



ISSN: 2456-4419

Impact Factor: (RJIF): 5.18

Yoga 2021; 6(2): 163-167

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www.theyogicjournal.com

Received: 16-08-2021

Accepted: 19-09-2021

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A comparative study of propulsive task related physical fitness in obese and non-obese adolescent boys

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Abstract

The aim of the present study was to compare the propulsive task related physical fitness in obese and non-obese adolescent boys. To achieve the purpose hundred adolescent boys from classes ninth and tenth were selected as subjects from various Government and Private Schools, Chandrapur, Maharashtra. The students were divided into 'obese' and 'non obese' group based on their skin fold measurements. Each group consists of so subjects. The ability to propel and lift the body mass is called propulsive task related physical fitness. The selected propulsive task related physical fitness variable were assessed by standing broad jump, sit-ups, 50-yard dash, shuttle run and 600 yards run and walk test. Other subjects had inferior performances on all tests requiring propulsion or lifting of the body mass compared with their non-obese counterparts. Results of this study showed the obese subjects had poorer performances on weight-bearing tasks scoring lower scores on all fitness components. To encourage adherence to physical activity in obese youth, it is important that activities are tailored to their capabilities. Results suggested that weight-bearing activities should be limited at the start of fitness program with obese participants and alternative activities that rely more on non-weight bearing activities. Such as cycling, swimming or other aquatic activities may be incorporated. It was concluded that the non-obese children were better than the obese children in selected propulsive task related physical fitness components.

Keywords: Propulsive task, physical fitness, adolescent boys, obese and non-obese

Introduction

Obesity is a complex disease involving an excessive amount of body fat. Obesity isn't just a cosmetic concern. It's a medical problem that increases the risk of other diseases and health problems, such as heart disease, diabetes, high blood pressure and certain cancers. Obesity may be classified according to either percent body fat or by the relationship of height and weight (BMI). Obesity leads to numerous negative health consequences. Obese adolescents seem to be less physically active than their leaner peers, but the total energy expenditure of obese adolescents may be equal or higher. Based on weight relative scores, most studies have found that obese children and adolescents are less fit than their normal-weight counterparts.

A chronic, relapsing, multi-factorial, neurobehavioral disease, when there is an increase in body fat regulates the dysfunction of adipose tissue and abnormal fat that results in adverse effects on the health which includes metabolic, biomechanical, and psychosocial consequences, the above mentioned is the obesity medical definition.

In 1998, the National Institutes of Health declared obesity a disease. In simple words, the meaning of obesity is as follows: "Overweight". Let us learn what causes obesity, what are the medical complications and how to prevent it?

Obesity is identified when the body mass index (BMI) is equal to 30 or greater than that. The body mass index can be calculated easily by dividing the body weight by squaring the height. But the BMI alone cannot estimate body fat but it is considered as one of the factors.

Obesity meaning is as follows, it is a complex disease involving an excessive amount of body fat. Obesity isn't just a cosmetic concern. It is a medical problem that will increase the risk of getting affected with other diseases such as heart attack, diabetes, and certain cancers. Usually, obesity is caused by a combination of inherited factors that are combined with the environment and exercise choices and personal diet.

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Causes

Although there are genetic, behavioral, metabolic, and hormonal influences on weight, obesity occurs once you absorb more calories than you burn through exercise and normal daily activities. Your body stores these excess calories as fat. People might eat more calories before feeling full, feel hungry sooner, or eat more during stress or anxiety.

Risk Factors

- **Family Inheritance and Influences:** The genes that we get from our parents may affect the amount of fat stored in our body, and where that fat is distributed. Obesity tends to run in families which is not just because of the genes they share but because of similar eating and activity habits.
- **Food Habits:** A diet that's high in calories, lacking in fruits and vegetables, filled with nutrients, and laden with high-calorie beverages and oversized portions contributes to weight gain. Liquid calories such as alcohol, soft drinks, high-calorie beverages etc. If a person has a sedentary lifestyle, he can easily take in more calories every day than he burns through exercise and routine daily activities. Looking at a computer, tablet, and phone screen may be a sedentary activity. The number of hours a person spends in front of a screen is highly associated with weight gain.
- **Age:** Obesity can occur at any age, even in young children and as a person ages, hormonal changes and a less active lifestyle increases the risk of obesity. In addition, the quantity of muscle in your body tends to decrease with age. The lower muscle mass can result in a decrease in metabolism. These changes also reduce calorie needs and may make it harder to stay off excess weight.
- **Diseases:** Many health conditions can lead to weight, and in turn obesity. And obesity can further aggravate the conditions, creating a vicious cycle of weight gain. Diseases such as hypothyroidism, insulin resistance, polycystic ovary syndrome, and Cushing's syndrome are known to be contributors to obesity.

