

Comparison of Functional Capacity among Obese and Non-Obese Young Adults

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ABSTRACT

Background: The Six minute walk test (6MWT) is a very useful, reliable, safe and easy to administer assessment tool for the functional capacity of obese and non-obese individuals.

Objectives: The study aimed to compare functional capacity among obese and non-obese young adults.

Material and Methods: A descriptive type of observation study was carried out. Total 50 participants were taken. The study was conducted by dividing selected population into two groups based on inclusion and exclusion criteria, namely obese (Group A) and non-obese (Group B). These groups of 25 individuals each were divided according to their BMI based on the WHO's percentile Guidelines for adults. The participants were asked to perform six minute walk test using obese and non-obese individuals. Baseline measurements were measured with both groups at the end of the six minute walk distance. The data was analyzed using appropriate statistical methods.

Results: After performing six minute walk test using compared both the group A (obese) 488±20.36 meter and group B (non-obese) 608±30.8 meter, 6MWD were measured and mean standard deviation were carried using statistical analysis, then both groups were compared using T-values 16.192 and P-values 0.0001 was seen. This test shows significant.

Conclusion: In conclusion, different factors contribute to 6MWD in obese and non-obese individuals. This study concluded that obese participants decrease the six minute walk distance as compared to the non-obese participants. This shows that the obese participants have got lower functional capacity when compared to the non-obese group.

Keywords: Obesity, functional capacity, six minute walk test.

INTRODUCTION:

Obesity, as defined by the World Health Organization [WHO] is a medical condition in which excess body fat accumulates to produce a negative effect on health which ultimately leads to increased morbidity and reduced life expectancy¹. Obesity is one of the most preventable diseases. Obesity has a multifactorial etiology that includes genetic, environmental, socioeconomic, and behavioural or psychological influence.

Obesity measurement can also be used to estimate morbidity and mortality. Body mass index (BMI) has been used to screen overweight and obese individuals. Obesity has inflammatory components, directly and indirectly, related to major chronic diseases such as diabetes, atherosclerosis, hypertension, and several types of cancer.² Once restricted to high-income countries, obesity is now also prevalent in low and middle income countries where its incidence is constantly increasing. Recent data from

the WHO show more than 1.9 billion adults, 18 years and older, are overweight. Of these over 650 million are obese. In 2016, 39% of adults 18 years and over (39% of men and 40% of women) were overweight. Overall about 13% of the world adult population (11% of men and 15% of women) are obese.³ Obesity is defined by body mass index (BMI) calculated as kilogram per square meters. WHO defines BMI >30 as obese. WHO Classification as Obesity Underweight: <18.5; Normal range: 18.5 - 24.5; Overweight: BMI \geq 25.00 Pre obese: BMI is 25.00–29.99, Class I obese: BMI is 30.00–34.99, Class II obese; BMI is 35.00–39.99, and Class III obese when BMI \geq 40.00.⁴

Functional capacity as the ability of a cell, organ, system, or body to maintain homeostasis within their narrow limits of survival in response to a specified stress. Functional capacity is pliable; declining rapidly with extreme physical inactivity or more slowly with aging, while preventing inactivity can increase functional capacity. A direct relationship between functional capacity and survival is a cornerstone of general medicine theory. A major predictor of functional capacity is maximal aerobic capacity (VO₂max), which while directly testing cardiovascular fitness and integrity also represents a combination of other physiologic components. An aerobic functional capacity in patients under 4-metabolic equivalents (METs), a typical demand during normal daily activities, increases postoperative cardiac and long-term risk.⁵

Assessment of functional exercise capacity has gained importance in evaluation of patients in various disease state. Timed walking test are widely used to evaluate functional exercise performance. The ability to walk for a distance is a quick, easy, and inexpensive way to assess the physical function of an individuals. It is also an important component of quality of life as it reflects the ability to undertake day to day activities.⁶ The assessment of functional capacity reflects the ability to perform

activities of daily living that require sustained aerobic metabolism. The integrated efforts and health of the pulmonary, cardiopulmonary, and skeletal muscle system dictate an individual's capacity. Numerous investigations have demonstrated that the assessment of functional capacity provides important diagnostic and prognostic information in a wide variety of clinical and research settings.⁷ body and may pace externally.

