



**ORIGINAL RESEARCH PAPER**

**Medicine**

**IN INDIVIDUALS WITH METABOLIC SYNDROME"SUBCUTANEOUS ABDOMINAL FAT MEASUREMENT USING ULTRASONOGRAPHY**

**KEY WORDS:**

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**ABSTRACT**

Obesity is defined as an excessively high amount of body fat or adipose tissues in relation to lean body mass. It may be due to an abnormal growth of adipose tissues due to enlargement of fat cell size (hypertrophic) or an increase in fat cell number (hyperplastic.) or a combination of both (Park 2015)<sup>[1]</sup>. Hyperplastic obesity is usually seen in childhood and weight reduction is difficult in these cases (Pandsey S)<sup>[2]</sup> Abdominal Obesity increases the risk of chronic complications like hypertension, diabetes, dyslipidemia<sup>[3,7]</sup>

Numerous body composition assessment techniques are available and the more accurate technique include hydrostatic weighing, dual energy X-ray absorptiometry (DEXA), CT scan and MRI. But in truth, these are very expensive, lacks practicality and expose the patient to ionising radiation. Different anthropometric indices such as the waist circumference, waist-hip ratio have been used in routine daily practice to estimate the amount of abdominal adipose tissue while BMI measure the overall obesity

Although, these measures are simple and convenient for epidemiological studies and a feasible mean of identification of overweight and obese but it may not distinguishes between accumulation of subcutaneous abdominal fat and visceral fat.

In contrast to the disadvantages of CT, MRI, DEXA, anthropometry, abdominal USG is shown to be reliable, simple and low cost method without radiation risk and convenient for assessing the amount of abdominal subcutaneous fat.

Hence this study was conducted to identify the association of abdominal subcutaneous fat with component of metabolic syndrome like HTN type 2 DM and dyslipidemia.

**AIMS AND OBJECTIVES**

The aim of this study is to compare the association of ultrasound and waist circumference measurement of abdominal subcutaneous fat with components of metabolic syndrome.

**Objectives of the study are following:**

1. To measure subcutaneous abdominal fat by ultrasonography in individual metabolic syndrome.
2. To measure waist circumference and waist-hip ratio in same group of subject with metabolic syndrome.
3. To correlate abdominal subcutaneous fat measured by ultrasonography and anthropometry (waist circumference and waist-hip ratio)to the component of metabolic syndrome (HTN, type 2 DM, dyslipidemia)

**MATERIAL AND METHODS**

**Inclusion criteria of the study:-**

This present study was carried out in the department of gastroenterology bhu varanasi The subjects were recruited randomly from medical and Endocrinology speciality OPD . A total of 100 subjects were taken with metabolic syndrome GASTROENTEROLOGY BHU VARANASI

**Exclusion criteria of the study was :-**

- Patient with history of midcompartment abdominal surgery
- Patient with ascitis
- Patient with distorting abdominal anatomy
- Patients who refuses to be enrolled in this study
- Pregnancy

**METHODS**

**Anthropometric measurements :** Clinical examination; detailed history and relevant laboratory investigations were done for all selected patients as detailed in the performa. If the patients had any co-morbid medical condition it was recorded. Height, weight, body mass index, WHR were the anthropometric parameters assessed. Height and weight were measured using the standard procedure suggested by Jelliffe (1966). Measurements were taken in subjects without wearing shoes or heavy outdoor clothing.

**INVESTIGATIONS**

Biochemical test(lipid profile) was performed in department of pathology.

Patients with Serum Triglyceride level >150mg/dl and males with HDL <40 females with HDL <50 were included in metabolic syndrome

**DISCUSSION**

Central or abdominal obesity has been shown to be an important predictor for increased mortality and morbidity from diabetes and coronary heart disease(123)abdominal obesity is acomponent of metabolic syndrome It has not affect only physique but mental health also meldenson myer has studied the psychological aspects of obesity.

Several studies show good correlation between visceral fat and metabolic syndrome .it has been suggested that the amount of subcutaneous fat may be as important as visceral fat.

The present study was undertaken to compare the association of ultrasonography and waist circumference measurement of abdominal subcutaneous fat with other component of metabolic syndrome among patients attending. GASTROENTEROLOGY BHU VARANASI

In this study patients visiting hamidia hospital were taken with either symptomatic cardiovascular disease (cerebral ischaemia, coronary artery disease ,peripheral artery disease ,or abdominal aortic aneurysm) or a marked cardiovascular disease risk factors like hypertension ,diabetes dyslipidemia

In present study 100 adults were taken out of which 55%were male and 45% were female.

The overall proportion of males was more than the females in this study

In this study study population was stratified in to 10 years of age group <30 ,31-40,41-50,51-60,61-70 and >70age of the male and female ranged between 30 to 75 years.

A total of 1 (1%) subjects were in the age group of <30 years of age .

Age group 31-40 consist of 18 (18%) subjects. Age group 41-50 constitute highest no of population i.e.34 (34%) ,out of which 22 were males and 12 were females.

Age group 51-60 years consists of 29 (29%) individuals males were 19 and females were 10.

Age group 61-70 years consist of 14(14%) subjects with 5 female and 9 male.

Age group >70 years consists of 4 subjects(4%) out of which 3 were female and 1 was male.

