Research Paper Physical Education

Impact of Yogic Practices on Selected Body Composition Measures And High Density Lipoproteins Among Obese Boys

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ABSTRACT

The purpose of the study was to find out the effect of yogic practices on selected body composition measures and high density lipoproteins among obese boys. To achieve this purpose, 20 obese boys, with BMI of 95th percentiles (body weight = > 30 kgs.), were randomly selected as subjects from various schools around Chidambaram. The age of the subjects were ranged from 14 to 16 years. The subjects were further classified at random into two equal groups of 10 subjects each, in which, group - I underwent yogic practices for six days (Monday to Saturday) per week for sixteen weeks and group - II acted as control who were not allowed to attend any special activities. The selected criterion variables such as percentage of body fat, body mass index and high density lipoproteins were measured before and after the yogic practice period. The selected criterion variables were assessed by using Deurenberg et al formula, Quetelet index and Boehringer Mannheim kit method. The collected data were statistically analysed by using Analysis of Covariance (ANCOVA). From the results of the study it was found that there was a significant reduction in percentage of body fat ($p > .05$) and body mass index ($p > .05$) and a significant increase in high density lipoprotein level ($p > .05$) after the yogic practice when compared with the control group. It was concluded from the result of the study, that yogic practice is a better tool to reduce the percentage of body fat and body mass index and increase the level of high density lipoprotein.

KEYWORDS Yogic Practices, Body Composition Measures, HDL.

INTRODUCTION

Obesity is a medical condition in which excess body fat has accumulated to the extent that it may have an adverse effect on health, leading to reduced life expectancy and/or increased health problems.[1] It is a metabolic disorder which is affecting the people throughout the world and commonly caused by a combination of excessive food energy intake, lack of physical activity, genetic susceptibility, and other psychological problems, although a few cases are caused primarily by genes, endocrine disorders, medications or psychiatric illness. [2] The negative health (obesity) consequences are less or more insulin resistance, chances of occurring type 2 diabetes, asthma, hyper tension, increase in high total cholesterol, low density lipoproteins, triglycerides and lowering the high density lipoproteins in blood, become sleep apnea, attaining early puberty, etc.[3] Indexes associated with high risk in obese persons often return to normal with appropriate physical activities, dietary habits, and a small weight loss even when body weight and percentage body fat remain above recommended amounts.[4]

Today many boys and girls live at an overweight (obese) in underdeveloped or developing countries. Fifty percent of chances that one parent is in obese and the boys too and if both, eighty percent chances of attaining obese.[5] Those children who have BMI of above 95% percentiles are in obese.[6] More children aged 2 to 5 years are obese, as are 17 percent of children aged 6 to 19 according to the Centers of Disease Control and Prevention (CDC).[7] The primary problems for obese children are psychological or emotional.[8] It is also evident that increasing mortality rate during adolescent are due to childhood obesity.[9] A 2008 study has found that children who are obese have carotid arteries which have prematurely aged by as much as thirty years as well as abnormal levels of cholesterol.[10] The obese children were abused and teased by their same age group[11] and also by their family members quite often.[12] [13]

Yoga is a spiritual science for the integrated and holistic development of physical, mental and spiritual aspects of our well being.[14] Yoga is originated in India many thousands of years ago and it is the oldest system of personal development in the world, encompassing body, mind and spirit.[15,16] Yogsana have a deeper significant value in the development of the physical, mental and spiritual personality, whereas pure exercises only have a physical effect on the muscles and bones. [17] Yoga poses are also designed to tone and exercise the muscles of the body to eliminate excess fat, and make it more flexible and stronger.[18] Yogic practice reduces the obesity and also reduces the risk factors associated with obesity. [19] A study shows there was a significant reduction in total cholesterol and increase in HDL after twelve weeks of yoga practices.[20] Various researches suggest that yoga exercise improves the BMI of sedentary human beings including boys. [21,22,23.24]

