

# To Assess the Cardio Respiratory Endurance in College Going Students- An Observational Study

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## Abstract

**Background:** Sub-maximal exercise test is very useful in evaluating individual's cardio-respiratory fitness. Many factors have impact on distance walked during six-minute walk test and considered to be ideal for patient population.

**Methods:** 100 young college going male and female subjects satisfying inclusion criteria performed six-minute walk test and vital parameters, prior to test and post test at regular interval till 3 minutes were taken. Body Mass Index (BMI) was calculated.

**Results:** 20 male and 80 female subjects performed six-minute walk test. The mean distance walked by males was 534.24 meters whereas mean distance walked by female subjects was 506.7 meters.

**Conclusion:** It was observed that college going healthy subjects have normal cardio-respiratory endurance.

## Keywords

Cardio Respiratory, Observational, Body Mass Index

## Imprint

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## Introduction

The six-minute walk distance test (6MWT) evaluates cardio-respiratory endurance in other terms it checks the functional capacity and within the duration of six minutes this walk test measures the distance covered by the individual then the functional capacity of an individual can be assessed. It is known that individual's BMI affects energy requirements during

performance of 6MWT [1]. Balke in 1963 first devised this test. This test is economical, simple and can be used to evaluate functional capacity of healthy as well as problem population [2].

Gender, age, weight, height plays a key role in predicting normative values in 6MWT [3]. In this view this is a simple, reproducible and 6MWT is well known which reflects and relate to activities of daily living (ADLs) well with quality of life score [4].

As The 6MWT only uses submaximal capacity of the person it is well tolerated by patients and it is more representative of the activities of daily living in comparison to another maximal or longer distance walk test [5], and is frequently used to assist medical fraternity on the severity of disease, prognosis and response to treatment [6].

Six-minute walk test can be used to evaluate as a tool in assessing fitness level, response to an intervention and a good predictor [1].

## Methodology

Study's ethical aspects were considered by institutional committee after which college going students were included in the study. Subjects were recruited keeping criteria with 18 years and above but less than 30 years, had no history of addictions, not diagnosed for any pulmonary diseases, not underwent any vigorous exercise program in last 48 hours and not having any Musculo-skeletal disorder that affects in performing six-minute walk test. The subjects were explained about study in detail and informed consent forms were obtained. Total 100 students Among them 20 male and 80 females with the age group of 18-30 year were assessed. Subjects were asked to sit near starting point for 10 minutes at least following which, pre-vitals were taken in form of Pulse rate (PR), Respiratory rate (RR) and Modified Borg's scale- Rating of perceived exertion (RPE), after performance each vitals were re-evaluated immediately after completion, after 3 min and after 5 min. The 6MWT was performed as per guideline [8]. test was performed in the optimal and well-ventilated place and therapist chose a quiet place so that commands at regular interval could be audible to subjects. Test was carried out at room temperature and all necessary precautions like standby emergency services, test supervision by senior therapist and availability of chair at short distance were taken care of.

## Results

Total of 100 participants were enrolled for the study in which 20 male participants and 80 female participants were recruited. We have analyzed the data as per gender to better understand the test results.

In male subjects, mean value of pulse rate prior to test was 77.75 beats/min, which raised to 87.35 beats/min at immediate post-test, and recovery seen after 3min 80.3 beats/min. Similarly, mean value of respiratory rate priorly was 19.1 breath/min, during immediate vital post-test reached to 22.1 breath/min and came to near normal after 3 min 19.6 breath/min. Their 6MWD mean value of 534.24 meter.

In female subjects mean value of pulse rate, priorly was 77.66 beats/min, which raised to 86.05 beats/min immediately post-test, and recovery in vital seen after 3min, 79.88 beats/min. Similarly, mean values of pre-test respiratory rate 19.11 breath/min, during post-immediate respiratory rate was 22.02 breath/min and after 3min 19.63 breath/min. Their 6MWD mean value of 506.7 meters.

Mean value for Level of exertion in males and females, prior to test was 0.00 and it raised slightly in males (0.002) and female (0.5) during post-immediate record. However, it again went back to 0.00 in both male and female subjects after 3 minutes during recovery period.

