

Research Article

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Effects of Aerobic Exercise on Happiness Among University Students

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Background: University students may experience academic and social stressors that adversely affect psychological well-being and happiness. Aerobic exercise may provide an accessible strategy for promoting positive mental health. This study investigated the effect of a structured aerobic exercise program on happiness among female university students.

Methods: In this one-group pretest–posttest quasi-experimental study, 80 female students aged 18-22 years participated in a supervised aerobic exercise program. The intervention comprised 16 sessions over 8 weeks, with two 45-minute sessions per week, performed at approximately 60% of maximum heart rate. Happiness was assessed using the 29-item Oxford Happiness Questionnaire before the intervention and one month after its completion. Data were analyzed using descriptive statistics and a paired-samples t-test in SPSS version 24.

Results: Following the intervention, the proportion of students with high or very high happiness increased from 40.0% at baseline to 63.75%, while the proportion with low or moderate happiness decreased from 60.0% to 36.25%. The paired-samples t-test demonstrated a statistically significant improvement in happiness following the intervention ($t(79) = 8.02, P < 0.001$).

Conclusion: An 8-week supervised aerobic exercise program was associated with a significant improvement in happiness among female university students. These findings suggest that structured aerobic exercise may be a practical strategy for promoting psychological well-being in university settings. Further randomized controlled studies with larger samples and longer follow-up are warranted to establish causal effects and determine the sustainability of these improvements.

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Introduction

Subjective well-being and happiness are important dimensions of health that extend beyond the absence of disease and reflect positive psychological functioning and perceived quality of life. University students are particularly vulnerable to factors such as academic demands, social pressures, financial concerns, sedentary behaviors, and irregular lifestyles, which may adversely affect their psychological well-being. Recent evidence indicates that student well-being is shaped by interacting behavioral, psychological, social, and contextual factors [1].

Physical activity is a potentially modifiable behavioral factor associated with psychological health and well-being. Evidence from recent systematic reviews indicates that physical activity is generally associated with better mental well-being among university students, although the magnitude of these benefits may vary according to the type, intensity, and context of activity

[2]. Similarly, studies in university populations have reported positive associations between physical activity and subjective well-being [3]. Emerging evidence further suggests that these benefits may operate through psychological and social pathways, including physical self-esteem, psychological resilience, and social support [4-6].

Recent meta-analytic evidence also supports a positive relationship between physical activity and affective or subjective well-being at the within-person level [7,8]. Moreover, evidence from randomized controlled trials suggests that aerobic exercise can improve mood and other aspects of psychological functioning [9]. These findings highlight the potential value of structured aerobic exercise as a feasible strategy for promoting well-being in university settings. Additional studies have examined related dimensions of student health and well-being, including sleep and emotional well-being, the combined roles of physical activity and sleep in mental health, happiness across higher education settings and the relationship between exercise behavior and college students' mental health [10-13]. Evidence from sport participation

research also indicates potential mental-health and social benefits while sleep quality may be an important pathway linking exercise with well-being [14,15]. Research on physical fitness further supports an association between physical functioning and mental health in college students [16]. Studies among international students have similarly linked physical activity with psychological well-being and related outcomes, while social and contextual factors such as social media experiences and loneliness may also influence young adults' well-being [17,18]. Broader evidence on population happiness and domain-specific physical activity further supports the importance of considering behavioral and contextual determinants of psychological health [19,20]. Systematic reviews have also synthesized evidence on physical activity, mental health, and the roles of mediation and moderation [21]. Studies of changes in activity among international students sport participation, perceived stress and life satisfaction, social anxiety and depression provide additional evidence that physical activity is closely related to multiple aspects of psychological functioning [22-25]. Finally, broader theoretical work has considered the relationship between happiness and socioeconomic context [26].

Despite this growing evidence, much of the literature remains observational or focuses on broad measures of physical activity. Therefore, intervention-based studies examining the effects of structured aerobic exercise on happiness specifically remain valuable, particularly among female university students. Accordingly, this study investigated the effect of a structured eight-week aerobic exercise program on happiness among female students at the Islamic Azad University, Tehran Medical Sciences Branch. Happiness was assessed using the Oxford Happiness Questionnaire before and after the intervention. We hypothesized that participation in the aerobic exercise program would significantly improve students' happiness.

