

RELATIONSHIP BETWEEN EXERCISE HABITS AND STRESS LEVELS IN STUDENTS OF NON-SPORT STUDY PROGRAM

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Abstract

This study aims to analyze the relationship between exercise habits and stress levels in non-sports study program students at Universitas Negeri Semarang. The study used a quantitative design with a descriptive correlational approach and a cross-sectional design. The sample consisted of 50 active students of the Faculty of Medicine who were selected purposively. Data was collected through an exercise habit questionnaire (IPAQ-SF) and a Perceived Stress Scale (PSS-10), then analyzed using the Spearman Rank test. The results showed that most respondents had moderate (80%) and high (20%) physical activity levels, without a low category. The average stress score was 20.12, indicating a moderate category, with 50% of students experiencing moderate stress and 28% experiencing high stress. There was a strong and significant negative relationship between total physical activity and stress levels ($\rho = -0.804$; $p < 0.01$), especially heavy activity which showed a stronger correlation ($\rho = -0.825$; $p < 0.01$). In contrast, moderate activity and walking did not show a significant relationship with stress. This study concluded that the intensity of physical activity, especially vigorous exercise, plays an important role in reducing stress levels of non-sports students. These results are expected to be the basis for campuses in designing mental health programs based on physical activity.

Keywords: *Physical Activity; Exercise Habits; Exercise Intensity; Stress*

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INTRODUCTION

Stress is a psychological condition that often occurs in students as a response to various pressures faced in academic, social, and personal life. Students are usually burdened with high academic demands, busy activity schedules, and expectations of achievement, which, if accumulated, can lead to stress both physically and mentally (Abelea et al., 2024). In Indonesia, the prevalence rate of stress in students is reported to be in the range of 36.7% to 71.6%, a figure that reflects the high vulnerability of this group to mental health problems (Ambarwati et al., 2019). Stress that is not appropriately managed risks reducing the quality of

life, hindering academic achievement, disrupting cognitive function, and triggering psychological disorders such as anxiety and depression (Bao et al., 2022). In addition to academic pressure, personal factors such as financial difficulties, family conflicts, and less supportive campus social environments have also been shown to exacerbate students' stress levels (Hutabarat et al., 2022; Rohmah & Mahrus, 2024). Therefore, efforts to effectively manage stress are an essential aspect in supporting student success, one of which is through a non-pharmacological approach based on physical activity.

Physical activity, particularly exercise, has long been recognized as an effective means of managing stress. Various studies have shown that exercise can increase the secretion of endorphins and serotonin, which play a role in improving mood and reducing psychological stress (Ricca Andalasari, 2019; Scott, 2021). Regular aerobic physical activity has also been shown to enhance cognitive function and improve sleep quality, both of which contribute to emotional stability and overall mental health in students (Peng et al., 2022). Research (Wahyudi et al., 2015) found that students with exercise routines had lower stress levels. Another study by (Alif Fahrhan Fadillah & Dodik Nursanto, 2024) also showed a negative correlation between exercise habits and stress levels in medical students. Likewise, a survey by (Nopiana et al., 2023) revealed that regular physical activity, such as jogging, not only increases VO₂MAX capacity but also supports students' mental health. Meanwhile, (Guerriero et al., 2025) stated through a literature review that physical activity is consistently related to reduced stress, while a sedentary lifestyle is associated with increased symptoms of psychological disorders.

Although the benefits of exercise on mental health have been widely studied, the impact of exercise intensity on mental health deserves special attention. Moderate to high-intensity exercise is known to provide optimal relaxation effects; however, exercise that is too intense without balanced recovery can actually worsen stress (Dany & Kusuma, 2022). Unlike previous studies that tend to focus on the linear relationship between exercise and stress in general, this study employs a multivariate approach that considers the frequency, duration, intensity, and type of

exercise, as well as stress levels. In addition, the object of study focuses on students from non-sport study programs who do not have a sports-based background or curriculum. Recognizing this gap, this study offers scientific novelty by examining the relationship between exercise habits and stress levels among non-sports students, specifically those from the Faculty of Medicine at Universitas Negeri Semarang, for the academic year 2023. Thus, this study builds upon previous studies (Azmi Putri Azzahra et al., 2023; Muzakir, 2021) with a more comprehensive approach, a different target population, and a more in-depth analysis of the characteristics of physical activity among non-sports students.

