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Impact of Yogic Practices on Selected Body Composition Measures and Triglycerides among Obese Women

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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 triglycerides among obese women. To achieve this purpose, 20 obese women, with BMI of 30-40 (W/H^2), were randomly selected as subjects from various places around Chidambaram. The age of the subjects were ranged from 30 to 35 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 training. The selected criterion variables such as percentage of body fat, body mass index and triglycerides 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, Triglycerides.

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 triglycerides 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]

Women suffer a disproportionate burden of disease attribute to overweight and obesity when comparing with men and the women those who are measuring more than 30 percent of the ideal body weight are becoming obese.[5] Women with body weight measuring up to 30 percent more than that of the ideal are known as Obese. The body mass index (BMI), is the most popular and effective way of calculating Female Obesity.[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

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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 triglycerides after twelve weeks of yoga practices.[20] Various researches suggest that yoga exercise improves the BMI of sedentary human beings including women.[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 triglycerides among obese women. To achieve the purpose of the present study, 20 obese women with the BMI of 95 percentile[30] or above and who were studying in various schools around Chidambaram, Tamilnadu were randomly selected as subjects. 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 triglycerides was assessed by phosphotungstate/Mg^{2+} 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. The blood samples were collected only after the consulting and getting permission from their parents. Analysis of covariance (ANCOVA) was applied to find out the significant difference if any between the experimental and control groups.

Results and Discussions

The data collected prior to and after the experimental periods were analysed and presented in the following tables.

Table I. Analysis of Covariance on Percentage of Body Fat Body, Body Mass Index and Triglycerides 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*
Triglycerides (mg/dl)	Pre-test Mean ± S.D	134.47 ± 15.226	134.67 ± 15.159	0.0001
	Post-test Mean ± S.D.	130.33 ± 14.104	134.27 ± 17.694	21.844*
	Adj. Post-test Mean	129.89	134.175	46.832*

*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).

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 decrease in triglycerides (Exp. Gr. Pre-mean = 134.47 ± 15.226 Vs. Post-mean 130.33 ± 14.104 & Cont. Gr. Pre-mean = 134.67 ± 15.159 Vs. Post-mean 134.27 ± 17.694) 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 differ with control group. Triglycerides was also significantly differ for yogic practice group (Exp. Gr. = 129.89 Vs. Cont. Gr. = 134.175, & F = 46.832, $p > 0.05$) with df 1,17.

Discussion

In the present study the subjects were obese children and their BMI was at 95th percentile.

1. The reduction in percentage of body fat and body mass index was significant for yogic practice group when compared 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*[38] and **Chen** *et al*[39] also found that there was a significant decrease in body mass index after the yogic practice period. **Ankad** *et al*[40] also found that there was a significant decrease in body mass index after the pranayama practice.
3. The result of the study shown that there was a significant decrease in triglycerides after the yogic practice period, when compared with the control group. The findings of **Telles** *et al*[41] found that there was a significant decrease in triglycerides 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 triglycerides after the experimental period. In this study, no attempt was taken to control the diet. But, in future, if the effort will be taken to control or modify the diet, the reduction in percentage of body fat, body mass index and triglycerides will be higher.

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