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# Influence of Physical Activities on the Academic Performance of Medical College Students

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## ABSTRACT

***Back Ground:*** *Regular physical activity, in addition to reducing stress level, has beneficial effect on body as well as mind. This beneficial effect on mind is assessed in terms of academic performance especially in medical college students. Retrospective analysis was carried out using students' bio-data (n=279) and their University exam results to see the effect of physical activity of students on their academic performance. Their physical activities were grouped under exercise, contact sports activities, non-contact sports activities, non-sports activities and sedentary group. Statistical analysis revealed positive correlation between physical activity and academic performance. Success rate is high (64.2%) in physically active group and failure rate is high (76.9%) in sedentary group of students. Within the physically active group, contact sports (P= 0.0002) and non-sports activity group (P= 0.0003) showed higher academic performance. Statistically significant correlation was not found between exercise group and academic performance (P= 0.0724) as well between non-contact sports group and academic performance (P= 0.1302). Thus the study concludes that physical activity is beneficial to students in their academic performance.*

***Key words:*** *Physical activity, academic performance, college students, sedentary life.*

## INTRODUCTION

Professional studentsare one of the highly stressed student community in the world. This high stress is due to voluminous academics meant to create professionals, which leave little time for sports activity and recreation[1]. As future doctors, medical students must be physically fit for long hours of duty. Sedentary life style is becoming an important threat factor that inflicts negatively on the health issues of most of us but specifically of children and adolescents. This trend is largely due to devotion of most of the available time to academics to keep the students and schools ahead,in the rat race, of the other competitors. But in reality the truth is different as revealed by researches. Reducing the time spent in academics to help the students engage in physical activities improved their academics[2]. On the other hand, reducing the time spent on physical activities to add to academic duration has not produced positive results[3]. Physical activity is defined as all forms of movements associated with increased energy expenditure. Academic performance is the students' performance when assessed by standardized test within a school or educational setting. Regular physical activity in the form of sports and extracurricular activities for students not only benefit them physically, but also mentally. It imparts desirable behavior, protects from indulging in undesirable and destructive behavior, improves school attendance and performance, and

transforms the child into a responsible and successful adult in the society. The health benefits include a favorable cardiovascular and metabolic risk profile, good bone health, reduced body fat and good scores on depression and anxiety[4]. since medical students have to dedicate a substantial amount of time for their studies, sports activity has assumed less importance. Therefore this study intends to assess the effect of physical activities on their academic performance.

## MATERIALS AND METHODS

This is a retrospective study based on secondary data. Written permission from the Director of the Institute was obtained to use the data, like students' bio data and marks obtained from Internal Assessment tests and University exams, for the study. The Institute Research and Ethics committee approval was obtained to conduct the study. The details of physical activities of the students, like various sports and extra-curricular activities were retrieved from the bio data of the students which were collected from the students at the time of admission as a standard procedure. For the purpose of analyzing the effect of physical activities on the academic performance, we have classified physical activities of the students into exercise (that included walking, jogging, workout in gym, yoga), contact sports (like football, volley ball, cricket, tennis, etc.) non-contact sports (like chess, carom) and non-sports activities (like singing, dancing, drawing, painting etc.) Data were entered in the MS excel worksheet for statistical analysis. We have utilized Graph Pad In Stat statistical software for Inferential statistics. We have entered the data in a contingency table for analysis and Fishers Exact test was run to detect the p value. First we have compared the physically active and sedentary group of students to find out the statistically significant difference between these two groups in relation to their academic performance. Then we compared the different types of physical activity groups with sedentary group and finally we have compared the different types of physically active groups among themselves to see which physically active group has favorable outcome on academic performance. Though we have planned to assess two batches of students (n=300), we managed to get the complete data for only 279 students, the rest of the data were not used as they were either incomplete or not available at all.

