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Sedentary Lifestyle and Well-Being Among University Students: A Cross-Sectional Correlational Study

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Abstract

Background: A sedentary lifestyle is an increasing public health concern among young adults, particularly university students. Prolonged sitting time has been associated with adverse physical and psychological outcomes that may compromise overall well-being.

Objective: To determine the association between sedentary lifestyle and multidimensional well-being among university students.

Methods: A cross-sectional correlational study was conducted involving 133 students randomly selected from the Faculty of Health Sciences, Universitas Muhammadiyah Surakarta. Data were collected in 2025 during regular classroom sessions. Sedentary behavior was assessed using the Sedentary Behaviour Questionnaire (SBQ), while well-being was measured using the Model for Healthy Questionnaire (MFH-Q). Descriptive statistics were calculated for sedentary time and well-being scores (mean sedentary time: 8.24 ± 5.26 hours/day). Data normality was evaluated using the Shapiro–Wilk test, and Pearson correlation analysis was performed to assess the relationship between variables.

Results: Most participants reported high sedentary time, and nearly half demonstrated low well-being. Pearson correlation analysis showed no statistically significant association between sedentary lifestyle and well-being ($r = –0.141$; $p = 0.105$; 95% CI –0.30 to 0.03), indicating a weak and non-significant negative relationship.

Conclusion: Sedentary time was not significantly associated with well-being among health sciences students. Well-being in young adults may be influenced by other factors such as sleep quality, academic stress, and social support. Further longitudinal and multivariate studies are recommended.

Keywords
Sedentary Behavior; Young Adult; Students; Quality of Life; Mental Health; Motor Activity

Introduction

A sedentary lifestyle, characterized by low physical activity and high sitting time, is becoming increasingly common among young adults. Technological advances and changes in work patterns have contributed to this behavior, with more than 50% of young adults spending more than 6 hours per day sitting, both at work and in daily activities.[1,2] This lifestyle has been associated with a variety of negative impacts on physical and mental health. Individuals who sit for more than 6 hours per day have a 34% higher risk of obesity, a 20% increased risk of type 2 diabetes, and a 15% higher risk of cardiovascular disease compared to those who are more active.[1]

The current well-being of young adults also shows a worrying trend, with an increasing prevalence of anxiety, depression, and stress. According to WHO , around 40% of young adults in urban areas experience psychological disorders such as anxiety or depression at certain periods, and their level of life satisfaction tends to be lower than that of more physically active generations. Low physical activity has been associated with an increased risk of mental health disorders, with individuals with low levels of activity having a 25–30% higher risk of experiencing depression and anxiety.[3,4]

Well-being encompasses aspects of a person's mental, emotional, and social health. Young adults with a sedentary lifestyle have been reported to have higher levels of stress, anxiety, and depression than physically active individuals. A study by Schuch et al. showed that a lack of physical activity correlates with an increase in anxiety of up to 30%.[4] In addition, a sedentary lifestyle is also associated with musculoskeletal disorders, decreased sleep quality, and chronic fatigue, all of which contribute to a decreased overall quality of life.[5,6]

Physical activity not only provides physiological benefits but also significantly impacts various domains in the concept of well-being. Physically active individuals tend to have more stable emotional well-being, better stress management skills, and increased self-esteem and self-confidence.[7] Physical activity can also encourage social connections, especially when done in a group context, which in turn strengthens social well-being. In addition, activities such as yoga, tai chi, or mindfulness-based sports contribute to spiritual well-being by increasing self-awareness and meaning in life.[8,9] This shows that physical activity broadly contributes to individual well-being holistically, not limited to the physical aspect alone.

