RESEARCH ARTICLE

International Journal of
PHYSICAL EDUCATION, FITNESS AND SPORTS

DOI: 10.54392/ijpefs2634

Screen Time, Sedentary Behavior, Body Mass Index, Sleep Quality, and Psychological Well-Being among University Students: a Cross-Sectional Study

Bhairu Singh Yadav [a, *]

[a] Department of Yoga, University of Engineering & Management, Jaipur, Rajasthan, India
* Corresponding Author E-mail: itsmebs15@gmail.com
DOI: https://doi.org/10.54392/ijpefs2634
Received: 12-06-2026; Revised: 24-08-2026; Accepted: 02-09-2026; Published: 07-09-2026

Abstract: Background: Screen use, sedentary behavior, body mass index (BMI), and sleep are plausible correlates of psychological well-being in university students, but their independent associations and possible gender differences remain inconsistent across studies. Methods: This cross-sectional survey included 49 university students recruited by convenience sampling at a single institution (36 men, 13 women; mean age 20.23 ± 2.06 years). Screen time and daily sitting time were self-reported in ordered categories and coded using category midpoints. BMI was calculated from self-reported height and weight. Psychological well-being was assessed using the WHO-5 Well-Being Index. A study-specific sleep-quality composite was derived from sleep duration, sleep latency, and sleep disturbance items. Associations were examined using Pearson and Spearman correlations, Welch independent-samples t-tests, one-way ANOVA, and multiple linear regression. Results: Screen time ($r = -0.092$, $p = 0.531$), sitting time ($r = -0.018$, $p = 0.902$), and BMI ($r = -0.031$, $p = 0.836$) were not significantly associated with WHO-5 well-being. The study-specific sleep-quality composite showed a positive bivariate association with well-being ($r = 0.346$, $p = 0.015$), although its internal consistency was poor (Cronbach's $\alpha = 0.24$). No statistically significant gender differences were detected for screen time, sitting time, BMI, sleep quality, or well-being (all $p > 0.29$). The screen time × gender interaction was not significant ($B = -3.58$, $SE = 6.56$, 95% CI [−16.80, 9.64], $p = 0.588$). The multivariable model was not significant overall ($R^2 = 0.136$, $p = 0.275$); sleep quality was the only individual coefficient reaching $p < 0.05$ ($B = 0.693$, $p = 0.032$). An exploratory uncorrected inverse association between screen time and BMI was observed ($r = -0.320$, $p = 0.027$). Conclusion: In this small, gender-imbalanced sample, there was no statistically significant evidence that screen time, sedentary sitting time, or BMI were associated with psychological well-being. Findings concerning sleep quality and the exploratory screen time–BMI association require cautious interpretation because of measurement limitations, multiple testing, and limited statistical power.

Keywords: Screen Time, Sedentary Behavior, Body Mass Index, Sleep Quality, Psychological Well-Being, University Students.

1. Introduction

Psychological distress is common among university students and is an important concern for higher-education health and wellness services. Multinational evidence from the WHO World Mental Health International College Student Project has documented a substantial burden of common mental disorders in this population (Auerbach *et al.,* 2018). Although physical activity is among the most consistently studied behavioral correlates of mental health (Schuch *et al.,* 2018), students also spend considerable time using screens and sitting, while sleep and body composition may also be related to psychological well-being. Evidence on screen time is mixed. Large-sample studies have reported associations between high screen exposure and depression that vary by gender and type of screen activity. Kleidermacher and Olfson (2023), for example, reported that longer screen time was associated with depression among women but not men, whereas Twenge and Farley (2021) found that associations differed by both screen activity and gender. Among Chinese college students, Huang *et al.* (2022) found that screen-based sedentary behavior, but not total sedentary time, was associated with anxiety. More recently, a 2026 systematic review and meta-analysis of 72 studies involving 71,633 university students found that greater screen exposure was associated with higher risks of depression, anxiety, stress, poorer sleep quality, insufficient physical activity, and poorer academic performance, while no significant association was observed with BMI (Zeng *et al.,* 2026). Together, these findings suggest that associations with screen exposure depend on the outcome examined, the way exposure is defined, and the population studied.

