the pandemic progressed, some students adapted and coped better than expected.

Social and environmental factors might have also played a role in the wellbeing trajectories of university students during the COVID-19 pandemic. Results about associated protective factors have provided information on how to support students in their adaptation to such a major crisis. Protective psychological factors included gratitude, hope, grit, resilience, and openness.^{28–30,44} Protective modifiable lifestyle behaviours included physical activity, sleep quality,³² and social connectedness.^{31,44,45} All identified protective factors were consistent with nonpandemic findings among university students,⁴⁷ therefore suggesting that they should be part of a continuous programme of support. Moreover, findings from sociodemographic associations with wellbeing may be considered when identifying at-risk groups who may need additional support. Importantly, being a female, identifying as non-heterosexual, having a lower socioeconomic background, and having a history of mental health diagnosis were associated with lower wellbeing. As wellbeing can serve as an efficient marker for prevention of future mental health disorders, monitoring wellbeing-related indicators are crucial. Given the duty of care of universities towards their students, results should inform the implementation of wellbeing-promotion strategies.

The current review highlights the need for a more coordinated approach to research commissioning, with longitudinal studies over a longer duration using representative sampling frames to assess a wider variety of wellbeing correlates across multiple universities. Importantly, none of the included studies reported investigating environmental settings. Investigating the role of campus and neighbourhood characteristics, such as outdoor natural spaces for student wellbeing in time of social isolation, may provide important findings. While some behaviours, such as physical activity, were examined, no studies analysed environmental correlates. Furthermore, while many articles discussed COVID-19 government countermeasures, none controlled for it in a standardised manner; for instance, by referring to the ‘Stringency Index’ developed by the Oxford COVID-19 Government Response Tracker, which rates the strictness of country-level policy responses around the world.⁴⁸ Research using other designs, such as interview or focus-group studies, would produce complementary findings, adding context to the interpretation of quantitative surveys, particularly in understanding experiences of intersectionality. Use of standardised wellbeing terminology and validated scales is recommended, and the continued need for strategic longitudinal collection of wellbeing data is essential.⁴⁹

Strengths and limitations

This review focused on wellbeing trajectories of university students, a population known to be at greater risk for psychological difficulties than their nonstudent counterparts, making them an important population to monitor. Identification of vulnerable subgroups and wellbeing correlates is crucial to the successful implementation of wellbeing-promotion strategies. In terms of design, the current search strategy included several keywords and was conducted across five databases. A variety of wellbeing outcomes using validated instruments were included in recognition of the fact that wellbeing is a multidimensional construct and that methodologically robust studies are important for comparisons. Selecting only longitudinal studies enabled the much-needed documentation of wellbeing changes and trajectories. Lastly, focussing on select countries allowed for context-specific comparability.

Studies included in this review presented data from convenient samples of self-selecting participants without representative sampling frames. Samples were primarily composed of female participants (63–88%). All studies were correlational in nature, and data were self-reported. Most studies had only two waves of data

collection and longer longitudinal assessments are important for further studies. Studies were primarily undertaken within a single university. The risk-of-bias assessment (Appendix Table A3) highlighted recurrent methodological shortcomings across studies, including lack of power analyses and high attrition. Given the variety of data collection timepoints, of wellbeing outcomes and of reported statistics, it remained difficult to synthesise results.

Conclusions

This systematic review of longitudinal studies among university students during the COVID-19 pandemic confirmed a significant decrease in wellbeing during the early stages of the pandemic. In later stages of the COVID-19 pandemic, findings revealed varying patterns of wellbeing that warrant further investigation. Results provided evidence for the role of protective factors, such as social connectedness. Future studies should include longitudinal studies over a longer duration and provide closer examination of modifiable social and behavioural factors and environmental settings.

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Competing interests

None.

Author contributions

All authors participated in the study conceptualisation and design. AL performed the literature search, screening of articles, and data extraction. JM verified a sample of the screened articles and data extraction. AL wrote the first draft. All authors have agreed to the published version of the manuscript.

Appendix A. Supplementary data

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