

## “Prevalence of metabolic syndrome among Sudanese women’s relatives.”

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### Abstract:

**Introduction:** A total of 200 apparently healthy adult Sudanese females aged 40-50 years were invited to participate in this study.

**Materials & Methods:** Participants were classified into two groups, non-obese, and obese (BMI-C:< 25 and >30kg/m<sup>2</sup>) based on WHO,1997. At (P<0.05) Diabetes mellitus, hypertension and obesity were recorded among obese women’s relatives more than non-obese ones. Chi test value were (0.030, 0.01, 0.00) respectively. While, cardiovascular diseases and sudden death, revealed no significant differences between participants relatives.

**Results& conclusion:** Chi test values were (0.08, 0.07) respectively. Obese women have greater relatives with metabolic syndrome. So this genetic factor should be taken in consideration during their life span and routine biochemical investigation should be introduced in order to control diseases silent stage. Prevention of obesity is also advisable.

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### Introduction:

Metabolic syndrome, or syndrome X or central metabolic syndrome (CMS) is identified now as the constellation of dyslipidemia ,elevated blood pressure, impaired glucose tolerance, and central obesity.(Deen, *et al.*, 2004, Parker, *et al.*, 2003).Estimations of metabolic syndrome revealed two latent factors, heritability of 42% and environmental factor of 16 %.(Koch, *et al.*, 2001). Visceral obesity is closely linked to both insulin resistance and type 2 diabetes..(Nyholm, *et al.*,2004).

Major risk factors for cardio vascular disease (CVD ) include hypertension and, after menopause, blood pressure increases in women. The

mechanism(s) responsible for this increase are not determined. Changes in oestrogen/androgen ratios, possible activation of the renin-angiotensin system, and increases in endothelin and oxidative stress, are hallmarks in postmenopausal women in addition to obesity.(Reckelhoff, 2004& Schulte, *et al.*, 2001).

To the best of our knowledge obese women have greater incident of lipids profile abnormalities. So o his study aims to compare the prevalence of metabolic syndrome between non-obese and obese Sudanese women relatives.

### 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.

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### **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/m<sup>2</sup>).Respectively based on (WHO,1997).

Data collection for this study was conducted during Oct-Dect 2011.For statistic analysis subjects with with BMI< 25 defined as control and those BMI>30 were defined as case .

### **Methodology**

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

### **Tool**

The study procedure consisted of collecting data by way of interview questionnaire,.

### **Data Analysis**

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

Percentage was calculated and Chi test was also used.

**Results:** As presented in tables (1,2) the prevalence of relatives with metabolic syndrome vary between non - obese women and obese ones .

The prevalence of relatives with diabetes mellitus for father, mother, brothers and sisters, fathers brothers and sisters, mothers brothers and sisters and total relatives with diabetes mellitus for hundred non-obese and hundred obese women was (11, 8, 5, 11, 17, 52),(18, 26, 29, 30, 26, 129) respectively.

Hypertension prevalence of non-obese and obese women, as showed by this study was (16, 16, 9, 14, 14, 63), (23, 30, 18, 23, 25, 119) for father, mother, brothers and sisters, fathers brothers and sisters, mothers brothers and sisters and total relatives with hypertension of the study participants.

Cardio vascular diseases (CVD) for father, mother, brothers and sisters, father's brothers and sisters, mothers brothers and sisters and total relatives of study subjects. (6, 0, 3, 4, 4, 17),( 10, 6, 6, 10, 8,40) for non-obese and obese women respectively.

Sudden death among relatives of study participants, non-obese and obese women, showed prevalence of (4, 1, 0, 3, 3, 11), (8, 5,3,4,3,23) for father, mother, brothers and sisters, father's brothers and sisters, mothers brothers and sisters and total relatives of study subjects whom have sudden death in their family.

Obesity among study participants non-obese and obese women, as exhibited by this study was (21, 34,24, 25,24, 128), (30, 56,31,20, 31,168) for father, mother, brothers and sisters, father's brothers and sisters, mothers brothers and sisters and total relatives of study subjects whom have obese individual in their families.

**Table 1. Prevalence of relatives with metabolic syndrome of 100 non-obese Sudanese women**

<b>Disease</b>	<b>Father</b>	<b>Mother</b>	<b>Brothers and sisters</b>	<b>Fathers brothers and sisters</b>	<b>Mothers brothers and sisters</b>	<b>Total</b>
Diabetes mellitus	11	8	5	11	17	52
Hypertension	16	21	9	14	14	63
CVD	6	0	3	4	4	17
Sudden death	4	1	0	3	3	11
Obesity	21	34	24	25	24	128

**Table 2 . Prevalence of relatives with metabolic syndrome of 100 obese Sudanese women**

<b>Disease</b>	<b>Father</b>	<b>Mother</b>	<b>Brothers and sisters</b>	<b>Fathers brothers and sisters</b>	<b>Mothers brothers and sisters</b>	<b>Total</b>
Diabetes mellitus	18	26	29	30	26	129
Hypertension	23	30	18	23	25	119
CVD	10	6	6	10	8	40
Sudden death	8	5	3	4	3	23
Obesity	30	56	31	20	31	168

At ( $P < 0.05$ ) Diabetes mellitus, hypertension and obesity were recorded among obese women's relatives more than non-obese ones. Chi test value were (0.030, 0.01, 0.00) respectively. While, cardiovascular diseases and sudden death revealed no significant differences between participants relatives. chi test value were (0.08, 0.07) respectively.

