

Brief Communication

Appraising the degree of physical activities among male students at a Saudi medical school



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Received 26 March 2020; revised 20 June 2020; accepted 23 June 2020; Available online 12 July 2020

Abstract

Objectives: This study aimed to assess the degree of physical activity among male medical students. We also investigated the association between their physical activity and academic performance.

Methods: In this cross-sectional study, we distributed the International Physical Activity Questionnaire among male medical students of the first year through the fourth year by using a convenient sampling technique. Physical activity was measured by using the Metabolic Equivalent Task (MET) score. The demographic variables included academic year and age of the participants.

Results: The study included 317 students; of those, 219 were pre-clinical (first and second year), and 98 were clinical (third and fourth year) students. According to the MET score, the degree of physical activity was categorized into three groups. As many as 140 (44%) students were classified as highly active (MET>3000) and 98 (34%) moderately active (MET 600–3000), while 69 (22%) students were inactive (MET<600). The second-year students had a higher degree of inactivity than others ($p = 0.004$). Additionally, there was a significant

difference in the amount of sitting time during the week, with a higher median sitting time by second-year students than by third- and fourth-year students ($p = 0.001$).

Conclusion: In our study, most male medical students showed moderate or high physical activity. However, second-year students were physically inactive. Hence, the reason for such inactivity among second-year students should be explored. This study calls for the implementation of university-level programs that can motivate students to participate in physical activities.

Keywords: College of medicine; International physical activity questionnaire; Medical students; Physical activity; Academic performance

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Introduction

Physical activity (PA) means moving the body in a way that uses energy. For PA to be beneficial, it has to be planned, structured, and repetitive.¹ The physical benefits of exercise are well known, but most people fail to recognize its psychological and physiological benefits.² A study has shown that physical activity improves circulation, increases blood flow to the brain, and raises levels of norepinephrine and endorphins.³ These physiological effects help reduce stress, improve mood, and produce a calming effect after

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Peer review under responsibility of Taibah University.



exercise, which are particularly beneficial for medical students. Eventually, these effects can improve medical students' academic achievements.³

During the years of medical education, students face a great amount of stress, anxiety, and possibly depression. These conditions will most likely cause burnout among most students, which may lead to their poor performance in academics.⁴ A Thai study using the International Physical Activity Questionnaire (IPAQ) found that half (49.5%) of the participants were physically active.⁵ Moreover, a prospective survey of a representative sample of medical students from 16 schools in the United States (US) assessed physical activity levels by using a Godin exercise questionnaire and found that more than half (61%) of US medical students adhered to Centers for Disease Control (CDC) PA recommendations. The median total energy use was 540 metabolic equivalent-min/week. The results of the survey revealed that male and preclinical students were more likely to be physically active.⁶

The assumption that physical activity can improve grade point average (GPA) and overall academic achievement was reviewed in a few studies. A US study followed 141 medical students and found that students who are more physically fit might also be better in dealing with academic life challenges; therefore, they can also prepare for their academic assessment.⁷ A cross-sectional study was conducted in Riyadh, KSA on 409 students to explore their physical activity habits and examine its association with GPA. Almost half of the students reported being physically active; results showed a positive association between students' physical activity habits and high GPA. A strong association was also found between normal BMI and high GPA, but no significant correlation was found between body fat percentage (BF%) and GPA.⁸ Conversely, other studies reported different results for physical activity and GPA. A study was conducted in Turkey on 359 students by using the IPAQ; no statistical association was found between GPA and physical activity.⁹

Medical students worldwide suffer a great deal of stress and anxiety that can affect their personal and academic life. A simple routine exercise and activity can aid medical students in improving and managing a healthy mental status throughout the stressful years of medical college; such an idea is worth investigating. The study aimed at revealing the prevalence of physically active male students in the College of Medicine at King Saud bin Abdulaziz University for Health Sciences (KSAU-HS) in Riyadh, KSA.

Materials and Methods

This cross-sectional survey was conducted between October 2017 and October 2018, among first to fourth academic year medical students at King Saud bin Abdulaziz University for Health Sciences (KSAU-HS) in Riyadh. There was a total of 721 male students in the four academic years. The required sample size was estimated as 377 based on expected physical activity prevalence of 50% at the 95% confidence interval with a $\pm 5\%$ margin of error.