Sedentary behavior and BMI are also relevant to student health. The World Health Organization recommends reducing sedentary time because of its relationship with adverse health outcomes (Bull *et al.,* 2020). Evidence in university populations is mixed rather than uniformly adverse. Nowak *et al*. (2019) reported that associations between sedentary behavior and quality-of-life domains varied by weekday versus weekend behavior and were not consistently related to life satisfaction, whereas Bukova *et al.* (2025) found that sedentary-time associations with subjective well-being were generally weak and mostly non-significant after correction for multiple testing. Higher BMI has been associated with greater odds of anxiety and/or depression and lower sleep restfulness in a large U.S. college sample (Barr-Porter *et al.,* 2025), although findings are not uniform and may depend on population, outcome definition, and analytic approach.

Sleep was included because previous studies have consistently linked sleep-related measures with mental health and well-being in university students. Sleep duration, sleep latency, and sleep disturbance are components of validated instruments such as the Pittsburgh Sleep Quality Index (Buysse *et al.,* 1989), and recent research in university students continues to report associations between poorer sleep quality and anxiety or depressive symptoms (Ramirez-Velez *et al.,* 2026). Psychological well-being was assessed using the WHO-5 Well-Being Index, a brief measure with strong evidence of validity across populations (Topp *et al.,* 2015).

Despite this evidence, relatively few studies have examined screen time, general sitting time, BMI, sleep quality, and gender within the same university sample. This question is practically relevant because screen time, sitting time, and BMI can be collected quickly in student wellness settings with limited resources. Examining these variables together may clarify whether they show detectable associations with well-being and whether the screen time–well-being relationship differs by gender. Accordingly, this study examined: (1) the associations of screen time, sedentary sitting time, and BMI with psychological well-being; (2) the joint associations of screen time, sitting time, BMI, sleep quality, and gender with well-being; (3) mean gender differences across the study variables; and (4) the exploratory moderating effect of gender on the association between screen time and well-being. Because the sample was small and gender-imbalanced, gender comparisons and interaction testing were treated as exploratory rather than adequately powered confirmatory analyses.

2. Materials and Methods

2.1 Study Design and Dataset Scope

A cross-sectional, correlational survey design was used to examine associations among screen time, sedentary sitting time, BMI, sleep quality, gender, and psychological well-being at a single point in time. This analysis focuses on screen time, sedentary behavior, BMI, and gender. The same 49-participant questionnaire dataset has also been used in a companion analysis focused primarily on physical activity and sleep quality. The two analyses address different predictors and research questions; the shared dataset should therefore be disclosed transparently to the journal to distinguish the present study from the companion analysis.

2.2 Participants and Sampling

University students were recruited through a self-administered Google Forms questionnaire using convenience sampling. Fifty responses were received; one respondent who did not provide consent was excluded. The final sample comprised 49 students (36 men, 13 women; mean age = 20.23 years, SD = 2.06).

2.3 Measures

2.3.1 Screen Time and Sedentary Sitting Time

Average daily screen time was assessed using four response categories: <2 h, 2–4 h, 4–6 h, and >6 h. Daily sitting time, excluding sleep, was assessed using four categories: <3 h, 3–5 h, 6–8 h, and >8 h. For Pearson correlation and regression analyses, categories were assigned numeric values approximating category midpoints.

Table 1. Coding of screen-time and sitting-time response categories.

Measure	Response category	Assigned value	Coding rationale
Screen time	<2 h	1	Approximate midpoint of assumed 0–2 h range
	2–4 h	3	Midpoint of stated range
	4–6 h	5	Midpoint of stated range
	>6 h	7	Approximation of an open-ended upper category
Sitting time	<3 h	2	Approximate midpoint of assumed 0–3 h range
	3–5 h	4	Midpoint of stated range
	6–8 h	7	Midpoint of stated range
	>8 h	9	Approximation of an open-ended upper category

Because the lowest and highest categories were open-ended, the values assigned to those categories were assumptions rather than directly observed durations. Spearman rank-order correlations were therefore used as a sensitivity analysis. The complete coding scheme is presented in Table 1.