## RESULTS

**TABLE 1: DISTRIBUTION OF VARIOUS KINDS OF PHYSICAL ACTIVITIES AMONG STUDENTS**

| S. No. | TYPE OF PHYSICAL ACTIVITIES | NO. OF STUDENTS (n= 279) |
|---|---|---|
| 1 | Exercise | 18 |
| 2 | Contact sports | 64 |
| 3 | Non Contact sports | 27 |
| 4 | Non sports activities | 54 |
| 5 | Nil (Sedentary) | 116 |

Table 1 shows the different of types of physical activities including exercise (walking, jogging, yoga, gym work outs etc.) contact sports (football, volleyball, basketball, throw ball, cricket, tennis, athletics etc.) non-contact sports (chess, carom) and non-sports activities (singing, dancing, drawing, painting etc.) the students involved in during their school and college days. The table also shows that nearly half of the students are leading a sedentary life without any physical activities, spending their time mostly in computer and mobile phones

**TABLE 2: EFFECT OF PHYSICAL ACTIVITIES ON ACADEMIC PERFORMANCE OF STUDENTS**

| S. No. | TYPE OF PHYSICAL ACTIVITIES | NUMBER OF STUDENTS | |
|---|---|---|---|
| | | PASSED(n=240) | FAILED(n=39) |
| 1 | Exercise | 17 | 1 |
| 2 | Contact sports | 61 | 3 |
| 3 | Non Contact sports | 24 | 3 |
| 4 | Non sports activities | 52 | 2 |
| 5 | Nil (Sedentary) | 86 | 30 |

Table 2 shows how academic performance of students is influenced by their physical activities. Students who are sedentary have high chance of failing when compared to those who are physically active.

**TABLE 3: COMPARISON OF EFFECT OF EXERCISE AND NIL ACTIVITY ON ACADEMIC PERFORMANCE OF STUDENTS**

| S. No. | Type of Physical Activities | Number of Students | | Fisher's Exact test |
|---|---|---|---|---|
| | | PASSED | FAILED | |
| 1 | Exercise | 17 | 1 | P= 0.0724 |
| 2 | Nil | 86 | 30 | |

Table 3 shows no statistically significant difference between active students in exercise group and sedentary group students with regard to their academic performance. This statistically insignificant result may be due to less number of students in the exercise group, though the actual numbers give a positive effect of exercise on academic performance.

**TABLE 4: COMPARISON OF EFFECT OF CONTACT SPORTS AND NIL ACTIVITY ON ACADEMIC PERFORMANCE OF STUDENTS**

| S. No. | Type of Physical Activities | Number of Students | | Fisher's Exact test |
|---|---|---|---|---|
| | | PASSED | FAILED | |
| 1 | Contact sports | 61 | 3 | P= 0.0002* |
| 2 | Nil | 86 | 30 | |

*significant p value

Table 4 shows a statistically significant difference between inactive group of students and students involved in contact sports. This significant difference may be due to the competitive spirit, proper planning and execution, learning from mistakes etc. that are inherent lesions learnt when individuals involve in competitive sports like football, volleyball, hockey etc

**TABLE 5: COMPARISON OF EFFECT OF NON CONTACT SPORTS AND NIL ACTIVITY ON ACADEMIC PERFORMANCE OF STUDENTS**

| S. No. | Type of Physical Activities | Number of Students | | Fisher's Exact test |
|---|---|---|---|---|
| | | PASSED | FAILED | |
| 1 | Non Contact sports | 24 | 3 | P= 0.1302 |
| 2 | Nil | 86 | 30 | |

Table 5 shows no significant difference between sedentary group and non contact sports group (chess carom). Though these are primarily mind games, students in this group may not be playing the game at a higher level so as to influence the mental capacity to affect the academic performance.

**TABLE 6: COMPARISON OF EFFECT OF NONE SPORTS ACTIVITIES AND NIL ACTIVITY ON ACADEMIC PERFORMANCE OF STUDENTS**

| S. No | Type of Physical Activities | Number of Students | | Fisher's Exact test |
|---|---|---|---|---|
| | | PASSED | FAILED | |
| 1 | Non sports activities | 52 | 2 | P= 0.0003* |
| 2 | Nil | 86 | 30 | |

*significant p value

Table 6 shows a striking finding that students involved in non-sports activities like singing, dancing, painting, etc. are like students in contact sports group in having a statistically significant difference with sedentary group students.

**TABLE 7: COMPARISON OF EFFECT OF PHYSICAL ACTIVITIES AND NIL ACTIVITY ON ACADEMIC PERFORMANCE OF STUDENTS**

| S. No. | Type of Physical Activities | Number Of Students | | Fisher's Exact test |
|---|---|---|---|---|
| | | PASSED | FAILED | |
| 1 | Physical activities present | 154 | 9 | P= 0.0001* |
| 2 | Nil | 86 | 30 | |

*significant p value

Table 7 shows how sedentary group of students are statistically different from the entire group of students who are involved in some form of physical activities (non sedentary group). This table highlights physical activity in any form is beneficial to academics.

