

Original Article

Association of type and duration of exercise with the mental and physical health and academic performance of Medical undergraduate students- Cross-sectional study

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Abstract

Background: The advantageous effect of physical activity stimulated mostly by aerobic exercise known to impact the particular phases of brain activities. Exercise does help to improve physical health and develop an individual's academic performance.

Aim and objectives: The study aimed to observe the relationship between type and duration of exercise on the mental, physical health, and academic performance of undergraduate medical students.

Materials and method: Present questionnaire-based study was undertaken on 50 students of medical undergraduates studying in their preliminary MBBS curriculum.

Results: Among the participants involved in regular exercise, 50% of them prefer jogging, brisk walking, or cycling as a mode of exercise, followed by 31% of participants who prefer to play various games that involve muscular activities. The remaining 19% of the students like to be involved in multiple activities of the gym. 84% of participants with regular exercise practice gave a strong opinion that they are confident enough to face academic assessment challenges. This observation was notably higher prevalence than that of non-exercise students (79%).

Conclusion: Individuals who exercise for one to two hours have better physical and mental health status and excellent academic performance. It can also be concluded that students who do regular exercise have higher confidence in academics than those who do not.

Keywords: Physical exercise; academic performance; mental health; physical health

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Introduction

Physical activity in the form of exercise is necessary for conditioning any part of the body. It is also essential for improved health and to maintain fitness through physical rehabilitation. Several factors influence how sport and physical activity impacts on health in different populations. Though physical

activity or sports may not directly affect the health benefits, it can promote healthy lifestyles and other factors¹.

Previous study reports have witnessed that exercise positively influences mental-related health disorders such as depression. The health benefits borne by physical activities predominantly focus on intra-

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personal factors like physiological, cognitive, and affective benefits².

The favorable impact of physical commotion stimulated through aerobic exercise on cerebral activities in particular aspect has been documented in the scientific literature. Both human and animal model studies have proved that aerobic workout can improve perception and performance. Deprivation of physical activities, particularly in children, is one of the significant reasons for obesity. Physical activity's beneficial effects have also been observed in the individual's lifespan with neurodegenerative diseases^{3,4}. Physical exercise does not only helps to mend the physical health of an individual, but it would also improve one's academic performance⁵. Regular activities can also be related to amplifying self-esteem, enhanced classroom behavior, and student academic performance⁶.

There are many types of physical activity. Aerobic activity, which is often referred to as endurance activity, involves the movement of large muscles of limbs, makes the heart beat faster than usual. It will also cause deeper breathing. The regular and systematic aerobic activity makes the vital organs such as the heart and lungs stronger. On the other hand, specific exercises such as 'push-ups,' weight-lifting, etc. improve the muscles' strength. Activities like running, walking are bone-strengthening activities that make bones stronger.

A minimum of 150 minutes of aerobic physical activity with moderate-intensity or 75 minutes of vigorous-intensity exercise throughout the week for the adults is recommended in an overall assessment. The minimum duration of aerobic activity, as suggested, should be performed in bouts of at least 10 minutes. However, for supplementary health welfares, one may have to increase the recommended durations to double⁷.

The current cross-sectional study aimed to investigate how exercise benefits the students' physical health, mental health, and academic performance. The types of activity and frequency and duration of exercise were also considered during this study. The study's objective is to raise awareness among the students about the types, duration, and frequency of activity on various aspects of their health.

Materials and method

The study involved the voluntary participation of 150 undergraduate medical students, age ranging

from 18-20years. Self-designed and faculty validated questionnaire was used in the research, and all the questions were close-ended. Institutional ethical consideration and informed consent from the participants have been obtained before conducting the study. The study data collected from participants' responses were compiled and interpreted with charts and tables. The questions included in the questionnaire mainly emphasized the relation of exercise to the students' physical and mental status together with their academic performances

Results

Among the 150 voluntary participants, 116 students regularly perform physical exercise either in games, sports, cycling, jogging, or gym activities. The remaining 34 students admitted that they are not involved in any physical exercises.

Among the participants who involve in regular exercise, 50% of them prefer jogging (23%), brisk walking (23%), or cycling (4%) as their preferred types of exercise. This prevalence was followed by 31% of participants who prefer to play various games that involve muscular activities such as badminton (15%), football (8%), basketball (5%), and Frisbee (3%). The remaining 19% of the students like to be involved in the gym activities [Figure 1]

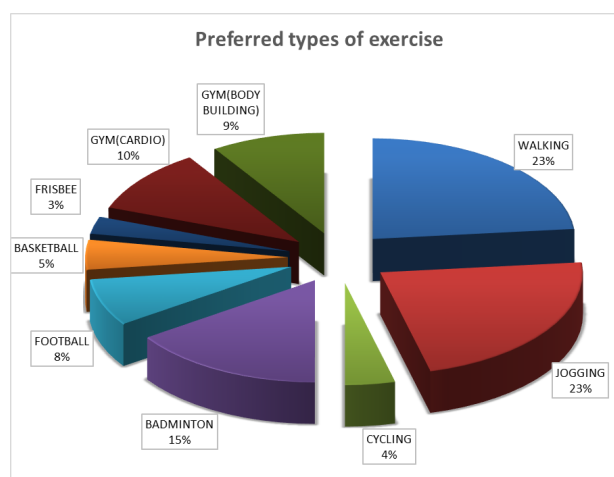


Figure 1: Various types of exercises preferred by the students

Out of all the games of students' choice, the Frisbee game was more effective in all three aspects: academic performances and physical and mental health status. Students who usually do not perform any exercise were shown to be academically satisfactory, but their physical and mental health status was found to be much weak compared to the students with regular

exercise [Figure 2]