2.3.2 Body Mass Index

BMI was calculated from self-reported body weight (kg) and height (m) as kg/m². Standard BMI categories were used to classify participants as underweight, normal weight, overweight, or obese. One invalid height entry resulted in one missing BMI value.

2.3.3 Sleep-Quality Composite

A study-specific sleep-quality composite was derived from three questionnaire items: sleep duration, sleep-onset latency, and sleep disturbance. Sleep duration was rescaled to 0–100 (≥7 h = 100; ≥6 h = 75; ≥5 h = 50; <5 h = 25). Sleep latency was rescaled to 0–100 (≤15 min = 100; ≤30 min = 75; ≤60 min = 50; >60 min = 25). Sleep disturbance was recorded on a 0–3 response scale and reverse-rescaled so that higher values represented better sleep (0 = 100, 1 = 75, 2 = 50, 3 = 25). For the 43 participants with complete data, the composite was calculated as the unweighted mean of the three rescaled scores. Six participants had one missing component (two missing sleep-duration values and four missing latency values); for these participants, the composite was calculated from the two available component scores. This approach retained all 49 participants in analyses involving the sleep composite and is consistent with the reported analytic sample sizes. It should be regarded as a pragmatic missing-data procedure rather than a validated scoring method. The composite was developed for this study and is not equivalent to the Pittsburgh Sleep Quality Index. Internal consistency among complete cases was poor (Cronbach's $\alpha = 0.24$; $n = 43$), and correlations among the three components were weak or inconsistent.

2.3.4 Psychological Well-Being

Psychological well-being was assessed using the WHO-5 Well-Being Index. In this sample, the WHO-5 showed excellent internal consistency (Cronbach's $\alpha = 0.952$). Scores were expressed as percentages, with higher scores indicating better psychological well-being.

2.4 Data Collection and Data Preparation

Data were collected using a single anonymous online questionnaire that began with an informed-consent item. Only consenting respondents were retained. Free-text and inconsistently formatted fields, including height, weight, and categorical time ranges, were parsed and recoded into numeric or ordered-categorical form. Category midpoints were used for range-based screen-time and sitting-time variables.

2.5 Ethical Considerations

No formal Institutional Ethics Committee or Institutional Review Board approval was obtained for the original data collection. The survey was anonymous and voluntary, involved no deception, collected no directly identifying information, and included informed consent. Because no prospective ethics review was obtained, no formal exemption should be claimed unless it is subsequently documented by an authorized ethics committee.

Participation was voluntary, respondents could discontinue participation without penalty, and data were analyzed in de-identified form. The questionnaire did not collect names, student identification numbers, or other directly identifying information.

2.6 Statistical Analysis

Analyses were performed in Python using pandas, SciPy, and NumPy. Descriptive statistics were calculated overall and by gender. Pearson correlations were used to assess bivariate associations, with 95% confidence intervals calculated using Fisher's z transformation. Spearman correlations were used as sensitivity analyses for midpoint-coded screen time and sitting time. Gender comparisons were examined using Welch independent-samples t-tests. One-way ANOVA was used to compare well-being across BMI categories, with η^2 and ω^2 reported as effect-size estimates. For the study-specific sleep composite, six participants with one missing component were retained by averaging their two available rescaled scores. Other bivariate analyses used the available observations for each variable. The multivariable regression used listwise deletion for the single missing BMI value, yielding n = 48. This missing-data procedure matches the sample sizes reported in the original statistical results but remains a pragmatic approach and is acknowledged as a limitation.

Gender moderation of the screen time–well-being association was tested using a regression model containing mean-centered screen time, a gender indicator (1 = male), and their interaction term. A separate ordinary least-squares regression examined the joint associations of screen time, sitting time, BMI, sleep quality, and gender with WHO-5 well-being. Model diagnostics included variance inflation factors, the Shapiro–Wilk test for residual normality, the Breusch–Pagan test for heteroscedasticity, and Cook's distance. Statistical significance was set at two-tailed $p < 0.05$. Because several bivariate and exploratory analyses were conducted without adjustment for multiple testing, isolated p values below 0.05 were interpreted cautiously.

