

Effect of Bharatnatyam Dancing on Body Composition of Bengalee Female Children

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Abstract Obesity, defined as abnormal or excessive fat accumulation that presents a risk to health, is on the rise including in the pediatric population in developed as well as less developed countries. As children are now fast adopting computer based activity both habitual and recreational with minimal level of physical effort, the prevalence of childhood obesity is a major concern. Indian dancing has been practised as a popular recreational activity for a long period of time. Bharatnatyam dancing is a traditional form of Indian classical dance which involves different body postures with continuous rhythmic body movements and therefore it may have some impact on body composition. A study has been undertaken in this backdrop, to assess the effect of Indian classical. Bharatanatyam dancing on body composition variables of girl children. Female individuals (12-18 year), receiving Bharatanatyam dancing training for at least a period of five years and practicing daily for an hour for 6 days in a week, constituted the Bharatanatyam dancing group (DG). Children of similar age and socioeconomic background with no regular physical activity including any form of dancing were randomly selected for constituting control group. It has been observed that training in Bharatnatyam dancing has significant ($P < 0.05$) favourable impact on the body composition parameters measured anthropometrically compared to the age and sex matched counterparts. It could therefore be concluded that Bharatnatyam dancing has specific beneficial impact on maintaining favourable body composition variables in children and thereby reducing the chance of obesity in adulthood.

Keywords: childhood obesity, anthropometry, physical exercise, recreational activity, rhythmic movement

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1. Introduction

Overweight, defined as having excess body weight for a particular body height from fat, muscle, bone, water or a combination of these factors [1], have become a global problem in the last decade [2]. The scale of the obesity problem has a number of serious direct and indirect consequences for individuals and public health systems. The direct economic costs are medical costs for prevention, diagnosis, and treatment services for the obesity problem, while indirect costs relate to loss of income from decreased productivity, restricted activity, absenteeism, and bed days and lead to income loss by premature death. Together with rise in obesity in adults, the proportion of obesity in children have increased from 5% to 18% during 1980 to 2010 [3]. Children and adolescents who are obese are at greater risk for bone and joint problems, sleep apnoea, and social and psychological problems such as stigmatization and poor self-esteem ([4,5,6]). The greater concern is that the risks of overweight during childhood will persist into adolescence and adulthood [7]. The

worldwide epidemic of excess weight is due to imbalance between physical activity and dietary energy intake, ective of the age of individuals. Sedentary lifestyle, unhealthy diet, and consequent overweight and obesity markedly increase the risk of cardiovascular diseases [8]. Physical activity plays an important role in the preventing one from becoming overweight and obese in childhood, reducing thereby the risk of suffering from obesity in adulthood [9]. Dance, a form of physical activity and a mode of exercise [10], performed by small groups of all ages [11], is a sequence of non verbal rhythmic body movements of creative nature and scope for expression. Bharatnatyam, an Indian classical dance, is a recreational activity since age old times.

It is a unique synchronization of music, rhythm and expression, where the dancer expresses the full gamut of human's experience through aesthetics. It includes some special movements like sitting, bending, standing, twisting etc and some complex movements like jumps and taut hand gestures. Some special types of exercise or initial basic steps, referred to as 'adavu', are required to be learnt before performing the dance. In this backdrop, a study was

undertaken to see the effect of regular Bharatnatyam dancing on body composition in children.

2. Methodology

Initially institutions imparting training on Bharatnatyam dancing were approached and required permission was obtained. The names of initially interested volunteers were enlisted. The inclusion criteria was that the children (12-18 year) should have a minimum training of 5 years in Bharatnatyam and practice it regularly for at least an hour for 6 days in a week. Bharatnatyam dancing training for less than 5 years and being trained in other forms of exercise were considered as exclusion criteria for the study. Children of comparable age and socio-economic background, but not receiving training in any form of dance and also not exercising regularly constituted the Control Group (CG). Information about age (year), period for which individuals are receiving training in Bharatnatyam dancing, daily practicing time, nature and duration of daily activity, food habits, preliminary socio-economic condition and past incidence of major illness of self and parents were recorded in pre-designed schedule. Basic physical data like body height (cm) using Anthropometric rod with an accuracy of 0.1cm, body weight (kg) using a pre calibrated weighing scale with an accuracy of 0.1kg, with individuals in light clothing and without shoes, were measured and BMI was calculated.

Waist circumference (WC), to the nearest of 0.5 cm, at the narrowest part of the iliac crest, and Hip circumference (HC), to the nearest of 0.5 cm, at the greatest circumference of the buttocks, with subjects in minimal inspiration were measured using a flexible measuring tape and waist hip ratio (WHR) was calculated. Body fat was estimated from skinfold measurement, using skin- fold calliper, obtained at three sites- tricep, subscapula and suprailiac. Obtained data were tabulated and used for further statistical analysis.

