



The Effect of Training Load and Academic Load on the Stress Level and Sleep Quality of Sports Students

Pengaruh Beban Latihan dan Beban Akademik terhadap Tingkat Stres dan Kualitas Tidur Mahasiswa Olahraga

Original Article

Feren Ayu Maharani*

Department of Sports Science,
Faculty of Sports Science and Health,
Yogyakarta State University,
INDONESIA

Nismara Maritza Sugiarto

Department of Sports Science,
Faculty of Sports Science and Health,
Yogyakarta State University,
INDONESIA

Muhammad Khairun Faiz

Prasetyo
Department of Sports Science,
Faculty of Sports Science and Health,
Yogyakarta State University,
INDONESIA

Muhamad Fakhri
Abhinaya

Department of Sports Science,
Faculty of Sports Science and Health,
Yogyakarta State University,
INDONESIA

Ulya Nufaisah Archam
Maulani

Department of Sports Science,
Faculty of Sports Science and Health,
Yogyakarta State University,
INDONESIA

Enggista Hendriko Delano

Department of Sports Science,
Faculty of Sports Science and Health,
Yogyakarta State University,
INDONESIA

Abstract.

Background

Sleep is one of the basic physiological needs that plays an important role in maintaining health and optimal bodily function. A lack of sleep duration or sleep quality can have a negative impact on health, both in the short term and in the long term. Sleep disturbance is also closely related to a decline in the immune system and to changes in emotional condition. One effort that can be made to improve sleep quality and to reduce stress is regular physical exercise.

Objectives

This study aims to analyse the effect of training load and academic load, both partially and simultaneously, on the stress level and sleep quality of students of FIKK UNY.

Methods

The research method used in this study was a quantitative method through a questionnaire survey. The population in this study consisted of all active students of the Faculty of Sports Science and Health, Yogyakarta State University (FIKK UNY). The research instrument used a closed questionnaire in order to collect quantitative data with a 1-5 Likert scale. Data collection was carried out by distributing the questionnaire online through the WhatsApp application in the form of a Google Form to active students of FIKK UNY, and the online questionnaire distribution was conducted over a period of 40 days. The data analysis technique used Multiple Linear Regression and descriptive statistical analysis.

Results

The research shows that physical training load has a fairly high effect on the deterioration of respondents' sleep quality, with a mean of 3.14 out of a maximum scale of 5. Academic stress shows a higher mean percentage of 3.33 compared with physical training load, with a far larger proportion of respondents in the high category, namely 30% against 15%.

Conclusion

The training load and academic load of sports students are classified as high, which contributes significantly to the high level of stress experienced by those students.

Keywords: Training Load, academic load, stress, sleep quality, sports students

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*Correspondence: ferenayu.2024@student.uny.ac.id

Feren Ayu Maharani

Department of Sports Science, Faculty of Sports Science and Health, Yogyakarta State University, INDONESIA

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INTRODUCTION

Sleep is one of the basic physiological needs that plays an important role in maintaining health and optimal bodily function. The fulfilment of sufficient sleep needs enables the body to carry out the process of recovery (*recovery*), to repair tissue, and to restore the energy that has been used during activity. The sleep needs of each individual are not the same, because they are influenced by various factors, one of which is age [3]. In addition, quality sleep plays an important role in maintaining a person's metabolic and cognitive function and mental health [6][11]. Therefore, adequate sleep quality and quantity become an important aspect in supporting a person's physical and psychological condition.

A lack of sleep duration or sleep quality can have a negative impact on health, both in the short term and in the long term. In the short term, sleep disturbance can cause a decline in concentration, creativity, thinking ability, and decision-making. If it continues on an ongoing basis, sleep deprivation has the potential to give rise to various more serious health disorders, such as a decline in memory and

attention function, excessive daytime sleepiness, mood disturbance, depression, and an increased risk of cardiovascular disease and cancer [24] [27]. This risk is known to be higher in individuals who have a sleep duration of less than six hours or more than nine hours per day, compared with those who sleep for seven to eight hours every night [20].

Sleep disturbance is also closely related to a decline in the immune system and to changes in emotional condition. Individuals who experience difficulty sleeping generally show a lower ability to concentrate, feel tired more easily, and are more susceptible to mood changes and irritability [24]. These conditions can affect students' productivity in carrying out academic activities. One factor that is often associated with the emergence of sleep disturbance is stress. Experts state that stress is the main cause of short-term sleep disturbance, which is generally triggered by various personal problems or by high academic demands [22]. Research by experts also shows that stress exerts an influence on the body's physiological responses, including cardiorespiratory synchronisation, which may ultimately disrupt the recovery process and sleep quality [13]. Although sleep disturbance can improve once the source of stress has been resolved, stress that lasts for a long time still has the potential to reduce sleep quality and to have an impact on daily activities [13].

