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Indian Classical Dancing: An Approach for Obesity Management

Chatterjee Surjani*, Banerjee Neepa*, Chatterjee Sandipan*, Chatterjee Ayan*, Chakraborti Biswanath, Banerjee Debamalya***, Mukherjee Shankarashis***

Abstract

Obesity being associated with several risk factors increases the morbidity and mortality rate, which in turn increases the health care cost. Hence to combat this challenge it requires immediate public health intervention. On the other hand regular exercise in the form of dancing plays an important role in maintaining good health. In this backdrop the present study aims to assess the impact of Kathak dancing on adult female individuals of Kolkata.

31 adult female individuals receiving dancing training for minimum 5 years and practicing regularly for a period of at least one hour for 6 days in a week constituted the Kathak dancing group (KDG). The non-dancing group or the Control Group (CG) had 37 female individuals of comparable age and socio-economic background but not receiving training in any form of dance or exercise. The obesity indices of the individuals were also calculated for both the groups to compare their obesity status. It has been observed that training in Kathak dancing has significantly ($P < 0.05$) favorable impact on the measured anthropometric and body composition parameters compared to the age and sex matched counterparts. It could therefore be concluded that Kathak dancing is a beneficial way of exercising which has specific beneficial impact on maintaining favorable body composition variables, adjudged anthropometrically, in adult Bengali females and can serve as a potential tool for the desired healthy living agenda.

Keywords: Kathak Dancing; Anthropometry; Central Obesity; Public Health; Anthropometry.

Introduction

Obesity, a major public health challenge, increases the likelihood of various chronic diseases and poses an enormous stress on socio-economic and public health sector even in developing countries like India [28]. The health consequences of obesity range from complaints that impact the quality of life, such as respiratory difficulties, musculoskeletal disorders including osteoarthritis, infertility, and increased risk of high levels of disability, to complaints that lead to an increased risk of premature death due type 2 diabetes, cardiovascular problems (hypertension, stroke and CHD) and even certain types of cancers (endometrial, breast and colon) [2]. Another important aspect of obesity is health care cost and its related consequences [18]. The burdens are posing to be a serious threat on the limited health care resources for low and middle income countries including India. To ameliorate this major public health burden an unlimited array of weight loss strategies have been recommended. Products and programs that induce rapid weight loss and disturb metabolic homeostasis dominate the focus area for marketers and consumers. However, rapid weight loss is potentially unhealthy and frequently induces undesirable rebound weight gain consequences. In addition, many anti-obesity pharmaceuticals accompanied by adverse reactions are emerging and

Author's Affiliations: *Human Performance Analytics and Facilitation Unit, Dept. of Physiology, University Colleges of Science and Technology, University of Calcutta, Rashbehari Shiksha Prangan, 92, Acharya Prafulla Chandra Road, Kolkata 700 009, **Consutant Physician ***Department of Production Engineering, Jadavpur University, Kolkata 700 032, India.

Corresponding Author: Mukherjee Shankarashis, Human Performance Analytics and Facilitation Unit, Dept. of Physiology, University Colleges of Science and Technology, University of Calcutta, Rashbehari Shiksha Prangan, 92, Acharya Prafulla Chandra Road, Kolkata 700 009, WB, India.

E-mail: msasish@yahoo.co.in

making the cure worse than the disorder itself. Thus, for successful treatment of obesity is limited. Hence, it is very important to develop a management strategy. It may be a type of therapy with a low cost intervention using safe and novel approaches. Regardless of the availability of pharmacological treatments, different health authorities strongly recommend that regular exercise and sensible eating habits should be emphasized [15] and can be a way out from the vicious cycle of obesity. Unfortunately, only few prescribe regular exercise as a remedy for weight loss [19]. To introduce exercise as a routine component of daily life, it is important to select a specific mode of exercise that is low cost and uses large muscles of the body in a continuous, rhythmical fashion, and that is relatively easy to maintain at a uniform intensity and can be continued for long period of time without risk of any injuries. Traditional Indian classical dances have the desirable properties and may influence the obesity status of the individuals [18]. Kathak, the north Indian classical dance, involves rhythmic footwork, linear and circular extension of the body with controlled coordination between hand and body [19] and thus, may be used as a measure for obesity management.

