

Assessing the Effect of Six-Weeks of Moderate Intensity Exercise Training on Cardiovascular Fitness among Young Obese Adults

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ABSTRACT

Aim – To determine the effectiveness of 6 weeks of moderate intensity exercise training & To provide an appropriate measure of cardiovascular fitness. The YMCA 3minute step test is based on how quickly your heart rate recovers following a short bout of exercise. Hence the purpose was to provide a submaximal measure of cardiovascular fitness after six-weeks of moderate intensity exercise training among young obese adults.

Methodology - According to simple random sampling 50 participants were included in the study after screening for the inclusion criteria. Thereafter They were explained the purpose of the study and the procedure involved in the study. Informed Consent was obtained and a YMCA 3-minute step test was done. Heart rate measures were recorded at the end of the 3-min step test Pre & Post intervention. Data analysis was done at the end of the study.

Results – Post intervention 10 students (20%) out of 50 had good cardiovascular fitness level, 22 students (44%) had an above average cardiovascular fitness, 13 students (26%) had average fitness & 5 students (10%) had below average level of cardiovascular fitness.

Conclusion- This study concluded that, six weeks of moderate intensity exercise training improved cardiovascular fitness and lowered the risk of developing cardiovascular disease in obese young adults.

Keywords: Cardiovascular fitness, YMCA 3minute step test, Moderate intensity exercise training.

INTRODUCTION

Obesity is the excessive or abnormal accumulation of fat or adipose tissue in the body that impairs health via its association with the risk of development of diabetes mellitus, cardiovascular disease, hypertension, and hyperlipidemia. It is a complex disease and has multifactorial etiology. After smoking, it is the second commonest cause of preventable death. Obesity occurs as a result of an imbalance between daily energy intake and energy expenditure which results in excessive weight gain.¹

Obesity is a progressive systemic disease process, with multiple organ-specific manifestations. Obesity brings a host of debilitating symptoms (physical, psychological, and medical consequences), plus secondary metabolic effects, many of which conspire to cause IHD. Ultimately obesity can kill, through its contribution to diabetes, CHD, cancers and more directly via complications such as Pickwickian syndrome, sleep apnoea, venous thrombosis embolus, or cellulitis.²

The core pathophysiology of obesity consists in the derangement of the central regulation of energy balance with alteration

of neuro-chemical and feedback signaling. This in turn produces an inappropriate expansion of the adipose organ with progressive hyper-production of adipokines and especially of inflammatory cytokines. At the systemic level, this translates into atherogenesis and atherosclerosis, hypertension, type 2 diabetes mellitus, increased risk of cardiovascular disease, certain types of tumors and eventually in a reduced life expectancy.³

Nowadays, Mechanization in all areas has affected the way of life, by reducing energy expenditure and by increasing sedentary lifestyle in the workplace and at home. Sedentary lifestyle such as passive transport, have also been associated with increased obesity.⁴ Cardiovascular health is independently associated with Physical activity (PA) and, with Physical Inactivity (PI) which is linked with the greatest risk of developing CVD. The prevalence of PI has increased over recent years, perhaps as the result of a greater adoption of the Western lifestyle, characterized by greater sedentary time, lower participation in active transport.⁵

Physical fitness is defined as any type of movement which is made by skeletal muscles, which requires energy consumption.⁶ The Australian national physical activity guidelines for adults recommended that for good health, adult should “put together at least 30 min of moderate-intensity physical activity on most, preferably all days.”⁷ Moderate-intensity activity is usually made up of exercises that get your heart rate up to 50% to 60% higher than its rate when you are at rest. During moderate physical activity, breathing and heart rate become more rapid and your body burns about 3.5 to 7 calories per minute. There are many activities that are generally counted as moderate-intensity exercise (such as – brisk walking, easy jogging, walking or jogging on a treadmill, bicycling, jumping rope). Regular exercise has a favorable effect on many of the established risk factors for cardiovascular disease. For example,

exercise promotes weight reduction and can help reduce blood pressure. Exercise can reduce “bad” cholesterol levels in the blood (the low-density lipoprotein [LDL] level), as well as total cholesterol, and can raise the “good” cholesterol (the high-density lipoprotein level [HDL]). In diabetic patients, regular activity favourably affects the body’s ability to use insulin to control glucose levels in the blood. The effect of continued, moderate exercise on overall cardiovascular risk, when combined with other lifestyle modifications such as: proper nutrition, smoking cessation, and medication use, can be effective.⁸ Most of the studies concluded that either moderate or high intensity exercise training can improve the cardiovascular fitness of an obese individuals within 8-12 weeks of intervention but there are lack of studies which conducted on effects of 6 weeks of moderate aerobic training on cardiovascular fitness. So, this study was done to observe and compare the effects of 6 weeks of moderate intensity exercise training among young obese adults.