Previous studies, such as Wang et al. and Jiang et al., have shown that a sedentary lifestyle is associated with lower levels of well-being.[10,11] However, a research gap exists in understanding how light to moderate physical activity can effectively improve well-being, especially in young adults. Most previous studies have emphasized the benefits of high-intensity physical activity, while the impact of light-intensity activity on mental and emotional health has not been widely studied.[12,13]

At the same time, relatively few studies have specifically examined the association between sedentary time and multidimensional well-being among university students in low- and middle-income countries, including Indonesia, and findings from international studies are not entirely consistent. Some studies report clear negative associations between sedentary behavior and

mental health, whereas others suggest that the impact may depend on contextual factors, such as the type of sedentary activity and the presence of protective behaviors (e.g., light activity, adequate sleep, social engagement).

Given the increasing prevalence of sedentary lifestyles and the growing concern about well-being among university students, particularly in health sciences programs, this study was designed to address this gap. Specifically, we aimed to examine the association between sedentary lifestyle and multidimensional well-being among health sciences students using the Sedentary Behaviour Questionnaire (SBQ) and the Model for Healthy Questionnaire (MFH-Q). We hypothesized that higher sedentary time would be associated with lower well-being scores.

Method

This study used a quantitative, cross-sectional correlational design to determine the relationship between a sedentary lifestyle and well-being in young adults. The data collection method was a survey, with questionnaires distributed to respondents who met the inclusion and exclusion criteria. A sedentary lifestyle was measured using the Sedentary Behaviour Questionnaire (SBQ), while well-being was measured using the Model for Healthy Questionnaire (MFH-Q), which includes physical, mental, emotional, and social dimensions.

This research was conducted at the Faculty of Health Sciences, Universitas Muhammadiyah Surakarta. Data were collected in 2025 during regular academic activities on campus.This research was approved by the Health Research Ethics Committee of the Faculty of Health Sciences, Universitas Muhammadiyah Surakarta (No. 501/II/HREC/2025). All participants were informed about the purpose and procedures of the research and signed an informed consent form voluntarily. Their identities were kept confidential, and they had the right to withdraw from the study at any time without consequence.

This study involved students from the Faculty of Health Sciences, Universitas Muhammadiyah Surakarta, as research subjects. The sample size was 133 students, consisting of 29 males (21.8%) and 104 females (78.2%), with an age range of 18 to 23 years and an average age of 19.58 years. All respondents were Indonesian citizens and active undergraduate students, and the majority came from a Javanese ethnic background. The social environment where respondents lived tended to be homogeneous, with relatively similar cultures and lifestyles, especially related to daily activities and study habits.

The target sample size was determined based on the primary objective of examining the correlation between sedentary lifestyle (SBQ total sedentary time) and well-being (MFH-Q total score). An a priori power calculation for a two-tailed Pearson correlation with an anticipated small-to-moderate effect size ($r = 0.25$), a significance level of $\alpha = 0.05$, and 80% statistical power indicated that a minimum of approximately 123 participants would be required. The final sample of 133 students therefore provided adequate power to detect correlations of at least small-to-moderate magnitude in the primary analysis. No formal power calculation was performed for subgroup or multivariable analyses, which were not planned in this initial exploratory study.

The initial target population consisted of approximately 300 active students from the Faculty of Health Sciences. Information about the study was disseminated via classroom announcements and social media, and students who were interested and met the eligibility criteria were invited to participate. Thus, the sampling procedure is more accurately described as convenience (voluntary) sampling rather than simple random sampling.

A total of 300 students were approached and informed about the study objectives and procedures. Of these, 133 students met the inclusion criteria, agreed to participate, and provided written informed consent, resulting in an approximate response rate of 44.3%. Data collection was carried out on campus during active lecture hours, in classrooms and open spaces considered conducive to completing the questionnaires. The researcher was present during data collection to provide clarification and ensure completeness of responses. No reward or financial compensation was given for participation.

The inclusion criteria were: (1) young adults aged 18–35 years who were currently enrolled as undergraduate students, and (2) self-reported ability to engage in at least light to moderate physical activity (e.g., walking, climbing stairs) without medical restrictions. The exclusion criteria were: (1) known physical or mental disorders that could substantially affect the ability to participate or complete the questionnaires, and (2) acute injuries during the study period that limited usual daily activities.