3. Results

The dancing group individuals and control group individuals do not differ significantly ($P > 0.05$) in respect of age.

In [Figure 1a](#) the mean Body Weight of individuals of DG (42.1kg) and CG (52.2 kg) are presented and there is significant difference ($P < 0.01$) between DG and CG individuals in respect of Body Weight. In [Figure 1b](#) the BMI (AM \pm SD) of both DG (22.0) and CG (17.9) individuals are presented and there is significant difference ($P < 0.01$) between DG and CG individuals in respect of BMI. The Absolute Body Fat data of DG and CG individuals are presented in [Figure 1c](#) in AM \pm SD form and significant difference ($P < 0.01$) between DG (9.2 kg) and CG (14.2kg) individuals in respect of Absolute Body Fat in kg is observed.

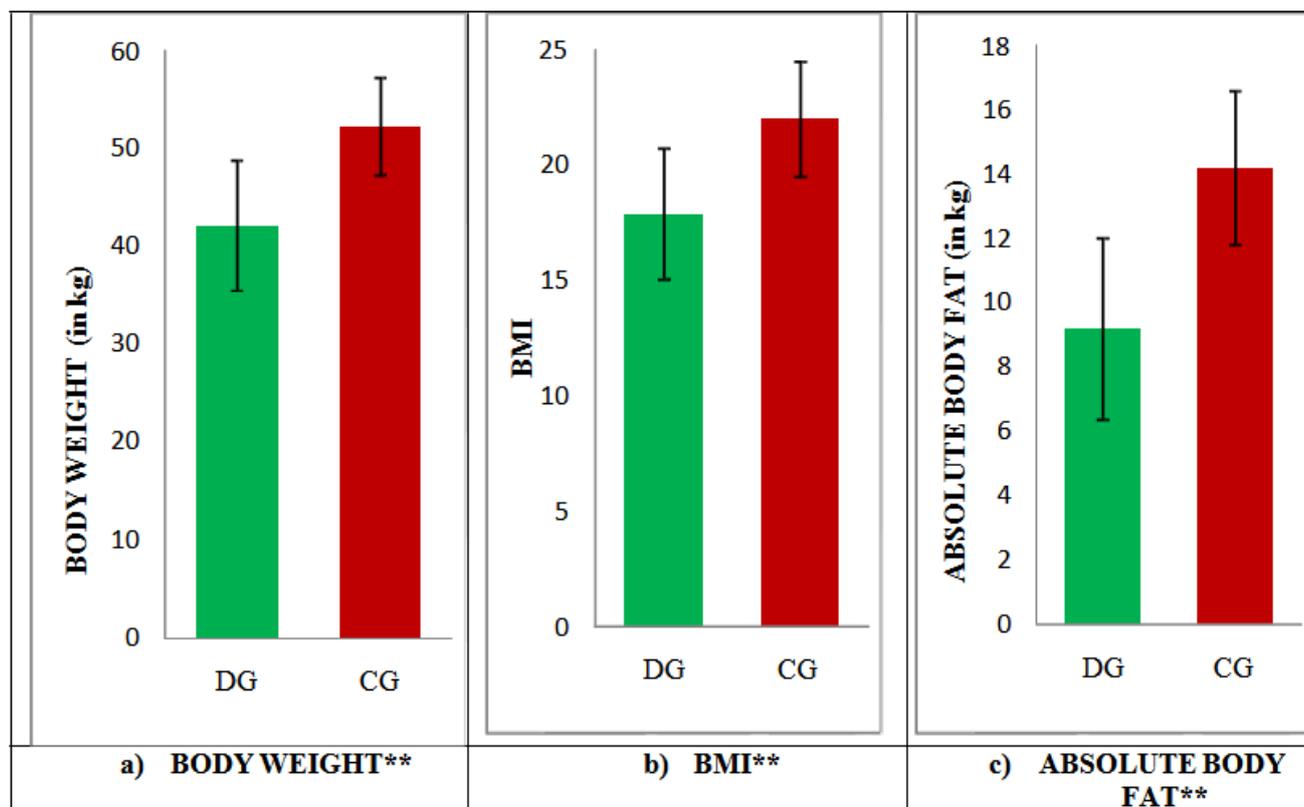


Figure 1. Comparison between DG and CG individuals in respect of BW, BMI and Absolute BF (** $P < 0.01$)

The comparison between DG individuals and CG individuals is presented in respect of Waist Circumference (WC) in [Figure 2a](#). It is observed that the WC is significantly ($P < 0.01$) lower in DG individuals (63.0cm) compared to their CG counterparts (70.5 cm).

In [Figure 2b](#) the Waist to Hip Ratio (WHR) status is presented for DG and CG individuals; the calculated values are respectively 0.76 and 0.78. It is observed that for the WHR, the DG individuals have significantly lower value ($P < 0.05$) compared to their CG counterparts.