**TABLE 8: COMPARISON OF EFFECT OF CONTACT SPORTS AND NON CONTACT SPORTS ON ACADEMIC PERFORMANCE OF STUDENTS**

| S. No. | Type of Physical Activities | Number of Students | | Fisher's Exact test |
|---|---|---|---|---|
| | | PASSED | FAILED | |
| 1 | Contact sports | 61 | 3 | P= 0.356 |
| 2 | Non Contact sports | 24 | 3 | |

**TABLE 9: COMPARISON OF EFFECT OF CONTACT SPORTS AND NON SPORTS ACTIVITIES ON ACADEMIC PERFORMANCE OF STUDENTS**

| S. No | Type of Physical Activities | Number of Students | | Fisher's Exact test |
|---|---|---|---|---|
| | | PASSED | FAILED | |
| 1 | Contact sports | 61 | 3 | P= 1 |
| 2 | Non sports activities | 52 | 2 | |

Table 8 and 9 show whether is there any statistically significant difference exist between different physically active groups. There are no significant difference between groups and thus again it reiterates the finding from Table 7 that physical activity in any form is beneficial to academics.

## DISCUSSION

The significant finding from the study is that physical activity is beneficial for students in improving their academic performance. This positive association between physical activity and academic performance has been delineated by similar studies in the past[5,6,7]. According to these studies, physical activity in students induce arousal and decrease boredom which are essential in providing prolonged attention to their studies, when compared to students who are not physically active. These studies also argue that increased physical activity increase the self-esteem of the students which help in improving the class room behavior that has direct influence over academic performance. Regular physical activity decreases stress, anxiety and depression which are negatively associated with academic performance and at the same time boosts self-esteem that is positively associated with academics[8]. Studies on animals have shown that when the animal is exposed to an exercise enriched environment (running wheel), neural tissues showed enhanced growth, especially in structures involved in learning and memory. Chemicals such as brain derived neurotrophic factors are released in higher amounts when the animals are exposed to regular aerobic exercise, that also increased the capillary blood flow to cortex and induced increased neuron and synapse formation which are involved in learning and performance[9]. Another similar study has found that physical activity enhanced neurotrophins production, increased nerve growth in hippocampus (center for learning and memory), development of nerve connections and increased brain volume, changes that may be associated with improved cognition such as attention, information processing, storage and retrieval[10]. Motivation may be the common factor that links the physical activity and academic performance.

Motivated students indulge themselves in various sports activities as well as motivated to excel in studies, as they would like to compete and win in sports. Thus they strive to achieve their goal vehemently[11,12]. Sports help young people to secure desirable characters like motivation, discipline, tenacity, competitive spirit, responsibility, perseverance, confidence and self-esteem, qualities that help one to outshine in academics and life as well[13]. Another common factor between physical activity and academic excellence is nutrition. Students who are physically active choose good foods, foods with high nutritional value and avoid junk foods. This good nutrition may also affect their neural tissues function positively which reflects in good academic performance[14,15]. Mere physical exercise, i.e. students who were doing regular exercise without involved in any kind of sports activities, has no significant effect on academic performance, though it has resulted in improved academic performance when compared to students who are sedentary, but when compared to students who are involved in sports activities, exclusive exercising group of students fared less well in exams, a finding similar toother studies[16,17]. The reasons may be that the number of students in that group is less which would result in erroneous findings; the students who are declaring themselves as exercising group may not be regular in exercising or not working out to that extent to produce positive results on their academic performance. Activities that increased only mental processes without much involvement of physical component, such as in chess or carom playing student group (non contact sports), has not produced equivalent beneficial effect on academic performance as compared to contact sports group.

**Limitation of the Study**

The detail regarding sports and extracurricular activity is based on self reported document i.e. the bio-data which may not be very accurate in revealing the actual physical. Thus design of this study limits the conclusion that can be drawn and it is difficult to attribute causation to any of the observed relationships.

## CONCLUSION

Physical activity is beneficial to the students, especially in their academic performance. Thus school and college authorities should recognize the positive aspects of physical activity on students and encourage them to participate in various extra-curricular activities.

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