Objective of the Study: -

- To assess the cardiorespiratory fitness & endurance.
- To See the effectiveness of 6-weeks moderate intensity exercise training on cardiovascular fitness in obese young adults.

METHODS AND MATERIALS

Participants were screened according to the inclusion & exclusion criteria. Informed written consent was obtained from the participants regarding to study. The Sampling method used was convenient sampling and a Sample Size of 50. Participants included in the study were Both male and female, Participants within the age group of 18-25 years in Dr. APJ Abdul Kalam College of Physiotherapy, Students who were having BMI more than or equal to 30 kg/m² participated for moderated intensity aerobic training for 6 weeks. Individuals who were having diabetes mellitus, asthma, congenital heart diseases,

pre-existing heart conditions, beta blockers, addiction of smoke were excluded. Demographic details were noted including name, age, height, weight, BMI. Pre & Post Intervention Cardiorespiratory and endurance fitness was assessed through 3 minutes step test.

Procedure – Demonstration was given to the participants by stepping on and off the step to the metronome beat following a cadence of up, up, down, down continuously for 3 minutes. The participants stepped up and down on the platform at the given rate for a total of 3 minutes. As the participants completed 3 minutes, they stop immediately and they were asked to sit down on the step. Starting within 5 seconds, the HR of the participant was calculated for one complete minute. Then participants were given the intervention according to the protocol designed for 6 weeks, 05 times in a week. Duration of each session was for 40 minutes including warmup & cool down period. Moderate intensity aerobic training was given on treadmill. After 6 weeks of intervention again the cardiovascular fitness was assessed and pre-post data was analyzed with statistical analysis.

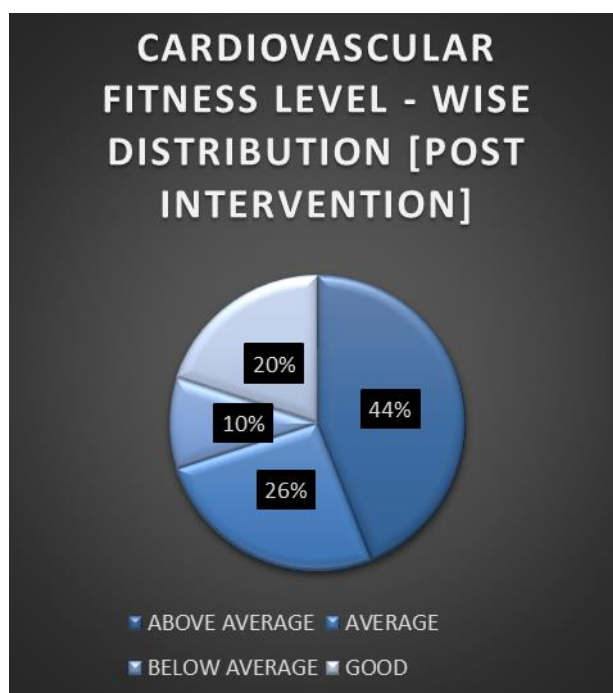
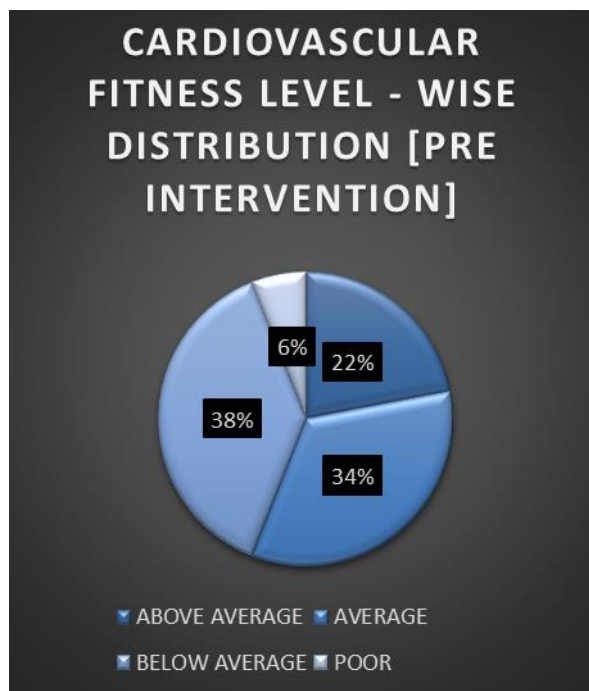
STATISTICAL DATA ANALYSIS AND RESULTS-

The study was conducted in obese young adults, which were selected from the same institute on the basis of inclusion and exclusion criteria. 50 students performed YMCA 3 mins step test. 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. Baseline measurements were taken before the YMCA 3 minutes step test. There were 7 males and 43 females who performed 3 min step test. The mean and standard deviation of age (21.68±1.63), height (162.1±9.12), weight (84.55±12.33), BMI (32.08±3.03) and resting heart rate (83.38±6.36) were calculated.

