Anthropometric measurements of obese Sudanese women Aged 40-50 years: Case study (Wed Medani) area

Nagah Abdelwahab Ahmed Mohamed
Biochemistry, Sudan University of science and technology, Faculty of Animal production Science and Technology
nagahelginay@hotmail.com

Abstract

This study was conducted to compare anthropometric measurements between obese and non-obese Sudanese women. A total of 200 apparently healthy adult Sudanese females aged 40-50 years were invited to participate in this study. Participants were classified into two groups, non-obese, and obese (BMI-C:< 25 and >30kg/m2) based on WHO,1997. At (P<0.05) the anthropometric measurements were greater in obese women compared to non-obese women. Means of body height, body weight, body mass index, waist circumference, abdomen circumference, buttock (hips) circumference, mid upper arm circumference and waist to hips ratio of non-obese and obese women were (162.39, 57.16, 21.82, 77.67, 87.16, 99.40, 28.49, 0.77 cm) and (160.70, 81.36, 31.98, 97.45, 102.47, 116.73, 36.30, 0.83 cm) respectively. Obese women appear to have abdominal visceral fat. As anthropometric measurements are ethnic specific, more studies are recommended.

Keywords: Obesity, Anthropometric measurements, Obesity, Women, Sudan.

Introduction

Obesity is a chronic disease conditioned by genetic, endocrine and environmental factors. Rapid body mass increments occur in young women who were overweight already in childhood. Another high risk group is constituted by women who reported considerable body mass increments during the first pregnancy. However, the application of oral contraception had no significant influence on the body mass increase (Ostrowska *et al.*, 2004).

Women had body mass index (BMI), overweight and abdominal obesity greater than men, and this could be explained by age, level of education, population group, ethnicity and area of residence (Puoane*, et al.,* 2002). Visceral obesity is closely linked to both insulin resistance and type 2 diabetes (Ko *et al.*, 1999; Ishikawa-Takata *et al.*, 2002; Nyholm *et al.*, 2004), hypertension (Ko *et al.*, 1999; Ishikawa-Takata *et al.*, 2002), and hypercholesterolemia (Ishikawa-Takata *et al.*, 2002). Baseline serum glucose, cholesterol, triglyceride, uric acid and blood pressure levels are usually higher in the upper body than is the case in peripheral obesity, and tend to decrease more in response to moderate weight loss (Pasanisi *et al.*, 2001).

Objective of the present study is to compare anthropometric measurements between obese and non-obese Sudanese women aged 40-50 years by measuring body weight, body height, abdomen circumference, mid upper arm circumference, waist circumference, hips circumference, and calculation of body max index and waist/hips ratio.

Material and methods

Study area

This study was conducted in Wad Medani town capital of Gezira state. It is located about two hundred kilometers Southern Khartoum on the Blue Nile river west bank. It is situated in the middle of the agricultural districts and represents the agricultural capital of Sudan.

Sampling

Cluster sampling technique-probability from local inhabitants was invited to participate in this study. A total of 200 apparently healthy adult female aged 40-50 years were the subject of this study. All participants were absence of medical illness as sub stained by medical history and physical examination. None had weight fluctuation more than 2kg during the last six months prior to testing and lived most of their lives in Sudan. The participants were classified into two groups, normal body weight and obese as indicated by body mass index categories (BMI-C: <25 and >30kg/m2), respectively based on (WHO,1997).

Data collection for this study was conducted during March-May 2011. For statistic analysis subjects with BMI>30 were defined as case and those with BMI<25 defined as control. All measurements and calculations were done by the researcher.

Anthropometric measurement

Body weight was weighed on an equilibrated portable balance scale (Seca,Germany) which was set to zero prior to each weighting to ensure accuracy. The weight was taken without shoes while wearing very light clothes. Weight was read to the nearest 100gm (Atwar *et al.*, 1979). Body height was measured without shoes using a tape measure fixed to the wall. The participant stands erect, so that the line of sight was horizontal and the heels and sub-scapula were aligning with the wall. The distant from the sole of the feet to the top of the head was measured and recorded to the nearest 0.1cm (Timothy, *et al.*, 1988).