Materials and Methods

This quasi-experimental study used a one-group pretest–posttest design to investigate the effect of a structured aerobic exercise program on happiness among female students at the Islamic Azad University, Tehran Medical Sciences Branch, Tehran, Iran. A total of 80 female students aged 18–22 years were recruited using consecutive sampling. Participants were eligible if they had no history of depression, use of antidepressant or anxiolytic medications, physical disability or cognitive impairment that could interfere with exercise, previous participation in formal aerobic exercise programs, or involvement in a similar research study. All participants provided written informed consent.

Participants completed 16 supervised aerobic exercise sessions over 8 weeks, with two 45-minute sessions per week. The program was conducted in the university sports hall and consisted of weight-bearing aerobic exercise (walking/light jogging) and cycling on a cycle ergometer. Exercise intensity was maintained at approximately 60% of maximum heart rate. Participants were organized into groups of 10 solely to facilitate supervision and implementation of the intervention.

Happiness was assessed using the 29-item Oxford Happiness Questionnaire (OHQ), with higher scores indicating greater

happiness. The questionnaire was administered before the intervention and one month after completion of the exercise program. Demographic characteristics were also collected using a structured questionnaire.

Data were analyzed using IBM SPSS Statistics version 24. Continuous variables were summarized as mean $\pm$ standard deviation and categorical variables as frequencies and percentages. The normality of continuous data was assessed using the Kolmogorov–Smirnov test. Because the outcome was measured in the same participants before and after the intervention, changes in happiness were evaluated using the paired-samples t-test. A two-sided $P < 0.05$ was considered statistically significant.

The study was approved by the Ethics Committee of the Islamic Azad University, Tehran Medical Sciences Branch (Ethics Code: IR.IAU.TMU.REC.1393.112). Participation was voluntary, and written informed consent was obtained from all participants.

Results

A total of 80 female students participated in the study, and all participants completed the intervention and follow-up assessments. The participants were aged 19–22 years, with a mean age of 20.5 ± 1.2 years. Most students lived in their own homes (68.8%), while 31.2% lived in dormitories. The largest proportion of participants studied in the Faculty of Modern Sciences (63.7%), whereas the smallest proportion was enrolled in Health and Biomedical Engineering (5%). Half of the participants did not report their grade point average, while 8.8% reported a GPA above 18. Most participants reported no history of stress (87.5%), and none reported a history of disease or previous aerobic exercise.

Before the intervention, 3 students (3.75%) had low happiness, 45 (56.25%) had moderate happiness, 31 (38.75%) had high happiness, and 1 (1.25%) had very high happiness. After the intervention, the corresponding proportions were 1 (1.25%), 28 (35.0%), 47 (58.75%), and 4 (5.0%), respectively (Table 1). Thus, the proportion of students with high or very high happiness increased from 40.0% before the intervention to 63.75% after the intervention, whereas the proportion with low or moderate happiness decreased from 60.0% to 36.25%. The distribution of happiness categories differed significantly between the pre- and post-intervention assessments (χ^2 test, $P < 0.002$; Table 1).

The mean happiness score increased from 1.09 ± 0.27 before the intervention to 2.01 ± 0.30 after the intervention (Table 2). The paired-samples t-test demonstrated a statistically significant difference between the pre- and post-intervention happiness scores ($t(79)=8.02$, $P < 0.001$; Table 3), indicating a significant improvement in happiness following participation in the aerobic exercise program.

Overall, these findings demonstrate a shift toward higher levels of happiness following the intervention, with a substantial reduction in the proportion of students reporting low or moderate happiness and a corresponding increase in those reporting high or very high happiness (Table 1).