Other Factors

- **Pregnancy:** Weight gain is common during pregnancy hence the women find it difficult to lose weight after the baby is born. This weight gain may contribute to the event of obesity in women. Breast-feeding could also be the simplest choice to lose the load gained during pregnancy.
- **Quitting Smoking:** When people quit smoking, they will consume more food to fulfil the cravings that in turn results in weight gain. At the end of the day, however, quitting smoking remains a greater benefit to your health than is constant smoke. Your doctor can assist you to prevent weight gain after quitting smoking.
- **Sleep:** Not having enough sleep or sleeping for too much time can cause changes in hormones that increase your appetite.
- **Negative Emotions:** Things like boredom, sadness, or anger, can have a huge influence on eating habits, leading to the intake of high calories.
- **Stress:** Many external factors that affect your mental health and well-being may contribute to obesity. When people are in stressful situations, they often consume high-calorie food.

Complications

People with obesity are more likely to develop a variety of probably serious health problems, including:

- **Heart Disease and Strokes:** Obesity causes you to be more likely to possess high vital signs and abnormal cholesterol levels (high LDL cholesterol, low HDL cholesterol, or high levels of triglycerides), which are risk factors for heart condition and strokes.
- **Type 2 Diabetes:** Our body uses insulin to regulate blood glucose levels which can affect obesity. It raises the risk of resistance to insulin and diabetes.
- **Digestive Problems:** Obesity increases the likelihood that you're going to develop heartburn, gallbladder disease and liver problems.
- **Gynaecological and Sexual Problems:** Obesity can also cause infertility and irregular periods in women. Obesity also can cause erectile dysfunction in men.
- **Osteoarthritis:** Obesity increases the strain placed on weight-bearing joints, causing inflammation within the body. This may cause problems like osteoarthritis.
- **Hypertension:** Obesity makes your heart work harder to pump blood through your body. All this extra effort puts strain on the arteries. The arteries, in turn, resist this flow of blood, causing the rise in blood pressure or hypertension. Obesity and hypertension combined are a leading cause of cardiovascular disease.
- **Sleep Apnea and Breathing Problems:** Fat deposits in the upper respiratory tract narrow the airway, resulting in a decrease in muscle activity in this region. This could lead to hypoxic and apneic episodes, resulting in sleep apnea.
- **Mental Illness:** It could also contribute to mental illnesses such as clinical depression, anxiety, and other mental disorders.
- **Gallbladder Disease:** In obesity, the hypersecretion of cholesterol causes local secretion of fat, leading to gallbladder disease.
- **Severe COVID-19 Symptoms:** Obesity increases the danger of developing severe symptoms if you become infected with the virus that causes coronavirus disease 2019 (COVID-19). People who have severe cases of COVID-19 may require treatment in medical care units or maybe mechanical assistance to breathe.

Prevention

As per the obesity definition, being overweight is caused due to overeating. By following certain steps, we can control being overweight. They are as follows: daily exercise, a healthy diet, and a long-term commitment to watch what you eat and drink.

- **Exercise Regularly:** You need to urge 150 to 300 minutes of moderate-intensity activity every week to stop weight gain. The physical activities include walking fastly and swimming.
- **Follow a Healthy-Eating Plan:** specialize in low-calorie, nutrient-dense foods, like fruits, vegetables, and whole grains. Avoid saturated fat and limit sweets and alcohol. Eat three regular meals in a day
With limited snacking, during this you can enjoy the high-calorie desserts or beverages in small quantities.
- **Avoid the Traps that Cause you to Eat:** Identify situations that trigger out-of-control eating. You can plan and develop strategies for handling these sorts of situations that will make you eat more and stay on top of your eating behaviors.

Physical fitness is a state of health and well-being and, more specifically, the ability to perform aspects of sports, occupations and daily activities. Physical fitness is generally achieved through proper nutrition, moderate-vigorous physical exercise, and sufficient rest.