This study employed two standardized instruments to measure sedentary lifestyle and well-being: the Sedentary Behaviour Questionnaire (SBQ) and the Model for Healthy Questionnaire (MFH-Q). The SBQ, originally developed by Rosenberg et al., assesses the duration of sitting activities across multiple domains of daily life. Respondents report the time spent on sedentary behaviors such as watching television, using computers or mobile phones, reading, writing, attending classes, and commuting, with separate estimations for weekdays and weekends. Total sedentary time is expressed in hours per day and, in this study, was categorized into three levels based on distribution-derived cut-offs from the sample: <4.5 hours/day (low), 4.5–8.5 hours/day (moderate), and >8.5 hours/day (high). These tertile-based classifications align with previous population studies using the SBQ. The instrument has demonstrated good internal consistency and test–retest reliability in earlier research, typically with Cronbach's alpha values above 0.80. In this study, the Indonesian version—translated using a forward–backward method and pilot-tested for clarity—showed acceptable reliability, with Cronbach's alpha coefficients of 0.62 for weekday items and 0.60 for weekend items, reflecting moderate internal consistency commonly reported among student samples.

The MFH-Q was used to evaluate well-being across four domains: physical, emotional, social, and spiritual. The questionnaire includes items that assess physical health (such as fatigue, pain, and perceived fitness), emotional conditions (including stress, mood, and calmness), social connectedness (such as support and interaction), and spiritual aspects involving meaning and purpose in life. All items are rated on a five-point Likert scale ranging from 1 ("strongly disagree") to 5 ("strongly agree"), allowing for a comprehensive and multidimensional assessment of well-being.Total MFH-Q scores are obtained by summing all item scores across the four domains, with higher scores indicating better well-being. Based on the MFH-Q structure, the possible total score ranges from 20 to 100 (20 items rated on a 1–5 Likert scale). In this study, well-being categories (low, medium, high) were determined using distribution-based tertile cut-offs, in which the sample was divided into three groups of approximately equal size based on the ranked MFH-Q total scores. This approach is commonly used in well-being research when population-specific distributions are preferred over fixed theoretical cut-offs.

The original MFH-Q has demonstrated acceptable psychometric properties in health promotion settings. In this study, the Indonesian version was used after translation and content validation. Internal consistency for the total scale in the original validation study was high (Cronbach's alpha = 0.88), supporting the reliability of the instrument for assessing multidimensional well-being.

Sedentary lifestyle was defined as the average daily time spent in sitting or reclining behaviors with low energy expenditure (≤1.5 METs), as measured by the SBQ. Well-being referred to multidimensional psychological and physical well-being, operationalized as the total MFH-Q score and its categories (low, medium, high). Potential confounders such as age and sex were recorded and considered in the interpretation of results, although no multivariable models were performed in the primary analysis.

This study used a quantitative correlational survey design without manipulation of variables. Sedentary lifestyle was treated as the independent variable, and well-being as the dependent variable. There were no experimental or control groups. Participants who met the inclusion criteria received an explanation of the purpose and procedures of the study before signing informed consent. The questionnaires were printed and distributed directly to the respondents.

The researcher remained available during completion to clarify questions and ensure that all items were answered. Questionnaires were checked for completeness immediately after submission; any missing responses were clarified on the spot whenever possible. All questionnaires were returned with complete responses, and no cases required exclusion due to missing data. Data were collected on campus during regular lecture hours. Participation was voluntary and anonymous to reduce social desirability bias. Data were processed using the Statistical Package for the Social Sciences (SPSS). Continuous variables were summarized as mean ± standard deviation (SD) and categorical variables as frequencies and percentages.