The exact body fat percentage cannot be precisely determined, but multiple methods are used to estimate it.[25] There is no single ideal percentage of body fat for everyone. Levels of body fat are epidemiologically dependent on sex and age.[26] There are many methods examine the percentage of body fat, such like, underwater body weight, skinfold test, bioelectrical impedance analysis, etc. The percentage of body fat will also be estimated with person's body mass index (BMI) by applying Deurenberg et al formula.[27] Body mass index (BMI) has recently gained favor as a better measure of adiposity.[28,29]

Methodology

The purpose of this study was to find out the effect of yogic practices on percentage of body fat, body mass index and high density lipoproteins among obese boys. To achieve the purpose of the present study, 20 obese boys with the BMI of 95 percentile[30] or above and who were studying in various schools around Chidambaram, Tamilnadu were randomly selected as subjects. Before the selection for present study, the parents of the subjects were consulted and explained about the research work, especially, the nature of the study. After getting the consent letter and necessary permission from the parents, then the subjects were included in the present study. The age of the subjects were ranged from 14 to 16 years (mean age = 15.1 ± 0.3 years). All the subjects were residing at their home, so, the food habits were not same and could not be measured. The selected subjects were divided into two

equal groups of ten subjects each. Group - I considered as experimental group who underwent yogic practices for sixteen weeks, six days (Monday to Friday) per week on selected yogic exercises (appendix – I) and the same were taught by yoga teachers from School of Yoga Studies, Annamalai University, Annamalainagar, Chidambaram. Group - II considered as control that did not undergo any training programme or physical activity (either strenuous or recreational) throughout the experimental period. The data were collected on selected criterion variables such as percentage of body fat was assessed by using Deurenberg et al[27,31] formula, body mass index was assessed by Quetelet index[32] and high density lipoproteins was assessed by phosphotungstate/Mg2+ method, using the reagent from Boehringer Mannheim Lab, Germany[33] after taking 5 ml of blood from each subject by venous puncture method by the lab technicians, under the supervision of a qualified doctor, before and after the sixteen weeks of yogic practices as pre and post test. Analysis of covariance (ANCOVA) was applied to find out the significant difference if any between the experimental and control groups.

Table – II
Analysis of Covariance on Percentage of Body Fat Body, Body Mass Index and High Density Lipoproteins of Yogic Practice Group and Control Group

Variable Name	Group Name	Yogic Practice Group	Control Group	'F' Ratio
Percentage of Body Fat (in Percentage)	Pre-test Mean ± S.D	28.2521 ± 1.8236	29.6861 ± 1.893	2.991
	Post-test Mean ± S.D.	25.8926 ± 1.5406	29.8121 ± 2.126	18.91*
	Adj. Post-test Mean	25.561	29.299	32.351*
Body Mass Index (kg/m^2)	Pre-test Mean ± S.D	31.8682 ± 1.3317	31.1816 ± 1.2628	0.1962
	Post-test Mean ± S.D.	29.3839 ± 0.8623	31.2125 ± 1.452	19.253*
	Adj. Post-test Mean	27.896	31.531	29.632*
High Density Lipoproteins (mg/dl)	Pre-test Mean ± S.D	40.22 ± 2.278	39.67 ± 1.976	0.989
	Post-test Mean ± S.D.	42.56 ± 1.884	38.89 ± 2.176	5.387*
	Adj. Post-test Mean	42.198	38.773	18.551*

*Significant at 0.05 level of confidence.(The table values required for significance at 0.05 level of confidence for 1 and 18 & 1 and 17 are 4.41 and 4.45 respectively).

results

The collected data prior to and after the yoga practice on percentage of body fat, body mass index and high density lipoprotein were analyzed by applying Analysis of Covariance (ANCOVA) are presented in table – II. In all the cases, .05 level of confidence was fixed to test the significance, which was considered as an appropriate.