Body circumference: Mid upper arm, Abdomen, Waist and buttock (hips)

Calculations are based on (WHO, 1997).

$$\text{Body mass index} = \frac{\text{Body weight in kg}}{(\text{Body height in meter})^2}$$

$$\text{Waist /hips ratio} = \frac{\text{Waist circumference in cm}}{\text{Hips circumference in cm}}$$

Table 1. Anthropometric measurements of 200 non- obese and obese Sudanese women

Variable	Mean±SD of non-obese women	Mean± SD of obese women	Significance
Body weight (kg)	57.16±8.18	81.36±15.22	*
Body height (cm)	162.39±8.14	160.70±7.34	Not significant
BMI	21.82±2.18	31.98±5.23	*
Waist circumference (cm)	77.67±10.20	97.45±11.26	*
Abdomen circumference(cm)	87.16±9.17	102.47±19.19	*
Hips circumference (cm)	99.40±8.99	116.73±11.35	*
Mid upper arm circumference(cm)	28.49±3.52	36.30±4.68	*
WHR	00.77±6.61	00.83±8.87	*

*: Significant at level 0.05; *:WHR: Waist hips ratio;
*:The figures in the table is means± standard deviation

Methodology

Two hundred women aged 40-50 years were invited to participate in this study. They were described as follows hundred obese women (case) and hundred non-obese women (control).

Data analysis

The data was analyzed by using Statistical Package for Social Sciences (SPSS), Windows version8x, 1997 SPSS, Inc, Chicago, IL, and USA. Independent t-test was used.

Results

The anthropometric measurements of two hundred Sudanese women

Two hundred Sudanese non- obese and obese women participated in this study, revealed significant differences for obese women at (p<0.05). Means of Body weight, body mass index, waist circumference, abdomen circumference, buttock (hips) circumference, mid upper arm circumference and waist to hips ratio of non -obese and obese women were (57.16, 21.82, 77.67, 87.16, 99.40, 28.49, 0.77 cm) and (81.36, 31.98, 97.45, 102.47, 116.73, 36.30, 0.83 cm) respectively, while, body height showed no significant among study participants with Mean (162.39 cm and162.39 cm) respectively (Table1).

Discussion

Comparing of the anthropometric measurements, of two hundred Sudanese non-obese and obese women participated in this study, revealed higher measurements (p<0.05) of all estimated anthropometric parameters, which, were expressed as body weight, body mass index, waist circumference, hips circumference, mid upper-arm circumference, abdomen circumference and waist hip ratio (WHR) among the obese women. These findings might be explained by the direct effect of obesity and the positive correlation of the anthropometric measurements with each other. These results were agreed with that obtained by Jia *et al.* (2003). WHO reported that, the body mass index (BMI), waist circumference (WC) and waist hips ratio (WHR) can be used in the prediction of abdominal visceral obesity, which are positively correlates with each anthropometric variable.

Waist circumference, hip circumference and waist hip ratio were greater in obese women compared to non-obese ones. These findings might be explained by the facts that: obese women trend to accumulate fat in the visceral region. Thus, increasing WC and WHR, making women more predispose to metabolic syndrome and its related complications. These findings were also similar to that obtained by Ascaso *et al.* (2003). WHO documented that the 'normal' waist circumference (WC) is defined as below 88 cm in women and below 102 cm in men; abdominal obesity 'AO' is defined as a WC equal to or above 88 cm in women and equal to or above 102 cm in men. Also these findings were agreed with that achieved by (Paccaud *et al.*, 2000; Ishikawa-Takata *et al.*, 2002; Jia *et al.*, 2003). WHO cited that among subjects with BMI≥28 kg/m2 or WC≥95 cm, 95% of men and 90% of women appear to have abdominal visceral obesity, either as WHR≥0.9 in men and WHR≥0.8 in women or as WC≥94 cm and WC≥80 cm, respectively. Nearly 61.7% of overweight/obese individuals and 14.2% of normal weight individuals had abdominal visceral obesity (VA≥00 cm). Also these similar finding was obtained by Blaak, (2001). WHO reported that the best cut-off points for assessing abdominal visceral obesity are as followed: body mass index (BMI) of 26 kg/m2, WC of 90 cm, and waist/ hips ratio (WHR) of 0.93, the WC being the most sensitive and specific factor.

