Status Analysis and Intervention of Fitness Programme on Health Related Fitness Variables among Obese School Boys

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Abstract

The purpose of this study was to analyze the body composition status and to investigate the effect of intervention of fitness programme on health related fitness variables among obese school boys. For the purpose of the study, 2500 students were selected at random and their body composition status was analyzed by BMI test and skin fold measurement. The age of the students ranged from thirteen to seventeen years. Method**:** After screening, sixty obese students were selected at random from the screened obese population and they were tested on health related fitness variables and they were divided into two groups such as intervention group and control group at random. Each group consisted of thirty subjects. The components of fitness intervention programme were additional sport and play activities outside school hours, class room education on healthy nutrition, active living and healthy life style choices and the involvement of parents. The intervention group underwent fitness programme for a period of twelve weeks on alternative days for 60 minutes and control group underwent no such treatment. The subjects of both groups were tested on the health related fitness variables such as body composition, cardiovascular endurance, muscular strength, muscular endurance and flexibility after the intervention period. Analysis and conclusion: ANCOVA was used for statistical analysis of the collected data. The research hypothesis was accepted and null hypothesis was rejected since the results of the study showed that the intervention of fitness programme had significant positive effects on the health related fitness variables among the subjects of intervention group.

Key words: Status analysis, Body composition, Intervention and health related fitness.

Introduction

The increase in sedentary behavior over the last decades is thought to be one of the risk factors for the development of obesity, diabetes, cardiovascular disease, osteoporosis and psychological constraints (Andersen et.al. 1998). The increase in childhood overweight and obesity can be attributed to behavioral and social ecological factors causing long-term imbalance between energy intake and energy expenditure (Baranowski T, et.al. 2003). In fact, the environment has been recognized more and more as 'obesogenic' agent in the etiology of obesity. Physical, socio-cultural, economic and political environmental influences on energy balance related behaviors can be distinguished at the micro level (households, schools, neighbor hoods) as well as at the macro level (health care, media, public transport, town planning) (Jansen et al. 2008) . Programmes on the prevention of childhood obesity should therefore address both behavioral and environmental determinants.

There is evidence that an insufficient amount of physical activity starts in childhood and tracks into adult life (Twisk. JW et.al, 2000). Risk factors which enhance sedentary behavior are large amounts of time spent in front of the television and computer, the inability to play outside or to actively commute to school, inactive parents or parents who do not support children to be active, and the lack of sufficient physical education at school. Although in children aerobic fitness is only moderately associated with physical activity, low physical activity and fitness are both associated with increasing prevalence of cardiovascular risk factors, even after adjusting for weight and obesity (Brage. S, et.al.2004).

Maximizing bone mass during growth may constitute one of the most effective prevention strategies for osteoporosis, a disease which affects millions of people throughout the world. There is evidence that the degree of weight bearing activity and calcium intake is related to bone mass in childhood and adolescence (Bailey et.al., 1999).

The greater the mass of an object the greater the inertia (Hamilton & Luttgens, 2002). Obesity is recognized as a major health problem in many parts of the world and the incidence of the condition is escalating at an alarming rate (WHO 1998).This global trend of increasing obesity prevalence indicates that current measures in the prevention, treatment and management of the condition are ineffective.

Obesity significantly increases the risk of developing numerous medical conditions, including hypertension, stroke, respiratory disease, type 2 diabetes, gout, osteoarthritis, certain cancers and various musculoskeletal disorders, particularly of the spine and lower extremities (Must and Straus 1999).

There is a limited number of studies focusing on the influence of overweight or obesity on locomotion function (Spyropoulos et al. 1991, Hills et al. 1991, McGraw et al. 2000, Messier et al. 1996).

Purpose of the Study

The purpose of this was to analyze the body composition status and to investigate the effect of intervention of fitness programme on selected health related fitness variables such as cardiovascular endurance, muscular strength, muscular endurance, flexibility and body composition among obese school boys.

Hypothesis

It was hypothesized that the intervention would have a significant positive effect on the selected health related fitness variables among obese school boys.

Methodology

Research Design

Randomized controlled trial 2500 subjects were selected at random from schools at Chennai between the age group of 13 and 17 years. The targeted population consists of students attending schools in inner city areas of Chennai where prevalence rate of overweight and obesity were relatively high. They were measured on their height and weight to derive the BMI score to categorize them into underweight, normal weight, overweight, obese class I, II and III categories respectively.

Test Administration

Height of the students was measured by Stadio meter in nearest 0.01 meter and weight of the subjects was measured by electronic weighing machine in nearest 0.01 kg. BMI value was derived by the following formula as suggested by WHO and Obesity foundation of India: BMI= Weight in Kg / Height in meter^2.

After the screening, the results showed that 8% of the population was underweight, 40% of the population was normal weight, 22% of the population was overweight, 30% of the population was obese class I, 1.4% of the population was obese class II and 0.6% of the population was obese class III.

