

Effect of Regular Practicing Bharatnatyam Dancing Exercise on Body Fat of Urban Female Teenagers

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Abstract: *Recently for obesity management approach, body fat has got the prime importance as because it has been identified not the body weight but actually the body fat plays the crucial role for predisposition of various metabolic diseases. To address the problem, regular practicing physical activity is a growing choice. On the other hand, dance is a traditional form of recreational activity involving different body movements and requiring body flexibility. From this point of view, present work has been designed to study the impact of receiving training on Bharatnatyam dancing and practicing it regularly as an exercise on body fat in female teenagers of Kolkata. It has been found that individuals receiving Bharatnatyam dancing training for at least a period of five years and practicing it regularly for at least a period of half an hour have significant favorable value of body fat compared to their age and gender matched individuals of similar socioeconomic condition leading otherwise sedentary lifestyle.*

Keywords: *Public health, traditional exercise, weight management, body composition, visceral fat*

Introduction

Obesity, an abnormal or excessive accumulation of body fat that impair health (1, 2), is one of the most concerning global public health challenges of recent times. Contrary to the popular belief, it is no more a disease of affluence. One in seven of all women and one in ten of all men are classified as obese worldwide (3), which is quite a matter of concern. Along with the shift toward the occupations that require less energy to be expended as a result of industrialization and modernization, marked shift in diet structure are the major predisposing modifiable established causes of obesity. Related to the effect of this industrialization, a similar shift has been found in time allocation in physical effort at home and in leisure activities. Besides accounting for a huge direct and indirect health care cost, the rising prevalence of overweight and obesity has a direct correlation with the increasing prevalence of obesity related comorbidities (4) including CVD, T2DM, metabolic syndrome, respiratory difficulties, musculoskeletal problems and so on. The prevalence of obesity and its consequences among children (5, 6), adolescents (7), and adults (8) has increased markedly in recent times. It is therefore important to strategize the management policy of the multifaceted problem, especially from Indian socio-economic perspectives. Epidemiological research shows that exercise improves the body's ability to burn fat, thus enhancing the loss of adipose tissue. Actually physical exercise is a critical adjunct to diet and behavioral modification in a comprehensive weight optimization program. To reverse the growing trend toward an obese population within different culture, not only physical activity and exercise need to become a routine component of daily life but also it is important to select a mode of exercise that is enjoyable to the individual, that uses the large muscles of the body in a continuous, rhythmical fashion, and that is relatively easy to maintain at a uniform intensity. Dance, an active, non-competitive form of recreational activity can be a

good choice in this regard. Indian classical dancing has a glorious tradition and is still popular. Bharatnatyam is one such form of Indian dancing involving neck movement and finger gestures i.e. 'mudras'; it also requires adoption of different postures like, sitting, bending, standing, knee bending that enhance body flexibility. Thus, from the physiological point of view, regular dancing (Bharatnatyam form), apart from being a recreational performing art, is expected to serve as a good exercise having potential beneficial effect in reducing obesity particularly central or abdominal obesity.

Materials and Methods

At first some institutions, in and around Kolkata, imparting training on Bharatnattam dancing were approached for getting access to individuals, being trained in dancing, for the purpose of conducting the assessments and they were briefed about the study requirements. The institutions, whose authorities were willing to allow us to carry out the studies, were further explained the details of the studies. Then the study requirements were again explained to the target individuals and their parents attending these dancing schools. The initially interested volunteers thereafter enlisted their names and thus a prior informed consent was obtained. The individuals, receiving training other than Bharatnattam dancing exercises (e.g. other dancing forms, swimming, karate, cycling, and yoga) and receiving Bharatnatyam dancing training for less than five years were excluded from the study. Forty five Bengalee female teenagers (age range 13-19 years) regularly receiving Bharatnatyam dancing training constituted the Bharatnatyam dancing group (BDG) and thirty four individuals, not undertaking regular exercise training of any form including dancing from similar age and socioeconomic background constituted control group (CG). In mutual convenience, dates of studies were arranged for recording of basic physical and physiological parameters. The age in years, period for which individual are receiving training on Bharatnatyam dancing, preliminary socio-economic data (9), and information about medical histories were recorded in pre-designed schedules. The anthropometric and body composition measurements were carried out in morning hours in the University laboratory. Body height (to the nearest of 0.1 cm) using an anthropometric rod, and body weight (to the nearest of 0.1 kg) were recorded without shoe using a pre calibrated weighing scale and Body Mass Index (BMI) was calculated. Whole body fat%, subcutaneous fat% and visceral fat% were measured by impedance technique (10) in bare foot after removal of metal jewelry and heavy pocket items. Obtained data were subjected to suitable statistical analysis and significance level was set at $P < 0.05$.

