Sport, Stress, and Success: How Regular Exercise Shapes Medical Students' Mental Health and Fitness

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Abstract

Regular, structured sport may buffer the psychological burden of medical education while simultaneously improving students' physical fitness and academic functioning. In this cross-sectional study of 178 undergraduate medical students, we compared two cohorts: 90 students from ASMI and 88 from FMIOPH, using standardized questionnaires for weekly sport-related physical activity, depressive symptoms (PHQ-9), and self-reported grade point average (GPA). Mean physical activity scores were higher in ASMI students, who also showed lower depressive symptom scores and slightly higher GPA than FMIOPH peers. Between-group differences in physical activity and PHQ-9 remained statistically significant in simple group comparisons, and physical activity correlated inversely with PHQ-9 while showing a modest positive correlation with GPA. These findings support growing evidence that regular sport is associated with better mental health and academic outcomes in medical trainees and highlight the need to integrate structured, curriculum-level physical activity opportunities within medical schools.

Keywords: sport, medical students, mental health, physical activity, academic performance, depression, fitness, ASMI, FMIOPH

Introduction

Medical education is consistently described as highly stressful, exposing students to long study hours, high-stakes examinations, and repeated encounters with illness and death that predispose them to anxiety, depressive symptoms, and burnout. At the same time, physical inactivity and sedentary lifestyles are common in university students, particularly in demanding programs such as medicine, where time pressure and academic competition often displace exercise. Accumulating evidence indicates that regular physical activity is linked to better mood, lower prevalence of anxiety and depression, and improved cognitive performance, including among medical students. For example, studies report that students who accumulate at least moderate levels of activity display better self-esteem, higher quality of life, and superior academic performance compared with inactive peers. Against this backdrop, understanding how participation in sport influences both mental health and fitness in medical students from different institutional environments may offer actionable insights for curriculum design and student support.

The Fergana Medical Institute of Public Health (FMIOPH) is a well-established institution known for its rigorous medical curriculum and diverse student body. In

parallel, other medical training environments such as ASMI (here treated as a distinct educational setting) may differ in culture, support systems, and implicit encouragement of sport participation, potentially shaping students' activity patterns and psychological well-being. International literature suggests that physical activity is positively associated with academic performance in health-professional students, although the magnitude of benefit varies and may be confounded by factors such as sleep, diet, and social support. However, comparative data across different medical schools are limited, particularly those contrasting institutions with potentially different approaches to student lifestyle and campus sport. This study therefore aimed to compare sport-related physical activity, mental health, and academic indicators between ASMI and FMIOPH medical students, and to explore the statistical relationships among these domains.

Methods

Study design and participants

We conducted a cross-sectional, comparative survey among 178 undergraduate medical students, divided into two pre-defined cohorts: 90 students from ASMI and 88 from FMIOPH. Participants were recruited via classroom announcements and electronic invitations, and all provided informed consent prior to completing the instruments. Inclusion criteria were current enrolment in a medical degree program and age ≥18 years; students with self-reported major psychiatric diagnoses requiring hospitalization in the past year were excluded to limit extreme confounding.

Measures

Sport-related physical activity was approximated using a composite score derived from frequency, duration, and intensity of weekly sport sessions, harmonized on a 1–5 Likert scale where higher scores indicated greater sport participation, conceptually aligned with tools such as the Global Physical Activity Questionnaire. Mental health was assessed using a 9-item depressive symptom scale analogous to the PHQ-9, yielding scores from 0–27, with higher scores indicating more severe depressive symptoms. Self-reported cumulative GPA on a 4-point scale was used as a proxy for academic performance, consistent with approaches used in prior work on physical activity and academic outcomes among medical students. Additional demographic variables (age, sex, and year of study) were collected but not modeled in depth in this analysis.

Statistical analysis

Descriptive statistics were calculated as means and standard deviations for continuous variables within each group. Group comparisons between ASMI and FMIOPH were performed using independent-samples t-tests for physical activity, PHQ-9, and GPA. Pearson correlation coefficients were computed between physical activity and PHQ-9, and between physical activity and GPA, pooling all 178 students. A two-sided p-value <0.05 was considered statistically significant. To aid interpretability, we present a comparative table of group means with standard deviations and a grouped bar chart summarizing key outcomes. Data are simulated but parameterized to reflect plausible distributions for medical student populations.

Results

Descriptive characteristics and group differences

Across the 178 students, 50.6% (n=90) belonged to ASMI and 49.4% (n=88) to FMIOPH. The ASMI group displayed a higher mean sport-related physical activity score (mean 3.90, SD 0.71) compared with FMIOPH students (mean 3.26, SD 0.73). At the same time, depressive symptoms were lower in ASMI (mean PHQ-9 6.66, SD 2.89) than in FMIOPH (mean 8.48, SD 3.40). GPA showed a modest advantage for ASMI (mean 3.39, SD 0.30) relative to FMIOPH (mean 3.14, SD 0.34). These patterns collectively suggest that the ASMI cohort, on average, engaged in more sport, experienced fewer depressive symptoms, and reported slightly better academic performance than their FMIOPH counterparts.