The effect of duration of exercise showed a progressive increase in score with increased duration of an activity. The increase is obvious between 30 minutes to 1 hour of exercise. Between 1 hour and 2 hours of exercise, there is a very slight increase in the students' academic score [Figure 3]

Further probe on the participants' level of confidence during the curricular assessment, 84% of participants with regular exercise practice gave a strong opinion that they are confident enough to face the challenges during the academic evaluation. This finding was notably higher in prevalence than that of non-exercise students (79%) who admitted that they are not confident in this regard [Figure 4].

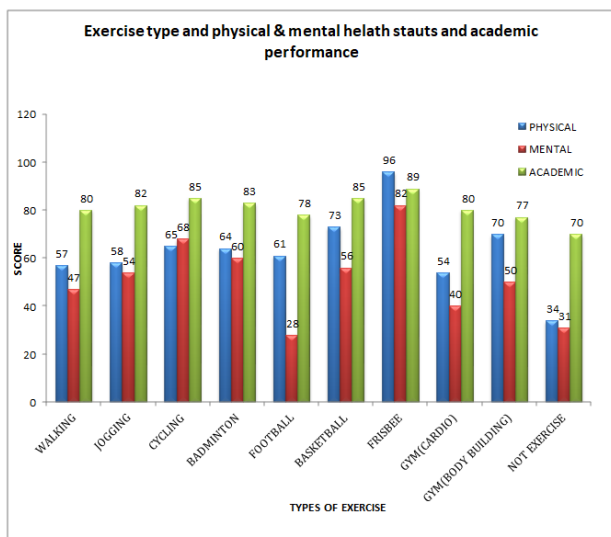


Figure 2- Relationship between various modes of exercise and participant's academic performance and physical and mental health status

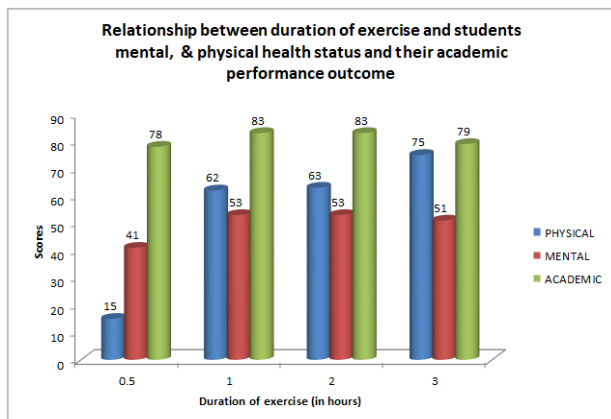


Figure 3: Relationship between exercise duration and participants' physical and mental health status and their academic performance

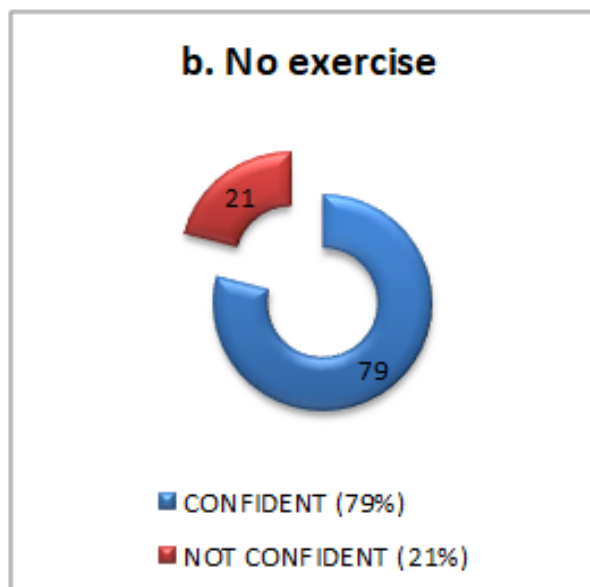
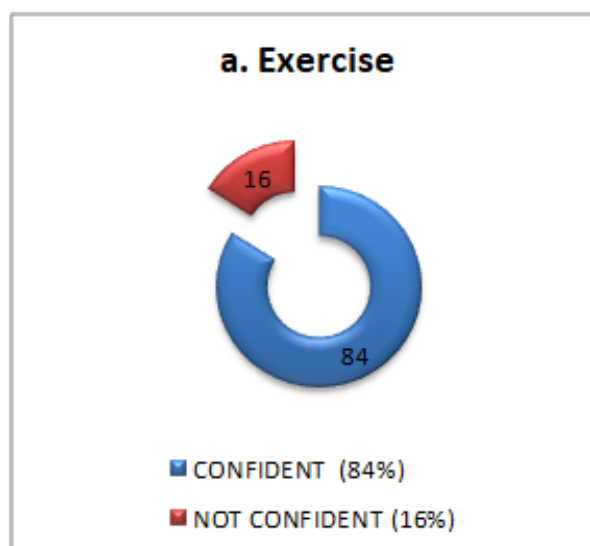


Figure 4: Prevalence of confidence among the students who exercise (a) and do not exercise (b).

