

## PHYSICAL ACTIVITY AS FACTOR IN COPING WITH STRESS AMONG WORKING STUDENTS <sup>1</sup>

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**Abstract:** Stress is one of the major challenges students face during their education, and it is particularly pronounced among those who study and work simultaneously. Chronic stress can negatively affect work performance, focus, professional efficiency, and academic achievement. Physical activity is recognized in literature as an important protective factor that contributes to the preservation of psychophysical health and may mitigate the negative effects of stress. This study aimed to examine the association between physical activity and perceived stress among working students, with a particular focus on the frequency and type of physical activity. The study included 196 participants who were simultaneously students and employed. Perceived stress was assessed using the Perceived Stress Scale (PSS-10), and the data were analyzed using descriptive statistics, correlation analysis, the independent-samples t-test, and one-way analysis of variance (ANOVA). The results indicate that most working students are affected by a moderate level of stress, with the most common sources being the balancing of academic and work obligations and a lack of free time. Gender-based analyses showed that women report higher average levels of stress compared to men. Students who engage in regular physical activity exhibit significantly lower levels of perceived stress compared to those who exercise rarely or not at all, with group-based forms of physical activity being associated with lower stress levels. The findings highlight the importance of physical activity as a valuable resource for maintaining the mental health of working students and underscore the need to promote healthy lifestyle behaviors within the student population.

**Keywords:** *physical activity, stress, students, mental health*

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## INTRODUCTION

Contemporary lifestyles involve increasing demands in both educational and professional contexts, which particularly affect students who simultaneously manage academic and work obligations. This specific population faces significant challenges in balancing studies, employment, and personal life, often resulting in elevated levels of stress. Prolonged exposure to stress can have serious consequences for mental and physical health, including emotional exhaustion, anxiety, and burnout syndrome.

Stress is considered to be one of the major challenges of contemporary society, with consequences that can be physical, mental, and emotional. The period of study represents a dynamic and demanding stage of life during which students face numerous academic, social, and personal challenges. Prolonged exposure to stress may lead to physical and mental exhaustion, reduced work efficiency, and impaired psychological well-being.

To mitigate the effects of chronic stress, numerous studies highlight the importance of physical activity as an effective mechanism for stress regulation. Regular exercise contributes to the reduction of tension, improvement of mood, and enhancement of overall well-being through neurobiological and psychological mechanisms, including the regulation of stress hormones and the improvement of cognitive functions (Donnelly et al., 2024).

Although the relationship between physical activity and stress has been widely studied, working students, who are positioned at the intersection of academic and professional demands, remain a relatively underexplored population in this context.

The subject of this study is the examination of the correlation between physical activity and perceived stress among working students. The study aimed to investigate the relationship between physical activity and perceived stress in working students, with a particular focus on the frequency and type of physical activity.

## LITERATURE REVIEW

Stress is defined as any internal or external stimulus that elicits a biological response aimed at maintaining homeostasis (Yaribeygi et al., 2017). These stimuli, known as stressors, may be physical in nature, such as injuries, infections, or other bodily disturbances, but also psychological, including emotional tension, anxiety, conflicts, and everyday life challenges (Schneiderman et al., 2005).

The body's response to stress can be adaptive, enabling individuals to adjust to challenges; however, it may also have negative consequences when stress is intense, prolonged, or exceeds an individual's coping capacity (McEwen, 2007). Chronic exposure to stress has been associated with serious health problems, including cardiovascular diseases, mood disorders, insomnia, and impaired immune function (Chrousos, 2009; Lupien et al., 2009).

Working students face specific challenges due to the need to simultaneously fulfill academic and professional obligations, which often results in elevated stress levels. Within the student population, different types of stress can be identified: acute, chronic, and episodic acute stress.

Acute stress is typically short-term and related to immediate pressures, such as exam preparation or meeting work deadlines. Although it may have a motivating effect, repeated exposure to acute stressors increases the risk of progression to chronic stress (Folkman, 2013). Chronic stress develops when stressors are continuously present and lack a clear endpoint; examples include ongoing financial insecurity, shift work combined with studying, or insufficient social support (Salamonson et al., 2020). Working students often fall into this category as they strive to achieve academic and professional goals simultaneously, which may lead to overload and a loss of the sense of control (Clinciu & Cazan, 2014; Drăghici & Cazan, 2022).