Table no. 1 – MEAN±SD of Pre and Post intervention Heart rate recovery, T and P Values

| PARAMETERS | MEAN ±SD |
|---|--------------|
| HEAR RATE RECOVERY (B/MIN) [PRE-INTERVENTION] | 108.1±6.45 |
| HEART RATE RECOVERY (B/MIN) [POST-INTERVENTION] | 100.12±5.927 |
| T - Value [POST-INTERVENTION] | 25.236 |
| P - Value [POST-INTERVENTION] | <0.0001 |

Chart of Cardiovascular fitness level [Pre & Post Intervention].



The pie chart demonstrates [Pre-Intervention] At the end of 3-minute step test – the results suggest that there were 11 students (22%) out of 50 who had an above average cardiovascular fitness, 17 students (34%) had average fitness, 19 students (38%) had below average fitness level & 3 students (6%) had poor level of cardiovascular fitness and had higher chances of having cardiovascular disease and there were no students involved in good category of fitness.

[post intervention] At the end of 3-minute step test – the results suggest that there were 10 students (20%) out of 50 who had good cardiovascular fitness level, 22 students (44%) had an above average cardiovascular fitness, 13 students (26%) had average fitness & 5 students (10%) had below average level of cardiovascular fitness. Overall result concluded that six weeks of moderate intensity exercise training improved the level of cardiovascular fitness and lowered the risk of developing cardiovascular disease in obese young adults.

DISCUSSION

The present study “Effect of six-weeks of moderate intensity exercise training on cardiovascular fitness among young obese adults” was conducted in Pravara institute of medical sciences, Loni. The purpose of the study was to determine the effectiveness of 6-weeks of moderate intensity exercise training for (5 days/week) on cardiovascular fitness among obese individuals. Where the students of Dr. APJ Abdul Kalam College of Physiotherapy, PIMS, Loni were the participants of this study equal numbers of students were taken from the 2nd year to interns batch.

For the current study Fifty obese participants (7 males & 43 females) were recruited where The Heart rate recovery was measured at the end of YMCA 3-minute step test Pre & Post Intervention. A YMCA 3-min step test provides a submaximal measure of cardio-respiratory & endurance fitness. Cardiorespiratory fitness is an

element of physical fitness requiring a combination of the circulatory, respiratory, and muscular systems to supply oxygen to the working tissues during physical activity. The test 3-min step test is based on how quickly your heart rate recovers following a short bout of exercise.

By using the values (pre & post) for statistical analysis, mean and standard deviation were carried out (Pre - 108 ± 6.45 & post - 100 ± 5.92). T test was applied for comparing both the Pre & Post heart rate recovery that is (25.236). P value was carried out by using the pre & post values which shows significant difference in heart rate recovery; (< 0.0001).

Based on the investigation the study concluded that there was an increase in level of cardiovascular fitness after moderate intensity exercise training for 6-weeks when compared to before training via YMCA 3-min step test. The probable reason behind decreased cardiovascular fitness was Unnecessary body fat that put unfavourable pressure on cardiac functions during physical activities. Body fat causes reduction in cardiac performance during prolong exercise which results in decreased oxygen uptake⁹ Hence, increasing cardiovascular fitness in obese individuals is necessary to lower the risk of cardiovascular disease and it helps to prevent further weight gain. Overall, the present study suggests that after training at the end of 3-minute step test there were 10 students (20%) out of 50 who had good cardiovascular fitness level, 22 students (44%) had an above average cardiovascular fitness, 13 students (26%) had average fitness & 5 students (10%) had below average level of cardiovascular fitness.

The probable mechanism behind obesity is physical inactivity in indigenous individuals having sedentary lifestyle may led to unhealthier accumulation of body mass which may affect their level of cardiorespiratory fitness and the heart rate recovery.¹⁰ Heart rate recovery is defined as the decrease in heart rate at 1 minute after the cessation of exercise. However

nowadays Weight gain during adulthood is the most common cause of an increase in the risk of heart disease, diabetes, and other chronic conditions. Since it's so hard for people to lose weight and keep it off, it's better to prevent weight gain in the first place Encouragingly. The more active people are, the more likely they are to keep their weight steady; the more sedentary, the more likely they are to gain weight over time. Moderate-intensity exercise training is defined as activities that are strenuous enough to burn three to six times as much energy per minute as an individual would burn when sitting quietly. Hence the moderate intensity exercise training can help to reduce the extent and impact of obesity and the associated chronic conditions.¹¹

CONCLUSION

The present study concluded that, six weeks of moderate intensity exercise training improved cardiovascular fitness and lowered the risk of developing cardiovascular disease in obese young adults.

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Conflict of Interest: None

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Ethical Approval: Approved

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