The six-minute walk test (6 MWT) is a measure of functional capacity and is a low-cost and easy-to-administer tool to measure submaximal loads during exercise. Physical fitness is a very useful health marker of functional status of our cardiovascular, respiratory, neuroendocrine, and musculoskeletal and circulatory system. It is used to see the association between body composition and its relation to morbidity and mortality. Physical fitness in obese and non-obese subjects was assessed by means of 6- min walk test according to the guidelines of the American Thoracic Society. The 6- min walk test (MWT) is safer, easier to tolerated administer, better, and better reflects activities of daily living than other walk test. The six-minute walk test (6MWT) is a simple, practical, standardized, reliable and valid measure of effects of submaximal exercise in healthy Young adult. 6MWT involves all assessment of cardiopulmonary and musculoskeletal system in addition to the variables like walked distance and time to complete the particular distance. walked distance can be influenced by corridor length and also believed to be one of the factors for prognostication of exercise capacity. this test can be performed and utilized for the purpose of modification / change in treatment as per the result gained by test and also it checks indirectly the aerobic capacity during physical activity⁸

There is an increased demand for clinical evaluation tools to assess functional capacity obese and non- obese individuals. Six minute walk test has been widely used to assess the functional capacity in diseased

as well as normal individuals. Thus the aim of this study is to compare the six min walk distance among obese and non- obese young adults. Also to identify the factors influencing 6MWD in normal weight and obese young adult and to identify the determinants of 6MWD in non- obese and obese individuals.

MATERIALS AND METHODS

All students/Participants were screened as per inclusion and exclusion criteria. All participants were briefed about the study and consent form will be filled from them. The sampling method used was Simple Random sampling and a sample size of 50 participant’s was categorized into two groups. One was the obese group and second group was non-obese young adults. 25 participants were included in each group of Population. Participants included in the study were both male and female, Participant within the age group of 18 to 25 years in Dr. APJ Abdul Kalam College of

physiotherapy. Before starting the study, they were instructed to wear loose comfortable clothing and comfortable footwear as per ATS guidelines for 6MWT. 6 minute walk test were performed for all the participants and data will be analyzed with statistical method.

Procedure:

According to American Thoracic Society (ATS) guidelines of 6 MWT published in 2002. The 6MWT was performed indoor corridor that was 30 m flat, straight course with a hard surface. The end of course was identified by two cones indicating the turns around points. Ten minute before the test the subject were made to sit in a chair located near the starting position. During baseline values were recorded. The subjects were asked to walk as far down the length of the corridor as they could at their own pace for six minute. At the end of the test the 6MWD covered during the test was recorded.

RESULTS AND STASTICAL ANALYSIS

Table No 1: Baseline Measurement

	Mean And Standard Deviation (OBESE)	Mean And Standard Deviation (NON –OBESE)
AGE	21.64± 1.497	22.28±1.24
HEIGHT (Cm)	159.7±7.612	157.4±5.66
WEIGHT (kg)	83.43±11.80	50.88±5.003
BMI (kg/ m ²)	32.6±3.55	20.62±1.86
HR (b/m)	85.7±8.28	83.16±5.74

Table No 2: Compression of Six Min Walk Test in OBESE And Non OBESE Young Adult

	Mean And Standard Deviation Six Minute Walk Distance
GROUP A (OBESE)	488.36 ± 8.794
GROUP B(NON-OBESE)	608.20±30.896