Table 1: Distribution of Happiness Levels Before and After the Aerobic Exercise Intervention

Happiness level	OHQ score	Before intervention, n (%)	After intervention, n (%)
Low	<22	3 (3.75)	1 (1.25)
Moderate	22–44	45 (56.25)	28 (35.00)
High	45–68	31 (38.75)	47 (58.75)
Very high	69–87	1 (1.25)	4 (5.00)
Total		80 (100.0)	80 (100.0)

Table 2: Descriptive Statistics of Happiness Scores Before and After the Intervention

Assessment	Mean	SD
Before intervention	1.09	0.27
After intervention	2.01	0.30

Table 3: Paired Comparison of Happiness Scores Before and After the Aerobic Exercise Intervention

Assessment	Mean	SD	t	df	P value
Before intervention	1.09	0.27	8.02	79	<0.001
After intervention	2.01	0.30			

Discussion

The present study found that an eight-week structured aerobic exercise program was associated with a significant improvement in happiness among female university students. Following the intervention, the proportion of students with high or very high happiness increased from 40.0% to 63.75%, while the mean happiness score increased significantly, with the paired-samples t-test indicating a statistically significant pre–post difference ($t(79)=8.02, P<0.001$). These findings support the hypothesis that regular aerobic exercise may contribute to improved happiness in university students.

Our findings are consistent with recent evidence linking physical activity with psychological well-being and subjective happiness. A systematic review among college students reported generally positive associations between physical activity and mental well-being, although the magnitude of the association varied according to activity characteristics and context [2]. Similarly, university-based research has identified a positive relationship between physical activity and subjective well-being [3]. Recent studies suggest that these effects may involve several psychological and social pathways, including physical self-esteem, psychological resilience, and social support [4–6].

The present findings are also supported by recent meta-analytic evidence. A positive association between physical activity and affective well-being at the within-person level, found a positive within-person association between daily physical activity and subjective well-being [7,8]. Furthermore, evidence from randomized controlled trials suggests that aerobic exercise can improve mood and other aspects of psychological functioning [9]. Together, these findings provide a plausible basis for the improvement in happiness observed in the present study. The broader literature also indicates that exercise may interact with sleep, physical fitness, stress, social support, and other contextual factors in shaping student well-being, while population-level and socioeconomic perspectives suggest that happiness is influenced by wider contextual conditions [10–26].

Several mechanisms may explain this relationship. Aerobic exercise may promote positive affect, improve physical self-perception, enhance sleep, reduce psychological distress, and strengthen psychological resources that support well-being.

However, because the present study used a one-group pretest–posttest design without a control group, causal conclusions should be interpreted cautiously. Other factors occurring during the study period may have contributed to the observed improvement. In addition, the relatively small sample, inclusion of female students from a single university, and limited follow-up period may restrict the generalizability and assessment of the long-term effects.

Despite these limitations, the study provides intervention-based evidence that a feasible, supervised aerobic exercise program may be associated with meaningful improvements in happiness among female university students. Future randomized controlled studies with larger and more diverse samples, control groups, and longer follow-up periods are needed to confirm these findings and clarify the mechanisms underlying the observed effects.

Conclusion

An eight-week supervised aerobic exercise program was associated with a significant improvement in happiness among female university students. The increase in both the proportion of students reporting high or very high happiness and their mean happiness scores suggests that structured aerobic exercise may be a practical approach to promoting psychological well-being in university settings. Given the limitations of the study design, further well-controlled longitudinal and randomized studies are warranted to establish causality and determine whether these benefits are sustained over time.

References

1. He J, Rameli MRM (2026) A systematic review of predictors of college students’ subjective well-being: evidence from pre- and post-pandemic literature. *Front Public Health* 14: 1793063.
2. Li R, Huang R (2025) The influence of physical activity on mental well-being in college students: a systematic review. *Front Psychol* 16: 1573446.
3. Blažević I, Matijašević B, Matijašević P (2021) The relationship between physical activity and subjective well-being in university students. *Sport Sci* 14: 111–117.
4. Zhu W, Du Z, Zhai F, Lv K (2025) Mediating effects of physical self-esteem and subjective well-being on physical activity and prosocial behavior among college students. *Sci Rep* 15: 19538.

