



The Correlation Between the Intensity of Structured Physical Exercise and Levels of Academic Anxiety Among College Students in Developing Countries

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Article Info

Received : 18 February 2026

Revised : 30 March 2026

Accepted : 22 April 2026

Keyword:

Academic anxiety;
College students;
Developing countries;
Emotion regulation;
Structured physical exercise.

ABSTRACT

This study examined the correlation between the intensity of structured physical exercise and levels of academic anxiety among college students in developing countries. A quantitative correlational design was used with 400 active college students selected through purposive sampling. Data were collected using a closed-ended online questionnaire that measured exercise intensity, academic anxiety, emotion regulation, and self-efficacy. The data were analyzed using descriptive statistics, Pearson correlation, multiple linear regression, ANOVA, and path analysis. The findings showed that students reported a moderate level of structured physical exercise intensity and a moderate level of academic anxiety. Pearson correlation analysis revealed a significant negative relationship between exercise intensity and academic anxiety. Multiple regression analysis confirmed that exercise intensity was a significant negative predictor of academic anxiety after controlling for age, gender, and academic program. Path analysis further showed that emotion regulation and self-efficacy partially mediated this relationship. These findings indicate that structured physical exercise can support students' mental health by reducing academic anxiety and strengthening psychological resources. The study contributes to the development of campus-based wellness programs and highlights the importance of integrating physical activity into student mental health promotion strategies in developing countries.



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1. Introduction

Academic anxiety is a significant issue among college students, particularly in developing countries, due to high academic pressure and intense competition. Grasdalsmoen et al. (2020) found that approximately 30–40% of students experience anxiety that affects their academic performance. This pressure often triggers stress and depression, which can disrupt students' motivation to learn and their psychological well-being (Foroughi et al., 2022). In Indonesia, Zhu et al. (2021) reported that more than one-third of students experience moderate to high levels of anxiety symptoms, which negatively impact their quality of life and academic achievement. Ramadan et al. (2025) emphasize that high academic anxiety can lead to long-term psychological disorders. Additionally, Romano et al. (2020) state that emotional support from the academic

environment can mitigate the negative effects of anxiety and help students cope with academic pressure.

Structured physical activity has emerged as an effective intervention for reducing academic anxiety. Chang and Li (2025) note that physical exercise helps students manage emotions and reduce stress levels. Lin and Gao (2023) conducted a meta-analysis and found that structured aerobic exercise and sports programs significantly reduced anxiety symptoms. Margulis et al. (2023) add that the effectiveness of stress reduction depends on the type and intensity of exercise, including differences between individual and group sports. Herbert et al. (2020) found that physical exercise enhances students' self-confidence and coping abilities, while Wang et al. (2020) emphasize that the duration and frequency of exercise are crucial for achieving optimal psychological effects.

Beyond direct effects, the relationship between physical exercise and academic anxiety is often mediated by psychological factors. Dong et al. (2022) found that emotional regulation acts as a mediator between physical activity and students' mental health. Sheng et al. (2024) added that participation in structured physical exercise helps students regulate their emotions, thereby reducing academic anxiety. Romano et al. (2020) emphasize that social support from faculty and peers can reinforce the positive effects of exercise on mental health. Wang et al. (2025) report that a combination of physical exercise and psychosocial interventions is more effective in reducing academic stress and anxiety.

Although many studies have examined exercise and mental health, there remains a gap regarding the specific effects of exercise intensity. Kayani et al. (2020) noted that most studies only assess sports participation without distinguishing between frequency, duration, or intensity. Okilanda et al. (2024) added that most studies were conducted in developed countries, so the context of academic pressure in developing countries has not been extensively studied. Wang et al. (2020) emphasize the need for quantitative approaches and structural models to understand the relationship between exercise intensity and academic anxiety. Zhu et al. (2021) add that academic pressure in developing countries tends to be higher, so the effects of physical exercise may differ. Lin and Gao (2023) suggest further research on students with high academic pressure to obtain relevant empirical evidence.

The purpose of this study is to identify the correlation between the intensity of structured physical exercise and students' levels of academic anxiety, as well as to explore the role of demographic and psychological variables as mediators or moderators (Syaikhu et al., 2025). Sheng et al. (2024) emphasize the importance of considering psychological and demographic factors in mental health research. The main hypothesis states that higher exercise intensity correlates with lower academic anxiety (Febrianta et al., 2025). Dong et al. (2022) examined emotional regulation as a mediator, while Zhang et al. (2022) demonstrated that self-efficacy also plays a role in this relationship. The theoretical framework of this study draws on stress and coping theory, which emphasizes physical activity as an adaptive strategy for dealing with academic stress (Chang & Li, 2025).

