Original Research Article

Prevalence of Metabolic syndrome in abdominal obesity: A cross-sectional study

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Abstract

Background: Although the prevalence of abdominal obesity and metabolic syndrome has been widely studied by several researchers, little is known about it in with respect to population size as this study was a small inpatient study. **Objective:** The goal of this population-based, prospective and non-randomised cohort study was toestimate the prevalence of metabolic syndrome (hypertension, diabetes, lipid profile, Anthropometric profile, history and present history) in abdominal obesity. **Methods:**All the patients referred to the department of Medicine, Al-Ameen Medical college hospital and District Hospital, Vijayapur, Karnataka, India over a period of twenty-two months extending from December 2013 to September 2015 were considered in this study.Inclusion Criteria included patients with waist circumference > 89 cm in men and >80 cm in women (as per NCEP Adult Treatment Panel III - ATPIII). **Results:**In the current study, mean age of study participants (male:61% and female:39%) was around 51 yrs. Out of 61 male patients, 28 patients were below the age of 50 yrs. Whereas, out of 39 female patients admitted, 16 patients were below the age of 50 yrs. Positive family history of diabetes, hypertension, ischemic heart disease was observed in 17 female participants (43.6%) and 18 of male participants (29.5%) 48 (78.7%) of the male participants were smokers where as no females had history of smoking. The history of IHD was present in 12 females (30.8%) and 11 male (18%). Further, out of 61 male patients 45.9% males had total cholesterol > 200 mg/dl, 45.9% patients had HDL<40mg/dl, 59% patients had TGA>150 and 42.6% patients were on lipid lowering agents. Out of 39 female patients 48.7% had total cholesterol > 200 mg/dl, 20.5% patients had HDL<35mg/dl, 56.4% patients had TGA>150 and 20.5% patients were on lipid lowering agents. Out of 61 male patients 72.6% patients had BMI>25 and 42.1% male patients had BMI <25. 27.4% female patients had BMI >25 and 57.9% female patients had BMI <25. the prevalence of metabolic syndrome was 67 % in our study group. The prevalence of MS was found to be significantly less in lower age groups (particularly in 20-30 years). The sex wise prevalence of metabolic syndrome was males of 70% and 61.5% of females. **Conclusion:**Average prevalence of metabolic syndrome was 67% in our study group. Moderate age group (41 to 60 years) comprised 37% prevalence of metabolic syndrome. Waist circumference was found to be the better predictor of metabolic syndrome when compared to BMI. All the components defining the metabolic syndrome correlate positively with the abdominal obesity. Systolic blood pressure values were significantly higher than diastolic blood pressure in subjects with abdominal obesity.

Keywords: Abdominal obesity, Metabolic syndrome, Prevalence

Introduction

With the global rise in obesity, metabolic syndrome is becoming a global epidemic as well. It is estimated that 12–37% of the Asian population and 12–26% of the European population suffer from metabolic syndrome [1]. Individuals with metabolic syndrome have an increased risk of cardiovascular morbidity and mortality, as metabolic syndrome is known to be a strong risk factor for type 2 diabetes, cardiovascular diseases, and stroke [2].Metabolic syndrome is defined as a cluster of at least three out of five cardio-metabolic abnormalities which occur concomitantly. These abnormalities are abdominal obesity, hyperglycemia, hypertriglyceridemia, low HDL-cholesterol, and hypertension. It is unclear to what extent the contributing components differ between populations with a different ethnic background.Clinical diagnosis of the metabolic syndrome (either by NCEP-ATP III or IDF criteria) has been associated with an increased relative risk of CVD [3].Epidemiologists in India and international agencies such as the world health organization (WHO) have been sounding an alarm on the rapidly rising burden of CVD for the past 15 years. It is estimated that by 2020, CVD will be the largest cause of disability and death in India, with 2.6 million Indians predicted to die due to CVD [4].There is substantial evidence supporting the notion that too much abdominal fat is predictive of insulin resistance and of the presence of related metabolic abnormal-lities commonly referred to as the metabolic syndrome. Despite the fact that abdominal obesity is a highly prevalent feature of the metabolic syndrome, the mechanisms by which abdominal obesity is causally related to the metabolic syndrome are not fully understood [5]. In view of this the objective of the current study was to estimate the prevalence of metabolic syndrome (hypertension, diabetes, lipid profile, Anthropometric profile,history and present history) in abdominal obesity.