Conclusion and recommendation

Obese women appear to have abdominal visceral fat, so consistent treatment is more important. As anthropometric measurements, are ethnic specific, so more studies is recommended.

References

1. Ascaso JF, Romero P, Real JT, Lorente RI, Martinez-Vall,s J and Carmena R (2003) Abdominal obesity, insulin resistance, and metabolic syndrome in a

southern European population. *Eur. J. Intern. Med.* Mar. 14(2), 101-106.

2. Atwar AE (1979) Biomechanics of over arm throwing movement and throwing injuries. *Exercise & Sport Sci. Rev.* 7, 43-85.

3. Blaak E (2001) Gender differences in fat metabolism. *Curr. Opin. Clin. Nutr. Metab. Care.* Nov. 4(6), 499-502.

4. Ishikawa-Takata K, Ohta T, Moritaki K, Gotou T and Inoue S (2002) Obesity,weight change and risks for hypertension, diabetes and hypercholesterolemia in Japanese men. *Eur. J. Clin. Nutr.* Jul. 56(7), 601-607.

5. Jia WP, Lu JX, Xiang KS, Bao YQ, Lu HJ and Chen L (2003) Prediction of abdominal obesity from body mass index, waist circumference and waist-hip ratio in Chinese adults. *Biomed. Environ. Sci.* Sep. 16(3), 206-211

6. Ko GT, Chan JC, Cockram CS and Woo J (1999) Prediction of hypertension, diabetes, dyslipidaemia or albuminuria using simple anthropometric indexes in Hong Kong Chinese. *Int. J. Obes. Relat. Metab. Disord.* Nov. 23(11), 1136-1142.

7. Nyholm B, Nielsen MF, Kristensen K, Nielsen S, Ostergard T, Pedersen SB, Christiansen T, Richelsen B, Jensen MD and Schmitz O (2004) Evidence of increased visceral obesity and reduced physical fitness in healthy insulin-resistant first-degree relatives of type 2 diabetic patients. *Eur. J. Endocrinol.* Feb.150(2), 207-214.

8. Ostrowska L, Lech MM and Karczewski J (2004) Identification of risk factors of obesity in premenopausal women. *Pol. Merkuriusz Lek.* Dec. 17(102), 603-607.

9. Paccaud F, Schluter-Fasmeyer V, Wietlisbach V and Bovet P (2000) Dyslipidemia and abdominal obesity: an assessment in three general populations. *J. Clin. Epidemiol.* Apr. 53(4), 393-400.

10. Pasanisi F, Contaldo F, de Simone G and Mancini M (2001) Benefits of sustained moderate weight loss in obesity. *Nutr. Metab. Cardiovasc Dis.* Dec.11(6), 401-406.

11. Puoane T, Steyn K, Bradshaw D, Laubscher R, Fourie J, Lambert V and Mbananga N (2002) Obesity in South Africa: the South African demographic and health survey. *Obes. Res.* Oct. 10(10), 1038-1048.

12. Timothy G, Alex F and RenaldoMartorell (1988) Anthropometric standardization reference Manual. 7.

13. World Health Organization (1997) Report of a WHO consultation on obesity. Preventing and managing the global epidemic, Geneva: WHO.