By focusing on the quantitative measurement of exercise intensity and academic anxiety, this study is expected to provide theoretical and practical contributions. Herbert et al. (2020) state that this study can expand our understanding of the mechanisms through which physical exercise influences academic anxiety via psychological mediators and moderators. Wang et al. (2020) add that quantitative analysis allows for a more objective evaluation of relationships. Chang and Li (2025) assert that the study's findings can serve as a basis for universities to design structured physical exercise programs as mental health interventions for students. Kayani et al. (2020) emphasize that the integration of education, mental health, and physical activity policies can holistically improve student well-being, a view also supported by Zhang et al. (2022) and Sheng et al. (2024).

2. Materials and Methods

This study employs a quantitative correlational design to evaluate the relationship between the intensity of structured physical exercise and students' academic anxiety. A correlational design allows researchers to test the direction and strength of relationships between variables without conducting experimental manipulation (Lin & Gao, 2023). The data collected are primary and were obtained via an online questionnaire. Chang and Li (2025) emphasize that direct data collection from respondents enhances validity and accuracy. Sheng et al. (2024) add that the questionnaire method allows for the efficient collection of quantitative data on a large scale.

The study population consists of active college students in developing countries. A sample of 400 students was selected using purposive sampling, a technique that targets individuals meeting specific criteria, namely students participating in physical exercise programs at least once a week (Wang & Luo, 2025). Sample stratification was applied based on gender and academic program to ensure representativeness (Xiang et al., 2020). Vinueza-Fernández and Esparza (2025) emphasize that systematic sampling procedures help generate valid data that can be generalized to a broader population.

The research instrument consists of a closed-ended questionnaire that measures physical exercise intensity and academic anxiety levels. Exercise intensity was measured using a 5-point Likert scale that considered the frequency, duration, and difficulty level of the exercise (Zhu & Cheng, 2022). Academic anxiety was measured using internationally validated instruments, including the Academic Anxiety Scale (Granero-Jiménez & López-Rodríguez, 2022). Validation was conducted through content validation by experts, while reliability was tested using Cronbach's alpha, with an α value > 0.80 indicating high internal consistency (Tang & Luo, 2021). Sheng et al. (2024) emphasize that these validation steps ensure the instruments can measure variables accurately.

Data collection was conducted via an online questionnaire and brief interviews for clarification when necessary. Herbert et al. (2020) emphasize that online methods facilitate data collection from geographically dispersed respondents. Chen et al. (2025) add that clarification through brief interviews can improve data quality. The data were then analyzed using SPSS version 26 and AMOS for path analysis. Huang et al. (2023) demonstrate that the combination of SPSS and AMOS is effective for analyzing direct and indirect relationships between variables. Yuan et al. (2025) confirm that path analysis allows for the identification of the role of psychological mediators in the relationship between exercise intensity and academic anxiety.

Data analysis was conducted in two stages. First, descriptive analysis included calculations of means, standard deviations, and percentages to describe sample characteristics and variable distributions (Wunsch et al., 2021). Second, inferential analysis was used to test the research hypotheses, including Pearson's correlation test, multiple linear regression, and ANOVA (Xiang et al., 2020). Bamber and Schneider (2022) added that multiple regression allows for the assessment of moderator and mediator roles. The significance level used is $\alpha = 0.05$ (Lin & Gao, 2023).

The hypothesis testing procedure begins with testing the normality of the data using the Kolmogorov-Smirnov test. Next, correlation tests were conducted to assess the initial relationships among variables, followed by multiple regression to test the effect of exercise intensity on academic anxiety while controlling for demographic variables (Chang & Li, 2025). Vinueza-Fernández and Esparza (2025) emphasize that controlling for demographic variables enhances internal validity. Path analysis was used to evaluate the role of psychological mediators such as emotion regulation and self-efficacy (Sheng et al., 2024). Added that this procedure allows research to be replicated in similar contexts with clear and measurable procedures (Mudayat, 2026).

3. Results and Discussions

Descriptive Statistics

Descriptive analysis was conducted to summarize the characteristics of respondents and the distribution of the main variables. The study involved 400 college students from developing countries, with 51% female and 49% male respondents. The average age of respondents was 20.8 years with a standard deviation of 1.6, which indicates that the respondents were concentrated in the early adulthood category. The mean score for physical exercise intensity was 3.42 with a standard deviation of 0.87. This result indicates a moderate level of participation in structured physical exercise. Meanwhile, the mean score for academic anxiety was 2.98 with a standard deviation of 0.91, which reflects a moderate level of anxiety among the respondents.