Methods

The study was carried out on 31 adult female individual undergoing Kathak dancing training, age range 18–25 years, after obtaining the required permission from the institutions imparting training on Kathak dancing. With the initial consent from the individuals, the names of volunteers were enlisted and the procedural requirements were explained elaborately. The Kathak dancing (KDG) adult female individuals received training for a minimum period of 5 years in Kathak dancing and practice it regularly for at least one hour for 6 days a week. Females of comparable age and socio-economic background, but not receiving training in any form of dance and also not exercising formally constituted the Control Group (CG) (n = 37). Individuals under medication (self reported) were excluded. Information about their age (year), daily activities, food habits were recorded in pre-designed schedule. Socio-economic status (SES) was measured using the updated Kuppuswamy scale [16]. The BMI was calculated from the measured body height (cm) using anthropometric rod with an accuracy of 0.1cm and body weight (kg) using electronic scale with an accuracy of 0.1kg with individuals in light clothing and without shoes. Waist circumference (WC) at the midpoint between the last rib and the iliac crest, with the subject standing, after complete exhalation [10], Hip Circumference (HC) at the maximum circumference over the buttocks with the arms relaxed at the sides [12] and Abdominal Circumference (AC) at the umbilicus were measured, with an accuracy of 0.1cm, using a narrow (19 mm), flexible, inelastic standard measuring tape and waist hip ratio (WHR) was calculated. Body Adiposity Index (BAI) [8], Conicity Index (CI), Waist to Body Height Ratio (WHtR), Abdominal Volume Index (AVI) [9] and Body Mass Abdominal Index (BMAI) [24] were calculated. Centripetal Fat Ratio (CFR) was found out with skinfold measurement nearest to 0.1 mm at two sites: tricep (T) [27] (measured on the right upper arm, midway between the acromion and the olecranon) and subscapula (S) (measured two fingers below the low point of the right scapula) [7] using skinfold calliper. The equations of the indices are as follows:

- $BMI = \frac{Body\ weight\ (kg)}{Body\ height^2 (m)}$
- $BMAI = BMI/WC\ (m)$
- $BAI = \left(\frac{HC\ (cm)}{Body\ height\ (m)^{1.5}}\right) - 18$
- $WHR = WC\ (cm)/HC\ (cm)$
- $WHtR = \frac{WC\ (cm)}{Body\ height\ (cm)}$
- $CI = \frac{WC(m)}{0.109 \times \sqrt{[Body\ weight\ (kg)/Body\ height\ (m)]}}$
- $AVI = [2\ cm \times (WC)^2 + 0.7\ cm \times (WC - HC)^2]/1000$
- $CFR = [\frac{S}{S+T}] \times 100$

To diminish the inter-measurement variation coefficients, all anthropometrical measurements were performed by the same researcher. The data of KDG and CG were compared to find out any significant difference. P value lower than 0.05 ($P < 0.05$) was considered significant.

Results

Present study was conducted on 31 and 37 Bengali female adults residing in and around Kolkata, constituting KDG and CG respectively. All individuals of KDG and CG were married with no significant difference in respect of age, body height and socio – economic status; but there is significant difference ($P < 0.05$) in their body weight. The general characteristics of both the groups have been presented in Table 1.

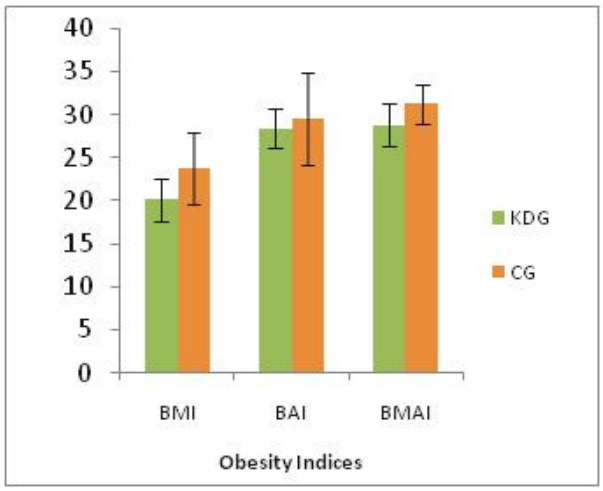
Table1: General characteristics of study participants

VARIABLES	KDG	CG
Age (year)^	20.9 ± 2.3	20.1 ± 1.79
Marital status	Married	Married
Family Socio economic status^	Upper middle	Upper middle
Physical activity	Kathak dancing	sedentary
Smoking/alcoholism	Nil	Nil
Body height (cm)^	154.2 ± 7.18	153.8 ± 6.85
Body weight (kg)**	49.0 ± 8.22	57.1 ± 12.39

^ns, **P < 0.01

In Fig.1, the Obesity indices in terms of Body Mass Index (BMI), Body Adiposity Index (BAI) and Body Mass Abdominal Index (BMAI) have been presented.