One effort that can be made to improve sleep quality and to reduce stress is regular physical exercise. Various studies show that physical activity is able to increase endorphin production, to help regulate stress hormones, to lower the risk of obesity, and to improve sleep quality [21] [18]. In addition to providing benefits for physical health, physical exercise also plays a role in lowering levels of stress, anxiety, and symptoms of depression, so that students' mental resilience in facing academic demands can be improved [15]. Nevertheless, these benefits are strongly influenced by the regulation of training load. An excessive training load (*training overload*) can cause physical and psychological fatigue, which leads to the disruption of the recovery process and of sleep quality [25]. This condition is often encountered among students who are actively engaged in sport or who hold the status of student athletes, because they must face high training demands in addition to their academic obligations. If the recovery process does not proceed optimally, the risk of sleep disturbance will increase further [19]. Accordingly, the balance between training load, academic stress level, and the fulfilment of sleep needs becomes an important factor that needs to be taken into account in order to support students' health and their academic and sporting performance.

METHOD

Type of Research

The research method used in this study was a quantitative method through a questionnaire survey. The quantitative method may be interpreted as being based on the philosophy of positivism, which is applied to a particular population and sample [16]. The objective of this study was to determine the effect of training load and academic load on the stress level and sleep quality level of sports students. The questionnaire method was adopted in order to obtain data from respondents on an online basis within a relatively short period of time. A questionnaire is a method that functions to obtain a set of data by giving questions or statements to respondents on an online basis. In this study, the authors provided a rating scale within the questionnaire in order to obtain data using a Likert scale. Through the use of the quantitative questionnaire method, this study is able to produce valid and accurate data regarding the effect of training load and academic load on the stress level and sleep quality level of sports students.

Population and Sample

A population is an area within which subjects or objects that have particular characteristics are contained, which are taken by the researcher in order to be analysed and from which conclusions are then drawn [16]. The population in this study consisted of all active students of the Faculty of Sports Science and Health, Yogyakarta State University (FIKK UNY).

A sample is part of the number and characteristics of a population [16]. In this study, the authors used the *Purposive Sampling* technique. The *Purposive Sampling* technique is a technique for determining a research sample with certain considerations, so that the data obtained are representative [16]. This technique was selected in order to make it easier for FIKK UNY students to determine the characteristics of the way in which they, as athletes, understand the problem of training load and academic stress in relation to their sleep quality level.

Research Instrument

An instrument is a tool used by a researcher when applying a particular method. The research instrument in this study used a closed questionnaire in order to collect quantitative data with a 1-5 Likert scale. The Likert scale is used to measure the attitudes, opinions, and perceptions of a person or a group regarding a social phenomenon [17].

Table 1. Scale Based on the Likert Scale

Statement	Score
Strongly disagree	1
Disagree	2
Neutral	3
Agree	4
Strongly Agree	5

The content of the questionnaire, in the form of questions and statements, was compiled on the basis of the indicators of each variable. The grid of the research questionnaire is presented in the following table.

Table 2. Grid of the Research Questionnaire

Variable	Indicator	Item Number
Training Load	• Training Intensity	1-5
	• Training Frequency and Duration	6-10
	• Fatigue Due to Training	11-15
	• Recovery After Injury	16-20
	• Effect of Training Load on Sleep Quality	21-25
Academic Stress	• Academic Assignment Load	1-5
	• Academic Pressure	6-10
	• Time Management	11-15
	• Academic Anxiety	16-20
	• Effect of Academic Stress on Sleep Quality	21-25

Data Collection Technique

Data collection was carried out by distributing the questionnaire online through the WhatsApp application in the form of a Google Form to active students of FIKK UNY. The online questionnaire distribution was conducted over a period of 40 days.

Data Analysis Technique

1. Multiple Linear Regression

The purpose of multiple linear analysis is to determine the magnitude of the effect of the independent variables, namely training load (X_1) and academic stress (X_2), on the dependent variable, namely the sleep quality (Y) of sports students.

Multiple linear regression analysis may be formulated as follows:

$$Y = a + b_1X_1 + b_2X_2 + e$$

Notes:

Y = sleep quality

a = constant

b_1 = regression coefficient of training load

X_1 = training load

b_2 = regression coefficient of academic stress

X_2 = academic stress

e = other factors outside the influence of the variables

2. Descriptive Statistical Analysis

Descriptive statistical analysis is used to describe the characteristics of the research respondents.