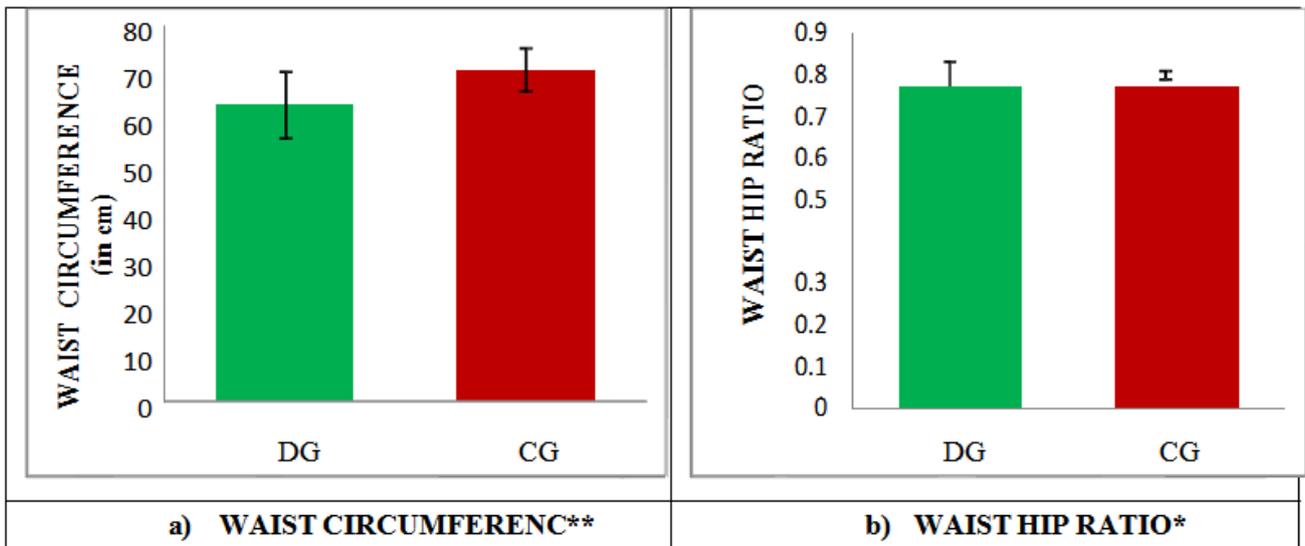


Figure 2. Comparison between DG and CG individuals in respect of WC and WHR (** $P < 0.01$, * $P < 0.05$)

4. Discussions

The mean body height of the DG individuals was 153.5 cm and that of CG was 154.4 cm. As per WHO guideline on height for age for girls, the height for 14 year and 15 year old girls are about 156cm and 160 cm respectively [12]. Body mass index (BMI, expressed in $\text{kg}\cdot\text{m}^{-2}$), calculated as the ratio of subject's body weight (in kg) to the squared stature (m), and is now considered as one of the most commonly used indicator of obesity [13]. Children are defined as obese when BMI equals to or exceeds the age-gender-specific 95th percentile. Those with BMI equal to or exceeding the 85th but are below 95th percentiles are defined overweight and are at risk for obesity related co-morbidities [14]. In present study, the mean BMI of DG individuals is 17.9 which is significantly lower ($P < 0.01$), compared to their CG counterparts with mean BMI of 22.0; the trend of result of the present study are in agreement with the findings of Wyon [15]. The mean BMI of DG individuals is also found to be around the lower limit of the normal range of BMI values for girls aged between 5-19 years, in terms of WHO guideline; as per the latter, the BMI for 14 and 15 year old girls should be within 20 to 23.9. The favorable impact of Bharatnatyam dancing is again affirmed with assessment of the absolute body fat. The DG individuals have significantly lower ($P < 0.01$) absolute body fat, compared to their CG counterparts.

Waist Circumference (WC) and Waist Hip Ratio (WHR) are important indicators for defining central obesity and cardiovascular disease risk. The mean WC for DG children is 63.0 cm which is significantly lower ($P < 0.01$) compared to their CG counterparts having mean value of 70.5 cm. Present finding that DG individuals have lower value of WC is in agreement with the works of [16]; the mean WC of DG individuals are much lower than the cut off limit for Asians. A similar trend is observed for the WHR.

Earlier studies have found that dancing exercise plays an important role in the prevention of becoming overweight reducing the risk of obesity in adulthood [17]. Favorable impact of practicing Bharatnatyam dancing on body composition was observed previously in adult

population [18], present study further affirmed that it has equally effective for female children.

5. Conclusion

On the basis of the study it could be concluded that Bharatnatyam dancing, if practiced regularly for at least an hour for 6 days in a week, has beneficial impact on maintaining favorable body composition variables, adjudged anthropometrically in children and thereby preventing the progression of onset of obesity and lower risk of suffering from specific diseases.

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