

Cardiovascular Fitness Assessment of Medical Students at Patan Academy of Health Sciences, Lalitpur, Nepal

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ARTICLE INFO

Article History

Submitted: 16 October, 2022

Accepted: 29 December, 2022

Published: 8 February, 2023

Source of support: None

Conflict of Interest: None

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ABSTRACT

Introduction: Despite of being aware of the fact that medical students should be healthy and have good physical fitness for better productivity, have difficulty in balancing their studies and physical fitness. Three minute step test is one of the widely used methods to assess the cardiovascular fitness after performing the submaximal exercise. Thus, this study aims to assess the cardiovascular fitness of the medical students by performing a YMCA (Young Men's Christian Association) 3-minutes step test.

Methods: This cross sectional study included 92 medical students of either sex with the age of 18-25 years. The test was performed by stepping up and down on 30 cm bench keeping in time with the beat of the metronome and recovery heart rate was recorded. The cardiovascular fitness was then categorized based on their recovery heart rate.

Results: Fitness level of medical students at Patan Academy of Health Sciences was found to be dominantly very poor (Very poor fitness level 43.6%, poor fitness level 29.3%, below average fitness level 9.8%, average fitness level 6.5%, above average fitness level 5.4% and good fitness level 5.4%).

Conclusion: The findings of the study remind us about the level of physical activity among the medical students and the need to promote a physically active lifestyle for a positive impact on their health and academic performance.

Keywords : Cardiovascular fitness; Physical activities; Three minutes step test.

INTRODUCTION

For better productivity the students should be healthy and have good physical fitness. In the recent decade, a decline in physical activity among college students has been observed.¹ It is necessary to measure and analyze the physical fitness of the students for their own benefit and improvement.

There are several modalities available for the objective evaluation of physical fitness. Three minute step test is one of the widely used methods to assess the cardiovascular fitness which record the recovery heart rate (RHR) after performing the submaximal exercise.² Some of the previous studies done in college students showed poor and below average cardiovascular ratings.^{3,4} Thus, this study aims to assess the cardiovascular fitness of the medical students in the institute by performing a

YMCA (Young Men's Christian Association) 3-minutes step test which measures the endurance fitness.

METHODS

This cross sectional study included 92 medical students based on inclusion and exclusion criteria. Stratified random sampling was the method adopted for subject selection. Informed written consent of subjects was taken for inclusion in the study done at Laboratory Room of Department of Physiology, Patan Academy of Health Sciences (PAHS), Lalitpur, Nepal. The study was conducted with the individuals of age group 18-25 years with both male and female. The exclusion criteria consist of Individuals suffering from any systemic

diseases like acute or chronic respiratory disorders, cardio-vascular disorders, neurophysiological disorders, musculoskeletal disorders of lower limbs or with lower limb deformities, Pregnant individuals, Individuals under any regular medication and Individuals who answered “YES” to one or more questions on physical activity readiness questionnaire (PAR-Q).

Procedure

The consented subjects were asked to sit down comfortably in the chair. They were then explained in detail regarding the study and procedure. The individual was demonstrated how to perform the test by stepping up and down on 30 cm bench keeping in time with the beat of the metronome. The resting heart rate (RHR) and 85% of HRmax (maximum heart rate) were calculated.

If the resting heart rate was within the normal range, the step test was started. If the individual deviated from the beat, he/she was helped to keep up with the beat of the metronome. However, if he/she kept slowing down due to fatigue, the test was stopped. During the step test, the heart rate was checked three times. The test was stopped immediately if the individual reached 85% of maximum heart rate at any point during the test.

At the end of 3 minutes, the individual was asked to sit down. After one minute, the post test heart rate was recorded using a saturation probe. Finally, using age, gender and post test heart rate, the test result was determined.

RESULTS

After performing YMCA (Young Men’s Christian Association) 3-minutes step test on the medical students, we first analyzed the number of medical students involved in the study according to the gender. Ninety two healthy individuals were included in the study. Among them, female (n=41) and male (n=51) were recruited for the study (Table 1).

Gender	Frequency	Percent
Female	41	44.6
Male	51	55.4
Total	92	100

Among 92 medical students participating in the study, majority of the students i.e. 40 students had very poor fitness level. The number of students with good, above average, average, below average, poor fitness level was found to be 5, 5, 6, 9 and 27 respectively. The number and the percentage of students with various cardiovascular fitness levels are shown in Table 2.

