SHORT RESEARCH ARTICLE

Association Between Physical Activity Level and Perceived Stress among Students of a Sports and Health Sciences Faculty in Indonesia: A Cross-Sectional Study

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ABSTRACT

Background: Physical activity is an important determinant of physical and psychological health. University students are particularly vulnerable to stress due to academic and social demands, making it relevant to examine its association with physical activity. The objective was to analyze the association between physical activity level and perceived stress among students of the Faculty of Sports and Health Sciences, Universitas Negeri Makassar.

Methods: This quantitative study used a cross-sectional design. Participants were selected using a non-probability convenience sampling method, resulting in 100 respondents. Physical activity was assessed using the Global Physical Activity Questionnaire (GPAQ), and stress was measured using the 10-item Perceived Stress Scale (PSS-10). The association between variables was analyzed using the Chi-square test with a significance level of 0.05.

Results: Most students had high physical activity levels (59%) and moderate stress levels (81%). The Chi-square analysis showed no statistically significant association between physical activity and stress ($p = 0.572$).

Conclusion: No significant association was found between physical activity level and perceived stress in this cross-sectional sample. Further longitudinal studies are needed to clarify the relationship.

Keywords: Physical activity, Stress level, University students, Indonesia

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INTRODUCTION

Stress among university students has emerged as a major global mental health concern, driven by academic pressure, developmental transitions, and psychosocial demands. Global evidence indicates that academic stress among university students is widely reported, with many studies documenting moderate to high stress levels across student populations, and 46.6% of studies reporting high stress levels.[1] Meta-analytic evidence reported substantial levels of stress symptoms among healthcare students globally, with moderate stress affecting 32% of students and smaller proportions experiencing mild (15%), severe (11%), and extremely severe stress (4%).[2] Persistent stress is linked to poorer academic performance, emotional instability, sleep problems, and reduced well-being, highlighting the importance of identifying modifiable protective factors.

In Southeast Asia, similarly concerning patterns are observed. Regional studies report notable proportions of moderate to severe stress[3], while Indonesian research indicates prevalence ranging from approximately one-third to more than two-thirds of students[4]. At the same time, national participation in regular physical activity remains relatively low. According to the 2021 Performance Report of the Ministry of Youth and Sports of the Republic of Indonesia, only 32.83% of individuals aged 10 years and older engage in regular exercise[5], suggesting that insufficient physical activity may coexist with rising psychological distress in young adults.

Theoretically, physical activity may reduce stress through integrated biological and psychological mechanisms. Exercise promotes endorphin release, enhances brain-derived neurotrophic factor activity, and regulates neurotransmitters such as serotonin, contributing to improved mood and stress resilience. Psychologically, regular activity improves self-efficacy, sleep quality, and social interaction, which together may buffer academic stressors.[6] Despite this rationale, empirical findings remain mixed. Some studies report no significant association between physical activity and perceived stress[7], potentially due to differences in measurement methods, activity intensity, and contextual confounders such as demographic and cultural factors.

In Indonesia, most studies have focused on general student populations[8,9], with limited evidence from students enrolled in sports-related academic programs. These students may have higher baseline activity levels but still face substantial academic and performance pressures. This lack of context-specific evidence represents a clear research gap.

Therefore, this study aims to examine the association between physical activity intensity and perceived stress among university students in Makassar, focusing on the Faculty of Sports and Health Sciences at Universitas Negeri Makassar, to clarify whether higher activity levels correspond to lower stress in a relatively active population.

METHODOLOGY

This study employed a quantitative analytical design with a cross-sectional approach to examine the association between physical activity level and perceived stress among university students. Data collection was conducted between September and October 2025 at the Faculty of Sports and Health Sciences, Universitas Negeri Makassar, Indonesia. The faculty is an academic unit dedicated to the development of sports science, physical education, health, and fitness through integrated academic, practical, and research-based activities. Students in this faculty typically engage in structured physical training alongside academic responsibilities, making this population relevant for investigating the relationship between physical activity and stress.

The study population comprised all registered undergraduate students from the 2023 and 2024 academic cohorts during the study period. Inclusion criteria were students who were actively enrolled, aged 18 years or older, willing to participate, provided informed consent, and completed the questionnaire in full. Exclusion criteria included students who did not meet these eligibility criteria or submitted incomplete responses.

A non-probability convenience sampling technique was applied due to accessibility considerations. Recruitment was conducted by distributing an online questionnaire link through class coordinators and official student communication groups. The total population was approximately 640 students. Sample size was estimated using the Slovin formula with a 10% margin of error, resulting in a minimum required sample of 86 respondents. To account for potential non-response, 100 students were included in the final analysis, yielding a response rate of 55.5%.

Physical activity level was defined as the exposure variable and measured using the Global Physical Activity Questionnaire developed by the World Health Organization[10]. Total activity was calculated as MET-minutes per week across work, transport, and leisure domains, and categorized into low (<600 MET-minutes/ week), moderate (600-2999 MET-minutes/ week), and high (≥3000 MET-minutes/week) according to standard scoring guidelines. Perceived stress was defined as the outcome variable and assessed using the 10-item Perceived Stress Scale (PSS-10) developed by Sheldon Cohen[11]. Each item was scored on a 5-point Likert scale (0-4), producing a total score range of 0-40, which was categorized as low (0-13), moderate (14-26), and high (27-40). Potential confounding variables included age, sex, and academic cohort.

