SPORT TK-EuroAmerican Journal of Sport Sciences

https://revistas.um.es/sportk Online ISSN: 2340-8812

Received: **06/04/2025.** Accepted: **15/08/2025.** Published: **03/12/2025**

Physical activity as a stressbuster: Insights from university students

Redhwan Ali Esmail Mohammed*

Head of Humanities Department, University Preparation Program, Dar Al Uloom University, Riyadh, Kingdom of Saudi Arabia.

* Correspondence: Redhwan Ali Esmail Mohammed; redhwan.m@dau.edu.sa

ABSTRACT

The aim of this study was to investigate how university students' psychological stress can be reduced by physical activity. Using a stratified random sampling technique, 580 students (52.93% males and 47.07% females) were chosen from three private institutions in Riyadh, Saudi Arabia. Participants were emailed a questionnaire with 20 questions that was created based on prior research. The findings indicated that exercise positively influenced mood, reduced anxiety and depression, improved focus, and enhanced overall quality of life. Physical activity was also found to lower psychological stress and support mental health. Differences in responses were observed across gender, academic level, and college, with male students reporting slightly higher mean scores than females. Statistical analysis revealed significant gender differences ($\alpha \leq 0.05$) in perceptions of the role of physical activity in reducing psychological stress, favoring male students. This study highlights the importance of physical activity in helping university students manage psychological stress and emphasizes the necessity of integrating and promoting physical activity programs within the campus setting.

KEYWORDS

Physical Activity; Psychological Stress; Mental Health; Students

1. INTRODUCTION

Mental health is an essential and integral part of public health, enabling individuals to devote their abilities, adapt to various stressors, and gain a better understanding of their lives. Nevertheless, mental health disorders constitute a serious burden on societies. The World Health Organization indicated that about 400 million people worldwide of all ages suffer from depression, which may lead in the most severe cases to suicide (WHO, 2018)

High levels of stress associated with social relationships, academic achievement, and life changes are among the difficulties that come with being a college student. Students' mental health may suffer because of these pressures, which may result in elevated anxiety and depression symptoms (Deng et al, 2024)

The importance of physical movement in fostering mental health and well-being is becoming more widely acknowledged, especially for college students who frequently deal with heavy social and academic demands. Regular physical activity has been demonstrated to boost mood, reduce psychological stress, and increase life satisfaction in general. According to research, exercise can cause the production of endorphins, which are neurotransmitters that function as natural stress reliever by lowering emotions of anxiety and depression. (Stults et al, 2014; Zhou et al, 2023). Recent studies have contributed to the growing body of evidence supporting the positive effects of physical activity on psychological stress among college students. For example, a study by Anderson et al. (2023) examined the relationship between physical activity and stress levels in a sample of college students and found that higher levels of physical activity were associated with lower perceived stress.

University students' academic performance and stress management are positively impacted by physical activity, according to an increasing number of studies. According to one study, especially during the COVID-19 pandemic, leisure-time physical activity dramatically lowers both functional and non-functional stress, improving recovery experiences and perceived academic performance (Teuber et al., 2024). Furthermore, studies on overweight and obese students showed that those who exercise moderately to vigorously are more likely to use active stress management techniques, which lowers stress levels (Lepping et al., 2023). Additionally, a comprehensive analysis found that important social and environmental factors, like time constraints and academic expectations, affect university students' levels of physical activity, which in turn affects their stress levels (Brown et al., 2024). Together, these findings underscore the critical role of physical activity in promoting mental well-being and academic success in this population.

Another notable study by Johnson et al. (2024) explored the impact of different types of physical activity on stress reduction among college students. The findings revealed that both aerobic exercises, such as running or cycling, and mind-body activities, such as yoga or tai chi, were effective in reducing stress levels. Moreover, the study highlighted the importance of incorporating physical activity into the daily routine of college students to maintain long-term benefits for stress management.

In general, the role of physical activity in overcoming psychological stress among college students has gained significant attention in recent research. The studies reviewed in this introduction highlight the positive impact of physical activity on reducing stress levels among college students. However, further research is needed to explore the optimal types, durations, and intensities of physical activity that yield the most significant benefits for stress management. By incorporating physical activity into the lives of college students, educational institutions can support their mental well-being and contribute to their overall success.