In the present study, prevalence of overweight (BMI23-29.9) was 51% .37% patients were put in obese class 1(BMI 25-29.9) and 7 patients were found to be class 2 obese (BMI30.0-34.9) and 4 patients were included in the group of class 3 obese patient (BMI35.0 -39.9)

In this study the BMI (table no 10) was ranged between 22.08 - 43.2 in females and ranged between 23.43 - 40.90 in males .mean BMI of the study population was 30.07±4.04 females were comparatively more obese than males.

GUTIERREZ Fisac JL et al (2004) also observed higher mean BMI among women (29.3) than the male (28.2kg/m<sup>2</sup>) in a cross sectional study in 4009 elderly people in Spain which was similar to this study.

In present study waist hip ratio of the study population ranged between 0.83-1.33 with a mean 1.04±0.08.

WHR of females ranged between 0.83 -1.33 with a mean 1.01 ±0.10 males were comparatively having more WHR than females.

A higher WHR in females than male (0.935±0.055Vs 0.926±0.055)was observed by Zargar AH et al (2000). In that study females had more WHR than males which was against this study.

Ultrasound measurements were performed in 100 patients attending hamidia hospital .the mean subcutaneous fat in men was 1.56±0.62 and in female it was 1.67±0.67(table no 8).

Abdominal obesity is a component of metabolic syndrome. Clinically abdominal obesity is identified by an increase in waist circumference .

In our study abdominal obesity according to waist hip ratio ,was found in 98 individuals.

The study population were stratified into 5 groups according to their waist hip ratio(table no 5).

Total 6 patients were found with WHR ranged between 0.8-0.9 with mean subcutaneous fat 1.07 ±0.07.

21 patients were found with WHR ranged between 0.9-1.0 with mean subcutaneous fat 1.54±0.70.

70 patients were found with WHR ranged between 1.01-1.2 with mean subcutaneous fat 1.65±0.63.

3 patients were found with WHR >1.2 with mean subcutaneous fat 2.27±0.46

When study population was stratified in to 4 groups according to there waist circumference.waist circumference ranged between 81-90 constitute 8 no of cases with mean subcutaneous fat of 1.05±0.09cm.

Waist circumference 91-100 cm include 33 patients with mean subcutaneous fat 1.25±0.35.

Waist circumference ranged between 101-110 cm include total 42 patients with mean subcutaneous fat 1.67±0.52.

Waist circumference more than 110 include 17 patients with mean subcutaneous fat 2.43±0.67.

In this study it was observed that higher subcutaneous fat is

associated with higher waist circumference.

A similar observation have been reported by Janssen I, Haymsfield SB, Alison DB ,et al they found the waist circumference is a stronger predictor of abdominal SUBCUTANEOUS and visceral fat.

A SIMILAR OBSERVATION was also reported by Roopakala MS, Suresh A, Ashtalakshmi et al(2009) they found that Waist circumference showed a significant positive correlation with subcutaneous fat and visceral fat. Waist circumference was found to be the best predictor of intraabdominal fat thickness

The association between three anthropometric indices and subcutaneous fat with DM/HTN and Dyslipidemia

Defining obesity in relation to BMI (cut off value >25gm/m<sup>2</sup>) total 50 patients were labelled as obese

In present study BMI was not significantly related to any of component of metabolic syndrome.

Our findings are consistent with several other studies .

In a comparative study of anthropometric indices to predict mortality among adult.BMI was reported as poor predictor as compare to other.

### SUMMARY AND CONCLUSION

The present study was undertaken to correlate intraabdominal subcutaneous fat measured by ultrasonography and anthropometry with other components of metabolic syndrome among patients attending GASTROENTEROLOGY BHU VARANASI

100 patients with either symptomatic disease (CVA, CAD, peripheral arterial disease or a marked cardiovascular disease risk factors like HTN, dyslipidemia, or DM)were taken randomly from endocrinology OPDs.

Subcutaneous intra-abdominal fat was measured in these patient by using ultrasonography.

In the present study, most of the subjects(34%) belonged to the age group of 41-50 years. Age of the male and female ranged between 30 and 75 years .

In this study BMI ranged between 23.43 to 40.90 kg/m<sup>2</sup> in males and between 22.08 to 43.20 in females.

Out of which most of the patients(51%) were overweight(BMI 23-29.9), 37%were class 1 obese(BMI30-34.9) ,7 patients were class 2 obese(35-39.9) and 4% patients were class 3 obese (BMI >40).

In present study BMI was not significantly related to any of component of metabolic syndrome P value was statistically insignificant other studies also declare the superceding of other indices over BMI.

Two indicator were studied purposely to measure abdominal obesity –WHR and WC.

In our study male participants showed statistically significant correlation between waist circumference and hypertension but this association was not shown by the female participants(p value 0.045) waist hip ratio could not be associated significantly with any component of metabolic syndrome.

Several studies are also in favour of waist circumference as a stronger predictor for metabolic risk factors and cardiovascular disease as compare to WHR.

In present study according to statistical analysis subcutaneous fat was significantly associated with hypertension in male patients (p value 0.038) but this association was not found in female participants in conclusion waist circumference and subcutaneous fat appears as accommodative marker of obesity to detect

Hypertension in males. However as this study is hospital based, a community based cohort study with representative sample is required to identify a sensitive and contextual marker in Indian sub-continent which will enable us to intervene in pre pathogenesis phase and to detect at earliest the cardiovascular morbidity.

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