Additional pressure arises from the role conflict, that is, the imbalance between the roles of student and employee. The demand to perform equally well in both roles can substantially increase psychological strain (Markle, 2015).

Psychological stress in this population most commonly originates from cognitive and emotional sources, such as perceived threats, chronic worries, and negative thought patterns. It is associated with academic expectations, work-related pressures, social comparisons, and self-imposed standards, and may manifest as anxiety, perfectionism, excessive rumination, and emotional exhaustion (Lazarus & Folkman, 1984; Lepping et al., 2021). In addition, stress involves physiological responses to disruptions of homeostasis, which may present as somatic complaints, sleep and appetite disturbances, and stress-related illnesses (Chu et al., 2025).

Given that working students represent a specific and vulnerable population, their stressors can be categorized into several main groups: academic, occupational, financial, and social. Academic stressors include course-work demands, short deadlines, and achievement pressure, which are further intensified by work obligations and difficulties in time management (Robotham & Julian, 2006; Rodic Trmcic et al., 2016). Occupational stressors encompass working under pressure, inflexible schedules, and interpersonal conflicts, while financial strain and reduced social support are common additional sources of burden (Butler, 2007; Regehr et al., 2013; Usman & Banu, 2019).

Personal factors such as perfectionism, low stress resilience, and poor time management and self-discipline may significantly contribute to increased perceived stress. Perfectionism, particularly when combined with high academic demands, is associated with elevated academic stress (Kim et al., 2017). In contrast, inadequate time management has been identified as one of the key sources of stress among working students (Lovin & Bernardeau-Moreau, 2022). Furthermore, self-esteem and sleep quality have been identified as important indicators of stress levels (Alotaibi et al., 2020). Anxiety has been shown to negatively affect academic performance (de Filippis & Foyssal, 2024), while poor sleep quality is associated with higher stress levels, depression, and impaired mental health (Riemann et al., 2020).

Certain professional groups experience particularly high levels of stress, especially under conditions of increased job demands, responsibility, and emotional burden. Research indicates that chronic occupational stress can negatively affect psychological well-being, job satisfaction, and the quality of task performance, as well as increase the risk of burnout (Bartkowiak et al., 2022; Gmayinaam et al., 2024; Jaracz et al., 2017). Although stress may also have an adaptive function, prolonged exposure to stressors predominantly leads to adverse psychological and physical outcomes (McEwen, 2007).

Among stress-reduction strategies, physical activity stands out as one of the most effective. At the biological level, exercise contributes to the regulation of the neuroendocrine stress response, while at the psychological and social levels it enhances a sense of control, self-confidence, and social connectedness (Nguyen-Michel et al., 2006; Salmon, 2001; Strehli et al., 2021). Research confirms that even moderate forms of physical activity can significantly reduce perceived stress and improve mental well-being in the student population (Erdoğan Yüce & Muz, 2020; Leis & Lautenbach, 2020).

## METHOD

Data collection was conducted with the approval of the Ethics Committee of the College of Sports and Health, approval number 243/25, confirming that all ethical research standards were met. The study was carried out via an online survey with the aim of obtaining a representative sample of working students from different levels and fields of study. Google Forms was used to design and distribute the questionnaire, and the survey instrument was available from May 12 to May 26, 2025. The link to the questionnaire was shared through student forums and mailing lists, enabling broader participation of the target population and increasing the accessibility of the survey to potential respondents.

### Instrument

The questionnaire used in this study was structured into four sections. The first section collected participants' demographic information, the second focused on habits and motives related to physical activity, the third assessed perceptions of the effects of physical activity on stress, and the fourth included the Perceived Stress Scale (PSS).

The independent variables included participants' demographic characteristics (gender, age group, education level, employment status), physical activity habits (frequency and type of physical activity), and participants' attitudes regarding the perceived effects of physical activity on stress levels.

Physical activity habits were assessed on two levels. First, participants reported their current frequency of engaging in physical activity using three categories: never, occasionally, and regularly. This variable was used to provide a general description of physical activity habits in the sample. Physical activity frequency was further exam-

ined using more precise categories reflecting the number of training sessions per week: never, 1–2 times per week, 3–4 times per week, and  $\geq 5$  times per week.