The purpose of this study was to explore in detail the relationship between exercise habits and stress levels of non-sports students, as well as to describe the characteristics of students' exercise habits (including frequency, duration, intensity, and type of activity), the level of stress experienced, and the relationship between the two variables. The findings of this study are expected to make theoretical contributions by enriching the literature on stress management through physical activity in non-sports students. This area has received little attention to date. In addition, the practical contribution of this study is expected to serve as a reference for the formulation of healthy campus policies, guidance, and counseling programs, as well as the design of physical activity-based interventions applicable in higher education environments. The results of this study are also expected to provide valuable information for students, educators, counselors, and parents in promoting an active lifestyle that supports the psychological resilience and mental health of students.

METHOD

This study employs a quantitative design with a descriptive correlational approach and a cross-sectional design, aiming to analyze the relationship between exercise habits and stress levels among non-sports study program students, particularly active students from the Faculty of Medicine at Universitas Negeri Semarang, for the academic year 2023. Selection of design cross-sectional conducted because the data was collected at one point in time without intervention

on the variables, making it suitable for observing the relationship between variables naturally in the ongoing academic context (Wahyudi et al., 2015).

The research was conducted at the Faculty of Medicine, Universitas Negeri Semarang, and data collection was carried out online using Google Forms during July 2025. The population in this study consisted of all active students in the Medical Study Program, with sample selection conducted randomly. Purposeful sampling, based on inclusion criteria, namely active students in the 2023 academic year who are willing to be respondents and complete the questionnaire. Exclusion criteria include students who do not complete the data accurately or are experiencing severe physical or psychological conditions that may compromise the validity of their answers.

Data collection was carried out using two main instruments: a questionnaire on exercise habits based on the International Physical Activity Questionnaire (IPAQ) short version and the Perceived Stress Scale (PSS-10) to measure stress levels. The IPAQ was used to measure the frequency, duration, intensity, and type of physical activity, the results of which were converted to MET-minutes/week scores, then categorized into three activity levels (low, moderate, and high). The PSS-10 scores were classified into three categories of stress levels: low (0–13), moderate (14–26), and high (27–40), taking into account items that required reversal scoring (Guerriero et al., 2025; Qiao & Huang, 2022)

The collected data were analyzed using the Spearman Rank correlation test (ρ), because the data were ordinal and not normally distributed. This test was used to determine whether there was a significant relationship between exercise habits and students' stress levels. The interpretation of the relationship was carried out based on the correlation coefficient value (r), which indicates the strength and direction of the relationship between the two variables. With this approach, the study is expected to provide an empirical picture of the effectiveness of exercise habits as a stress management strategy for non-sports students with a high academic load who have not been exposed to physical culture structurally.

RESULT AND DISCUSSION

Table 1. Distribution of Respondents Based on Demographic Characteristics

Characteristics	Category	Frequency	Percentage (%)
Gender	Man	24	48
	Woman	26	52
Age	Mean	21.1	-
	Minimum	19.0	-
	Maximum	24.0	-
Sports Time	Morning	20	40
	Daytime	0	0
	Afternoon	20	40
	Night	10	20
Exercise to Reduce Stress	Very often	10	20
	Often	16	32
	Sometimes	10	20
	Seldom	10	20
	Never	4	8

Table 1 presents the demographic characteristics of the respondents. This study involved 50 active students of the Universitas Negeri Semarang Medical Study Program. The composition of respondents was relatively balanced between males (48%) and females (52%), providing proportional representation of the medical student population. The average age of the respondents was 21.1 years (range, 19-24 years), a stage in the young adult phase that is vulnerable to academic, social, and emotional pressures, making it relevant to study in the context of stress and coping mechanisms through physical activity.

The majority of respondents exercised in the morning (40%) and afternoon (40%), while 20% chose the evening. There were no sports activities carried out during the day. This suggests that students select times outside of class hours to exercise, prioritizing convenience and time availability. A total of 32% of respondents stated that they often use exercise as a way to cope with stress, followed by 20% who very often, 20% who sometimes, 20% who rarely, and 8% who never do. This finding suggests that most respondents are aware of the benefits of exercise for mental health, although a small number have not utilized it as a stress management strategy. In general, these characteristics suggest that respondents are

physically active, in the productive age group, and tend to use exercise as a means of maintaining psychological well-being.

Exercise Habits Description (IPAQ-SF)

Table 2. Distribution of Frequency and Duration of Physical Activity

Activity Type	Days/Week (Mean ± SD)	Minutes/Day (Mean ± SD)	MET Value	Total MET-Minutes/Week (Mean)
Heavy Activity	2.28 ± 1.68	53.0 ± 34.11	8	1172.8
Medium Activity	2.56 ± 1.43	43.4 ± 22.55	4	501.6
Walking	5.2 ± 1.39	32.5 ± 13.37	3.3	571.6

Table 2 presents data on the respondents' exercise habits, measured using the short version of the IPAQ instrument. The respondents' physical activity was classified into vigorous, moderate, and walking activities, with measurements of frequency, duration, and MET minutes per week scores.