**Table 3. Chi test of relatives with metabolic syndrome among study participants relatives.**

Disease	Chi test	Significance
Diabetes mellitus	0.03	*
Hypertension	0.01	*
Obesity	0.00	*
Cardio vascular diseases	0.08	Not significant
Sudden death	0.07	Not significant

**Discussion:**

Diabetes mellitus was recorded among obese women relative's more than non-obese ones. These might be to genetic factors and visceral adiposity. These matters of direct observation are similar to those recorded by Nyholm, *et al.*, (2004) and Srinivasan, *et al.*, (2003) who noted visceral obesity is closely linked to both insulin r. The inheritance of an increased tendency to store fat in visceral fat depots may be a characteristic phenotypic feature in Familial Diabetic Relatives (FDR). Parental diabetes is an independent predictor of longitudinal changes in adiposity, glucose, insulin, insulin resistant in the offspring, regardless of

race and gender. As young adults, the offspring of diabetic parents had a higher prevalence of body mass index, waist, obesity, hyperinsulinemia indicative of insulin resistance hyperglycemia. Thus, the offspring of diabetic parents displayed excess body fatness beginning in childhood and accelerated progression of adverse risk profile characteristics of insulin resistance syndrome from childhood to young adulthood.

Hypertension was higher among relatives of obese participants, compared to non-obese women relatives. The participant's relatives female had more prevalence rate of hypertension than did male. This might be explained by

the fact that gender vary in their body fat distribution. The fact which agreed with that obtained by Puoane, *et al.*,(2002) who documented women had body mass index ,overweight and abdominal obesity greater than men. It also agreed with those noted by Bener, *et al.*, (2004)& Wolf, *et al.*, (1997)& Bani, and Anokute, (1994) who reported the elevated blood pressure is more prevalent in women than in men, especially in the older age groups. Hypertension is present in 38% of cases; it is slightly more common among females than males (52% vs 48%), respectively.

There was no significance difference between non-obese and obese women in having relatives with cardiovascular diseases (CVD). But obese relatives recorded higher rate of CVD than non-obese. These finding can be explained by the facts obtained by Voller, *et al.*, (2004) who said with regard to the fat distribution, it is concentrated on the trunk in the android form as compared to the hips in the gynecoid form. The android form is subject to a higher incidence of cardiovascular morbidity and mortality. The effects of generalized obesity on cardiovascular function are chiefly an increase of blood volume and an eccentric left ventricular hypertrophy. These findings support previous observations obtained by Chang, *et al.*, (2000)& Lin, *et al.*,(2004)& Reckelhoff, (2004)& Schulte, *et al.*, (2001) who accounted for major risk factors for CVD include hypertension and, after menopause, blood pressure increases in women .The

variation of total body fat percentage have no effect on any cardiovascular disease risk factors. Obesity serum uric acid levels were significantly higher in the male group than in female group. Hyperuricemic men with hypertension, would predict cardiovascular disease incidence synergistically with uric acid level.

There was no significance difference between non-obese, over weight and obese women in recording sudden death among their relatives in spite male in participants relatives reported more sudden death. These findings support previous observations documented by Dahlberg, (1990) & Tokashiki, *et al.*,(1999) & Folsom, *et al.*,(1993)& Jouven, *et al.*,(1999).& Mansur, *et al.* ,(2001) who attended to women have an incidence of sudden death lower than that of men the crude incidence rate is 0.51 in men and 0.23 in women. Risk of death is always higher for men of any age group. Body mass index, an index of relative weight, is associated with mortality rates are elevated in the leanest as well as in the most obese women. Parental sudden death is an independent risk factor for sudden death in middle- aged men. Obesity was highly distributed among obese women relatives compared to non- obese ones relatives. These might be to the strong effect of genetic factor. These results are similar to those documented by Hopfe, *et al.*, (2004)& Gonzalez-Ortiz,*et al.*,(1999) & Nyholm, *et al.*,(2004) who accounted for risks of overweight increases in subjects whose family members are overweight and obese. Family history in both first and second degree relatives on the maternal side increased both systolic blood pressure and serum uric acid level and triglycerides concentration in probands. ( IJBAMR) The ability of NSAIDs to down-regulate RAGE may be of importance.

**Conclusion:** The prevalence of metabolic syndrome is more predominant among obese individuals so the morbidity could be prevented with the adoption of a prudent diet, avoidance of overweight and engagement in moderate to vigorous physical activity for at least 0.5 h/d.

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