The normality of SBQ and MFH-Q scores was assessed using the Shapiro–Wilk test. Because the data met the assumptions for parametric analysis, the Pearson correlation test was applied to examine the relationship between sedentary lifestyle (SBQ total time) and well-being (MFH-Q total score). The level of significance was set at $p \leq 0.05$ (two-tailed). Although Spearman's rank correlation is commonly used when normality is not met, in this study the normality assessment supported the application of Pearson correlation; therefore, no additional non-parametric sensitivity analysis was conducted. No multivariable regression models were conducted in this initial analysis; therefore, potential confounding by demographic factors (e.g., age, sex) could not be fully ruled out and is considered in the Discussion.

Several steps were taken to minimise potential sources of bias. To reduce selection bias, all eligible classes within the Faculty of Health Sciences were approached using a standardised announcement and all students who met the inclusion criteria and were willing to participate were invited, although the convenience nature of the sampling is acknowledged. To limit information and recall bias, standardised written and verbal instructions were provided, questionnaires were completed in a quiet classroom environment during scheduled sessions, and the researcher was present to clarify any ambiguities. Questionnaires were anonymous and no grades or incentives were linked to participation, in an effort to reduce social desirability bias. All questionnaires were checked immediately after completion; missing responses were clarified on the spot, resulting in a dataset without missing item-level data for the variables analysed in this study.

Results

This study involved 133 participants, with an average age of 19.58 years. The majority were female (78.2%). Table 1 presents the baseline characteristics of the participants.

Table 1. Baseline characteristics of participants (n = 133)

Characteristic	Value
Age (years)	Mean = 19.58 Range = 18–30
Sex	Male: 29 (21.8%) Female: 104 (78.2%)
Study program	Physiotherapy (FIK/FIKES): ± 97% of sample Other programs (Electrical Engineering, Informatics): few cases (<5%)
Semester distribution	Majority in Semester 2Smaller groups in Semesters 4, 6, and 8, and a few transfer/alih jenjang students
Employment status	Students: almost all participants Working students: small number (<5%)
Anthropometrics	Body weight range: 38–98 kg Height range: 145–185 cm BMI not included in primary analysis
Age category (WHO)	Late adolescence ("remaja akhir"): majority (≈ 90%) Early adulthood ("dewasa awal"): small proportion

The SBQ questionnaire measured sedentary lifestyle, and 57.9% of participants were in the high sedentary category. Meanwhile, the MFH-Q showed that 46.6% of participants had a low level of well-being.

Table 2. Frequency distribution of sedentary lifestyle and well-being categories (n = 133)

Variable	Category	Frequency (n)	Percentage (%)
Sedentary lifestyle	Low	26	19.5
	Medium	30	22.6
	High	77	57.9
Well-being	Low	62	46.6
	Medium	61	45.9
	High	10	7.5

This table shows the distribution of respondents based on sedentary lifestyle and well-being categories. The majority (57.9%) had high sedentary time, indicating a relatively long daily sitting duration. For well-being, almost half of the respondents (46.6%) were in the low category, and only 7.5% had high well-being. In addition to categorical distributions, the mean ± SD of total sedentary time and MFH-Q scores were as follows: sedentary time = 8.24 ± 5.26 hours/day.

The MFH-Q total score could not be summarized numerically because item-level MFH-Q data were not recorded in the dataset; therefore, only well-being categories (low, medium, high) were available for analysis. The results of the Pearson correlation test between sedentary lifestyle and well-being showed $r = –0.141$ and $p = 0.105$, indicating no statistically significant association.

Table 3. Pearson correlation between sedentary lifestyle (SBQ) and well-being (MFH-Q)

Variable X	Variable Y	r value	95% CI for r	p-value	Interpretation
Sedentary lifestyle	Well-being	–0.141	–0.30 to 0.03	0.105	Weak negative correlation, not significant

Figure 1 presents the flow of participant recruitment and selection, outlining the process from initial contact through screening, eligibility assessment, and final inclusion in the analytic sample. This diagram provides a clear overview of how the study population was derived and ensures transparency in reporting participant attrition at each stage.