Strenuous activity was performed on average 2.28 ± 1.68 days per week for 53.0 ± 34.11 minutes per day, resulting in an estimated energy expenditure of 1172.8 MET-minutes per week. Moderate activities were recorded at a frequency of 2.56 ± 1.43 days per week and with a duration of 43.4 ± 22.55 minutes per day, resulting in a score of 501.6 MET-minutes per week. Meanwhile, walking was the most frequent activity, occurring 5.2 ± 1.39 days per week for 32.5 ± 13.37 minutes per day, resulting in 571.6 MET-minutes per week.

This finding suggests that vigorous activity, although less frequent, contributes the most to total energy expenditure due to its high intensity. On the other hand, walking was the most consistent form of activity, suggesting that activities with light to moderate intensity are more easily integrated into students' daily routines.

Table 3. Categories of Physical Activity Levels Based on Total MET-Minutes/Week

Activity Categories	Rate MET-min/week	Frequency	Percentage (%)
Low	<600	0	0.0
Medium	600 - 3000	40	80.0
High	>3000	10	20.0

Table 3 illustrates the classification of respondents' physical activity levels based on total MET minutes per week, calculated from a combination of vigorous, moderate, and walking activities. The classification was based on the IPAQ (International Physical Activity Questionnaire) guidelines, which categorize activity levels into three categories: low (<600 MET-minutes/week), moderate (600-3000 MET-minutes/week), and high (>3000 MET-minutes/week).

The classification results showed that no respondents fell into the low activity category (0%), indicating that all students in this sample had physical activity levels that met or exceeded the minimum threshold for health benefits according to WHO standards. A total of 40 respondents (80%) fell into the moderate activity category, and 10 respondents (20%) fell into the high activity category. Most students in the light category generally showed a combination of light to moderate activity, including walking and recreational activities. However, it has not reached the accumulation of intensity and duration required to be categorized as high-intensity activity.

Stress Level Description (PSS-10)

Table 4. Distribution of Scores and Categories of Stress Levels

Statistics	Mark
Average PSS Score	20.12
Standard Deviation	10.27
Minimum	6.0
Maximum	37.0

Table 4 presents a summary of the descriptive statistics for respondents' stress scores, measured using the Perceived Stress Scale (PSS-10) instrument, which shows an average score of 20.12 with a standard deviation of 10.27, and a range of values between 6 and 37. These results indicate that, in general, respondents fall into the moderate stress category, with considerable individual variation. The widespread scores reflect the differences in stress perception between students, ranging from very low to high levels of stress. Maximum scores close to the upper limit of the scale indicate the presence of individuals with significant psychological distress.

Theoretically, the PSS-10 assesses perceptions of stress in the context of uncertainty, role pressure, and self-control. The relatively high mean score in this population reflects the academic load and social pressures commonly experienced by medical students.

Table 5. Categories of Stress Levels

Stress Category	Score Range	Frequency	Percentage (%)
Low	0 - 13	11	22.0
Medium	14 - 26	25	50.0
High	27 - 40	14	28.0

Table 5 presents the distribution of respondents by stress level category, which is determined based on the PSS-10 total score. A total of 22% of respondents fell into the low-stress category, 50% into the moderate category, and 28% into the high category. Thus, most respondents (78%) experienced moderate to high levels of stress.

This distribution reflects the high level of mental stress experienced by medical students due to their academic load, professional demands, and social pressures. Although a small proportion of respondents (22%) exhibited low stress, this suggests that stress management remains a significant challenge. The sizable proportion of high stress (28%) indicates the need for preventive interventions, both through institutional support, such as psychological services, and individual approaches, including healthy lifestyles and exercise.

Normality Test

Table 6. Normality Test Results

	Tests of Normality					
	Kolmogorov-Smirnov ^a		Shapiro-Wilk			
	Statistic	df	Sig.	Statistic	df	Sig.
Total PSS	.139	50	.016	.918	50	.002
Total MET	.117	50	.084	.965	50	.144

a. Lilliefors Significance Correction

A normality test is conducted to determine whether the data on the studied variables have a distribution that approaches a normal distribution. In this study, two main variables were examined: Total PSS Score and Total Activity

(Total_MET), using two statistical methods: the Kolmogorov–Smirnov (K-S) and Shapiro–Wilk (S-W) tests.

Based on the results in Table 6, the significance values for the Total_PSS variable are 0.016 (K-S) and 0.002 (S-W). Both of these values are smaller than the significance limit of 0.05, so it can be concluded that the Total_PSS data is not normally distributed. In contrast, the Total_MET variable has significance values of 0.084 (K-S) and 0.144 (S-W), both of which are greater than 0.05, indicating that the Total_MET data is usually distributed.