Participation in specific types of physical activity was assessed using a multiple-choice question that allowed participants to select more than one option. The offered categories included walking, running, gym/fitness training, yoga, cycling, swimming, team sports, and combat sports/martial arts (boxing and karate). This variable was treated as nominal, and the results were presented using descriptive statistics.

Motivation for engaging in physical activity was assessed by selecting one of the offered motives, including social interaction and companionship, physical appearance, psychological relief, health-related reasons, habit and routine, stress reduction, and competition. The selected motives were used in descriptive analyses to determine their prevalence in the studied population.

Sleep quality was assessed using a single question with the following response options: “I do not sleep well at all”, “I occasionally sleep well”, “I usually sleep well” and “I always sleep well”. For analytical purposes, the responses “I occasionally sleep well” and “I usually sleep well” were combined and coded as 2, while “I do not sleep well at all” and “I always sleep well” were coded as 1 and 3, respectively. This variable was treated as ordinal.

Barriers to regular physical activity were examined using a multiple-choice question that allowed participants to select more than one response. The offered categories included lack of time, fatigue after work or study, lack of motivation, and other reasons.

Perceptions of the effects of physical activity on stress were assessed using a specially designed question within the questionnaire, allowing participants to select multiple responses. The offered categories included health preservation and improvement, stress reduction, psychological relief, the improvement of physical appearance, the establishment of a daily routine, and social interaction.

The PSS-10 scale, developed by Cohen and colleagues (Cohen et al., 1983; Cohen & Williamson, 1988), was used to assess subjective stress levels during the previous month and served as the dependent variable. The reliability of the original scale is considered satisfactory (Cronbach’s  $\alpha \approx 0.78$ ) (Cohen & Williamson, 1988).

In the present study, the internal consistency of the PSS-10 scale was high, with a Cronbach’s  $\alpha$  of 0.84. PSS-10 score ranges were used solely for descriptive interpretation of perceived stress levels (0–13 low, 14–26 moderate, 27–40 high) (Antonijevic et al., 2020; Bhat et al., 2012; Campbell, 2024; Vanichkachorn, 2023), while the original numerical scores were used in all statistical analyses.

### **Data Analysis**

Data were analyzed using the statistical software IBM SPSS (version 20). Descriptive statistics included means, standard deviations, and frequencies. Differences in perceived stress levels between groups defined by the frequency of physical activity were examined using one-way analysis of variance (ANOVA), with the Tukey HSD post hoc test applied where appropriate. Differences in PSS scores between genders were assessed using an independent-samples t-test.

Differences in perceived stress levels in relation to the type of physical activity were also examined using one-way ANOVA. Because participants were able to select multiple types of physical activity, a variable representing the dominant type of physical activity was created. In cases where multiple activities were reported, participants were assigned to the category with the higher hierarchical priority. The hierarchy of activities was defined based on their approximate intensity, in accordance with the MET classification of physical activity (CDC, 2025).

The association between PSS scores and sleep quality was assessed using Spearman’s correlation coefficient. Statistical significance was set at  $p < 0.05$ .

### **Sample**

The sample was formed using a convenience sampling method and included working students enrolled in undergraduate and master’s programs at the College of Sports and Health, Belgrade. Participants were students who were employed, including those in full-time employment, part-time employment, or occasional freelance engagements. The total sample consisted of 196 participants. The demographic characteristics of the participants are presented in Table 1.

**Table 1.** Demographic characteristics of participants

Variable	Option	Number (n)	Percentage (%)
Gender	Male	46	23.5
	Female	150	76.5
Age group	Up to 20 years	20	10.2
	21–25 years	73	37.2
	26–30 years	26	13.3
	Over 30 years	77	39.3
Current level of education	Professional Master’s studies	49	25.0
	Professional Undergraduate studies	147	75.0
Employment status	Full-time employment	132	67.3
	Part-time employment	21	10.7
	Freelance or occasional employment	43	21.9
Weekly working hours	Up to 10 h	23	11.7
	11 - 20 hours	62	31.6
	Over 30 hours	111	56.6
Type of employment	In the field of study	123	67.6
	Outside the field of study	69	32.4

## RESULTS

The overall level of perceived stress was assessed using the PSS-10 scale. Based on the participants’ responses, the mean total score was  $M = 19.33$ , with a standard deviation of  $SD = 6.57$ .