After applying the Analysis of Covariance, the result of this study shows that there was a significant decrease in percentage of body fat (Exp. Gr. Pre-mean = 28.2521 ± 1.8236 Vs Post-mean = 25.8926 ± 1.5406 & Cont. Gr. Pre-mean = 29.6861 ± 1.893 Vs. Post-test mean = 29.8121 ± 2.126) and body mass index (Exp. Gr. Pre-mean = 31.8682 ± 1.3317 Vs. Post-mean 29.3839 ± 0.8623 & Cont. Gr. Pre-mean = 31.1816 ± 1.2628 Vs. Post-mean 31.2125 ± 1.452) and also there was a significant increase in high density lipoproteins (Exp. Gr. Pre-mean = 40.22 ± 2.278 Vs. Post-mean 42.56 ± 1.884 & Cont. Gr. Pre-mean = 39.67 ± 1.976 Vs. Post-mean 38.89 ± 2.176) only for yogic practice group.

Further, comparing the adjusted post-test means of the criterion variables (between yogic practice group and control group), such as percentage of body fat (Exp. Gr. = 25.561 Vs. Cont. Gr. = 29.299 & F = 32.351, $p < 0.05$), body mass index (Exp. Gr. = 29.896 Vs. Cont. Gr. = 31.531 & F = 29.632, $p < 0.05$) the yogic practice group was significantly decreased when compared with control group. High density lipoprotein was significantly increased for yogic practice group (Exp. Gr. = 42.198 Vs. Cont. Gr. = 38.773, & F = 18.551, $p < 0.05$) with df 1,17.

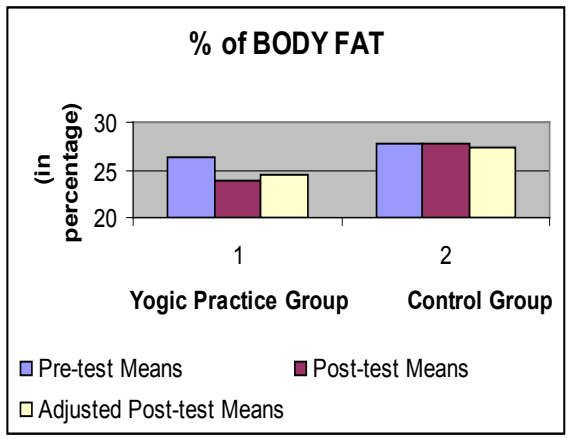


Figure- I: Bar diagram showing the mean values of % of body fat between yogic practice group and control group

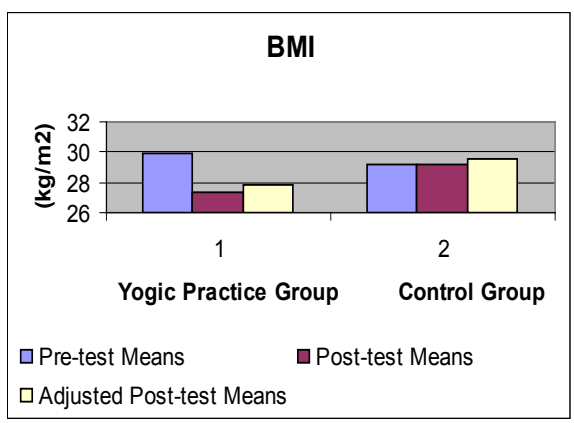
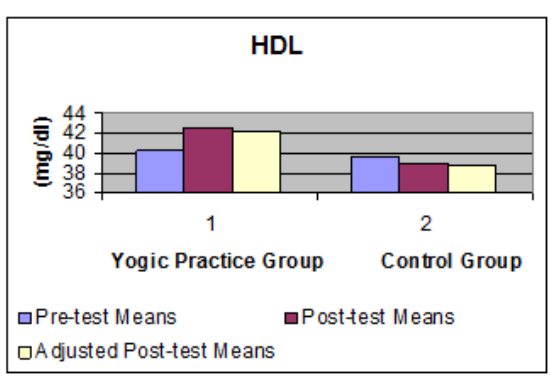