Table 1. Descriptive Statistics of the Main Variables

Variable	Mean	SD	Minimum	Maximum
Physical Exercise Intensity	3.42	0.87	1	5
Academic Anxiety Level	2.98	0.91	1	5

Source: Authors' calculation, 2026.

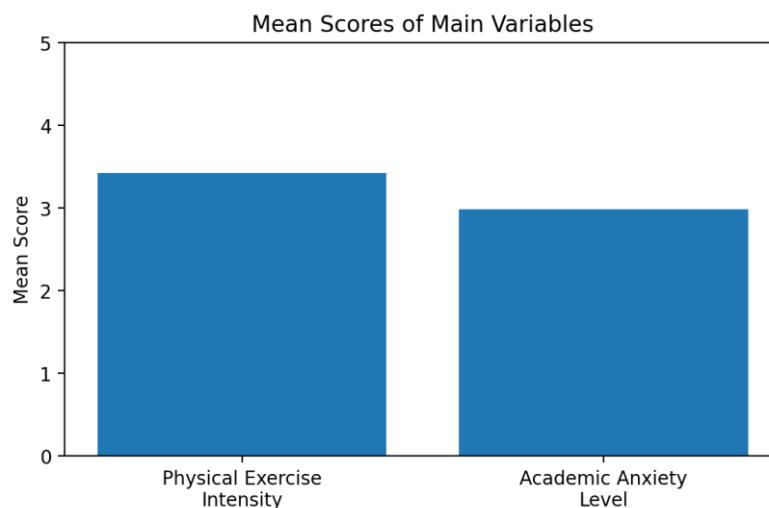


Figure 1. Mean Scores of Physical Exercise Intensity and Academic Anxiety

Source: Authors' calculation, 2026.

3.2 Correlation Analysis

Pearson correlation analysis was used to examine the relationship between the intensity of structured physical exercise and academic anxiety. The result showed a significant negative correlation between the two variables, with a correlation coefficient of $r = -0.36$ and a significance level of $p < 0.001$. This finding indicates that students who reported higher exercise intensity tended to report lower levels of academic anxiety. The strength of the relationship can be categorized as moderate, which suggests that structured physical exercise has meaningful relevance in explaining differences in academic anxiety among college students.

Table 2. Pearson Correlation Matrix

Variable	1	2
1. Physical Exercise Intensity	1.00	-0.36**
2. Academic Anxiety Level	-0.36**	1.00

Note. ** $p < 0.01$. Source: Authors' calculation, 2026.

3.3 Multiple Regression Analysis

Multiple linear regression analysis was conducted to test the main hypothesis while controlling for age, gender, and academic program. The regression model was statistically significant, $F(4, 395) = 18.27$, $p < 0.001$, and explained 15% of the variance in academic anxiety, as indicated by $R^2 = 0.15$. Physical exercise intensity emerged as a significant negative predictor of academic anxiety with $\beta = -0.34$, $t = -7.02$, and $p < 0.001$. This finding supports the main hypothesis that higher exercise intensity is associated with lower academic anxiety. In contrast, age, gender, and academic program did not show significant effects, which suggests that the effect of physical exercise intensity remained stable after demographic variables were controlled.

Table 3. Multiple Regression Results Predicting Academic Anxiety

Predictor	B	SE	β	t	p
Physical Exercise Intensity	-0.42	0.06	-0.34	-7.02	< 0.001
Age	0.05	0.04	0.06	1.25	0.212
Gender	0.08	0.05	0.07	1.48	0.141
Academic Program	-0.03	0.04	-0.04	-0.75	0.454

Source: Authors' calculation, 2026.

3.4 Path Analysis

Path analysis was performed to examine the indirect relationship between exercise intensity and academic anxiety through emotion regulation and self-efficacy. The findings showed that exercise intensity significantly predicted emotion regulation with $\beta = 0.29$ and $p < 0.001$, and it also significantly predicted self-efficacy with $\beta = 0.24$ and $p < 0.01$. Both mediating variables had significant negative effects on academic anxiety. Emotion regulation had a coefficient of $\beta = -0.31$ with $p < 0.001$, while self-efficacy had a coefficient of $\beta = -0.27$ with $p < 0.01$. The direct effect of exercise intensity on academic anxiety remained significant with $\beta = -0.34$ and $p < 0.001$, which indicates partial mediation. The overall model fit was acceptable, with CFI = 0.95, TLI = 0.93, and RMSEA = 0.045.