3. Results

3.1 Participant Characteristics and Gender Comparisons

No statistically significant gender differences were detected for screen time, sitting time, BMI, the study-specific sleep-quality composite, or WHO-5 well-being (all $p > 0.29$). Given the small female subgroup (n = 13), these results should not be interpreted as evidence of equivalence between genders. Gender-specific descriptive statistics and Welch test results are presented in Table 2, and mean WHO-5 well-being scores by gender are shown in Figure 1.

3.2 Bivariate Associations

Screen time, sitting time, and BMI were not significantly correlated with WHO-5 well-being. The study-specific sleep-quality composite showed a positive association with well-being ($r = 0.346$, 95% CI [0.071, 0.571], $p = 0.015$), although this result should be interpreted cautiously because the composite had poor internal consistency. The full set of bivariate associations is summarized in Table 3. An exploratory inverse association was observed between screen time and BMI ($r = -0.320$, $p = 0.027$), as shown in Figure 2. A Spearman sensitivity analysis produced a similar but slightly weaker association ($\rho = -0.290$, $p = 0.046$). Because this finding emerged among multiple unadjusted tests, it is considered hypothesis-generating rather than confirmatory

Table 2. Participant characteristics by gender using Welch independent-samples t-tests. BMI n = 35 men and 12 women because of one invalid height entry.

Variable	Male, M (SD)	Female, M (SD)	t	df	p
Screen time (h/day)	3.83 (2.05)	3.31 (1.38)	1.026	31.87	0.313
Sitting time (h/day)	5.81 (2.32)	5.23 (2.20)	0.795	22.26	0.435
BMI (kg/m²)	22.71 (4.63)	21.37 (3.49)	1.056	24.95	0.301
Sleep-quality index	81.13 (13.78)	75.64 (16.57)	1.069	18.36	0.299
WHO-5 well-being (%)	51.44 (30.51)	43.69 (23.01)	0.950	28.19	0.350

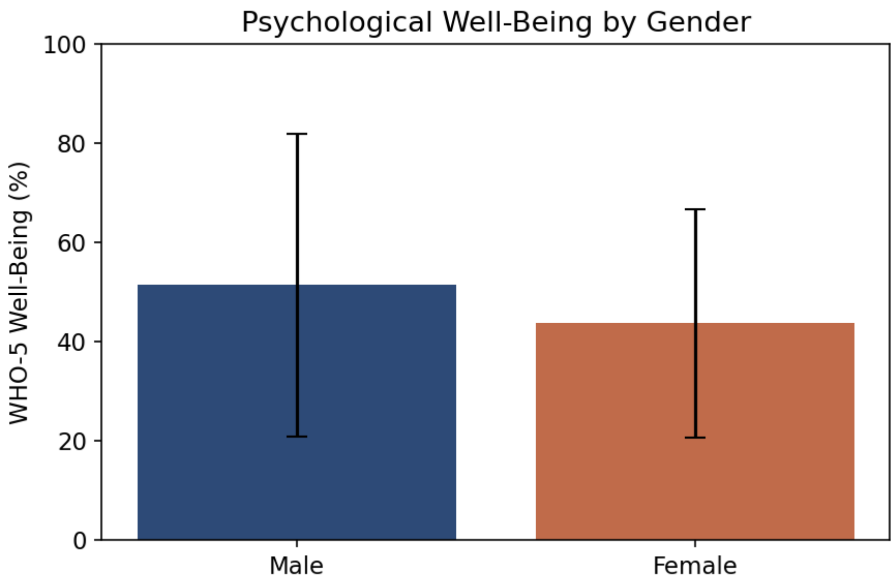

Figure 1. Mean WHO-5 well-being score by gender with SD error bars. The difference was not statistically significant (p = 0.350).