Table 1

Mean values of Vitals and (Rating of Perceived Exertion) RPE of Male subjects

	Pre-Vitals	Post-Immediate	After 3 Min	Distance
BMI	21.57 kg/cm <sup>2</sup>			
PR-per Minute	77.75	87.35	80.3	<b>534.24 Meters</b>
RR-per Minute	19.1	22.1	19.6	
RPE	0	0.002	0	

Table 2

Mean values of Vitals and (Rating of Perceived Exertion) RPE of Female subjects

	Pre-Vitals	Post-Immediate	After 3 Min	Distance
BMI	19.92 kg/cm <sup>2</sup>			
PR-per Minute	77.66	86.05	79.88	<b>506.70 Meters</b>
RR-per Minute	19.1	22.02	19.63	
RPE	0	0.5	0.006	

## Discussion

In our study we assess cardio respiratory endurance in form of 6min walk test in 100 college going students age group 18-30 years. All subjects completed the six minute walk test and none of the subjects required a rest during test duration.

As the results suggested, it was observed that female subjects walked lesser distance than male subject. The proper explanation might be due to height and higher cadence. Mean values of distance walked by males (Table 1) and females (Table 2) were 534.24 meter and 506.70 meter accordingly. In this regards, A recent study found that both the resting heart rate and the heart rate after the test were significantly higher in the female subjects compared with the male subjects in study and the distance covered was also more [9].

Supporting present study one researcher, suggested that age, height and weight are self-reliantly linked with the distance walked, but with motivation, wrong commands and frequent turns due to short corridors might have impact in other way around [2]. We observed raise in the vital parameters such as pulse rate, respiratory rate and level of exertion post test immediately after the performance of the test which was an expected response due direct increase in the energy demand required to perform the test. However, vitals and exertional recovery observed in almost all individuals on 3<sup>rd</sup> minute post Six-minute walk test suggested sufficient body functions for the fast recovery and good cardio-respiratory fitness.

## Conclusion

The present study observed normal functional capacity in college going young healthy male and female subjects which is a vital components of the physical fitness.

## Statement on ethical issues

Research involving people and/or animals is in full compliance with current national and international ethical standards.

## Conflict of interest

None declared.

## Author contributions

The authors read the ICMJE criteria for authorship and approved the final manuscript.

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## References

1. H. Vaish, S. Gupta, S. Sharma. Six Minute Walk Distance and Six Minute Walk Work in Young Adults Aged 18-25 Years. *International Journal of Pharmaceutical and Medicinal Research*,2017;5(3):464-468.
2. Vibhuthikiran shah, MugdhaOberoi, Veena-krishnanand. Response to 6 Minute walk test in healthy adults. *International journal physiotherapy* ,2015;2(6):967-971.
3. HatemAlameri, Sulaiman Al-Majed, Abdelrahman Al-Howaikan. Six-min walk test in a healthy adult arab population. *Respiratory Medicine*, 2009; 103: 1041-1046.
4. Nisar Ahmed Rao,MuhammadIrfan, Ahmed SulemanHaque, Ali Bin SarwarZubairi,SafiaAwan. Six minute walk test performance in healthy adults Pakistani volunteers. *Journal of the college of physicians and surgeons Pakistan*, 2013;23(10):720-725.
5. Victor Zuniga Dourado. Reference equations for the 6- minute walk test in healthy individuals.2010:1-11.
6. Lalita Fernandes, Anthony Menezes Mesquita, Rohit Vadala, Amit Dias. Referance equation for six minute walk test in healthy watern india population. *Journal of clinical and diagnostic research*, 2016;10(5):1-4.
7. Hulya Nilgun Gurses, Melih Zeren, Hilal Denizoglu Kulli, Elif Durgut. The relationship of sit to stand tests with 6-minute walk test in healthy adults. *Medicine*,2018;97(1):1-5.
8. ATS Statement: Guidelines for the Six-Minute Walk Test. This Official Statement Of The American Thoracic Society Was Approved By The Ats Board Of Director. 2002; 166:111-117.
9. He Zou, Xiuruo Zhu, Jia Zhang, Yi Wang, Xiaozhen Wu, Fang Liu, Xiaofeng Xie, Xiaoshu Chen. Reference equations for the six minute walk distance in the healthy Chinese population aged 18-59 years. *plos one*,2017;12(9):1-13.