Figure-1
Showing the Results of Status Analysis on BMI

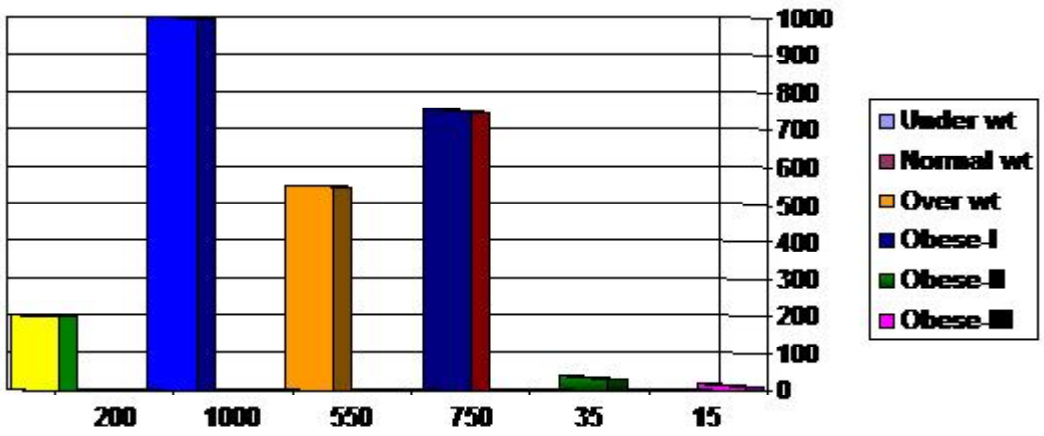


Table-I
Showing the Physical Characteristics of the Subjects

Scores	Age	Height	Weight
Max. Value	17	1.75	73
Min. Value	13	1.55	93
Mean	15	1.66	84.03
SD	1.38	0.04	4.75

Experimental Design

The obese population was assigned individual numbers and seventy subjects were selected at random. All the subjects were screened by exercise screening questionnaire using ACSM criteria (David and Brian, 2007). Sixty subjects were under low risk category and ten subjects were under moderate risk category. Considering the homogeneity of the subjects

only sixty subjects were under low risk category chosen for the study. All the subjects were tested on the selected health related fitness variables such as cardiovascular endurance, muscular strength, muscular endurance, flexibility and body composition. Then they were divided into two groups such as Intervention group and control group at random. Each group consisted of thirty subjects. The intervention group underwent fitness programme for a period of twelve weeks and control group underwent no such intervention. The consent form was signed by the subject and parents for participating in the study and the subjects had no medical problems.

Fitness Programme Intervention and its Components

The intervention targeted individual behaviors as well as the environment and was based on theory of planned behaviour (Ajzen I, Madden TJ, 1986: Godin G, Kok G: 1996). The intervention of fitness programme was conducted thrice a week on alternative days in the morning sessions between 6am and 7am. The components of fitness programme consisted of fitness training, class room education and parent involvement.

Fitness Training

Fitness training consisted of aerobic fitness, strength training and stretching which are known to improve overall or specific health in children. The fitness training included 5 minutes of warming up and cooling down each, 20 minutes of moderate to vigorous cardiovascular endurance training, 15 minutes of strength training and 15 minutes of minor relay games. Fitness training was individualized as much as possible to fulfill, based on his personal level. Utmost importance was given to a positive and motivating ambience during the lessons, to create any type of positive feeling and attitude towards physical exercise. Heart rate reserve method was used in fixing the intensity of cardiovascular endurance training. Intensity was fixed between 50% and 85%. Strength training was given with own body weight resistance exercises, free weights and resistance tube exercises. The target heart was fixed once in every two weeks based on the resting heart rate.

Class Room Education

Three classes were conducted for the subjects and each class on the weekends initially for first three weeks. The three lessons dealt with healthy nutrition, active living and healthy life style. Central theme of the lessons was to enjoy a fit and healthy lifestyle. Each lesson was taken for 60 minutes including quiz at the end of the class so as to make the children to retain what was taught.

Parent Involvement

Parents are important agents in shaping children's eating and physical activity behaviors (Golan M, Crow S, 2004). Parents were involved by providing them with written information on the intervention and inviting them for a gathering at the beginning of the intervention.

During this gathering information was provided by a qualified dietician about a healthy lifestyle, focusing on reducing sedentary activities (watching TV and playing on the computer), promotion of outdoor play, and reduction of sugar-sweetened beverage intake and promotion of having breakfast daily. All of these behaviors have been shown to be associated with childhood obesity (Bauer et al, 2008, Whitaker RC., 2003). Both the groups were tested on the selected health related fitness variables after the period of twelve weeks.

Health Related Fitness Variables Assessment

Cardiovascular Endurance

It was measured by coopers run and walk test conducted in a standard 400 m track. The results were recorded in meters.