Table 3. Bivariate Pearson correlations. P values are two-tailed and unadjusted for multiple comparisons

Association	n	r	95% CI	p
Screen time – WHO-5	49	−0.092	[−0.363, 0.195]	0.531
Sitting time – WHO-5	49	−0.018	[−0.298, 0.265]	0.902
BMI – WHO-5	48	−0.031	[−0.312, 0.256]	0.836
Sleep-quality index – WHO-5	49	0.346	[0.071, 0.571]	0.015
Screen time – BMI (exploratory)	48	−0.320	[−0.554, −0.040]	0.027
Screen time – Sitting time	49	0.153	[−0.134, 0.417]	0.293
Screen time – Sleep-quality index	49	0.087	[−0.199, 0.360]	0.551
Sitting time – Sleep-quality index	49	0.170	[−0.117, 0.431]	0.243
Sitting time – BMI	48	−0.018	[−0.300, 0.268]	0.904

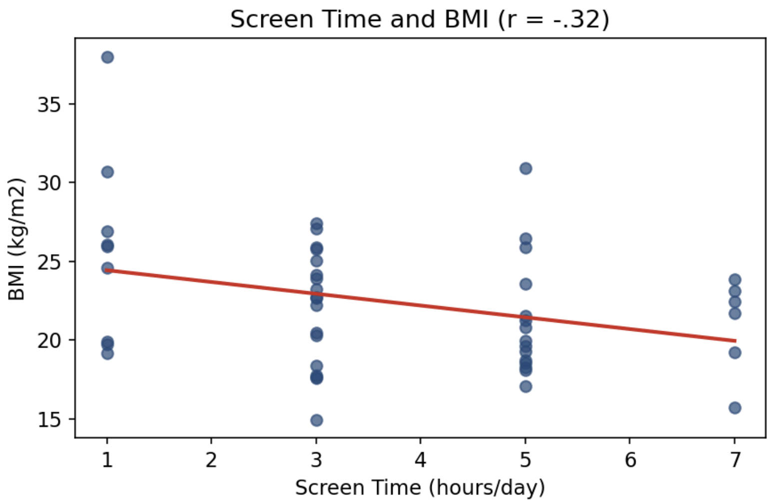

Figure 2. Exploratory relationship between midpoint-coded screen time and BMI (r = −0.320; uncorrected for multiple comparisons).

3.3 Exploratory Gender Moderation

A formal interaction model was used to test whether gender moderated the association between screen time and WHO-5 well-being. The screen time × gender interaction was not statistically significant ($B = −3.577$, $SE = 6.564$, 95% CI [−16.798, 9.643], $p = 0.588$). The complete interaction model is reported in Table 4. With only 13 women, the analysis had limited power to detect an interaction; therefore, the non-significant result should not be taken as evidence that gender moderation is absent.

3.4 Well-Being across BMI Categories

WHO-5 well-being did not differ significantly across BMI categories, $F(3, 44) = 0.497$, $p = 0.686$, $\eta^2 = 0.033$, $\omega^2 = −0.033$. Descriptive statistics by BMI category are presented in Table 5, and the corresponding mean WHO-5 scores are shown in Figure 3. The obese subgroup included only three participants, so its descriptive estimate is unstable.

3.5 Multivariable Regression and Diagnostics

The multivariable model including screen time, sitting time, BMI, the study-specific sleep-quality composite, and gender was not statistically significant overall, $F(5, 42) = 1.319$, $p = 0.275$, $R^2 = 0.136$, adjusted $R^2 = 0.033$. Screen time, sitting time, BMI, and gender did not show statistically significant coefficients. The complete regression results are presented in Table 6.

Table 4. Exploratory regression test of gender moderation of the screen time–well-being association ($R^2 = 0.032$; $n = 49$)

Predictor	B	SE	95% CI	t	p
Constant	44.256	8.420	[27.296, 61.216]	5.256	<0.001
Screen time (centered)	1.459	6.108	[−10.842, 13.761]	0.239	0.812
Gender (1 = male)	7.484	9.727	[−12.107, 27.075]	0.769	0.446
Screen time × gender	−3.577	6.564	[−16.798, 9.643]	−0.545	0.588

Table 5. WHO-5 well-being by BMI category.