2. METHODS

2.1. Participants

In a study investigating how exercise can help university students' deal with psychological stress, 1,640 male and female students who exercised at least three days a week made up the population. A stratified random sampling technique was used to choose a sample representing 30% of the population. Three private universities were represented among the participants: Prince Sultan University, Dar Al Uloom University, and Al Yamamah University. There were 273 females and 307 males among the 580 people in the final sample. The study adhered to moral guidelines, including obtaining informed consent from participants, ensuring confidentiality, and addressing any potential risks or discomfort associated with the study.

2.2. Instrument and Procedure

A questionnaire was designed to measure the role of physical activity in reducing psychological stress. The questionnaire consisted of 20 questions directed towards the students, and its design was informed by previous studies in the field, such as Anderson (2023),Atiyah (2022), Chang et al. (2022), Gerber et al. (2015), Margolis et al. (2021), and Kanabain (2015). The questionnaire was presented to a group of experts, including nine people with PhDs in sports psychology, to establish content validity and confirm the questionnaire's validity. Changes were made in response to their suggestions. A test-retest approach was then used to evaluate the questionnaire's reliability on a sample of 17 students who were not included in the first sample. An appropriate degree of reliability for carrying out this investigation was attained by the reliability coefficient, which came to 0.89. The questionnaire was sent via email to the study sample between April 15, 2023, and May 15, 2023. Responses were received from the participants.

A Likert scale was used to measure the students' responses to the questionnaire. The three-point Likert scale was adopted, with the following interpretations: 2.5 or lower indicates weak agreement,

2.5-3.99 indicates moderate agreement, and 4.00 or higher indicates strong agreement. Statistical analysis: Once the data was collected, data analysis was applied using appropriate statistical analysis methods.

2.3. Statistical Analysis

Descriptive statistics, including frequencies, percentages, means, and standard deviations, were calculated to summarize the demographic characteristics of the sample and students' responses regarding the role of physical activity in overcoming psychological stress.

To examine differences in responses based on gender, independent-samples t-tests were conducted. Comparisons across academic major (faculty) and academic level (year of study) were analyzed using one-way analysis of variance (ANOVA) to identify any significant variations between groups. The level of significance was set at $\alpha \leq 0.05$.

3. RESULTS

The table below presents the demographic and academic distribution of the participants in the study. It includes information on gender, academic major, and year of study, providing a clear overview of the main characteristics of the sample.

Table 1. Demographic results of study participants

Variables		**Frequencies**	**Percentage**
Gender	Male	307	52.93%
	Female	273	47.07%
Major	Science Faculty	235	40.51%
	Humanities Faculty	345	59.48%
Academic Levels	First Year	132	22.75%
	Second Year	141	24.31%
	Third Year	110	18.97%
	Fourth Year	97	16.72%
Total		**580**	**100%**

The sample consisted of 580 students, with slightly more males (52.93%) than females (47.07%). Most students were from the Humanities Faculty (59.48%) compared to the Science Faculty (40.51%). Regarding academic level, the largest groups were second-year students (24.31%) and first-year students (22.75%), while third- and fourth-year students comprised smaller proportions. Table 2 presents the mean scores and standard deviations of students' responses regarding the role of physical activity in overcoming psychological stress.

Table 2. Students' responses on the role of physical activity in overcoming psychological stress

No.	Question	Mean*	SD	Level of Agree	Rank
1	Do you feel an improvement in your mood after engaging in physical activity?	4.15	0.85	Strongly Agree	5
2	Do you experience anxiety or depression, and does physical activity help alleviate them?	4.14	0.75	Strongly Agree	6
3	Do you feel an improvement in your concentration and focus after engaging in physical activity?	4.13	0.86	Strongly Agree	7
4	Have you noticed an improvement in your physical endurance and perseverance after engaging in physical activity?	4.12	0.89	Strongly Agree	8
5	Do you believe that physical activity helps improve your self-confidence and enhance your self-image?	4.06	0.84	Strongly Agree	13
6	Do you feel an improvement in the quality of your sleep after engaging in physical activity?	4.09	0.85	Strongly Agree	10
7	Do you believe that physical activity contributes to reducing daily stress?	4.02	0.80	Strongly Agree	16
8	Do you feel an increase in your energy level and vitality after engaging in physical activity?	4.07	0.86	Strongly Agree	12
9	Have you noticed an improvement in your physical flexibility after engaging in physical activity?	4.08	1.17	Strongly Agree	11
10	Do you feel an improvement in your overall quality of life after engaging in physical activity?	4.05	0.86	Strongly Agree	14
11	Have you noticed a reduction in psychological stress levels after engaging in physical activity?	4.16	0.66	Strongly Agree	4
12	Do you feel that engaging in physical activity helps you control the level of psychological pressure you face?	4.24	0.79	Strongly Agree	2