Results and Discussion

Present study was conducted on 45 and 34 Bengalee female teenagers residing in and around Kolkata, constituting BDG and CG respectively. Both BDG and CG individuals were unmarried post pubertal teenagers. The physical and physiological characteristics have been presented in Table 1

Table 1: General characteristics of study participants

VARIABLES	BDG	CG
Age (year) [^]	15.5 ± 1.78	15.9 ± 1.63
Pubertal status	Post pubertal	Post pubertal
Age at menarche (year) [^]	11.0 ± 0.98	10.8 ± 0.97
Marital status	Unmarried	Unmarried
Family Socio economic status [^]	Upper middle	Upper middle
Physical activity	Bharatnatyam dancing	sedentary
Smoking/alcoholism	Nil	Nil
Body height (cm) [^]	153.7 ± 7.23	153.2 ± 5.77
Body weight (kg) [*]	48.3 ± 7.69	51.9 ± 11.3

[^]ns, ^{*}P < 0.05

All the participating individuals belonged to upper middle socioeconomic strata of the society. They had no self or family history of diabetes, hypertension or any other chronic disease (self reported). The mean values of body height and body weight were 153.7 cm and 48.3 kg respectively in BDG individuals, whereas for CG individuals the values are 153.2 cm and 51.9 kg respectively. No significant difference has been found between BDG and CG individuals in respect of body height whereas CG individuals have significantly higher body weight compared to BDG individuals.

In figure 1, comparison between BDG and CG individuals in terms of BMI, body fat percentage, subcutaneous fat percentage and visceral fat percentage has been graphically presented.