BMI category	n	Mean WHO-5	SD
Underweight	9	60.00	39.34
Normal	26	46.46	23.13
Overweight	10	48.80	31.71
Obese	3	53.33	37.17

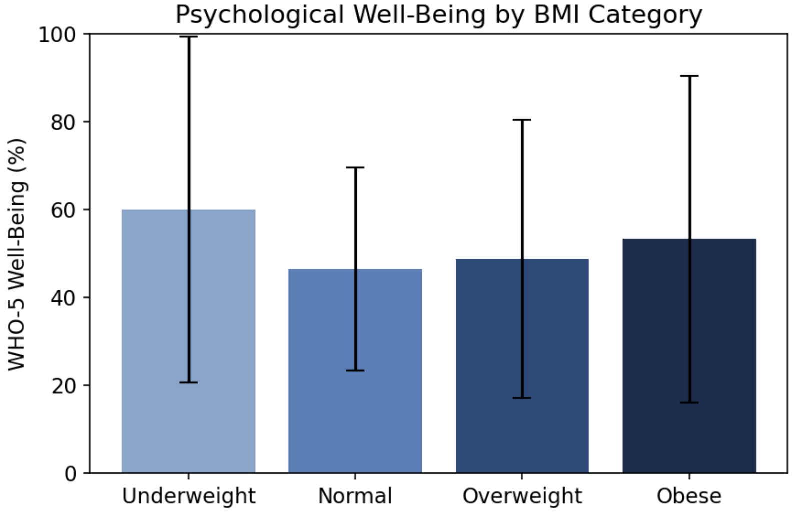

Figure 3. Mean WHO-5 well-being score by BMI category with SD error bars. The obese category (n = 3) should be interpreted with particular caution.

Table 6. Multiple linear regression predicting WHO-5 well-being (n = 48). Model R^2 = 0.136; adjusted R^2 = 0.033; F(5, 42) = 1.319; p = 0.275.

Predictor	B	SE	t	p
Constant	13.873	37.574	0.369	0.714
Screen time (h/day)	−2.228	2.364	−0.943	0.351
Sitting time (h/day)	−0.846	1.841	−0.459	0.648
BMI	−0.508	1.011	−0.503	0.618
Sleep-quality index	0.693	0.313	2.217	0.032
Gender (1 = male)	6.331	9.646	0.656	0.515

Table 7. Regression diagnostics

Diagnostic	Statistic	Interpretation
Multicollinearity	VIF 1.03–1.15	No evidence of problematic multicollinearity
Residual normality	Shapiro–Wilk W = 0.968, p = 0.204	No statistically significant departure from normality
Homoscedasticity	Breusch–Pagan LM = 8.35, df = 5, p = 0.138	No statistically significant evidence of heteroscedasticity
Influence	Cook's D 0.0001–0.120; 2/48 > 4/n	Maximum Cook's D remained well below 1

The sleep-quality coefficient reached $p < 0.05$ (B = 0.693, p = 0.032), but it should not be interpreted as a confirmed independent association because the overall model was not significant and the sleep composite had poor internal consistency. Regression diagnostics are summarized in Table 7.

4. Discussion

4.1 Principal Findings

Screen time, general sitting time, and BMI did not show statistically significant associations with WHO-5 psychological well-being in this small university sample. The multivariable model was also not significant overall, and neither the mean gender comparisons nor the screen time × gender interaction reached statistical significance. These findings indicate that the study did not detect the proposed associations; they do not establish that such associations are absent in the wider university population. The study-specific sleep-quality composite was positively correlated with well-being and was the only individual coefficient that reached $p < 0.05$ in the joint regression. However, interpretation is limited by two points: the overall multivariable model was not significant, and the composite showed very low internal consistency (α = 0.24). The result therefore applies to the study-specific composite and should not be taken as evidence of a robust independent association between validated sleep quality and well-being.

4.2 Comparison with Previous Research

The absence of a screen time–well-being association differs from some large-sample studies that reported gender-dependent relationships between screen exposure and depression (Kleidermacher & Olfson, 2023; Twenge & Farley, 2021). It also differs from recent meta-analytic evidence. Zeng *et al.* (2026), synthesizing 72 studies involving 71,633 university students, found that greater screen exposure was associated with higher risks of depression, anxiety, stress, and poorer sleep quality. However, that meta-analysis found no significant association between screen time and BMI, indicating that screen exposure is not related to all health outcomes in the same way. The present study did not distinguish academic, social, entertainment, or passive screen use. This limited exposure detail may have reduced the ability to detect behavior-specific associations with WHO-5 well-being.