Table 3. Respondent Characteristics

Characteristic	Category	Frequency (n)	Percentage (%)
Age	18 years	1	5%
	19 years	9	45%
	20 years	6	30%
	21 years	4	20%
Total		20	100%
Gender	Male	13	65%
	Female	7	35%
Total		20	100%
Athlete Status	Active athlete	8	40%
	Formerly an athlete	10	50%
	Not an athlete	2	10%
Total		20	100%

This study involved 20 respondents, with the majority aged 19 years (45%) and dominated by male respondents (65%). Based on athlete status, most respondents had formerly been athletes (50%), followed by active athletes (40%), while only a small proportion had never been athletes (10%).

RESULTS AND DISCUSSION

This study used the responses of active sports students of Yogyakarta State University, and those who completed this questionnaire were from the 2024-2025 cohorts. The total number of respondents obtained was 20 respondents, who came from 4 different study programmes: IKOR had 15 respondents, PKO 3 respondents, PJKR 1 respondent, and PJSD 1 respondent. The age range of the respondents was 19 to 21 years, with 13 male respondents and 7 female respondents.

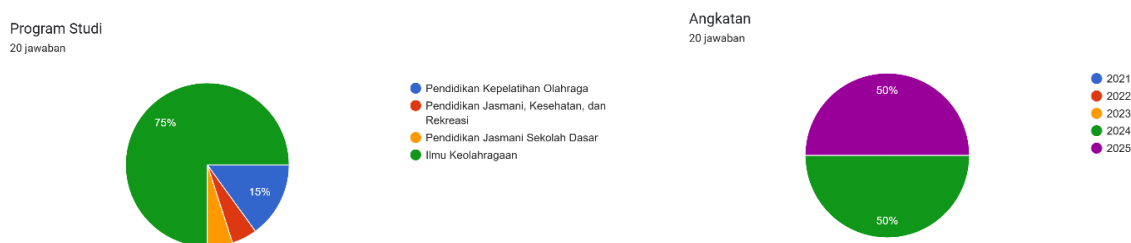


Figure 1. Participant Data

Once the data had been collected, the related analysis was carried out. The results obtained from the distribution of the questionnaire, which was conducted from 12 May 2026 to 20 June 2026, indicate that many respondents had their sleeping hours disturbed or impaired because of fairly high training and academic stress.

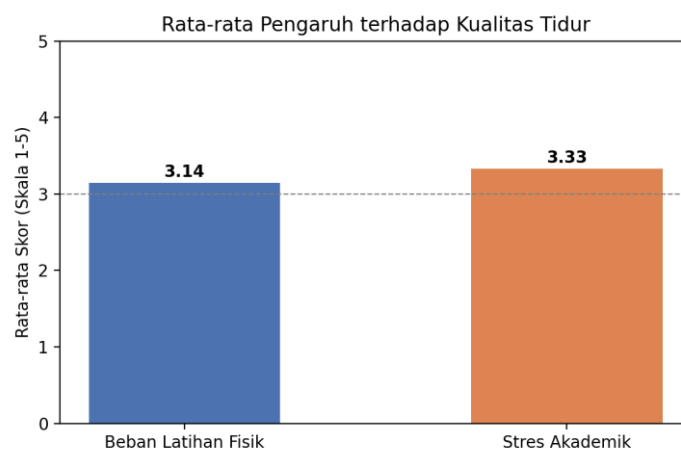


Figure 2. Comparison of the Mean Academic Stress and Physical Training Load in Relation to Sleep Quality

Based on Figure 2, it can be seen that academic stress has a higher effect on the disruption of students' sleep patterns than physical training load, with percentages of 3.14 (physical training load) against 3.33 (academic stress).

Questionnaire Results for the Training Load Variable

Table 4. The results of the descriptive analysis of the training load variable are presented in the following table.

Indicator	Item Number	Mean Score	Category
Training intensity	1-5	3,27	moderate
Physical impact after training	6-10	3,15	moderate
Training schedule	11-15	3,28	moderate
Bodily recovery and sleep quality	16-20	3,21	moderate
Effect of training load on sleep quality	21-25	2,80	moderate
Overall mean	1-25	3,14	moderate

Based on Table 4, the training load variable obtained an overall mean score of 3.14, in the moderate category. The indicator with the highest mean value was training schedule (3.28), whereas the indicator with the lowest mean value was the effect of training load on sleep quality (2.80). In general, these results show that the respondents had a training load level that was in the moderate category.

Questionnaire Results for the Academic Stress Variable

Table 5. The results of the descriptive analysis of the academic stress variable are presented in the following table.