Discussion

Physical health is a fundamental part of one's health, and it includes activities extending from physical fitness to overall wellness. Good health is a state of well-being, and it makes the individual a mechanically apt to perform their hassle-free day to day activities.

Frisbee appears to be the most suitable exercise to increase physical fitness in this research. It is a unique sport that fosters many traditional fundamental motor skills and requires new Frisbee specific skills, as it needs sprinting and endurance running, whether its offense or defense. The Frisbee game requires quick turns, pivots, throws, and jumps, which means a full-body workout in

the attempt of squatting or jumping to catch a disc. This activity will help to burn calories and increase resting metabolic rate. Basketball and gym (bodybuilding) follow Frisbee to be an essential exercise to improve physical health. Basketball accentuates strong physical presence as well as excellent techniques to play. Frequent jumping and body tackle involvement in this game might well contribute to good physical health. Bodybuilding is well-known for obtaining a toned-up physique, stiff muscles, and bones and is pivotal for perfect physical health.

Research showed that aerobic exercise has antidepressant effects on the body⁸. Following the exercise, the heart rate is elevated, and the blood circulation is increased. The other beneficial values of exercise are observed to be changes in the levels of cortisol and steroids, opioid peptides, and cytokines⁹, thus affecting the mood of an individual. These features are also said to be the pathophysiological cause of affective disorders. Besides, some research reports suggest that exercise can also modify neuroactive substances in the central nervous system¹⁰.

Free fitness activities, otherwise known as green exercises, are known to minimize the stress and improve the sense of well-being. Regular exercising in the fresh air and being exposed to beautiful sights favor a healthy mind and body¹¹. Any physical activity in a clean environment enables us to breathe in the fresh air and helps the mind psychologically sound. Cycling through scenic spots or jogging by a lake or water bodies is the best way to gain mental benefits from outdoor exercise.

Regular exercises do show a satisfactory score in academic performances. Exercise is a necessary practice to develop excellent cognitive skills. Most team sports or individual sports require a high amount of thinking and decision making to succeed. For instance, in a basketball or football game, split-second decision making is pivotal in scoring. This workout would help improve players' thinking skills and eventually enable them to cope more effectively with everyday stress or, in this context, academic focus. Early research results revealed adverse influences on academic performances due to physical inactivity^{12,13}.

Physically active students perform better academically than inactive students. The exercises' physiological and psychological mechanisms are evident in the animals, as its physical activity has proven to stimulate neural development¹⁴ and higher capillary volume¹⁵. Hillman et al. (2005) reported the positive association between physical activity and cognitive function by comparing the top- and low-fit preadolescent children with an average age of 9.6 years¹⁶. The findings are suggestive of a positive association between the physical fitness and neuro-electric indices of attention. Physically active students would often show more considerable attention during class¹⁷. Hence, physically active persons are in greater self-esteem levels and lesser levels of anxiety despite both being associated with developed academic achievement¹⁸.

Researches have also been emphasized a relationship between physical activity and cognitive function in schoolchildren¹⁹. The present study result is also in alignment with the conclusion that physical activity directly relates to the various components of cognitive functions, namely perceptual skills and academic accomplishment and readiness.

The duration of the exercise also matters in academic performance. The longer the period of each exercise session, the better the physical version of the students. However, the duration must be kept in check because overspending time on exercise may harm the body, as injury risk can be elevated.

As for mental performance, according to our result, the maximum duration of exercise is between 1 to 2 hours. Below one hour of activity, the subjective score of the students is lower than 40%. Similarly, an increase in exercise duration to 3 hours per session also showed a slight decrease in the students' mental scores. The acute exercise lasting for 20 to 40 minutes of aerobic activity would improve anxiety and mood that could persist for several hours²⁰.

Physical activity can impact mental skills and behavior, and academics are essential components of enhanced educational performance—exercise aids in advancing memory through increased blood flow to the brain and increased brain neurotransmitters. Therefore, considering the participants' role as medical school students, the best exercise duration to

obtain an overall good score is between 1-2 hours per session.

Students who do regular exercise will generally have higher confidence in their academic performances than those who do not exercise. Self-confidence is closely related to an individual's mental status, and it is enhanced by physical activity. It has proven to reduce tension, fatigue, and depression. Exercise also helps to alleviate social withdrawal symptoms, which later contributes to building up self-confidence within themselves.

Conclusion

It has been found that the exercise gained from game-related activities would be the most effective exercise for improving physical and mental health and also enhancing academic performance. Students who exercise one to two hours daily have the optimum physical, mental health and showed excellent academic performance. It can also be concluded that students who do regular exercise have higher confidence in academics than those who do not.

Conflict of Interests: There is no conflict of interest regarding the publication of this paper.

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