The null result for general sitting time is consistent with a mixed literature. Nowak *et al.* (2019) reported different associations for weekday and weekend sedentary behavior across quality-of-life domains and no significant relationship with overall life satisfaction. Bukova *et al.* (2025), in 1,314 first-year Slovak university students, found that associations between sedentary time and subjective well-being were weak and mostly non-significant after false-discovery-rate correction. These findings suggest that total sedentary time alone may have limited explanatory value unless its context, timing, and relationship with physical activity are considered. The null BMI–well-being result differs from Barr-Porter *et al.* (2025), who found that higher BMI was associated with greater odds of anxiety and/or depression in 536 U.S. college students. However, their sample and outcome measures differed substantially from those used in the present study.

The exploratory inverse association between screen time and BMI was opposite to the direction often assumed in behavioral-health research and should not be interpreted causally. Zeng et al. (2026) found no significant overall association between screen time and BMI among university students, which further supports a cautious interpretation of the present isolated correlation. The association was unadjusted for multiple comparisons and became slightly weaker in the Spearman analysis. Chance, error introduced by midpoint coding, and uncontrolled confounding are plausible explanations.

4.3 Practical Implications

The present findings do not support the use of brief self-reported screen time, sitting time, or BMI as stand-alone indicators of psychological well-being in a small university sample. Student wellness screening may benefit from validated measures that distinguish the context and purpose of screen use and sedentary behavior. Sleep also warrants further study, but practical recommendations should be based on validated sleep instruments rather than the study-specific composite used here.

4.4 Strengths and Limitations

The study has several methodological strengths. Multiple lifestyle and physical correlates were examined within the same analytic framework, and the analyses reported effect estimates, confidence intervals, an interaction test, sensitivity analyses, and regression diagnostics. The cross-sectional findings were also interpreted without making causal claims. Several limitations should be considered. The sample was small (N = 49), drawn by convenience sampling from one institution, and gender-imbalanced, limiting statistical power and generalizability. Screen time and sitting time were measured using broad self-reported categories, and numeric values for the open-ended categories had to be approximated. BMI was based on self-reported height and weight. The sleep-quality composite was developed for this study, was not equivalent to the PSQI, and showed poor internal consistency. For six participants with one missing sleep component, the composite was calculated from the two available components; this preserved the reported sample size but may have introduced additional measurement error. Multiple statistical tests were conducted without formal adjustment, increasing the possibility of type I error for isolated significant findings. The obese BMI subgroup included only three participants. The cross-sectional design prevents temporal or causal inference. In addition, the absence of formal ethics committee review is a limitation of the study's ethical governance and may affect editorial acceptability.

5. Conclusion

In this single-institution convenience sample of 49 university students, screen time, sedentary sitting time, and BMI did not show statistically significant associations with psychological well-being. No statistically significant gender differences or gender moderation of the screen time–well-being association were detected. The study-specific sleep-quality composite was positively associated with well-being, but its low internal consistency and the non-significant overall multivariable model limit the strength of this finding. Larger, adequately powered studies using validated sleep measures, objective or behavior-specific screen-time measures, and more balanced samples are needed to clarify the relationships among screen use, sedentary behavior, BMI, gender, sleep, and psychological well-being in university students.

References

Auerbach, R.P., Mortier, P., Bruffaerts, R., Alonso, J., Benjet, C., Cuijpers, P., Demyttenaere, K., Ebert, D.D., Green, J.G., Hasking, P., Murray, E., Nock, M.K., Pinder-Amaker, S., Sampson, N.A., Stein, D.J., Vilagut, G., Zaslavsky, A.M., Kessler, R.C. (2018). WHO World Mental Health Surveys International College Student Project:

Prevalence and distribution of mental disorders. *Journal of Abnormal Psychology,* 127(7), 623–638. [DOI] [PubMed]

Barr-Porter, M., Sullivan, A., McNamara, J. (2025). Body mass index, sleep, and food insecurity predict prevalence of anxiety and depression in college students. *American Journal of Lifestyle Medicine*. [DOI] [PubMed]