The data was collected by convenient sampling by using a questionnaire—International Physical Activity Questionnaire (IPAQ)—and distributing it among medical students.

This questionnaire provided information on the time spent during sitting, walking, and moderate and vigorous level activities.¹⁰ According to IPAQ's webpage, 'This physical activity questionnaire is publicly available, it is open access, and no permissions are required to use it'.¹¹ The validated self-administered questionnaire was in the English language, and it did not take more than 10 min to complete.¹¹ The IPAQ is a global instrument to measure physical activity.²

The main variables in this research were the levels of physical activity, which were low, moderate, and high, according to the IPAQ score and the cumulative Grade Point Average (GPA). The questionnaire asked about a student's physical activities in the last seven days. It has 27 questions distributed in five parts, and in each part, a choice is provided to either skip the part or answer about the duration and intensity. The first part includes job-related physical activity questions (seven questions); the second part deals with transportation physical activity questions (six questions). The third part includes housework, house maintenance, and caring for family questions (six questions), and the fourth part addresses recreation, sport, and leisure-time (six questions). Finally, the fifth part includes questions on time spent sitting (two questions). The intensity of these activities is classified as vigorous (activities that take hard physical effort and make you breathe much harder than normal) or moderate (activities that take moderate physical effort and make you breathe somewhat harder than normal). GPA was used to measure the academic achievement of the students and compare students who are physically active with those who are not.

The students were classified as having high, moderate, or low activity based on the Metabolic Equivalent of Task (MET).¹¹ There are two criteria for high PA levels: vigorous-intensity activity on at least three days achieving a minimum total physical activity of 1500 MET-min/week, or ≥ 7 days of any combination of walking, moderate-intensity, or vigorous-intensity activities achieving a minimum total physical activity of 3000 MET-min/week. The three criteria for moderate PA are as follows: three or more days of vigorous-intensity activity of at least 20 min per day; or five or more days of moderate-intensity activity and/or walking of at least 30 min per day; or five or more days of any combination of walking, moderate-intensity, or vigorous-intensity activities achieving a minimum total physical activity of 600 MET-min/week. An activity is categorized as low physical activity, if it does not meet any of the criteria from high or moderate.¹¹

The data was collected through a questionnaire that was analysed using SPSS version 20. Qualitative data, such as academic year, GPA (three groups), and physical activity, are presented as percentages and frequencies. The numerical data (sitting time) was presented by median and interquartile range as it was not normally distributed. A Chi-square test was used to compare categorical variables (academic years and activity levels) between the two groups. The Kruskal Wallis test was used to compare the median sitting time between academic years. A p-value of <0.05 was considered to show a statistically significant difference for all the statistical tests.

Results

A total of 317 male medical students completed the survey from the four academic years (Table 1). A cut-off point of 600 or more MET score was used to determine whether a participant was physically active. From a total of 317 students, there were 218 (78%) who were physically active with a score of 600 MET or more, 140 (44%) were classified as highly active (MET > 3000), 98 (34%) students were moderately active (MET 600–3000), while 69 (22%) were low/inactive (MET < 600). There was a higher proportion of inactive students among the second-year students (31%) compared with first (16%), third (12%), and fourth (18%) year students ($p = 0.004$) (Figure 1). The second-year students had an equal distribution between the different levels of physical activity.

It was found that third year students had the lowest median sitting time of 2310 min/week (IQR: 1635, 3000), as shown in Figure 2, which could explain why they had the highest physical activity level (as noted above). It was found that second year students had the highest median sitting time of 3330 min/week (IQR: 2040, 4800), and this could be explained by their low physical activity levels (as noted above). While comparing the different levels of physical activity and GPA, it was found that there was no

significant association between the level of physical activity and the GPA ($p = 0.92$) (Table 2).

Discussion

This study has shown that, out of the 317 medical students, one-fifth were classified as inactive, while almost half were highly active. The second-year students had a higher inactive proportion than the first-, third-, and fourth-year students. The second-year students also spent more time sitting during the week than the third- and fourth-year students.

