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Fat Accumulation and Waist-Hip Ratio Trait of Bengali Women at Menopausal Phase

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ABSTRACT

49 Bengali menopausal women were studied for their physical characteristics, fat accumulation and waist-hip ratio trait. The average age of the studied Bengali women was 54.6 (±4.1) yr with a range 47-63 yr. Average age at menopause was 49.1 (±3.2) yr with a range 43 -55 yr. Average height of the Bengali menopausal women was 150 (±3.6) cm with a range 145.9-157.2 cm. Average weight of these population was 61.5 (±3.2) kg with a range 61.5 (±3.2) kg with a range 49-77 kg. Average fat% was 33.9 (±3.8) with a range 27.8-41.1 %. Average waist-hip ratio was 0.85 (±0.04) with a range 0.73-0.93. Average BMI was 27.1 (±2.8) kg./m^2 with a range 22.5-34.1 kg./m^2 . Only 28.6 % Bengali menopausal women were in normal weight category where 71.4 % were in overweight category when BMI was considered. Thus from the above, it could be concluded that Bengali menopausal women of the present study had higher fat%. Most of them were obese and had higher risk of syndrome X.

INTRODUCTION

Menopause is the time in most women's lives when menstrual periods stop permanently. The human ovaries become unresponsive to gonadotropins with advancing age, and their function declines, so that sexual cycles disappear (Ganong 2008). This unresponsiveness is associated with and probably caused by a decline in the number of primordial follicles, which becomes precipitus at the time of menopause. The overies no longer secret progesterone and 17 ß-estadiol in appreciable quantities, and estrogen is formed only in small amounts by aromatization of androstenedione in peripheral tissues. As the negative feedback effect of estrogens and progesterone is reduced, secretion of FSH and LH is increased, and plasma FSH and LH increase to high levels (Ganong 2008). In women, the menses usually become irregular and cease between the age of 45 and 55. The average of the onset of menopause has been increasing since the end of the 19th century and is currently 52 years (Ganong 2008). Menopause may also be defined by a decrease in hormone production by the ovaries. Hormonal fluctuation may not be responsible for all irregular bleeding during this period. Thus a change in hormonal level, the menopause women may experience a weight gain and other symptoms like hot flashes or flushes insomnia, mood changes, irregular menses, mastodynia, depression and headache.

Most of the works had been done on pattern of menopausal problem or health related problems like cardiovascular diseases, prevalence of breast cancer, or hormonal change. No study had been done on the body composition and physical characteristics of women at menopausal phase. Thus the present study was aimed to find out the physical characteristics, body composition and waist-hip ratio and obesity pattern of Bengali menopausal women residing urban areas.

MATERIALS AND METHODS

Subjects: 49 Menopausal Bengali women were studied randomly from Durga Nagar, Kolkata, West Bengal for their physical characteristics, Fat % and waist-hip ratio. Women were from middle class family and all of them were house-wife.

Anthropometrical measurements: Height and body weight was measured with an Anthropometric Rod (CESCORF, Brazil) and electronic weighing scale (OMRON, India). Measurement was done according to the standard method recommended by International Society for the Advancement of Kinanthropometry (ISAK 2011).

Skinfold Thickness: Biceps, Triceps, Subscapular and Supraspinale skinfold thicknesses were measured with a Harpenden skinfold caliper (Bety Int, UK).

Body Fat %: Body fat % was calculated using the equation of Siri (1956).

Durnin and Womersley (1974) technique was followed for Body density.

Body fat % = (495/Body density) — 450.

Body density = 1.1339-0.0645 log (Biceps +Triceps+ Subscapular + Supraspinale) for 50 yr and over.

Body Mass Index: Body Mass Index (BMI) was calculated using the equation where BMI = Weight (kg) / Height(m)^2.

Body weight category was determined using WHO guideline based on BMI (WHO 2017) as follows :

Category	BMI (kg.m^2) Cut-off points
Normal	18.50-24.99
Overweight	≥ 25.00
Pre- obese	25.00-29.99
Obese	≥ 30.00

Statistical Analysis: Statistical package SPSS 10.0 was used for statistical analysis.