Fitness is far more than simply exercising on a consistent basis. Fitness has a variety of components and there are many ways it can be measured. With a solid understanding of this topic, individuals can address those aspects of their life that directly impact fitness.

Physical fitness can mean many things. To a physician, physical fitness may simply mean the absence of disease. To a weight lifter, it may be synonymous with large bulging muscles. To a health or physical educator, physical fitness may mean the ability to perform a specific number of calisthenics activities or to run or walk one mile in a certain time. To a health fitness professional, physical fitness means being able to acquire and maintain specific health standards.

Physical fitness is one's richest possession; it cannot be purchased and has to be earned through a daily routine of physical exercise. People, who possess optimal physical fitness, tend to look better, feel better and experience good health; all of which contributes to the quality of life. Physical fitness is necessary for success in most of the games and sports. Without a high level of physical fitness, an individual will not be able to withstand the stress and strain caused on the body by various games and sports. Physical fitness, in addition to bringing about performance in games and sports also helps in prevention of injuries in the long run and is an inseparable part of sports performance and achievement. The quality of an individual sportsman's fitness in terms of its utilitarian value is directly proportional to the level of performance. That means greater the level of fitness, the greater is the ability of a person to attain higher level of performance.

Definition of Fitness

According to the Centers for Disease Control and Prevention (CDC), physical fitness is defined as 'the ability to carry out daily tasks with vigor and alertness, without undue fatigue, and with ample energy to enjoy leisure-time pursuits and respond to emergencies.' Based on this definition, fitness involves everything from getting out of bed to hiking to performing CPR.

In order to complete all of these tasks, one must consistently address their fitness levels. This requires proper conditioning through both structured exercise and leisurely activities.

Physical fitness is a general state of health and well-being and, more specifically, the ability to perform aspects of sports or occupations. Physical fitness is generally achieved through correct nutrition, moderate vigorous physical activity, exercise and rest. It is a set of attributes or characteristics seen in people and which relate to the ability to perform a given set of physical activities.

Before the industrial revolution, fitness was the capacity to carry out the day's activities without undue fatigue. However, with automation and changes in lifestyles physical fitness is now considered a measure of the body's ability to function efficiently and effectively in work and leisure activities, to be healthy, to resist hypokinetic diseases, and to meet emergency situations.

Fitness is defined as the quality of being suitable to perform a particular task. Around 1950, perhaps consistent with the Industrial Revolution and the treatise of World War II, the term fitness increased in western vernacular by a factor of ten.

Modern definition of fitness describe either a person or machine's ability to perform a specific function or a holistic definition of human adaptability to cope with various situations. This has led to an interrelation of human fitness and attractiveness which has mobilized global fitness and fitness equipment industries. Regarding specific function, fitness is attributed to personnel who possess significant aerobic or anaerobic ability, i.e., strength or endurance. A holistic definition of fitness is described by Greg Glassman in the Cross Fit journal as an increased work capacity across broad times and modal domains; mastery of several attributes of fitness including strength, endurance, power, speed, balance and coordination and being able to improve the amount of work done in a given time with any of these domains.

Aims and Objectives of Fitness

The aim of physical fitness can be summed up on a single sentence:

- To reach an optimum level of physical and mental wellbeing”.

The ultimate objective of fitness is longevity with no disease, no any physical pain, and happiness. It is hard to get this objective of life but not impossible. The happiness of life can be obtained through physical fitness. There are many ways people try get physical fitness, some of them are better lifestyle, better diet, gym, yoga, aerobics etc. Here are some main positive symptoms of fitness

- Zero levels of stress and tension
- Physical strength, stamina and flexibility
- Greater powers of concentration and self-control
- Better organ functioning
- Sense of balance and internal harmony
- Healthy & glowing skin
- Strong Immune System etc.

Physical fitness can mean many things. To a physician, physical fitness may simply mean the absence of disease. To a weight lifter, it may be synonymous with large bulging muscles. To a health or physical educator, physical fitness may mean the ability to perform a specific number of calisthenics activities or to run or walk one mile in a certain time. To a health fitness professional, physical fitness means being able to acquire and maintain specific health standards.

There is a difference of opinion in physical education about how best to bring about the improvement of the human body in structure and function.

In some areas, it is thought that the general use of sports, games, and recreational activities is all that the body requires to bring it to a state of high efficiency and good development. For the past many years, this concept has been the basis for most of our physical education.

