

EFFECT OF YOGA THERAPY ON ANTHROPOMETRIC AND CARDIOVASCULAR VARIABLES IN OBESE ADULTS.

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Abstract

Obesity pose a definite problem in terms of their physical and their mental health threats at an individual level. Obesity is a complex disorder involving an excessive amount of body fat. It increases your risk of diseases and health problems, such as heart disease, diabetes and high blood pressure. Studies have shown that yoga practices reduce anthropometric parameters and improve psychological and physical wellbeing. Objective: The aims of the study were to, (1) To study the effect of Yoga therapy on anthropometric variables in obesity. (2) To study the effect of Yoga therapy on cardiovascular variables in obesity. Materials and Methods: In this short-term interventional study with a pre-post design on 30 participants with obesity. Were taught integrated yoga module. It included *asanas*, *pranayama*, relaxation. Assessment were carried out on the 1st and 31th day of the therapy, using a BMI is a direct calculation based on height and weight it is non gender specific and body fat mass was measured by using the instrument InBody R20 Model by Electrode Method, Tetra Polar 8-point Tactile Electrode System. Measurement Method was Direct Segmental Multi-frequency Bioelectrical Impedance Analysis Method, based on DSM-BIA Method along with Blood pressure, respiratory rate and pulse rate. Results: Significant reduction in BMI, fat mass, blood pressure, pulse rate, respiratory rate respectively ($p < 0.000$) were observed after one month of yoga therapy in obese. *Conclusion:* This study provides evidence that yoga therapy, a short term program helps obese in Reducing the BMI, fat mass, blood pressure, pulse rate, and respiratory rate.

Key words: BMI- Body mass index, Fat mass, IAYT- integrated approach of Yoga therapy.

Introduction

Obesity is a chronic nutritional disorder which is increasing in prevalence worldwide. Obesity is associated with increased risk of development of diabetes mellitus II, hypertension, cardiac ailments, gall bladder disease and certain forms of cancer and is also used as predictor of mortality along with fat distribution. Obesity and visceral fat accumulation has strongly associated with overstimulation of the hypothalamic pituitary-adrenal (HPA) axis (Rosmond R, Dallman M & Bjorntorp P. 1998) due to distress (Björntorp P. 1996) and altering diurnal cortisol secretion. Abnormal regulation of the HPA axis and perceived stress-dependent cortisol levels are strongly related to perturbations of the endocrine axis as well as abdominal obesity with metabolic abnormalities. (Wüst et al., 2000) A complex set of interrelationships occur between life style, anthropometric, psychological and physical activity variables (Kyrios et al., 2009) of particular interest is the apparent relationship between physical and mental health. (Teychenne M, Ball K & Salmon J. 2008). The prevalence of overweight and obesity rose from 2 to 17.1%. The drastic change in lifestyle of the rural dwellers was found to be a contributory factor for the rising rates of obesity and associated metabolic diseases such as diabetes. (Ramachandran A, Snehalatha. 2010). It is among most common disorders in medical practice and also found to be very frustrating and difficult to manage. Obesity results in both increased morbidity as well as mortality. It is one of the most prominent preventable causes of death worldwide (Mokdad et al, 2000). Increased mortality is basically from the diseases like cardiovascular disease, high blood pressure, and diabetes mellitus. Obesity has an immense impact globally in terms of human suffering and economic burden, resulting from the chronic disease and disability associated with obesity. The conventional treatment for obesity includes decreasing caloric intake and increasing physical activity, that is, 'diet and exercise.' Medications have also been utilized. However, the long-term success rate of most weight loss programs is very low (Gaby, 2011). Yoga is proven to be beneficial in the management of obesity by its holistic approach to the problem, Many studies shown significant Effect of yoga on obesity reducing the risk of binge eating (Majithia & Koch, 2011), Another study (Gilbride & Judith, 2006) the participants scored a positive mood state, Hatha and relaxation yoga had a statistically significant role in controlling weight, hypertension, and mood. In another short term residential study showed a decrease in BMI, waist and hip circumferences, fat-free mass, total cholesterol, high density lipoprotein (HDL) cholesterol, fasting serum leptin levels and an increase in postural stability and hand grip strength (Telles et al., 2010). There is an urgent need for an effective understanding of obesity and its management, including the use of natural strategies that are affordable and effective. The comprehensive, healthcare system known as holistic approach offers valuable insights and practical applications in this regard.