The most common sources of stress among working students are presented in Table 2.

**Table 2.** Most common sources of stress among working students

Sources of stress	Responses	
	N	Percentage
Work	122	28.3%
Lack of time	90	20.9%
Academic obligations	91	21.1%
Financial issues	55	12.8%
Family issues	50	11.6%
Health issues	18	4.2%
No sources of stress	5	1.2%
Total	431	100.0%

Regarding the perceptions of the effects of physical activity on stress, participants who were regularly physically active more often reported physical activity as an effective mechanism for stress management. As many as 61.9% of participants cited psychological relief as one of the main motives for engaging in physical activity, while 29.1% highlighted stress reduction as a direct reason for participation. Other motives included health (80.4%), appearance (55%), and habit/routine (23.8%), whereas only a small proportion (6.3%) viewed physical activity primarily as a means of social interaction.

With respect to their employment status, the majority of participants (56.6%) worked full time, which, combined with their studies, indicates a substantial daily workload. In terms of physical activity frequency, the largest proportion of participants reported being physically active 1–2 times per week (35.1%), while 14.7% exercised five or more times per week.

The most frequently reported form of physical activity was walking (69.3%). The main barriers to regular exercise were lack of time (70.6%) and fatigue after work or study (57.8%).

Table 3 presents the mean (M) and standard deviation (SD) of the total perceived stress score (PSS-10), as well as average item scores, in relation to physical activity frequency.

**Table 3.** Perceived stress (PSS-10) in relation to physical activity frequency\*

Physical activity frequency	PSS-10 total score (M±SD)	Mean item score (M±SD)
Not physically active	21.52±7.33	2.15±0.73
1–2 times per week	19.84±6.53	1.98 ± 0.65
3–4 times per week	18.00±5.79	1.80 ± 0.58
≥5 times per week	18.21±6.73	1.82 ± 0.67
Total	19.32±6.57	1.93±0.65

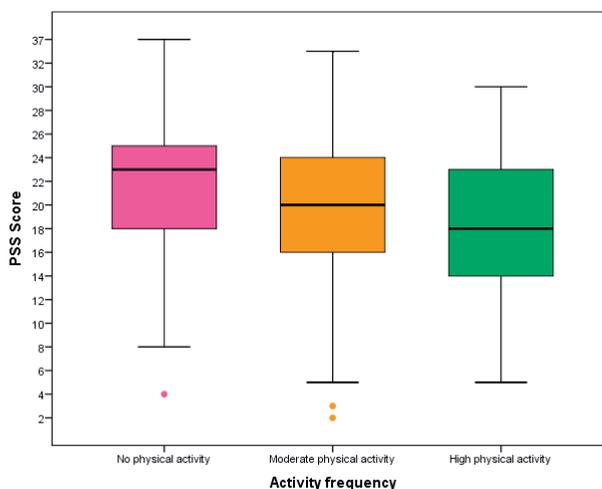
\* The PSS-10 consists of 10 items rated on a five-point Likert scale (0–4), with the total score obtained by summing the items (range 0–40). The mean item score was calculated by dividing the total PSS-10 score by the number of items.

A one-way ANOVA revealed a statistically significant difference in perceived stress between groups defined by physical activity frequency,  $F(3, 192) = 2.675, p = 0.049$ .

Tukey's HSD post hoc test showed that the statistically significant difference occurred between participants who were not physically active and those who exercised 3–4 times per week ( $p = 0.049$ ), while other between-group differences were not significant.

Figure 1 illustrates the distribution of perceived stress scores according to current physical activity engagement (never, occasionally, regularly), providing a visual overview of differences between groups.