Figure 2 illustrates the distribution of sedentary lifestyle categories alongside levels of well-being among the participants. The visual representation highlights that highly sedentary behavior is prevalent within this student population and that lower well-being scores are also relatively common. Together, these patterns underscore the relevance of examining the relationship between sedentary lifestyle and well-being in this context.

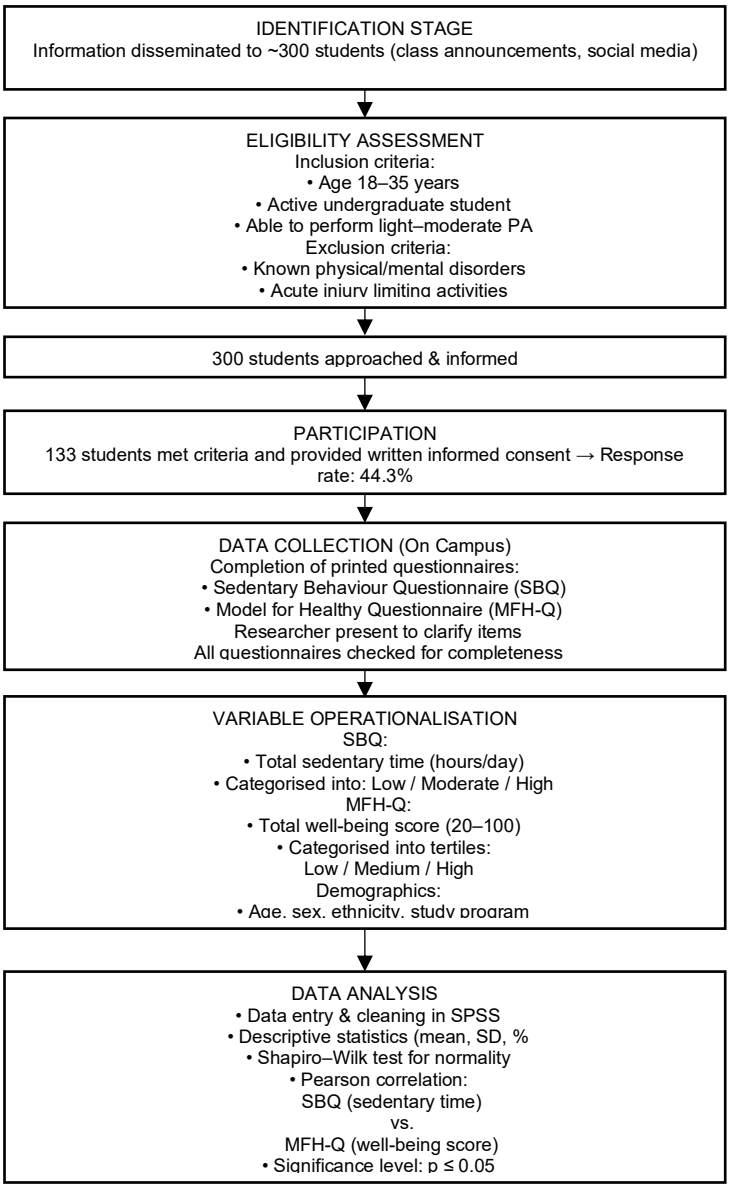

Figure 1. Research Respondent Flow Chart

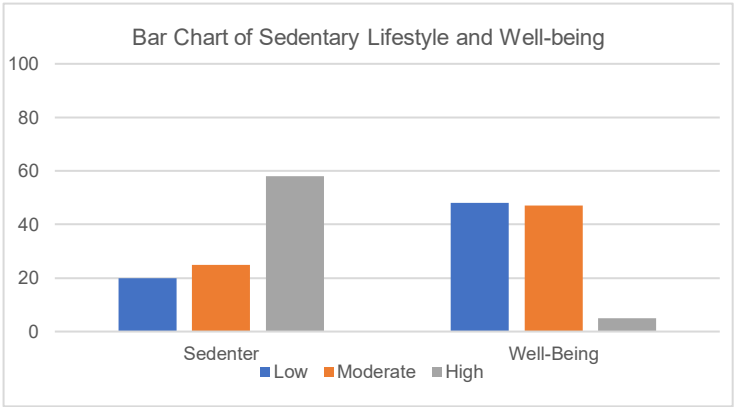

Figure 2. Bar Chart of Sedentary Lifestyle and Well-being

Discussion

Although the achieved sample size was adequate for detecting small-to-moderate correlations, as indicated by the a priori power calculation, the 95% confidence interval around the correlation coefficient (–0.30 to 0.03) suggests that the true association, if present, is likely to be small and may have been attenuated by measurement error and the relative homogeneity of this student sample. In other words, although students with higher sedentary time tended to have slightly lower well-being scores, the relationship was not strong or consistent enough to reach statistical significance in this sample.

These findings contrast with several previous studies that reported clearer associations between sedentary behavior, low physical activity, and mental health problems such as depression and anxiety.[12,14,15] In those studies, reduced physical activity and prolonged sedentary time were associated with increased psychological distress and lower quality of life. Mechanistically, low physical activity may reduce the release of endorphins and serotonin, which are important for mood regulation and stress reduction, and may also contribute to sleep disturbances, fatigue, and cognitive decline.

Several methodological and contextual factors may help explain why the present study did not detect a significant association. First, the sample was relatively homogeneous: all participants were health sciences students from a single faculty, with similar age range, academic environment, and lifestyle patterns. Limited variability in both sedentary time and well-being may have reduced the statistical power to detect small effects. Second, both sedentary behavior and well-being were assessed using self-report questionnaires, which are subject to recall bias and social desirability bias. Misclassification or measurement error tends to attenuate true associations toward the null. Third, the study may have been underpowered to detect small correlations, even though the number of participants was adequate for moderate effect sizes. The 95% confidence interval around r included both small negative and near-zero effects (–0.30 to 0.03), indicating considerable uncertainty about the true magnitude of the association.