However, because one of the main variables (Total_PSS) is not normally distributed, a non-parametric correlation test, namely Spearman's Rank, is used to test the relationship between variables. The use of this test is appropriate for ordinal or non-normal data conditions.

Correlation Test

Table 7. Results of Spearman Rank Correlation Test between Physical Activity and Stress Level

Variable 1	Variable 2	Correlation Coefficient (ρ)	Sig. (p)	Interpretation of Relationships
Total Activity	Total Score PSS	-0.804**	0.000	Strong, negative, significant
Heavy Sports Day	Total Score PSS	-0.825**	0.000	Strong, negative, significant
Medium Sports Day	Total Score PSS	+0.023	0.875	Very weak, insignificant
Walking Day	Total Score PSS	-0.186	0.196	Weak, insignificant

The results of the Spearman correlation test in Table 7 indicate a strong and significant negative relationship between the total physical activity of students (Total MET) and stress levels (Total PSS Score), with a correlation coefficient of -0.804 ($p = 0.000$). This means that the higher the intensity and duration of overall physical activity, the lower the level of stress felt by students.

The strongest relationship was found between the frequency of vigorous exercise and stress, with a coefficient of -0.825 ($p = 0.000$), indicating that high-intensity physical activity plays a significant role in reducing stress. This confirms

the effectiveness of vigorous exercise as a more dominant psychological coping strategy than other forms of activity.

In contrast, moderate exercise showed a very weak and non-significant correlation with stress ($\rho = +0.023$; $p = 0.875$), while walking had a negative but still non-significant correlation ($\rho = -0.186$; $p = 0.196$). Thus, light to moderate physical activity did not significantly contribute to reducing stress levels in this population.

Students' Physical Activity Level

Most non-sports students at Semarang State University had moderate (80%) and high (20%) physical activity levels, with no students in the low category. This indicates that all respondents have met the WHO minimum recommendation of 600 MET minutes per week (Guerriero et al., 2025). The most consistent activity was walking (mean 5.2 days/week), while strenuous activity contributed the most energy (1172.8 MET-minutes/week). This finding aligns with (Bao et al., 2022), which states that non-sporting students can still achieve adequate levels of physical activity, reflecting their awareness of the importance of an active lifestyle.

Student Stress Level

50% of students were in the moderate stress category and 28% in the high category, with an average score of 20.12. This condition reflects the high academic pressure, as described by (Ambarwati et al., 2019). The absence of a sports-based curriculum can exacerbate the mental burden on non-sports students. (Azmi Putri Azzahra et al., 2023) Showed that students who rarely exercise tend to have higher stress levels compared to those who are physically active.

Relationship between Physical Activity and Stress

Spearman correlation analysis showed a strong and significant negative relationship between total physical activity and stress levels ($\rho = -0.804$; $p < 0.01$). The higher the physical activity, the lower the stress level experienced by students. This finding supports Lazarus's coping theory, as well as research by (Alif Fahrhan Fadillah & Dodik Nursanto, 2024) and (Muzakir, 2021), which shows that exercise can reduce stress and improve emotional regulation.

The Role of Activity Intensity

Strenuous activity showed the strongest and most significant negative correlation with stress ($\rho = -0.825$; $p < 0.01$), while moderate activity ($\rho = +0.023$; $p = 0.875$) and walking ($\rho = -0.186$; $p = 0.196$) were not significant. This suggests that activity intensity is a major determinant in the effectiveness of stress reduction. (Abelea et al., 2024) Moreover, (Guerriero et al., 2025) confirmed that high-intensity exercise has a greater psychophysiological impact in reducing stress. Dishman et al. (2006), as cited in (Muzakir, 2021), also suggested that high-intensity activity provides a protective effect against mood disorders, making it a relevant preventive and therapeutic strategy in the academic context.

CONCLUSION

This study revealed that all respondents had adequate levels of physical activity, with the majority falling into the moderate (80%) and high (20%) categories. Strenuous activity contributed the most to weekly energy expenditure, signifying its dominant role in the active lifestyle of university students. Meanwhile, most respondents experienced moderate to high stress, with an average stress score of 20.12.

Correlation analysis revealed a strong and significant negative relationship between total physical activity and stress levels, particularly in high-intensity activities. This finding confirms that intensity is a key factor in the effectiveness of physical activity as a stress reduction strategy. Therefore, high-intensity physical activity is recommended as a non-pharmacological approach to support the mental health of university students, particularly in non-sports-related study programs. Future studies with longitudinal or experimental designs are needed to examine causal relationships and identify potential mediating factors such as social support, motivation, and sleep quality, in order to develop more comprehensive and effective physical interventions.

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