**Figure 1.** Total perceived stress score (PSS-10; 0–40) in relation to physical activity frequency



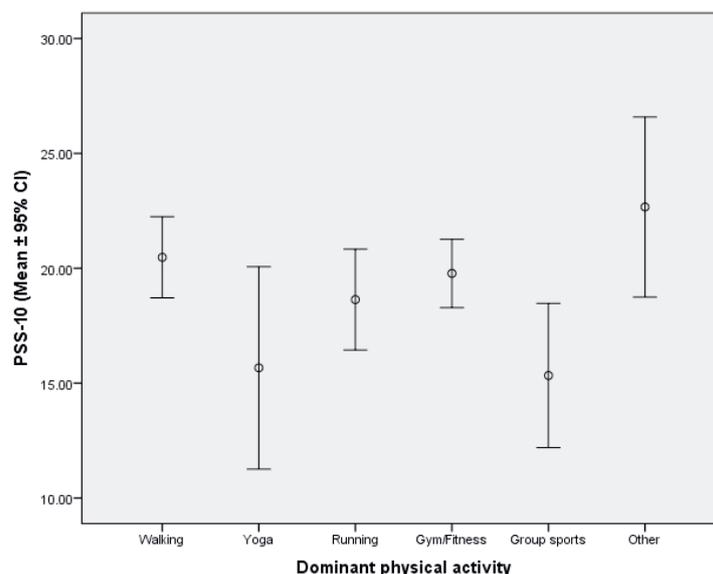
Regarding participation in specific physical activities, the largest proportion of respondents reported walking (68.9%), followed by gym/fitness training (46.4%), running (18.9%), yoga (8.7%), cycling (8.2%), swimming (4.6%), group sports (8.2%), and combat sports/martial arts (1%).

A one-way ANOVA showed a statistically significant difference in perceived stress levels according to the dominant type of physical activity ( $F(5,190) = 3.40$ ;  $p = 0.006$ ) (Table 4). Tukey's HSD post hoc analysis indicated that participants engaged in group sports had significantly lower PSS scores compared with those who predominantly practiced walking ( $p = 0.034$ ), as well as compared with participants classified in the other physical activities category ( $p = 0.028$ ). A graphical presentation of the mean PSS-10 scores by dominant type of physical activity is shown in Figure 2.

**Table 4.** Descriptive indicators of PSS scores by dominant type of physical activity

Activity	N	PSS-10, M (SD) [0-40]
Walking	63	20.48 (7.01)
Yoga	12	15.67 (6.93)
Running	33	18.63 (6.20)
Gym/Fitness	58	19.78 (5.67)
Group sports	18	15.33 (6.30)
Other physical activities	12	22.67 (6.17)

**Figure 2.** Mean PSS-10 scores with 95% confidence intervals by dominant type of physical activity



Gender-based analysis indicates that women report higher average stress levels than men (mean score 22.1 for women vs. 18.7 for men). An independent-sample t-test showed that women have significantly higher perceived stress than men ( $t(196) = -2.954$ ,  $p = 0.004$ ).

Spearman's correlation analysis revealed a statistically significant positive association between stress level and sleep quality ( $\rho = .26$ ,  $p < .001$ ,  $N = 196$ ), indicating that higher stress is associated with poorer sleep quality.

A one-way analysis of variance further showed a statistically significant difference in perceived stress levels across sleep quality groups ( $F(2,193) = 9.55$ ,  $p < 0.001$ ). The results indicate that participants who report poor sleep quality have the highest mean PSS scores, while the lowest scores are observed among those who report always sleeping well.

## DISCUSSION

The results of this study indicate that the majority of employed students perceive a moderate level of stress, with the most common sources being the need to balance work and academic obligations and a lack of free time. Gender-based analysis shows that women report higher average stress levels than men, which is consistent with previous research (Cohen et al., 1983; Gerber & Pühse, 2009).

One of the key findings of this study is the confirmation of a negative association between the frequency of physical activity and the level of perceived stress. Students who engage in regular physical activity, particularly those exercising five or more times per week, report significantly lower mean scores on the PSS scale compared to those who are less active or do not engage in physical activity at all. This finding suggests a protective effect of regular physical activity in the prevention and reduction of stress among employed students. Occasional physical activity shows a trend toward stress reduction, although without reaching statistical significance.