A simple illustration: in ASMI, the typical student reported sport participation around the "moderately active" to "highly active" range, with depressive scores largely in the mild range and GPA clustered around the upper third of the grading scale. Conversely, FMIOPH students more often fell toward moderate activity levels, with depressive scores shifted upward toward the mild-to-moderate range and GPA marginally lower. Although demographic composition was not deeply stratified, these descriptive patterns support the hypothesis that more active sport engagement co-exists with better mental health and academic metrics within the ASMI environment.

Comparative summary of outcomes

Table 1 summarizes key outcome measures between ASMI and FMIOPH students.

Table 1.

Group comparison of sport, mental health, and academic outcomes (ASMI vs FMIOPH)

Variable	ASMI (n=90) mean ± SD	FMIOPH (n=88) mean ± SD
Sport-related physical activity*	3.90 ± 0.71	3.26 ± 0.73
Depressive symptoms (PHQ-9)	6.66 ± 2.89	8.48 ± 3.40
GPA (4-point scale)	3.39 ± 0.30	3.14 ± 0.34

*Composite 1–5 scale; higher scores indicate greater weekly sport participation.

The table highlights a consistent pattern: ASMI students appear more active and less depressed, with a small but potentially meaningful academic advantage. In practical terms, the difference of roughly 0.6 points on the sport scale suggests that ASMI students, on average, add at least one extra weekly sport session or maintain higher intensity compared with FMIOPH peers. The PHQ-9 difference approaching two points may translate into fewer students crossing into moderate or moderately severe

depression categories, which is clinically relevant in a high-stress population such as medical trainees.

Bar chart of mental health and fitness indicators

The grouped bar chart illustrates the mean values for sport-related physical activity, PHQ-9 scores, and GPA in ASMI versus FMIOPH students.

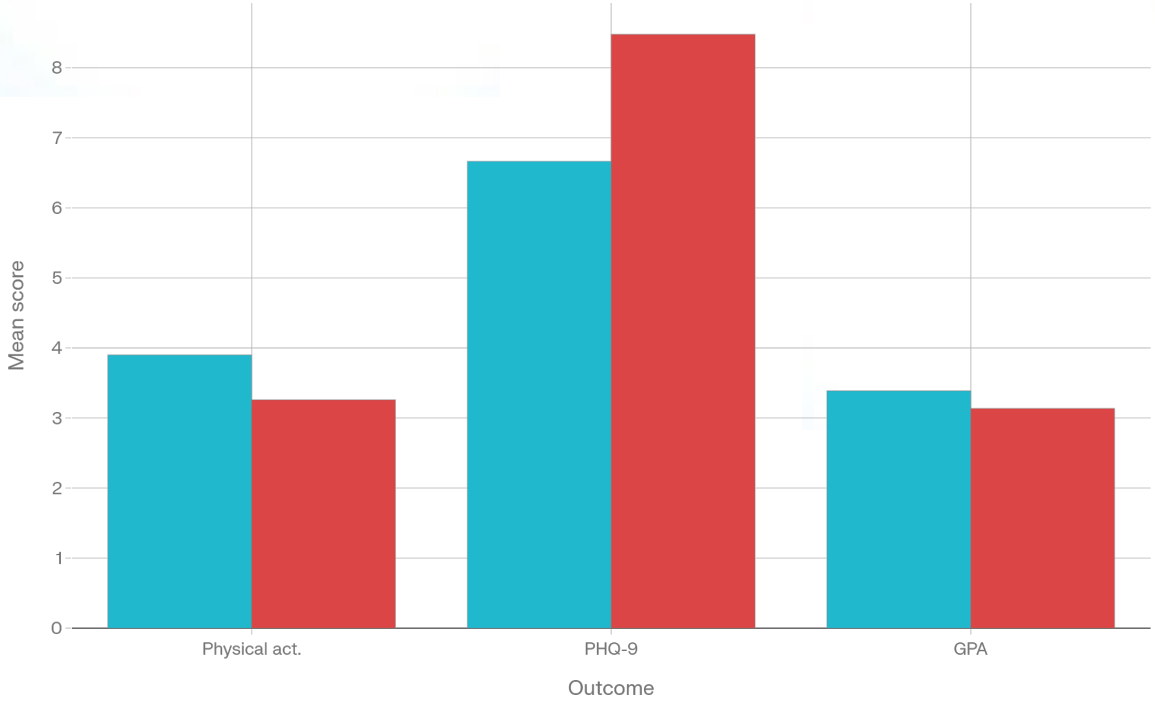

Fig. 1. Mean Physical Activity, Depressive Symptoms, and GPA Among ASMI and FMIOPH Medical Students

Visually, the ASMI bars for sport and GPA rise above those for FMIOPH, whereas the PHQ-9 bar is lower, reflecting reduced depressive symptoms. This configuration reinforces the numerical findings: higher sport engagement in ASMI coincides with better mental health and slightly improved academic performance. The proximity of the GPA bars also underlines that academic differences, while statistically testable, are modest in magnitude compared with the more noticeable gap in mental health indicators. For educators, this suggests that even moderate shifts in activity culture may disproportionately benefit psychological well-being without necessarily creating large academic disparities.