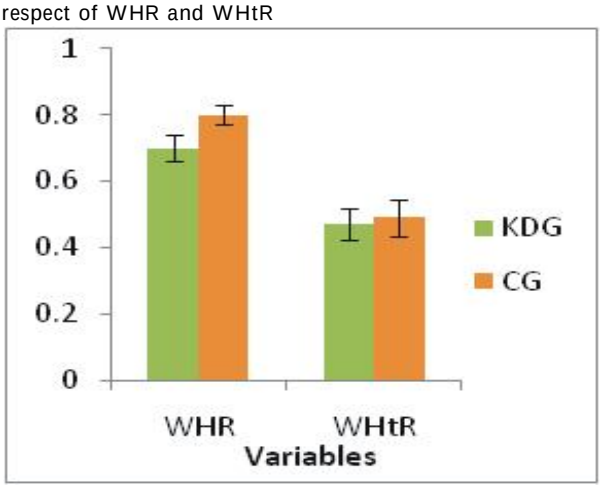
Fig.1: Comparison between KDG and CG individuals in respect of BMI, BAI and BMAI



For BMI and BMAI, P < 0.01; for BAI - ns

In Fig.2, the obesity indices in terms of Waist to Hip Ratio (WHR) and Waist to Body Height Ratio (WHtR) and have been presented.

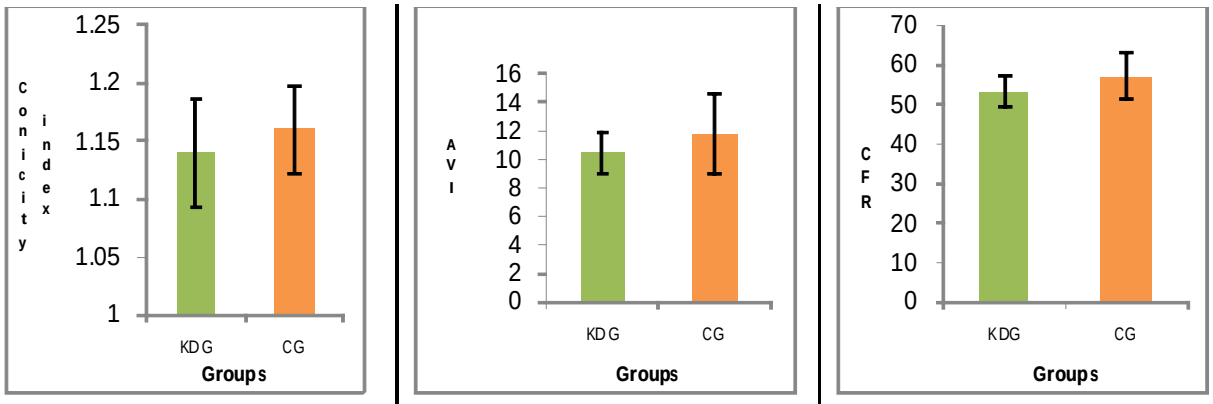
Fig.2: Comparison between KDG and CG individuals in respect of WHR and WHtR



For WHtR P < 0.05; for WHR P < 0.01

In Figure 3, the obesity indices in terms Conicity Index (CI) (a), Abdomoinal Volume Index (AVI) (b) and Centripetal Fat Ratio (CFR) (c) have been presented.

Fig. 3: Comparison between KDG and CG individuals in respect of CI (a) AVI (b) and CFR (c)



(a) CI** (b) AVI* (c) CFR**

* P < 0.05; ** P < 0.01

Discussions

Obesity has reached an epidemic proportion globally [21] and there is urgent need for suggesting preventive measures and management strategies. Especially in Indian culture, along with hormonal differences [19] regular physical activity of females is also less compared to their male counterparts; making the females more vulnerable to obesity. On the other hand dancing which brings about an active lifestyle [22] may consequently influence the body composition of the Indian females. Hence the present study has been undertaken to assess the obesity indices of female Kathak dance trainees and compare it with the CG counterparts.