The mechanisms through which physical activity contributes to stress reduction include neurobiological changes, such as increased endorphin release and reduced cortisol levels, as well as improvements in perceived control, self-confidence, and coping capacity when facing everyday challenges (Salmon, 2001; Strehli et al., 2021). Regular exercise does not necessarily have to involve structured training; even moderate activities such as walking, cycling, recreational sports, or household tasks can contribute to lower stress levels and improved emotional balance.

The sample included the following categories of dominant physical activity: walking, yoga, running, gym/fitness training, group sports, and other activities. The results indicate that participants engaged in group sports report significantly lower levels of perceived stress compared to those involved in certain other forms of physical activity. This finding may be explained by the combined effects of physical exertion and social interaction that characterize group sports. In addition to the physiological benefits of physical activity, group sports provide social support, a sense of belonging, and shared goals, all of which may facilitate more effective stress coping (Burke et al., 2006). Furthermore, the structured nature and clear organization of group training may contribute to better stress regulation compared to individual, less structured forms of physical activity. These findings are consistent with previous studies showing that physical activity involving social interaction may have a stronger protective effect on mental health than individual exercise modalities (Burke et al., 2006; Johnston et al., 2021; Teh & Rajkumar Krishnan, 2022).

The association between sleep deprivation and increased stress levels is consistent with previous findings indicating that higher stress is accompanied by poorer sleep quality, further underscoring the importance of psychological factors for overall well-being (Meng et al., 2025). The present results show that poorer sleep quality is associated with higher levels of perceived stress. Participants who reported not sleeping well had significantly higher PSS scores compared to those who reported good sleep quality. This finding aligns with earlier studies pointing to a bidirectional relationship between stress and sleep disturbances, whereby elevated stress levels can impair sleep quality, while poor sleep further increases vulnerability to stress (Almojali et al., 2017; Herawati & Gayatri, 2019). The results of this study further confirm the importance of sleep quality as a key factor in the regulation of perceived stress.

The findings also highlight important practical implications for the promotion of mental health among employed students. Programs that encourage regular physical activity, particularly group-based exercise, may contribute to strengthening psychological resilience, reducing perceived stress, and improving coping with academic and work-related demands. These results are consistent with previous research demonstrating the positive psychological effects of regular exercise, including reductions in stress, anxiety, and depressive symptoms (Cohen et al., 1983; Gerber & Pühse, 2009; Salmon, 2001).

The limitations of this study include reliance on self-reported measures of physical activity frequency and perceived stress, which may be subject to bias, as well as the fact that the sample consisted exclusively of employed students, limiting the generalizability of the findings to the broader population. Nevertheless, the results provide valuable guidance for the implementation of physical activity-based strategies as effective tools for stress reduction in this population.

## CONCLUSION

The aim of this study was to examine the association between the frequency of physical activity and the level of perceived stress among employed students, a population simultaneously exposed to academic and work-related demands. Based on data collected from 196 participants, a statistically significant negative association was identified between the frequency of physical activity and the level of perceived stress. Students who engaged in physical activity 3–4 times per week reported lower levels of perceived stress compared to those who did not exercise, exercised occasionally, or engaged in physical activity very frequently.

The results further indicate that participants involved in group-based forms of physical activity had lower average levels of perceived stress compared to some other types of physical activity, suggesting the potential importance of the social component of physical activity in stress regulation. These findings confirm that physical activity is not only a means of maintaining physical health but also an important resource for the prevention and reduction of psychological stress, as well as for strengthening resilience and coping more effectively with multiple obligations.

The practical implications of this study are reflected in the potential application of the findings to the development of support programs for employed students, through the promotion of regular and accessible physical activity and through institutional initiatives that facilitate the balance between academic, professional, and personal responsibilities. Higher education institutions and employers may use these findings as guidelines for improving students' mental well-being.

On a theoretical level, this research contributes to the literature in the fields of health psychology and physical activity by providing an insight into the patterns of association relevant to the contemporary academic–work context. Although certain limitations exist, such as the subjectivity of self-reported measures and the lack of longitudinal follow-up, the results provide a solid foundation for future research and the development of targeted preventive strategies. The scientific relevance of this study lies in its focus on the population of employed students, while its professional relevance is reflected in the potential for practical application of the findings in educational and work-related environments.

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