Bukova, A., Krzepota, J., Sadowska, D., Kimakova, T., & Melicharova, P. (2025). The relationship between physical activity, sedentary behavior, and subjective well-being: Gender differences among Slovak university students. *Healthcare,* 13(24), 3274. [DOI] [PubMed]

Bull, F.C., Al-Ansari, S.S., Biddle, S., Borodulin, K., Buman, M.P., Cardon, G., Carty, C., Chaput, J.P., Chastin, S., Chou, R., Dempsey, P.C., DiPietro, L., Ekelund, U., Firth, J., Friedenreich, C.M., Garcia, L., Gichu, M., Jago, R., Katzmarzyk, P.T., Lambert,E., Leitzmann, M., Milton, K., Ortega, F.B. Ranasinghe, C., Stamatakis, E., Tiedemann, A., Troiano, R.P., van der Ploeg H.P., Wari, V., Willumsen, J. F. (2020). World Health Organization 2020 guidelines on physical activity and sedentary behaviour. *British Journal of Sports Medicine,* 54(24), 1451–1462. [DOI] [PubMed]

Buysse, D.J., Reynolds, C.F., III, Monk, T.H., Berman, S.R., Kupfer, D.J. (1989). The Pittsburgh Sleep Quality Index: A new instrument for psychiatric practice and research. *Psychiatry Research,* 28(2), 193–213. [DOI] [PubMed]

Huang, T., Zheng, K., Li, S., Yang, Y., Kong, L., Zhao, Y. (2022). Screen-based sedentary behaviors but not total sedentary time are associated with anxiety among college students. *Frontiers in Public Health,* 10, 994612. [DOI] [PubMed]

Kleidermacher, L.E., Olfson, M. (2023). Gender differences in the association between screen time and depression. *AJPM Focus,* 3(2), 100176. [DOI] [PubMed]

Nowak, P. F., Bozek, A., Blukacz, M. (2019). Physical activity, sedentary behavior, and quality of life among university students. *BioMed Research International*, 2019, 9791281. [DOI] [PubMed]

Ramirez-Velez, R., Calderon-Gonzalez, J.C., Palma-Pulido, L.H., Mejia-Vasquez, A.F., Arias-Alzate, C., Urriago-Fontal, J.C., Gutierrez-Quintero, G.A., Ortiz-Lopez, J.D., Bedoya-Salazar, D.M., Romero-Martinez, G., Izquierdo, M. (2026). Associations of sleep quality and physical activity with anxiety and depressive symptoms among university students: A cross-sectional study. *Frontiers in Public Health*, 14, 1799311. [DOI] [PubMed]

Schuch, F.B., Vancampfort, D., Firth, J., Rosenbaum, S., Ward, P.B., Silva, E.S., Hallgren, M., Ponce De Leon, A., Dunn, A.L., Deslandes, A.C., Fleck, M.P., Carvalho, A F., Stubbs, B. (2018). Physical activity and incident depression: A meta-analysis of prospective cohort studies. *American Journal of Psychiatry*, 175(7), 631–648. [DOI] [PubMed]

Topp, C.W., Ostergaard, S.D., Sondergaard, S., Bech, P. (2015). The WHO-5 Well-Being Index: A systematic review of the literature. *Psychotherapy and Psychosomatics*, 84(3), 167–176. [DOI] [PubMed]

Twenge, J. M., Farley, E. (2021). Not all screen time is created equal: Associations with mental health vary by activity and gender. *Social Psychiatry and Psychiatric Epidemiology*, 56(2), 207–217. [DOI] [PubMed]

Zeng, Z., Shi, Z., Hou, S., Yan, J., Yang, R., Li, X. (2026). Comprehensive effects and dose-response relationship of screen exposure on university students' physical and mental health and academic performance in the digital age: A systematic review and meta-analysis. *BMC Public Health,* 26(1), 1363. [DOI] [PubMed]

Conflicts of Interest

The author declares no conflict of interest regarding the publication of this article.

Funding

This study received no external funding.

Does this article pass screening for similarity?

Yes

About the License