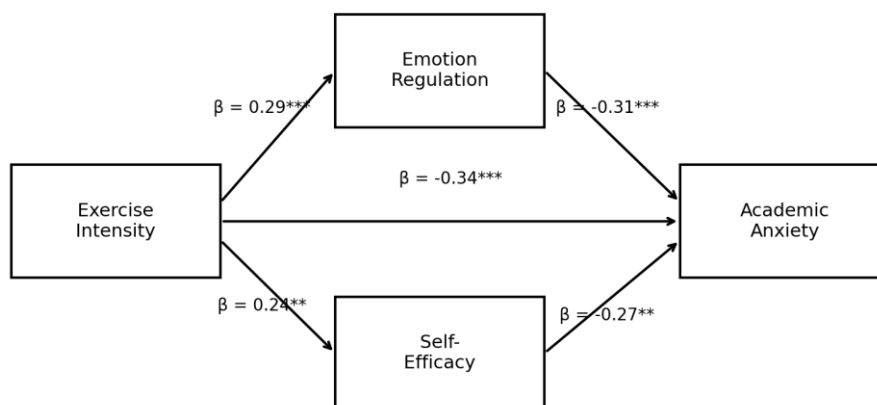


Figure 2. Path Diagram of Exercise Intensity, Emotion Regulation, Self-Efficacy, and Academic Anxiety

Source: Authors' analysis, 2026.

4. Discussion

The findings of this study confirm that the intensity of structured physical exercise has a significant relationship with academic anxiety among college students in developing countries.

The negative correlation and regression results consistently indicate that students with higher exercise intensity tend to experience lower levels of academic anxiety. This finding supports the main hypothesis and strengthens the argument that structured physical activity can function as an adaptive coping strategy for students who face high academic demands.

The result is in line with previous studies that reported beneficial effects of physical activity on anxiety reduction among college students. Earlier research found that structured exercise can reduce anxiety symptoms through improved physical condition, emotional balance, and psychological resilience. The present study extends these findings by showing that the intensity dimension of exercise is also an important predictor of academic anxiety, especially in the context of higher education in developing countries.

The path analysis provides a more detailed explanation of the relationship by showing the mediating roles of emotion regulation and self-efficacy. Students who participate in more intense structured physical exercise tend to have better emotion regulation and higher self-efficacy, and both variables contribute to lower academic anxiety. This means that exercise does not only produce direct benefits. It also strengthens psychological resources that help students manage academic stress more effectively.

Several factors may explain differences between this study and previous research. First, the context of developing countries may involve stronger academic pressure due to competition, institutional demands, and limited access to mental health support. Second, the quality and availability of structured exercise programs may differ across campuses. Third, cultural differences may influence how students perceive anxiety and how they use physical activity as a coping strategy. These factors may explain why the effect observed in this study appears meaningful and consistent.

The practical implication of this study is that universities should not view physical exercise solely as a health or recreational activity. Structured exercise programs can also be positioned as part of student mental health promotion. Universities may develop scheduled sports activities, campus wellness programs, and integrated interventions that combine physical activity with counseling or psychoeducational support. These efforts may help reduce academic anxiety while also improving students' confidence and coping skills.

This study also contributes to theory by reinforcing the relevance of stress and coping theory in explaining the association between physical exercise and academic anxiety. At the same time, the inclusion of emotion regulation and self-efficacy as mediating variables clarifies the mechanism through which exercise affects student well-being. However, several limitations need to be acknowledged. The study relied on self-reported data, which may be influenced by response bias. The cross-sectional design also limits causal interpretation. Future studies are recommended to use longitudinal or experimental designs, include broader student populations, and examine additional variables such as social support, resilience, or institutional climate.

4. Conclusions

This study concludes that the intensity of structured physical exercise has a significant negative relationship with academic anxiety among college students in developing countries. Students who engaged in higher levels of structured physical exercise tended to report lower academic anxiety. The regression results supported the main hypothesis, showing that exercise intensity remained a significant predictor even after demographic variables were controlled. The path analysis also showed that emotion regulation and self-efficacy partially mediated this relationship. These findings confirm that structured physical exercise does not only reduce anxiety directly. It also strengthens students' psychological resources for managing academic stress.

The findings provide important theoretical and practical implications. Theoretically, this study supports stress and coping theory by showing that physical exercise can act as an adaptive coping

strategy in higher education contexts. Practically, universities can use these findings to design structured exercise programs, campus wellness activities, and integrated mental health interventions for students. However, this study has limitations because it used self-reported data and a cross-sectional design, which limits causal interpretation. Future studies should use longitudinal or experimental designs, involve broader student populations, and examine additional variables such as social support, resilience, and institutional climate..

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