RESULT

Table 1: Average physical characteristics, Fat %, Waist-Hip ratio of 49 Bengali menopausal women

Parameter	Age (yr)	Height (cm)	Weight (kg)	Fat %	Waist-Hip Ratio	BMI (kg/m^2)
Mean (x)	54.6	150	61.5	33.9	0.85	27.1
Standard Deviation (±)	4.1	3.6	3.2	3.8	0.04	2.8
Minimum	47	145.9	49	27.8	0.73	22.5
Maximum	63	157.2	77	41.1	0.93	34.1

Table 2: Average age , menopausal age of 49 Bengali menopausal women

Parameter	Age at menopause			Average Age at menopause
Range	40-44 yr	45-49 yr	50-55 yr	49.1 (±3.2) Range 43-55 yr
No	1	24	24	
Number percent	2.2 %	48.9 %	48.9 %	

Table 3: Body weight category of menopausal women based on BMI according to WHO guidelines (2017)

Category	BMI ($kg.m^2$) Cut-off points	Frequency	%
Normal	18.50-24.99	14	28.6
Overweight	≥ 25.00	35	71.4
Pre- obese	25.00-29.99	28	57.2
Obese	≥ 30.00	7	14.2

DISCUSSION

The average age of the menopausal women of the present study was 54.6 (±4.1) yr with a range of 47-63 yr. The average age at menopause of Bengali women of the present study was 49.1 (±3.2) yr with a range of 43-55 yr (Table 2). Age at menopause for 2.2 % of studied Bengali women was in between 40-44 years, whereas in 48.9 %, menopause started between 45-49 yr and between 50-55 yr (Table 3). In women, the menses usually become irregular and cease between the age of 45 and 55 yr. The average of the onset of menopause has been increasing since the end of the 19th century and is currently 52 years (Ganong 2008). For Indian women, Ahuja (2016) identified 46.2 ± 4.9 yr as the age of natural menopause. The Indian women begin their perimenopausal stage, identified by irregular periods, by the age of 44.69 ± 3.79 yr (Kapur *et al* 2009, Singh 2012, Singh and Pradhan 2014). Other studies conducted in India also showed a similar profile in the menopausal age of women in India (Kriplani and Banerjee 2005, Sharma *et al* 2007, Kakkar *et al* 2007, Borker *et al* 2013). The Indian menopause and perimenopausal age has been reported to be earlier as compared to the developed countries (McKinlay 1992). Thus, in the present study, the Bengali women

experienced late menopause than the other studies in India but supported the reports of late onset of menopause (Ganong 2008).

In the present study, the average height of the menopausal Bengali women was 150 (±3.6) cm with range 145.9-157.2 cm. The average body weight was 61.5 (±3.2) kg with a range 49-77 kg. (Table 1). Average fat % was 33.9 (±3.8) with a range between 27.8 and 41.1 %. Body fat by 33.9 % could be considered as high though there were no other studies available for reference. The average fat % of American young women fell between 25 to 28 % (Lohman and Going 1993, Lohman et al 1997). The fat % of female Olympic level athletes fell between 8.4 to 16.6 % which could be taken as a model (McArdle and Katch 2001). No studies were available for Bengali women. The Bengali menopausal women possessed a high average value of 33.9 (±3.8) %, which was very high compare to athletic population (McArdle and Katch 2001).

Both generalized and abdominal obesity are associated with increased risk of morbidity and mortality. The main cause of obesity-related deaths is cardiovascular disease (CVD), for which abdominal obesity is a predisposing factor. It is unclear which anthropometric measure is the most important predictor of risk of CVD in adults – BMI, waist circumference, waist–hip ratio or even hip circumference. BMI has traditionally been the chosen indicator by which to measure body size and composition, and to diagnose underweight and overweight. However, alternative measures that reflect abdominal adiposity, such as waist circumference, waist–hip ratio and waist– height ratio, have been suggested as being superior to BMI in predicting CVD risk. Waist-Hip ratio was suggested as better anthropometric measure for estimating the risk of type 2 diabetes mellitus, and the optimal cut off values of 0.82 for women was set for Asian population (Cheng 2010, Hajian-Tilaki and Heidari 2015). The average BMI of the present Bengali menopausal women was 27.1 (±2.8) Kg/m^2 with range between 22.5 -34.1 kg/m^2 (Table 1). 71.4 % menopause Bengali women of the present study fell in overweight category, whereas only 28.6 % were in normal weight category. Of them, 14.2 % were in obese category. The average waist-hip ratio of the present menopausal women was 0.85 (±0.04) with a range between 0.73 to 0.93. 40.8 % Bengali menopause women fell under 0.83, whereas rest of them fell over 0.83. Thus, most of them had the risk of CVD along with diabetics and other syndrome X.

Thus, from the above study, it could be concluded that the Bengali menopausal women of the present study had higher fat %. Most of them were obese and had higher risk of syndrome X.

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