The influence of sedentary lifestyle on well-being is also likely to be indirect and shaped by multiple intermediate factors. As highlighted in previous literature, light physical activity, sleep quality, and social support may all play important protective roles.[14,16,17] Short bouts of light activity—such as walking between classes, taking the stairs, or stretching during study sessions—can improve circulation, reduce muscle tension, and promote endorphin release, helping to regulate stress and mood. Adequate and high-quality sleep supports emotional regulation, cognitive performance, and overall functioning.[16] Strong social support from peers, family, and academic staff can buffer the negative effects of stress and enhance resilience.[17]

Furthermore, not all sedentary activities have the same impact on well-being. Productive sedentary activities such as reading, writing, or studying may provide cognitive stimulation and a sense of achievement, which can contribute positively to psychological well-being, whereas more passive activities, such as prolonged television viewing or non-interactive screen time, are more consistently linked with adverse outcomes. This nuance may help explain why high total sitting time does not always translate into low well-being, especially in a student population where a substantial proportion of sedentary time is spent on academic tasks.[6,12]

Conceptually, well-being is a multidimensional construct that includes physical, emotional, social, and psychological components. Recent studies suggest that factors beyond sedentary behaviour — such as academic stress, heavy workload, diet quality, and financial or social pressures — substantially influence students' well-being. For instance, Barbayannis et al. found a strong negative correlation between academic stress and mental well-being among university students, while Pérez-Jorge et al. identified academic overload and difficulty balancing personal life as major stressors affecting student mental health.[18,19] Similarly, Simões de Almeida et al. demonstrated that lifestyle factors collectively shape mental health outcomes in higher-education students.[20] These findings reinforce that sedentary behavior is only one among many determinants of well-being, and that omission of academic stress, workload, diet, and social/environmental stressors may overlook important confounding or moderating variables. Sedentary behavior is only one of many lifestyle factors that may influence these domains. Academic stress, workload, diet quality, financial strain, and family dynamics may be equally or more important determinants of students' well-being. Because these variables were not directly measured in this study, their potential confounding or moderating effects could not be evaluated and must be considered when interpreting the null findings.