Methods

Subjects and study design

Obese adults between the ages of 18 and 50 years with body mass index (BMI) range (28 kg/m² to 45 kg/m²), were recruited from the community centre in Chennai, Tamilnadu. We have fully explained the potential risks and benefits in the study before written informed consent was provided by participants, according to the guidelines of the S-VYASA Universities institutional ethical committee. Those with associated medical problems such as cardiac problems, uncontrolled hypertension, diabetes, osteoarthritis and on psychiatric medications were excluded. In this study we adopted a convenient sampling method to recruit the subjects who were interested to undergo yoga therapy program at the community centre, Both genders, Age group 18 to 50 years and BMI above 28 kg/m², a single group pre-post design was used. The 4-week study was successfully completed by 30 participants, Detailed demographic Data shown below (Table 1).

Table.1 : Demographic Data

Demographic Data			
Age	Mean 30.87	Sd ±10.38	
Gender	Male =07	Female =23	
Marital state	unmarried=2	married=28	
Education	UG=18	PG=12	
Occupation	employee=17	student=1	House wife=12

INTERVENTION

The daily routine practiced at the center included 90 minutes of integrated yoga therapy practice for 30 days. The integrated yoga therapy practice included shithilikarana vyayamas (loosening practices) followed by yogasanas and relaxation techniques with pranayama practices. The concepts used to develop a specific module of an integrated approach to yoga therapy (IAYT) for obesity were taken from the traditional yoga scriptures (Patanjali Yoga Sutras, Yoga vasishtha and Upanishads) that highlight a holistic life style for positive health at physical, mental, emotional and intellectual levels. (Nagarathna R, Nagendra HR. 2000) Yoga is defined as mastery over the modifications of mind (*Chitta Vritti Nirodhah*-definition of *yoga* by *Patanjali*). It helps to remove the unnecessary surges of neuromuscular activation resulting from heightened stress responses that may contribute to aging (Nagarathna R, Nagendra HR. 2001) The daily routine included a 1.30 hrs practice.

OUTCOME MEASURES

BMI is a direct calculation based on height and weight it is non gender specific. BMI was calculated from the equation-dividing a person's weight in kilograms by height in meters squared (Bray GA, Jama, 1976). The body weight was measured using an electronic weighing machine (ESSAE-DIGI, Bangalore), which is accurate to 0 mm between 200 gms to 150 Kgs. The height (in centimetres) was measured using a scale graduated in millimetres. Body fat mass was measured by using the instrument InBody R20 Model by Electrode Method, Tetra Polar 8-point Tactile Electrode System. Measurement Method was Direct Segmental Multi-frequency Bioelectrical Impedance Analysis Method, based on DSM-BIA Method.

Blood Pressure was recorded manually with a standard mercury sphygmomanometer auscultating over the right brachial artery. The diastolic pressure was noted as the reading at which the korotkoff sounds disappeared. Pulse Rate was measured by Gently placing two fingers on radial artery at the wrist of the participant. This was recorded by counting the number beats in 60 seconds. Respiratory rate was recorded by counting how many times the chest raises for one minute. This was done while the participants attention was not on the respiration

Data was collected before and after yoga practice of one month. The participants reported for the assessment between 5:00 PM to 6:00 PM. Timing was kept fixed for all the participants for the whole duration of study, all the participants were practiced yoga therapy under experienced therapists. Participants reported twice for assessment i.e. before and after the yoga practice. Data was taken with help of InBody R20 at single point of time in which the InBody R20 which measured fat mass, BMI, for all the 30 subjects in the study, To avoid the errors complete instructions with demonstration was given before the assessments. When the assessment was completed, respondents were appreciated for their time and cooperation.