The individuals of both the groups were comparable in terms of age, socio – economic status and body height but differ significantly ($P < 0.01$) in terms of body weight (Table 1). Adults are defined as overweight when, as per WHO recommendation, BMI equals to or exceeds the age-gender-specific 85th percentile but are below 95th percentiles and are at risk for obesity related co-morbidities [25]. The mean BMI of the CG individuals unlike the KDG individuals have crossed the lower cutoff limit for being referred to as overweight for Asians (Figure 1). This may be due to the swift movements of the dance which requires much energy expenditure to maintain a favourable body composition [3]. The trend of this result is in agreement with the findings of Wyon *et al*, 2006 [29]. Recently studies have shown an increasing trend of abdominal obesity [14] especially in the urban population [6] and thus estimation of the central adiposity indicators is important. Body Adiposity Index (BAI), predictor of body fat [21] without assessment of body weight [16], is an alternative index based on hip circumference and body height [23]. In the present study, the CG individuals have been found to have a higher value of BAI (Fig.1); this can be attributed to their larger hip circumferences [8], which is an indicator of higher plasma CRP, indicating insulin resistance and metabolic disorder, in obese females [13]. The mean Body Mass Abdominal Index (BMAI) of the KDG individuals (28.8) is significantly lower ($P < 0.01$) than their CG counterparts (31.2) which reduce the likelihood of having health related co-morbidities in the KDG individuals. Waist Hip Ratio (WHR) is an important indicator for defining central obesity and cardiovascular risk. The Asian population exhibit increased WHR and is likely to reflect increased visceral adipose tissue and increased risk [9]. Visceral adiposity induces greater endocrine activity by modulating tissue concentrations of adipokines such as adiponectin and resistine , a markers of insulin resistance, or by transforming growth factor á and interleukin 6, inflammatory mediators 2 (C). It is also found that the risk of myocardial infarction was more strongly associated with WHR than with WC. In the present study the KDG individuals have significantly lower ($P < 0.01$) value of WHR (Fig. 2). The trend of the present study is in agreement with previous study on football players [1]. It has also been reported that Waist-to-Height Ratio (WHtR) is a better predictor of abdominal obesity, and is more closely related to CVD morbidity and mortality. The mean WHtR of the KDG individuals is significantly lower ($P < 0.01$) than the CG individuals preventing the KDG individuals from the adult onset of obesity. In Fig.3 (a) the conicity index (CI), another measure of central adiposity is presented. It is based on quantifying the deviation from the circumference of an imaginary cylindrical shape model, with the help of body height, body weight and WC of the individuals [26], has good association with WHR; its rise indicates higher degree of abdominal obesity. CI is found to be related with atherogenic risk factors to an extent similar to that of WHR in adults, but has the advantage of calculating central adiposity without the measurement of hip circumference. Thus, CI is considered to be a better indicator, compared with WHR for identifying high trunk fat. In the present study the KDG individuals have significantly lower ($P < 0.01$) CI value compared to their CG counterparts. The Abdominal volume index (AVI), yet another central adiposity marker is also significantly lower ($P < 0.05$) in KDG individuals (Fig.3 b).

Among other methods, anthropometric measurements play an important role in Body Fat estimation especially in clinical practice. Ratios of two skinfolds, ticeps and subscapula [30], are used to calculate Centripetal Fat Ratio (CFR); it is widely used to rank individuals in terms of central adiposity. Fat patterning, associated with cardiovascular risk, have been the focus of research for the past three decades. Further studies have found fat distribution to be a risk factor for diabetes and coronary artery disease. The mean CFR of CG individuals is significantly higher ($P < 0.01$) than KDG individuals (Fig.3c), indicating a higher subscapular skinfold which is a trunk fat pattern site for the females [4].

The results of the present study show an increasing trend of obesity and abdominal obesity in the female adult population of Kolkata. Earlier studies have found that dancing exercise plays an important role in the prevention of becoming overweight, reducing the risk of obesity in adulthood

[6] and attaining favorable impact on body composition [29] which is further confirmed in the present study for the Bengalee adult females of Kolkata.

The results of the study indicate that regular practicing of Kathak dancing have significant favorable impact on the body composition parameters of adult Bengalee female individuals and thus may be used as a strategic plan to incorporate it in our daily life for the betterment of public health management.

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