In comparison to other studies, a study at King Saud University in KSA reported 47% of male students as active.⁸ Another study from Sri Lanka reported 41% of students as inactive, while in this study, 22% of students were inactive.¹² In southern Thailand, 50% of students were considered physically active in a study that used the Global Physical Activity Questionnaire (GPAQ), while in a Polish study, medical students were compared with other students in health care and were reported to have the highest proportion of low physical activity students (26%).¹³ A literature review identified only one similar study conducted in KSA, which used different variables than those used in this study.⁸

The IPAQ is a validated questionnaire that has been used locally and globally, with a high number of specific questions.^{8,12} In this study, students from all four years of medical education were included in the survey.

In this study, the group of third-year students had the highest percentage of active students, which can be explained by the fact that they are in the clinical years, where the students are asked to go on medical rounds in the hospital's wards. Conversely, second-year students were reported to have the highest percentage of inactive students and the highest number of hours spent sitting. This is because the second year is among the hardest years in medical school, wherein the students are asked to study a huge amount of

Table 1: Proportion of students who participated from each year

| Academic year | Total (N = 721) | Sample (n = 317) * |
|---------------|-----------------|--------------------|
| 1st | 187 | 92 (49%) |
| 2nd | 226 | 127 (56%) |
| 3rd | 191 | 60 (31%) |
| 4th | 117 | 38 (32%) |

*% is out of row total.

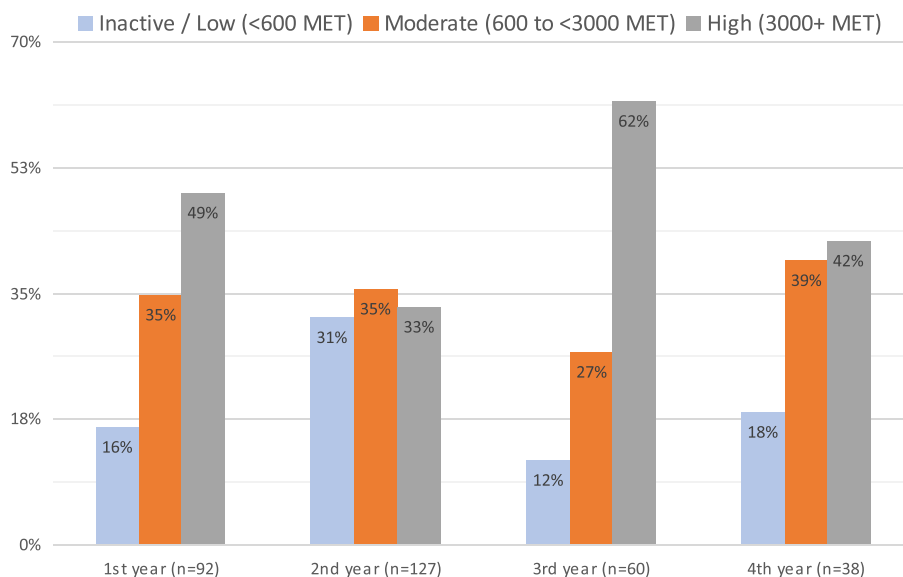


Figure 1: Comparison of physical activity level by academic year.