No.	Question	Mean*	SD	Level of Agree	Rank
13	Do you believe that physical activity helps improve your focus and academic achievement?	4.33	0.84	Strongly Agree	1
14	Do you feel that physical activity helps you achieve a balance between academic and personal life?	4.04	0.81	Strongly Agree	15
15	Do you believe that engaging in physical activity plays a role in improving mental health and reducing psychological stress among university students?	4.00	0.85	Strongly Agree	17
16	Do you believe that engaging in physical activity contributes to improving overall mental health?	3.93	0.88	Strongly Agree	20
17	Do you prefer engaging in physical activity individually or joining a group exercise or sports activity?	4.10	0.87	Strongly Agree	9
18	Do you feel that engaging in physical activity reduces psychological anxiety?	4.22	0.71	Strongly Agree	3
19	Does engaging in physical activity make you feel happier?	3.96	0.92	Agree Moderately	19
20	Do you feel that engaging in physical activity brings you tranquility?	3.98	0.87	Agree Moderately	18

Table 2 showed that the mean scores for Questions 1 to 18 ranged from 4.02 to 4.33, indicating a high level of agreement (“Strongly Agree”) among the students. In contrast, Questions 19 and 20 received moderately positive responses.

Table 3 presents the results of the survey on the role of physical activity in overcoming psychological stress, specifically examining the variables of gender, college, and academic level. The table includes the levels of each variable, the frequencies of respondents in each level, the mean scores, and the standard deviations.

Table 3. Students' responses on the role of physical activity in overcoming psychological stress (gender, college, academic level)

Variables	Levels	Frequencies	Mean	SD
Gender	Male	307	4.20	0.660
	Female	273	4.02	0.581
College	Science Faculty	235	4.19	0.609
	Humanities Faculty	345	4.22	0.538
Academic Level	First Year	132	4.02	0.567
	Second Year	141	4.13	0.752
	Third Year	110	4.08	0.690
	Fourth Year	97	4.11	0.642

The results show small differences across groups. Male students reported slightly higher mean scores (M = 4.20) compared to female students (M = 4.02). Students from the Humanities Faculty showed a marginally higher mean (M = 4.22) than those from the Science Faculty (M = 4.19). Across academic levels, mean scores were similar, ranging from 4.02 to 4.13, indicating generally high and consistent responses among all year groups. Overall, all groups demonstrated high agreement with relatively low variability (SD ≈ 0.54–0.75). Table 4 presents the results of the t-test conducted to find differences between the means of responses from the study sample based on the gender variable.

Table 4. Differences between the means of responses based on gender variable

Variable		Count	Mean	DS	t-value	p value
Gender	Male	307	4.20	0.660	2.867	*0.003
	Female	273	4.02	0.581		

Table 4 indicates the presence of statistically significant differences at ($\alpha \leq 0.05$) level of significance between the means of male and female participants regarding the questionnaire assessing the role of physical activity in reducing psychological stress among university students. These differences favor males. This can be attributed to the fact that males engage in physical activities more than females on campus and in the recreational activities organized by the university. As a result, they have a greater awareness of the role of physical activities in reducing psychological stress.

4. DISCUSSION

The study aimed to understand the role of physical activity in reducing psychological stress among university students. As well as identifying differences in the role of physical activity in reducing psychological stress among university students according to the variables of gender, college, and academic level.

These questions assess various positive effects of physical activity on mood, anxiety and depression, concentration and focus, physical endurance and perseverance, self-confidence and self-image, sleep quality, stress reduction, energy levels, physical flexibility, overall quality of life, and the ability to control psychological pressure. The standard deviations, ranging from 0.66 to 1.17, suggest some variability in responses, indicating that while the majority of students strongly agree, there is some variation in the extent of agreement. This is consistent with the results of a study conducted by Rodriguez Fernandez (2017) that physical activity and exercise are two major factors in an individual's perception of his quality of life, whether in the field of physical or psychological health. A study conducted by Garber et al. (2015) also indicated that physical activity and exercise are two major factors in an individual's perception of his quality of life, whether in the field of physical or psychological health.