An important conceptual distinction, often misunderstood in practice, is the difference between sedentary behavior and physical inactivity. Tremblay et al. define sedentary behavior as waking behaviors with energy expenditure ≤1.5 METs in a sitting, reclining, or lying posture, whereas physical inactivity refers to not meeting recommended levels of moderate-to-vigorous physical activity.[21] Thus, an individual can be physically active (e.g., exercising regularly) yet still have high sedentary time (e.g., sitting for long periods while studying). Intervention strategies should therefore aim not only to increase moderate-to-vigorous physical activity but also to reduce total sitting time and break up prolonged sedentary periods with light movement.

From a health promotion and physiotherapy perspective, the present findings underscore that improving student well-being requires a comprehensive approach. Active lifestyle education, promotion of micro-activities (short walks, stretching, use of stairs), optimization of learning environments to allow more movement (e.g., open spaces, standing options), sleep hygiene education, stress management strategies, and fostering supportive social networks may all contribute to better well-being, even if the direct correlation between total sitting time and well-being appears small in this particular dataset.[20,21]

This study has several limitations that should be acknowledged. First, the cross-sectional design precludes any inference about causality or temporal direction between sedentary behavior and well-being. Second, the use of convenience sampling from a single faculty limits the generalizability of the findings to other universities, disciplines, or cultural contexts. Third, both exposure and outcome were measured by self-report instruments, which are subject to recall and social desirability biases and may underestimate or overestimate true behaviors and perceptions. Fourth, potential confounders such as academic stress, sleep quality, dietary habits, and detailed physical activity levels were not assessed, and no multivariate analyses were conducted to adjust for age, sex, or other factors. Fifth, although the sample size was adequate for detecting moderate correlations, it may not have been sufficient to detect small effects; this is reflected in the wide confidence interval around the correlation coefficient.

Future research should consider longitudinal designs, objective measurements of sedentary behavior (e.g., accelerometers), more diverse samples, and multivariable modelling to clarify the complex relationships between sedentary time, physical activity, and different dimensions of well-being.

Conclusion

This study shows that, in a sample of health sciences university students, there was no statistically significant relationship between sedentary lifestyle and multidimensional well-being, although a weak negative trend was observed. These findings suggest that sedentary time alone may not be a dominant determinant of well-being in this context and that other lifestyle and psychosocial factors—such as sleep quality, academic stress, and social support—may play important roles.

Given the limitations of the cross-sectional design and the use of self-report measures, the results should be interpreted cautiously and primarily as a contribution to the descriptive profile of sedentary behavior and well-being in this population.

Further research is recommended to include additional variables such as sleep quality, perceived stress, academic workload, diet, and social support, and to employ longitudinal and multivariate designs to better understand the mechanisms linking sedentary behavior and well-being. In practice, active lifestyle education and simple strategies to interrupt prolonged sitting should still be promoted as part of holistic health promotion programs for university students.

In addition, future studies should incorporate a priori sample size calculations tailored to multivariable models and, where feasible, objective measures of sedentary behaviour to reduce measurement bias and better capture the complex interplay between movement patterns and well-being among university students.

Author Contribution

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Writing—review & editing: Farid Rahman
Supervision: Farid Rahman

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Conflict of Interest Statement

The authors declare that there is no conflict of interest associated with this study.

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Ethics Statement

This study was approved by the Health Research Ethics Committee of the Faculty of Health Sciences, Universitas Muhammadiyah Surakarta (Approval No. 501/II/HREC/2025). All participants received a detailed explanation of the study objectives and procedures and provided written informed consent prior to participation. Participant confidentiality was strictly maintained, and participation was entirely voluntary.

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