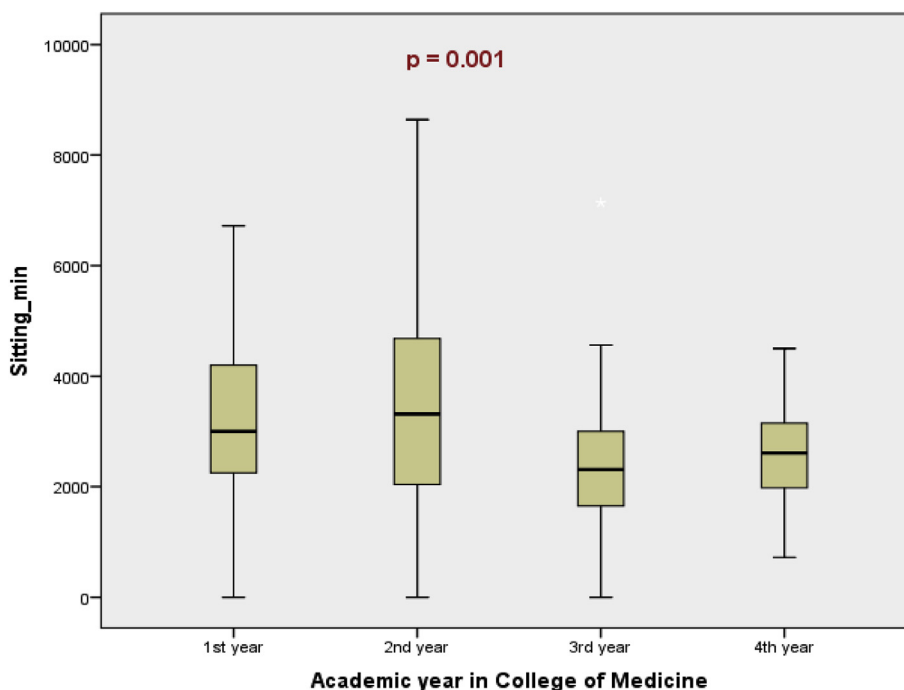


Figure 2: Comparison of sitting time by academic year.

Table 2: Comparison of students' physical activity levels with GPA category.

| Physical activity level | Total | GPA groups | | | p-value |
|-------------------------------------|-------|--------------|----------------|---------------|---------|
| | | <4.0 4.49 | 4.0 to 4.49 | 4.5 to 5.0 | |
| Low/inactive (MET < 600) | 64 | 7 (11%) | 29 (45%) | 28 (44%) | 0.92 |
| Moderately active (MET 600 to 3000) | 96 | 10 (10%) | 45 (47%) | 41 (43%) | |
| Highly active (MET > 3000) | 123 | 10 (8%) | 54 (44%) | 59 (48%) | |

materials, which is reflected in their inactivity and the hours spent sitting.

Physical activity has a positive influence on mental health.¹⁴ Since medical students have a high rate of burnout and dropout,¹⁵ Physical activity could help them cope with their stressors during college years and use their time more efficiently. Peleias et al. found that a better quality of life was associated with higher levels in physical activity among medical students in Brazil.¹⁶

In this study, the IPAQ was used, and according to initial reports by students, it was difficult and confusing to answer. Female students' forms were not taken due to difference in the type of physical activity affected by the socio-cultural environment. The distribution of students between years was different. Therefore, a proportional number of medical students were surveyed from the fourth year. The use of a self-administered questionnaire could result in subjective answers depending on the respondent's mood and free time,

along with their ability to remember the past week's activity to answer. In future work, we recommend measuring GPA in a smaller range to allow for greater specificity and differentiation in the responses.

Conclusion

In summary, most medical students at KSAU-HS were found to be highly active. Third year medical students had the highest percentage of active students. The second year medical students reported the highest percentage of inactive students; further, they were also sitting for the highest number of hours.

Recommendations

The university should implement physical activity programs and create an environment suited to physical activity, as well as motivate the students to participate and help them achieve lower levels of stress and burnout. Furthermore, we suggest that physical activity should be compared between male and female students by using a larger student cohort.

Source of funding

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

Conflict of interest

The authors have no conflict of interest to declare.

Ethical approval

The study required participants to fill out questionnaires, which included a consent form on the front page. Participants were not required to provide any information unless they agreed to participate in the study. Moreover, the information provided by them did not involve any identifying data. The participants could withdraw at any time. Furthermore, the research proposal was reviewed by the King Abdullah International Medical Research Centre (KAIMRC) and approved by its Institutional Review Board. The information provided by the participants were kept confidential.

Author contributions

AAH, RAM, MAS, AHM, and AO were involved in the conception and design of the project. AAH, RAM, and MAS collected the data. ASM and AHM performed the data entry. AAH and AO analysed and interpreted the data. RAM, MAS, AHM, and ASM prepared the initial and final drafts of the article and provided logistic support. All authors have critically reviewed and approved the final draft and are responsible for the content and similarity index of the manuscript.

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How to cite this article: Alhaqbani AS, AIMaini RY, Alshalhoub MZ, Mcrabi AH, Marenga AS, Omair AA. Appraising the degree of physical activities among male students at a Saudi medical school. *J Taibah Univ Med Sc* **2020**;15(5):417–421.