Statistical analysis

The results are expressed as the mean±standard deviation. The Wilcoxon's signed rank test was used for changes in differences before and after. All statistical analyses were performed using the Statistical Package for the Social Sciences version 19.0 for Windows (SPSS, Inc., Chicago, IL, USA). Statistical significance was set at p-value<0.05.

RESULTS

The study included 30 adults Mean 30.87 ± 10.3 years of age who were classified as obese BMI range (28 kg/m² to 45 kg/m²). Changes in body composition and cardiovascular variables before and after 4 weeks of yoga therapy are summarized in Table 2. Body weight and BMI significantly ($p < 0.000$) decreased after yoga therapy. Fat mass was significantly ($p < 0.000$) decreased with yoga therapy and, there was a significant reduction in Blood pressure ($p < 0.000$), pulse rate ($p < 0.000$), respiratory rate ($p < 0.000$) also. Table:2 show the details.

Table: 2. changes in body composition and cardiovascular variables after 4 weeks of yoga therapy

Variable	Pre	Post	t-stat	df	P. sig.
BMI	33.33±2.84 ¹	32.03±2.82	10.9	29	<0.000***
FM	41.97 ±8.85	38.70± 7.87	9.7	29	<0.000***
BP(SYS)	126.20 ±11.5	118.33 ±8.6	3.8	29	<0.001***
BP(DIA)	83.07 ± 8.16	79.27 ±6.48	1.9	29	<0.000***
RR	18.10 2.85	15.93 2.57	4.17	29	<0.000***
PR	78.67 9.10	73.00 7.02	4.17	29	<0.000***

¹Values are presented as means±SD. Diff, post value-pre value; BMI, body mass index; FM, fat mass. BP(SYS), systolic blood pressure. BP(DIA), diastolic blood pressure. RR, respiratory rate. PR, pulse rate. *p<0.05, pre value v/s post value; **p<0.01, pre value v/s post value; ***p<0.001, pre value v/s post value.

Discussion

A growing number of research studies have shown that yoga can improve strength and flexibility, and may help control physiological variables such as blood pressure, lipids, respiration, heart rate and metabolic rate to improve overall exercise capacity.(Ray et al., 2001) thus supporting the findings of clinical parameters reduction in our study. The present study was designed to determine the impact of yoga therapy on body composition and cardiovascular variables in obese. One month of yoga therapy practice improved body weight, BMI, FM, BP, RR, and PR compared with baseline values in obese. Yoga has been shown to decrease hypertension and cardiac inflammation, stabilize the sympathetic nervous system, and improve psychological health and cardiac function (Vempati & Telles, 2002). The physiological effects of yoga training that have been previously reported include the inhibition of body weight gain, reductions in cholesterol levels, and blood pressure, and improvement in immune function as well as beneficial psychological effects (Pal et al., 2011). Importantly, even short-term yoga based comprehensive lifestyle intervention led to notable reduction in body mass index, blood pressure, and blood glucose with a clinically meaningful improvement in lipid profile(Bijlani et al., 2005). Yoga therapy is an economical tool requiring little in the way of equipment or professional personnel, studies indicating excellent long-term adherence and benefits from yoga therapy than conventional regimes.

Conclusion

Some limitations of the current study are the relatively small sample size, may not have been sufficient to obtain statistically significant results. A future study with a larger number of participants is necessary. Furthermore, obesity is a complex condition and thus treatment modalities should be of holistic in nature. The finding of the study demonstrate that yoga therapy training is a suitable approach for attenuating obesity, as indicated by improvements in BMI, FM, BP,RR and PR, compared with baseline values. Consequently, yoga training may be effective in controlling some metabolic syndrome factors in obese. Future investigations are demanded to establish and expand the results of the present study and to compare the metabolic effects of yoga therapy with those of conventional approaches.

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None

Conflict of interest

None

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