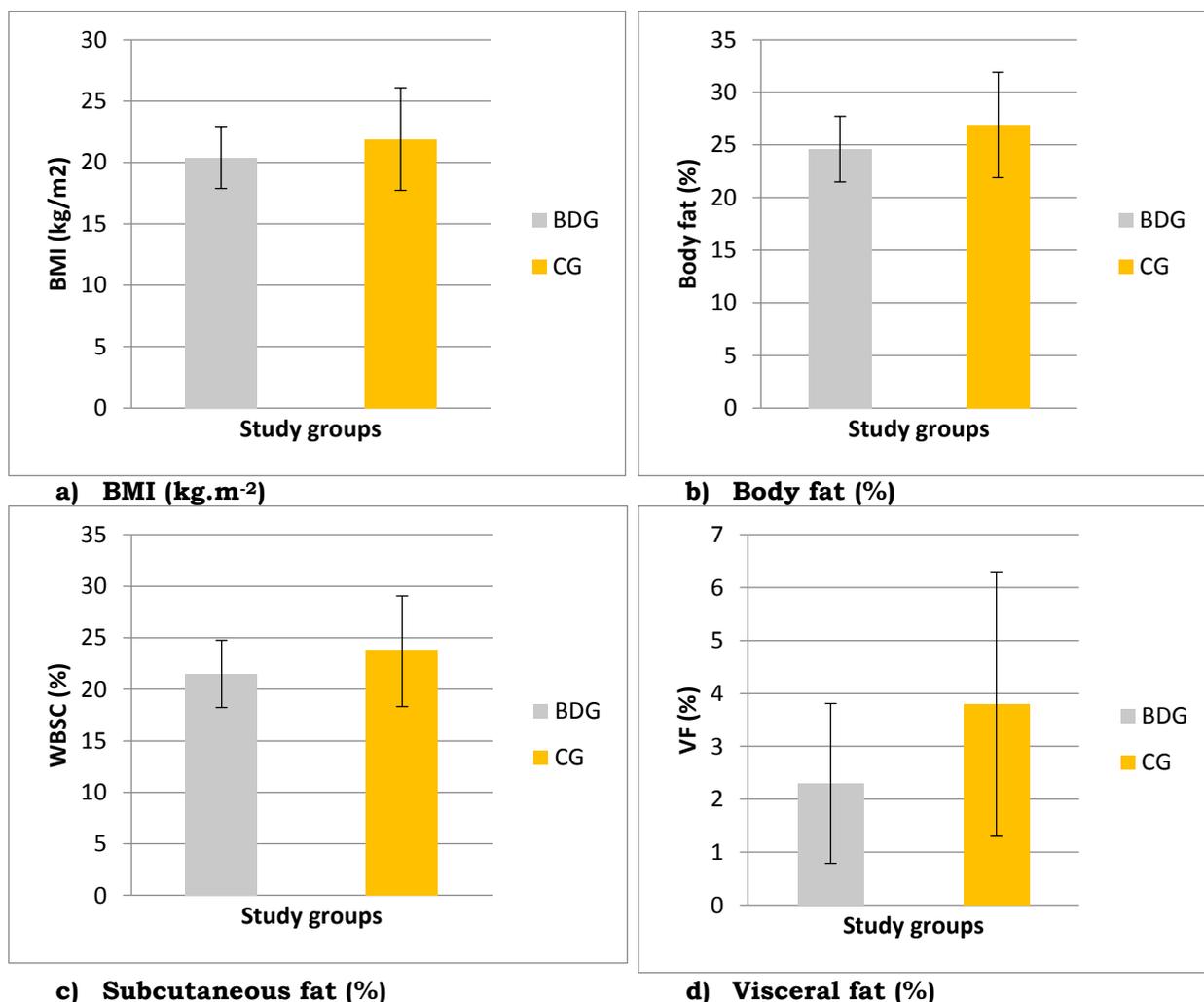


Figure 1: Comparison between BDG and CG individuals in respect of BMI, body fat, whole body subcutaneous fat and visceral fat

BMI is the most popular obesity indicator. It has been found that mean value of BMI is lower in BDG individuals compared to CG individuals. Similar trend has been found for other three parameters namely body fat, subcutaneous fat and visceral fat.

Discussion

The significantly ($P < 0.05$) lower body weight in BDG individuals, compared to their CG counterparts, could be attributed to regular dancing exercise of Bharatnatyam form, as the BDG

and CG individuals were not differing in terms of their socio-economic background and dietary energy intake in both age groups. The trend is affirmed by lower BMI in BDG individuals, compared to their CG counterparts.

As the BMI alone does not provide the true picture of fat distribution in body, for it takes into consideration both fat and fat-free components of body weight, the limitation is overcome by assessing the total body fat percentage. The significantly lowered ($P < 0.05$) body fat percentage in BDG individuals compared to CG individuals further affirms that individuals regularly practicing Bharatnatyam dancing are accomplishing optimized body weight including body fat. The findings of the present study that dance has a favorable impact on body fat, which are in agreement with several other studies carried out on adult (11, 12) as well as on children (7), is important as incidence of obesity, including obesity in children, and its consequent adverse impacts in India is on the rise. To combat the growing epidemic different management strategies mainly physical activity and dietary management or in combination have been addressed; but in the present study, the body fat percentage has been found to be significantly lowered in BDG, compared to CG, without resorting to any intervention in respect of dietary consumption.

A further detailed approach has been made in the present study by estimating subcutaneous and visceral fat separately. It has been found that mean values of both subcutaneous and visceral fat percentage is lower in BDG individuals compared to their CG counterparts. Previous studies have found that the metabolic effect of subcutaneous and visceral fat are opposite in nature with decreased level of subcutaneous fat is associated with impaired glucose tolerance (13). In the present study although subcutaneous fat is favorable in CG individuals from this aspect but the overall body fat status is deleterious. Visceral adipose tissue (VAT) is considered to be one of the most dangerous fat depots within the body, as it is strongly related to cardio metabolic risk factors and insulin resistance (14). The comparison between DG and CG individuals in respect of visceral fat has been presented in figure 1.d., and it could be observed that the BDG individuals have significantly lower ($P < 0.05$) visceral fat than CG individuals. It has been reported that there is a significant positive association between VAT and all-cause mortality in adults (15); in this study it has been found that only through regularly practicing Bharatnatyam dancing, BDG individuals, maintain significantly lower level of VAT compared with their CG counterparts.

Conclusion

From the present study it can be concluded that regular practicing of Bharatnatyam form of dance has favorable impact on obesity adjudged in terms of body weight and BMI and also body fat in urban Bengalee female teenagers. As body fat is the main predisposing factor for many metabolic disorders, by achieving favorable value of body fat and maintaining healthy body composition from young age risk of suffering from those complications can be reduced.

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