Muscular Strength

Push-up test was used to measure the muscular strength. Total number of push-ups performed till exhaustion was taken as a final score.

Muscular Endurance

It was measured by 60 seconds timed sit up test. The results were recorded in the number of sit ups performed in 60 seconds.

Flexibility

It was measured by sit and reach test. The results were recorded in nearest centimeters.

Body Composition

It was measured by two tests namely Body Mass Index test and Skin fold measurement to find discrimination and to ascertain the results.

Body Mass Index score was derived by measuring height and weight of the subjects. Skin fold measurement score was derived by measuring seven skin fold sites such as triceps, biceps, subscapular, supraspinale, abdominal, thigh and calf using slim glide (C-120Black) equipment. The scores were recorded in nearest millimeter. The mean of two measurements were taken. If the two measurements differed greatly, a third one was done and the median value was taken as the final score.

Statistical Procedure

The Wilk-Shapiro test of data distribution showed normal distribution of all parameters, therefore ANCOVA was used for the comparison of differences between intervention group and control group on selected health related fitness variables. The p value of less than 0.05 was considered to represent statistical significance.

Results and Discussion

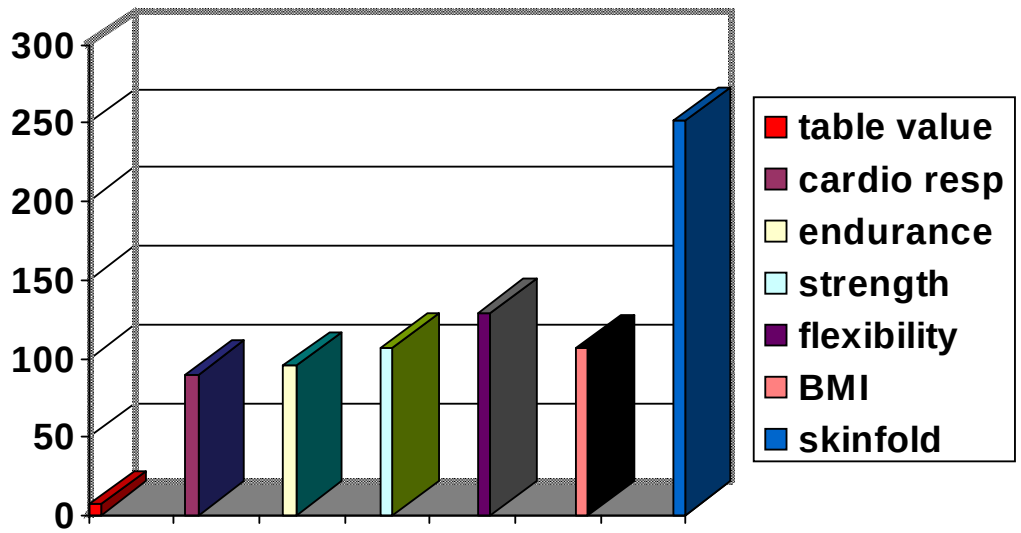
Table-II
Showing the Adjusted Means and f Values of Selected Health Related Fitness Variables

Variables	Int. Group	Control group	Obtained f value	Table value @ 0.05 level	Table value @ 0.01 level
Cardio resp. End	2098.80 (m)	1754.54 (m)	90.01*	4.00	7.01
Musc. End	8.93	4.97	95.38*		
Musc. Strength	9.11	4.96	107.28*		
Flexibility	2.52 (cm)	-6.62 (cm)	129.12*		
Bmi	114.70 (kg/m^2)	127.36 (kg/m^2)	106.23*		
Skinfold	26.47 (mm)	31.91 (mm)	251.33*		

***** Significant at 0.05 and 0.01 level.

Figure-2

Showing the Obtained f Values of Selected Health Related Fitness Variables



Discussion

A primary objective of this study was to analyze the BMI status and to determine the effect of fitness programme intervention on selected health related fitness variables among obese school boys. Table-II shows the results of adjusted mean values and F values of selected health related fitness variables and all the selected health related fitness variables were significantly different at 0.05 and 0.01 level. The adjusted mean value of intervention group was higher in cardiovascular endurance (2098.80(m)), Muscular endurance (8.93), Muscular strength (9.11), Flexibility (2.52 (cm)) and the body composition measures such as BMI (114.70 (kg/m^2)) and Skin fold measurement (26.47 (mm)) was lesser than the control group. Hence the research hypothesis was accepted and null hypothesis was rejected.

Conclusions

After the intervention, the intervention group had positive significant improvement on selected health related fitness variables than the control group. It was concluded that intervention of fitness programme had a positive significant effect on the selected health related fitness variables among obese school boys. It is recommended that all schools must include compulsory physical education programme in their curriculum so as to curb the menace obesity among school children.

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