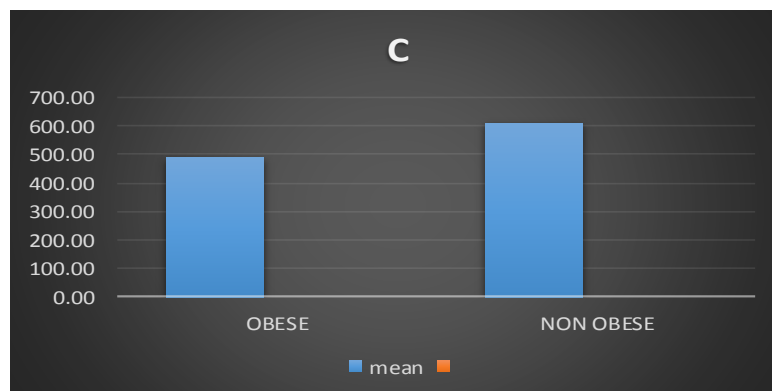


Table No 3: Comparison of OBESE and Non OBESE Mean And Standard Deviation

Parameters	GROUP A(OBESE) Mean ± SD	GROUP B (NON-OBESE) Mean ±SD	T-Values	P-Values	Significance
Six Min Walk Distance (m)	488±20.36	608±30.8	16.192	0.0001	SIGNIFICANT

The study was conducted obese and non-obese in young adults, which were selected from the same institute on the basis of inclusion and exclusion criteria. total 50 students performed six minute walk test, out of which 25 students were obese; (group A) and 25 students were non-obese; (group B). the height was measured by using inch tape, weight was measured by using weighing machine and then BMI was calculated by using the formula (kg/m²) and heart rate was measured by using pulse oximeter.

This distance was measured by counting the lap till six minute distance accordingly the mean and standard deviation for group A(obese) with 488m and for group B (non-obese) with 608m.

On comparing the six minute walk test (6MWT) the mean and SD values is 488 ±20.36 meters is group A (obese) and 608±30.8 meters is group B (non-obese) respectively. The calculated T-Values is 16.19 2 and P-values is 0.0001 which reveals significant results in both the groups. When compared to both the groups the obese participants have got the lower functional capacity as compare to non-obese group.

DISCUSSION

The purpose of this study was to compare the functional capacity among obese and non-obese young adults. In this study, total 50 students participated out of which 25 participants were obese adults and 25 were non- obese adults. Among 50 students there were 2 males and 48 females selected from Dr APJ Abdul Kalam college of physiotherapy. Using American thoracic society approved six-minute walk test as an outcome measure. 18 to 25 age group was selected as a study done by 2nd year to Interns.

The study was conducted by dividing selected population into two groups based on inclusion and exclusion criteria. namely obese (Group A) and non-obese (Group B). These groups of 25 individuals each were divided according to their BMI based on the WHO's percentile Guidelines

for adult. The six minute walk distance for selected participants group. The statistics mean and standard deviation Group A (obese) value was 488±20.36 meters and Group B (non-obese) value was 608 ± 30.8 meters. Using this values T test 16.192 was applied both the group like Group A (obese), Group B (non-obese). Using this P value were seen 6MWD (0.0001) shows significance.

The study shows that Group A (Obese) decrease six minute walk distance as compared to Group B (Non-obese). This Present study showed that there was significant difference between six minute walk distances of obese and non -obese participants. The obese participants have got lower functional capacity when compared the non-obese group.

The probable mechanism behind the lesser distance covered by obese participants in this present study was due to increased weight and reduced muscle strength, higher fat mass which covers greater body surface and lowered cardiorespiratory endurance and functional capacity. It is also observed that in obese individuals the gait speed is low as well which is accompanied with the shorter stride lengths.

According to a study conducted by Chuang et.al, as the measure of assessing the functional capacity during a 6MWT. In the present study, the 6MWD of obese subjects was found to be significantly higher as compared to normal weight subject. The possible explanation of this could be that obese subject have greater body mass hence greater 6Mw.

According to a study conducted by Hergenroeder, Andrea L et al. The Influence of Body Mass Index on Self-report and Performance-based Measures of Physical Function in Adult Women.” This study purpose of this study was to asses physical function in adult women across BMI categories using self-report and performance-based measure and determine the influence of BMI on the relationship between physical function measures (six

minute walk test) This study finding that gait speed is most impaired in individuals with class III obesity is supported in previous studies. In an analysis of the kinematic components of gait in adult with obesity, found that individuals with obesity walked much slower than those of normal weight.

CONCLUSION

In conclusion, different factors contribute to 6MWD in obese and non-obese individuals. This study concluded that the obese participants have lower functional capacity when compared with non-obese group.

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