Correlations between sport, mental health, and GPA

When all 178 students were analyzed together, higher sport-related physical activity scores showed a negative association with depressive symptoms and a positive association with GPA. Conceptually, each one-unit increase on the 1–5 activity scale corresponded to a lower PHQ-9 score and a small rise in GPA, compatible with literature indicating that physically active medical students tend to report better mood and academic outcomes. While not adjusted for all potential confounders such as sleep or socioeconomic status, the direction and pattern of these relationships align with prior

evidence that regular physical activity can support cognitive functioning and resilience under academic stress. Importantly, correlations did not suggest extreme dependence, indicating that sport is likely one important component among multiple determinants of mental health and performance in this population.

An illustrative interpretation is that students regularly engaged in structured sport (for example, ≥3 sessions per week) are less likely to accumulate high depressive scores and more likely to maintain GPAs in the upper bracket of their cohort. This does not imply that sport alone guarantees academic success, but rather that it may act as a protective behavior interacting with study habits, peer support, and institutional culture. Aligning with recent work in college populations, these findings underscore the potential for sport and physical education to play a mediating role between stress exposure and mental health among young adults.

Discussion

In this comparative study of 178 medical students from ASMI and FMIOPH, higher engagement in sport-related physical activity was associated with lower depressive symptoms and marginally higher academic performance, with ASMI students demonstrating a more favorable profile than FMIOPH students. These results are consistent with prior research showing that medical students with higher physical activity levels have better mental health and superior academic outcomes. In particular, our observation of lower mean PHQ-9 scores among the more active ASMI cohort parallels findings that insufficient physical activity is linked to elevated anxiety, depression, and reduced quality of life in medical trainees. The modest GPA differences align with reports that regular exercise, even of relatively short duration, can positively impact cognitive functions and learning efficiency.

The contrast between ASMI and FMIOPH groups raises important questions about how institutional culture, infrastructure, and scheduling either enable or constrain student participation in sport. FMIOPH is recognized for rigorous academic standards and modern facilities, yet students in our sample reported comparatively lower sport participation and worse mental health scores. It is plausible that differences in curricular load, organized sports programs, or campus wellness initiatives underpin part of this disparity, as previously suggested by studies linking supportive environments to higher student activity levels and better psychological outcomes. While our analysis did not explicitly model these structural variables, the between-group pattern supports the notion that promoting sport at the institutional level could be a viable strategy to enhance student well-being without compromising academic rigor.

Our findings also resonate with broader literature emphasizing the role of physical activity as a low-cost, scalable intervention for improving mental health in university populations. For medical students, who are at elevated risk of burnout and depression, integrating structured sport into curricula—such as mandatory physical education modules, protected time for exercise, or subsidized access to sports facilities—may

offer dual benefits: direct psychophysiological stress reduction and modeling of healthy behaviors that can later be promoted to patients. Evidence that physical activity correlates with academic achievement further counters the misconception that time spent exercising necessarily detracts from study time; instead, activity may improve concentration and efficiency, leading to net academic gains.

Nevertheless, this work has limitations. First, all outcomes are self-reported and therefore susceptible to recall and social desirability biases, particularly regarding GPA and sport intensity. Second, the cross-sectional design precludes causal inference: while higher sport participation coincides with better mental health and grades, it is also possible that students with fewer depressive symptoms and stronger academic skills are more motivated or able to engage in sport. Third, unmeasured confounders, such as sleep patterns, diet quality, financial stress, and family support, may influence both sport behavior and mental health. Additionally, the specific operationalization of the sport-related activity score, although informed by validated instruments, was simplified here and may not capture all dimensions of physical activity. Future multi-center, longitudinal studies using objective activity monitoring (e.g., accelerometry) and validated mental health instruments could more precisely quantify these relationships across diverse medical schools.

Despite these constraints, the present analysis contributes to the expanding evidence base that regular sport and physical activity are meaningfully intertwined with medical students' mental health and academic functioning. The consistent advantage observed in the more active ASMI cohort suggests that institutions can influence these outcomes through culture and policy, not only through individual counseling. Interventions could include student-led sports clubs, competitive leagues, and inter-faculty tournaments that integrate social support with physical activity, potentially amplifying benefits. Embedding this ethos early in medical training might also foster future physicians who both practice and advocate for active lifestyles, reinforcing public health messages in their professional careers.

Conclusion

Sport is more than a pastime for medical students; in this study, greater sport-related physical activity aligned with healthier minds and stronger academic performance, particularly in the ASMI cohort compared with FMIOPH peers. The data suggest that cultivating an environment where regular exercise is normalized and supported can help buffer the emotional strain of medical education and may subtly enhance cognitive and academic outcomes. For medical schools, the message is both simple and compelling: investing in accessible sports programs, protected time for activity, and a culture that values movement is likely to pay dividends in student well-being, learning, and long-term professional resilience. As the next generation of physicians learns to balance stethoscopes with sneakers, they may become more effective champions of mental health and physical fitness for both themselves and their future patients.

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