Only recently has education become aware of the fact that the desired results in physical fitness have not been brought about by such activities. The results of sports, games and recreational activities have not been adequate to make up for the diminishing activities of daily life for the general population.

There is increasing recognition in education for the necessity of a return to more formal exercise, specifically to improve the body, than our sports program has been able to offer. It is now evident that only specific training methods will decrease

the number of sub strength children and adults in our country, and give us the physical strength and power to be adequate for the demands the future will make upon us all.

Motivating obese subjects to adhere to an activity program is a major challenge. To improve adherence, one must develop an exercise program that is manageable for obese children and adolescents. Interventions that are not tailored to the fitness levels of obese participants may contribute to discouragement of future participation in physical activity.

Purpose of the study

The aim of the study was to analyze the propulsive task related physical fitness in obese and non-obese adolescent boys.

Hypothesis

It was hypothesized that “non-obese” adolescents would have better propulsive task related fitness than “obese” adolescents.

Methodology

To achieve the purpose hundred adolescent boys from classes ninth and tenth were selected as subjects from various Government and Private Schools, Chandrapur, Maharashtra. The students were divided in to “obese” and “non-obese” group based on their skin fold measurements. Each group consists of 50 subjects. The selected propulsive task related physical fitness variables were assessed by 50-yard dash (speed), shuttle run (agility) standing broad jump (explosive power), sit-ups (abdominal strength), 600 yard run and walk (endurance) and pull ups (shoulder strength).

Table 1: Showing mean, standard deviation, mean difference standard error of the difference between mean and obtained ‘T’

Variables	Group	Mean	SD	DM	SE	T
Speed	Obese	8.34	0.66	1.41	0.14	11.76
	Non Obese	6.75	0.45			
Agility	Obese	11.89	0.49	1.21	0.12	17.88
	Non Obese	9.69	0.58			
Explosive Power	Obese	1.76	0.09	0.36	0.02	17.45
	Non Obese	2.24	0.12			
Abdominal Strength	Obese	15.32	4.01	17.31	0.95	18.49
	Non Obese	26.68	5.25			
Endurance	Obese	1.96	0.13	0.16	0.04	5.49
	Non Obese	1.75	0.18			
Shoulder Strength	Obese	5.30	1.24	3.32	0.23	13.76
	Non Obese	8.74	1.22			

Required table value -1.99 at 0.05 level.

Df = (2.98)

Table 1 reveals that there was a significant difference between the “obese” and “non-obese” groups in speed (obtained “t” value = 11.76), agility (obtained “t” value=17.88), explosive power (obtained “t” value = 17.45), abdominal strength (obtained “t” value=18.49) endurance (obtained “t” value=5.49, and shoulder strength (obtained “t” value=13.76) as the obtained value were higher than the required “t”=1.99 at 0.05 level).

Discussion

In the present study, obese subjects had inferior performances on all tests requiring propulsion or lifting of the body mass (standing – broad jump, sit-ups, shuttle run, 50m dash and endurance) compared with their non-obese counterparts. These poorer performances in obese individuals are probably due to the fact that their excess body fat is an extra load to be moved during weight-bearing activities because of the greater energy cost compared with normal-weight children. In this case, the poorer performance could also be a consequence of a lack of experience in weight-bearing tasks. Because obese young boys are limited in their ability to perform weight-bearing activities, such activities should be limited at the start of an intervention. Activities that are not tailored to the capabilities of bigger children may discourage the continued participation of obese individuals.

Most importantly, moving or lifting the excess body weight may also overload the joints of such individuals. Once fitness levels have decreased and/or fitness levels have improved, weight-bearing tasks may be much less exhausting and should be progressively implemented into the program. Useful non-weight-bearing alternatives such as cycling, swimming or other aquatic activities should be the focus in the early stages of a program and then continued as an appropriate means of

balancing various types of activity.

Results

Weight-bearing activities should be limited at the start of fitness program with alternative activities and obese participants that rely more on non-weight bearing activities, such as swimming, cycling or other aquatic activities may be incorporated. It was concluded that the non-obese adolescent boys were better than their obese counterparts in selected propulsive task related physical fitness components

Conclusion

It was concluded that the “non-obese” adolescents were better than the “obese” adolescents in the selected propulsive task related fitness variables. Activities must be tailored to the capabilities of obese individuals such as useful non-weight-bearing alternatives such as cycling, swimming or other aquatic activities should be the focus in the early stages of a fitness program.

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