Questions 19 and 20: For these questions, the mean scores are slightly lower, at 3.96 and 3.98, respectively. The agreement level is categorized as "Agree Moderately." These questions inquire about the effects of physical activity on happiness and tranquility. The standard deviations, 0.92 and 0.87, indicate a higher degree of variability in responses compared to the previous questions.

The rankings provided indicate the relative positions of each question based on the mean scores. The lower the ranking, the higher the mean score, suggesting higher agreement among the participants. Questions 13, 12, and 11 received the highest rankings, indicating the strongest agreement, while questions 16, 19, and 20 received the lowest rankings, indicating relatively lower agreement.

Overall, the results suggest that engaging in physical activity is perceived positively by the students surveyed, with a strong consensus on its benefits for mood improvement, anxiety and depression reduction, concentration and focus, physical endurance, self-confidence, sleep quality, stress reduction, energy levels, physical flexibility, overall quality of life, and control over psychological pressure. However, there is slightly less agreement regarding the effects on happiness and tranquility. These findings highlight the potential of physical activity as a valuable tool for managing psychological stress among university students. This is consistent with the results of many

studies, such as a study by Rodríguez-Romo (2022) that found relationships between students' physical activity level and their mental health status. The higher the total physical activity, the better their mental health scores. Most research suggests that exercise and physical activity are associated with a better quality of life and health outcomes (Penedo & Dahn, 2005).

The survey examined students' perceptions of the role of physical activity in overcoming psychological stress, considering differences in gender, college, and academic level. Overall, the results indicate a high level of agreement on the positive effects of physical activity. Male students reported a mean score of 4.20 with a standard deviation of 0.660, while female students had a slightly lower mean score of 4.02 and a standard deviation of 0.581, suggesting that both genders generally agree on the benefits, with males showing slightly higher agreement. Responses from students across different faculties were also high, with the Science Faculty reporting a mean of 4.19 (SD = 0.609) and the Humanities Faculty slightly higher at 4.22 (SD = 0.538), indicating strong agreement in both groups, with humanities students showing marginally greater endorsement of the positive effects of physical activity. Considering academic levels, first-year students had a mean score of 4.02 (SD = 0.567), second-year students 4.13 (SD = 0.752), third-year students 4.08 (SD = 0.690), and fourth-year students 4.11 (SD = 0.642), showing that students at all levels generally recognized the benefits of physical activity, with second-year students demonstrating the highest level of agreement. These findings illustrate a consistent perception among the study sample that physical activity plays a significant role in overcoming psychological stress, with only minor variations across gender, faculty, and academic level.

5. CONCLUSIONS

In conclusion, this study has shed light on the significant role of physical activity in overcoming psychological stress among college students. The findings consistently demonstrate that engaging in regular physical activity can effectively reduce stress levels and improve overall mental well-being. The positive impact of physical activity on stress reduction is attributed to various mechanisms, including the release of endorphins, the diversion of attention from stressors, and the enhancement of self-esteem and self-efficacy.

While this study provides valuable insights into the role of physical activity in overcoming psychological stress among college students, further research is needed to explore additional factors that may influence relationships. Longitudinal studies could investigate the long-term effects of physical activity on stress levels and mental well-being, considering individual differences and

contextual factors. Additionally, qualitative research could delve deeper into students' experiences and perceptions of using physical activity as a coping mechanism for stress.

The findings of this study strongly advocate for the inclusion of physical activity as a key component of stress management strategies for college students. By recognizing and prioritizing the link between physical activity and mental health, we can empower students to overcome psychological stress and thrive academically and personally.

6. RECOMMENDATIONS

It is recommended to design student-centered activity programs that incorporate group projects to enhance engagement and participation. Targeted initiatives should be developed to encourage higher levels of physical activity among women, while lectures and workshops can be organized to emphasize the mental health benefits of regular exercise. Conducting long-term research on the effects of physical activity on mental well-being is also important, alongside increasing sample sizes to include a more diverse range of students. Additionally, examining the influence of factors such as socioeconomic status can provide deeper insights, and strengthening collaboration between the departments of physical education and mental health services can ensure more integrated support for students.

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AUTHOR CONTRIBUTIONS

All authors listed have made a substantial, direct and intellectual contribution to the work, and approved it for publication.

CONFLICTS OF INTEREST

The authors declare no conflict of interest.

FUNDING

This research received no external funding.

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