Table 2: Cardiovascular fitness rating

Cardiovascular fitness rating	Frequency	Percent
Good	5	5.4
Above average	5	5.5
Average	6	6.5
Below average	9	9.8
Poor	27	29
Very poor	40	43.5
Total	92	100

Further, we also assessed the cardiovascular fitness level of the medical students on the basis of gender. The result showed that 22 female and 18 male students had very poor fitness level. This finding also showed that majority of the medical students of either gender had very poor fitness level.

Table 3: Cardiovascular fitness rating according to gender

Cardiovascular fitness rating		Gender		Total
		Female	Male	
Good	Frequency	0	5	5
	Percent-age	0%	9.8%	5.4%
Above average	Frequency	2	3	5
	Percent-age	4.9%	5.9%	5.4%
Average	Frequency	1	5	6
	Percent-age	2.4%	9.8%	6.5%
Below average	Frequency	4	5	9
	Percent-age	9.8%	9.8%	9.8%
Poor	Frequency	12	15	27
	Percent-age	29.3%	29.4%	29.3%
Very poor	Frequency	22	18	40
	Percent-age	53.6%	35.3%	43.6%
Total	Frequency	41	51	92
	Percent-age	100%	100%	100%

The number of female and male students with good fitness level was 0 and 5 respectively. The number and percentage of medical students with different cardiovascular fitness level according to gender is shown in Table 3.

DISCUSSION

The aim of the study was to assess the cardiovascular fitness level on the basis of 1-minute post exercise recovery heart rate following YMCA 3-minutes step test which is a sub-maximal exercise. The study was done on healthy medical students at Patan Academy of Health Sciences (PAHS).

Fitness level of medical students at PAHS was found to be dominantly very poor (Very poor fitness level 43.6%, poor fitness level 29.3%, below average fitness level 9.8%, average fitness level 6.5%, above average fitness level 5.4% and good fitness level 5.4%) (Table 2). Bijay Subedi et al had conducted a similar study among healthy medical students at School of Health and allied sciences, Pokhara University, Nepal. The study concluded that majority of the students were found to be dominantly poor (Poor fitness level 70.5% vs. good fitness level 29.5%).⁶ The findings were in agreement with our study.

One of the reasons for majority of the medical students at PAHS having a very poor and poor fitness level is not involving themselves in physical activities and is more dedicated towards their medical education. Kenya S, Brodsky M et al. in their study had found that students from Asian and African countries have the lowest levels of participation in the physical activities in comparison to the Caucasian students.⁷ Similarly, Lee S-H et al. in their study concluded that U.S. college women were involved in the exercise more than the South Korean college women (42.5% vs. 21.3%; $p < 0.001$). The study showed that South Korean college women were focused at developing their inner beauty and mental efforts like improving knowledge, helping others.⁸ These findings are also in accordance to our study since the medical students at our medical school are also focused on improving their knowledge and skills more than the physical activities.

In our study, there is also association of gender with the cardiovascular fitness level. The greater percentage of females had very poor fitness level as compared to males (Very poor fitness level: female 53.6% vs. male 35.3%). Likewise, the percentage of males with good fitness level is also high as compared to females (Good fitness level: female 0% vs. male 9.8%). These findings are similar to the findings of the study done by Bijay Subedi et al. where they had concluded that greater percentage of females had poor fitness level as compared to the males (Poor fitness level: female 75.2% vs. male 61.2%).⁶

In a similar study done in United State, it was highlighted that the average hours of physical activity per week for the Asian female college students was substantially less than the average hours of physical activity reported by female college students from other continents like North America, Europe, South America.⁹ This conclusion also supports one of the findings of our study where the cardiovascular fitness of the females is not good as compared to the males and indicates that the female medical students need to increase their participation in the physical activity along with their dedication in the field of medicine. However, there are few studies which showed no differences in the physical activity and level of fitness between male and female college students. This finding was observed in the study conducted by Calfas KJ et al.¹⁰

CONCLUSION

Based on the findings of our study, it has helped us understand that the physical activity is insufficient among the medical students at PAHS which have lead to dominantly very poor cardiovascular fitness level. However, it still remains the subject of further research in a larger population size which will aid us come to a definitive conclusion. Furthermore, the medical students, mentors, recreation staffs in the medical school as well as the health related professionals should be aware of these findings. This will remind us about the level of physical activity among the medical students and the need to promote a physically active lifestyle for a positive impact on their health and academic performance.

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