5. Wang Y, Zou R, Si W, Kang W, Ying M, et al. (2026) Physical activity enhances university students' subjective well-being: a moderated mediation model. *J Health Psychol* 31: 3284-3302.
6. Shen J, Xu Y (2026) The impact of college students' physical exercise on subjective well-being: a chain-mediation model involving psychological resilience and social support with gender as the moderator. *BMC Psychol* 14: 691.
7. Rehder J, Timm I, Berretz G, Reinhard I, Neubauer AB, et al. (2026) An individual participant data meta-analysis of how physical activity relates to affective well-being in daily life. *Nat Hum Behav* 10: 1297-1315.
8. Bourke M, Judge-Mears B, Guo B, Fortnum K (2026) A meta-analytic review of the within-person association between daily physical activity and sedentary time with subjective wellbeing. *Health Psychol Rev* 20: 303-329.
9. Wang S, Chen J, Gao C, Zhou Y, Wei Z, et al. (2026) Effects of aerobic exercise on cognition, sleep, and mood in healthy adults: a systematic review and meta-analysis of randomized controlled trials. *Front Hum Neurosci* 20: 1808755.
10. Bodziony V, Stetson B (2024) Associations between sleep, physical activity, and emotional well-being in emerging young adults: implications for college wellness program development. *J Am Coll Health* 72: 1057-1067.
11. Brown DM, Lerner I, Cairney J, Kwan MY (2024) Independent and joint associations of physical activity and sleep on mental health among a global sample of 200,743 adults. *Int J Behav Med* 32: 180-194.
12. Caridade CMR, Martins JA, Pereira V (2025) How happy are our students? A case study of three higher education institutions. *Int J Math Educ Sci Technol* 56: 1567-1580.
13. Chuan K, Xiong YM (2023) The influence of physical exercise behaviour on college students' mental health. *Rev Psicol Deporte* 32: 446-456.
14. Eather N, Wade L, Pankowiak A, Eime R (2023) The impact of sports participation on mental health and social outcomes in adults: a systematic review and the "Mental Health through Sport" conceptual model. *Syst Rev* 12: 102.
15. Hadas S, Joseph G (2022) Exercise and sleep quality among college students. *J High Educ Theory Pract* 22: 10-21.
16. Hong Y, Shen J, Hu Y, Gu Y, Bai Z, et al. (2024) The association between physical fitness and mental health among college students: a cross-sectional study. *Front Public Health* 12: 1384035.
17. Liu Z, Quan Q, Long B, Kim S (2026) The impact of physical activity on the psychological wellbeing and study abroad satisfaction of Chinese international students in a cross-cultural context. *BMC Public Health* 26: 1689.
18. Matthews T, Arseneault L, Bryan BT, Fisher HL, Gray R, et al. (2025) Social media use, online experiences, and loneliness among young adults: a cohort study. *Ann N Y Acad Sci* 1548: 194-205.
19. Ram R (2021) International convergence in population happiness: evidence from recent data. *Appl Econ* 53: 3984-3991.
20. Teychenne M, Sousa GM, Baker T, Liddelow C, Babic M, et al. (2026) Domain-specific physical activity and mental health: an updated systematic review and multilevel meta-analysis in a combined sample of 3.3 million people. *Br J Sports Med* 60: 267-285.
21. White RL, Vella S, Biddle S, Sutcliffe J, Guagliano JM, et al. (2024) Physical activity and mental health: a systematic review and best-evidence synthesis of mediation and moderation studies. *Int J Behav Nutr Phys Act* 21: 134.
22. Yin C, Kim SH, Kim YH (2024) Factors associated with changes in physical activity levels among Chinese international students in South Korea. *Phys Act Nutr* 28: 31.
23. Yuliasitri D, Sholikhah AM, Mustar YS, Noordia A, Bakti AP, et al. (2024) A cross-sectional study exploring sport participation, perceived stress, and its association with life satisfaction among university students. *Sports Sci Health* 14: 5-12.
24. Zhao H, Chi Y, Shi L (2025) Analyzing the effect of physical exercise on social anxiety in college students using the chain mediation model. *Sci Rep* 15: 17751.
25. Zhou Y, Guo K (2023) Physical activity and depression: a chain mediation model. *Soc Behav Pers Int J* 51: 1-9.
26. Carabelli A, Cedrini M (2011) The economic problem of happiness: Keynes on happiness and economics. *Forum Soc Econ* 40: 335-359.

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