Figure - II: Bar diagram showing the mean values of BMI between yogic practice group and control group

Figure- III: Bar diagram showing the mean valuesof HDL between yogic practice group and control group



Discussion

1. The reduction in percentage of body fat and body mass index was significant for yogic practice group when com-

pared with the control group.
2. There was a significant increase in high density lipoprotein cholesterol for yogic practice group when compared with the control group.

conclusions

1. The results of the study revealed that there was a significant reduction in percentage of body fat after the yogic practice period. This result is in line with that of the study earlier conducted by Pal et al[34] and Shenbagavalli and Divya[35] found that there was a significant reduction in percentage of body fat after the yogic practice. Ruhall, Bhandari and Chakravarti[36] also found that there was a significant reduction in percentage of body fat after the pranayama practice.
2. The result of the study also shown that there was a significant reduction in body mass index (BMI) after the yogic practice period, when compared with the control group. The findings of Kumari et al[37], Dhananjai et al[19] and Chen et al[21] also found that there was a significant decrease in body mass index after the yogic practice period. Ankad et al[38] also found that there was a significant decrease in body mass index after the pranayama practice.
3. The result shows that there was a significant increase in high density lipoproteins after the yogic practice period, when compared with the control group. The findings of Telles et al[39] found that there was a significant increase in high density lipoproteins after the yogic practice period.
4. The overall result of the study shown that there was a significant reduction in percentage of body fat, body mass index and high density lipoproteins after the experimental period. In this study, no attempt was taken to control the diet. But, in future, if the effort will be taken, the reduction in percentage of body fat, body mass index and high density lipoproteins will be higher.

Table - I
TRAINING SCHEDULE FOR YOGIC PRATICE GROUP

List of Yogasana & Pranayama	Weeks	Duration	Maintaining Duration	Recovery in between Yogasanas	Repetitions	Frequency	Warming up and cooling down
Padmasana	1- 3 Weeks	20 min.	30 seconds	30 seconds	2	Monday Tuesday Wednesday Thursday Friday & Saturday	5 – 10 Minutes
Trikonasana			30 seconds	30 seconds			
Dhanurasana			30 seconds	30 seconds			
Shashangasana			1 minute	30 seconds			
Patchimosthasan			1 minute	30 seconds			
Meditation– Omkar.			1 minutes	30 seconds			
Pranayama – Nadisuthi			1 minutes	30 seconds			
Shavasana			2 minutes		1		
As in previous week	4 – 6 Weeks	40 min	20 minutes		2	Monday Tuesday Wednesday Thursday Friday & Saturday	5 – 10 Minutes
Bhujangasana			1 minute	30 seconds			
Shalabasana			1 minute	30 seconds			
Utkattasana			1 minute	30 seconds			
Gomukasana			1 minute	30 seconds			
Meditation – Omkar.			1 minute	30 seconds			
Pranayama – Sitali.			1 minute	30 seconds			
Shavasana			2 minutes		1		
As in previous week	7– 9 Weeks	66 min	40 minutes		3	Monday Tuesday Wednesday Thursday Friday & Saturday	5 – 10 Minutes
Sedhupandhasan			1 minutes	30 seconds			
Matsyasana			1 minutes	30 seconds			
Uttanasana			1 minute	30 seconds			
Meditation - Omkar			1 minutes	30 seconds			
Pranayama – Bhastrika.			1 minute	1 minute			
Shavasana			2 minutes		1		
As in previous week	10 – 12 Weeks	86 min	66 minutes		3	Monday Tuesday Wednesday Thursday Friday & Saturday	5 – 10 Minutes
Paschimottasana			1 minute	30 seconds			
Ushatrasana			1 minute	30 seconds			
Meditation – Omkar.			1 minutes	30 seconds			
Pranayama – ujjayi.			1 minute	30 seconds			
Shavasana			2 minutes		1		

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