Descriptive statistics were used to summarize participant characteristics. The association between physi-

cal activity level and stress level was examined using the Chi-square test with a significance level of $p < 0.05$. Statistical analyses were performed using SPSS version 29.

Ethical approval for this study was granted by the ethics committee of Universitas Hasanuddin (1610/UN4.14.1/TP.01.02/2025, August 27th 2025) with protocol number 21825092192. Electronic informed consent was obtained from all participants prior to participation.

Results

After data screening, a total of 100 respondents met the inclusion criteria and were included in the analysis, exceeding the minimum required sample size of 86 participants. The majority of respondents were male (71.0%), aged between 19 and 20 years, and were predominantly enrolled in the 2024 academic cohort.

Table 1: Participant Characteristics (n = 100)

Characteristics	Respondents (%)
Gender	
Male	71 (71.0)
Female	29 (29.0)
Age (years)	
18	10 (10.0)
19	36 (36.0)
20	42 (42.0)
21	11 (11.0)
22	1 (1.0)
Academic Cohort	
2023	46 (46.0)
2024	54 (54.0)

Table 2: Bivariate Analysis between Physical Activity Level and Stress Level

Physical Activity Level	Stress Level			Total
	Low	Moderate	High	
Low	0 (0.0)	6 (100)	0 (0.0)	6
Moderate	8 (22.9)	26 (74.3)	1 (2.9)	35
High	8 (13.6)	49 (83.1)	2 (3.4)	59
Total	16	81	3	100

Values are presented as n (row %). P value = 0.572

Based on the Global Physical Activity Questionnaire (GPAQ), most students reported high levels of physical activity (59.0%), followed by moderate activity (35.0%), while only a small proportion demonstrated low physical activity levels (6.0%). Assessment of stress levels using the Perceived Stress Scale (PSS) showed that most respondents experienced moderate stress (81.0%), whereas 16.0% reported low stress and only 3.0% experienced high stress.

Bivariate analysis using the Chi-Square test examined the association between physical activity level and stress level. Respondents across all physical activity categories were predominantly classified as having moderate stress. Among students with low physical activity, all respondents were categorized as experiencing moderate stress. Similarly, moderate and high physical activity groups were dominated by moderate stress levels. The Chi-Square analysis yielded a p-value of 0.572 ($p > 0.05$), indicating no statistically significant association between physical activity level and stress level among students of the Faculty of Sports and Health Sciences at Universitas Negeri Makassar.

Discussion

This study found no statistically significant association between physical activity level and perceived stress among students at the Faculty of Sports and Health Sciences, Universitas Negeri Makassar ($p = 0.572$). Although most participants reported moderate to high activity levels, moderate stress remained the most common category, indicating that higher activity intensity was not accompanied by lower perceived stress in this sample.

These findings are consistent with previous studies conducted among university students in Indonesia, including those at Universitas Tanjungpura and IPB University, which similarly reported no significant relationship between physical activity and stress despite substantial engagement in vigorous exercise[12,13]. In a systematic review, most studies generally showed that physical activity did not have a significant and consistent relationship with stress levels in college students[7]. Although some studies found a significant association, the different directions of the associations resulted in the overall results being insignificant.

The findings of this study, which indicate no significant relationship between physical activity and stress levels, may be explained by variations in activity intensity as well as physiological response mechanisms to exercise. The literature suggests that the benefits of physical activity on stress may be nonlinear, in which moderate-intensity activity provides the most optimal effect, whereas very high-intensity activity may trigger physiological responses similar to stress, thereby reducing its protective effect[14]. This condition may lead individuals with high levels of physical activity to still report relatively high perceived stress. In addition, differences in sample characteristics, academic periods that may increase pressure, and the use of self-report measures prone to bias may also contribute to the lack of statistically significant association. Therefore, the non-significant findings of this study likely reflect the complexity of the relationship between physical activity and stress, which is influenced by intensity, context, and other individual factors.

Although age, sex, and academic cohort were considered as potential confounders, residual confounding may persist due to unmeasured variables such as

sleep quality, social support, and academic pressure, which could influence both activity behavior and perceived stress.

Strengths and Limitations

The study's strengths include the use of standardized instruments (GPAQ and PSS-10) and its focus on an understudied population of sports faculty students at Universitas Negeri Makassar. However, several limitations should be considered. The cross-sectional design limits causal interpretation, and reliance on self-reported data may introduce recall or reporting bias. The relatively small sample size may have reduced statistical power, and the specific academic context may limit generalizability to other university populations.

Conclusion

The study found no statistically significant association between physical activity level and perceived stress among students at the Faculty of Sports and Health Sciences, Universitas Negeri Makassar ($p = 0.572$). Although most students reported relatively high activity levels, stress remained predominantly moderate, indicating no measurable relationship within this cross-sectional sample. These findings should be interpreted cautiously due to the study design and sample characteristics. Further longitudinal or experimental studies are needed to clarify the temporal relationship between physical activity and perceived stress in university populations.

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Availability of Data: The data supporting the findings of this study are available from the corresponding author upon reasonable request.

Declaration of Non-use of Generative AI Tools: This article was prepared without the use of generative AI tools for content creation, analysis, or data generation. All findings and interpretations are based solely on the authors' independent work and expertise.

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