Indicator	Item Number	Mean Score	Category
Academic assignment load	1-5	3,65	High
Academic pressure	6-10	3,20	moderate
Sleep disturbance due to academic assignments	11-15	3,37	moderate
Academic impact on sleep quality	16-20	3,35	moderate
Effect of academic stress on sleep quality	21-25	3,08	moderate
Overall mean	1-25	3,33	moderate

Based on Table 5, the academic stress variable obtained an overall mean score of 3.33, in the moderate category. The indicator with the highest mean value was academic assignment load (3.65), whereas the indicator with the lowest mean value was the effect of academic stress on sleep patterns (3.08). Overall, this shows that the respondents' academic stress level was in the moderate category.

DISCUSSION

The research results show that physical training load has a fairly high effect on the deterioration of respondents' sleep quality, with a mean of 3.14 out of a maximum scale of 5. Based on the available data, 80% of respondents were at the moderate level, which means that physical training load is fairly influential but not at a very high level that disturbs sleep significantly. According to the available data, the deterioration of sleep quality due to physical training load is more evident in the need to wake up earlier and in daytime sleepiness caused by fatigue, rather than in sleep disturbance at night. This means that physical training load shifts or shortens respondents' sleep more than it disrupts the continuity of the sleep itself. From this study, there are several ways to overcome the problem, one of which is by taking a nap. Napping has several positive benefits; experts state that napping can help reduce fatigue and help improve emotional balance [9]. In fact, several examples of research show that physical exercise also has a positive effect on sleep quality. As in this study, a significant relationship is shown between physical activity and sleep quality, in which a person who is active in physical activity has a greater chance of obtaining better sleep than a person who is less active or not active at all.

Academic stress shows a higher mean percentage of 3.33 compared with physical training load, with a far larger proportion of respondents in the high category, namely 30% against 15%. These results provide a picture that academic demands become a pressure that is far greater on respondents' sleep quality than physical exercise within this research population. The data show that the cause of the deterioration of sleep quality is assignment deadlines and the habit of staying up late to complete coursework, which become the main causes of the deterioration of respondents' sleep quality. The habit of thinking about assignments before sleeping also becomes one of the causes that disturbs the mind before sleep. Stress is the body's response in a situation that is considered threatening or beyond a person's ability to cope with it [2]. Matters that may become solutions or efforts to address academic stress include the provision of counselling services, time management training, the improvement of mental health literacy, and the formation of healthy sleep habits, which must be improved in order to balance academic demands and a person's sleep quality [10]. Completing assignments during the day or in the afternoon, once the assignment has been given, may also be adopted as a solution in order to avoid staying up late to complete assignments. In this way, sleep quality at night can be properly maintained.

The relationship data show that students who feel a high routine training load with high intensity also feel a high academic stress load, and the reverse also occurs. This relationship may be explained through the concept of dual burden, that is, a condition in which students with an athlete background must divide their time and energy between academic demands and physical training demands. When both demands increase simultaneously, rest time becomes limited, and this is also what causes sleep quality to deteriorate further.

CONCLUSION

The training load and academic load of sports students are classified as high, which contributes significantly to the high level of stress experienced by those students. Training load and academic load have a negative and significant effect on the sleep quality of sports students, in which a high load causes a decline in sleep quality. A heavy training load increases the physiological condition that makes it difficult for the body to relax and lengthens the time taken to fall asleep, whereas a complex academic load triggers excessive mental activity, which also disturbs sleep. The combination of a heavy training load and academic stress becomes a dual stressor that mutually reinforces the other, so that it has an adverse impact on the sleep quality and daily performance of sports students.

Sports students need to apply effective time management in order to balance academic obligations and training demands, so that the stress level is reduced and sleep quality is maintained. Education on the importance of "sleep hygiene" and of the post-training recovery process is strongly recommended in order to improve sleep quality and overall health. The faculty or educational institution should provide support in the form of stress management programmes and the improvement of awareness regarding the fulfilment of sleep quality for sports students. Further research may consider more specific interventions for regulating an optimal training load and academic load, in order to support the mental and physical health of sports students.

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AUTHOR CONTRIBUTION STATEMENT

The Author Contributions Statement can be up to several sentences long and should briefly describe the tasks of individual authors. Please list only 2 initials for each author, without full stops, but separated by commas (e.g. JC, JS). In the case of two authors with the same initials, please use their middle initial to differentiate between them (e.g. REW, RSW). The Author Contributions Statement should be included at the end of the manuscript before the References.

CONFLICT OF INTEREST AND FUNDING

There is no conflict of interest

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