Material and Methods

This cross-sectional, population-based, retrospective and non-randomised cohort study was conducted in the department of

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Medicine, Al-Ameen Medical college hospital and District Hospital, Vijayapur, Karnataka, India over a period of twenty-two months extending from December 2013 to September 2015. Patients with abdominal obesity after informed consent were included in the study. All the participants were subjected for detailed medical history, clinical examination(weight, height, abdominal circumference) and investigations (lipid profile, FBS, PPBS,serum creatinine,Blood urea,ECG, USG abdomen). Inclusion Criteria included patients with waist circumference > 89 cm in men and >80 cm in women. (As per NCEP Adult Treatment Panel III - ATPIII). Exclusion criteria included causes of abdominal distention due to conditions other than obesity that include hypothyroidism, paralytic ileus, ascitis, pregnancy, intra-abdominal tumors, organo-megaly and cushings syndrome.The collected data was coded and entered in Microsoft excel wherein the data was represented as frequency, percentages, and graphs. Descriptive statistics were used to describe the study variables of the subjects. Quantitative data variables were represented by using mean and standard deviation and qualitative data variables were represented by using proportions and percentages.

Association between study risk factors and the prevalence of metabolic syndrome was tested using chi-square test. The P-values were corrected by the Bonferroni method and a P-value< 0.05 was regarded as statistically significant. Data was analyzed using Statistical Package for Social Sciences (SPSS) software (version, 16) for statistical analysis.

Results

This cross-sectional, population-based, retrospective and non-randomised cohort study was conducted in the department of Medicine,Al-Ameen Medical college hospital and District Hospital, Vijayapur, Karnataka, India over a period of twenty-two months extending from December 2013 to September 2015. In this study, a total of 100 patients with detailed medical history, clinical examination (weight, height, abdominal circumference) and investigations (lipid profile, fasting blood sugar (FBS), post-prandial blood sugar (PPBS), serum creatinine, blood urea, electrocardiogram, ultrasonogram of the abdomen) were studied. The following data makes an attempt to summarize the details of observations noted during the study.

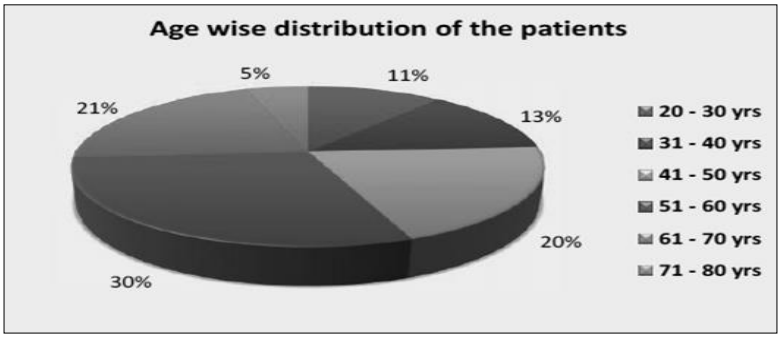

Fig 1: Age distribution of patient studied

In the current study, out of 100 patients , 44 patients were below the age of 50 yrs. 54patients were above 50 yrs. Youngest was 23 yr old And oldest was 80yrs. Mean age was ~51 yrs.

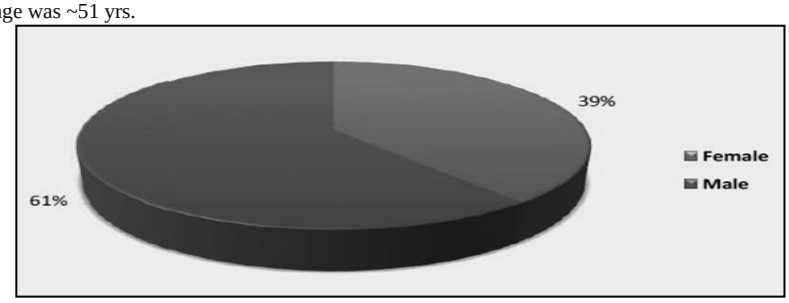

Fig 2: Sex wise distribution of the patients

In the study, out of 100 patients, 61% of the participants were male and 39% were female patients.

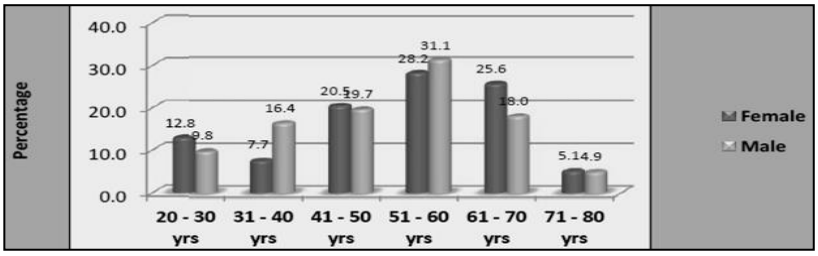

Fig 3: Age and sex wise distribution of the patients

In this study, out of 61 male patients, 28 patients were below the age of 50 yrs. The youngest patient was 23 yrs and the oldest patient was 80 yrs.The average age was ~51 yrs.In this study, out of 39 female patients admitted, 16 patients were below the age of 50 yrs. The youngest patient was 23 yrs. and the oldest patient was 74 yrs.The average age was ~53 yrs.

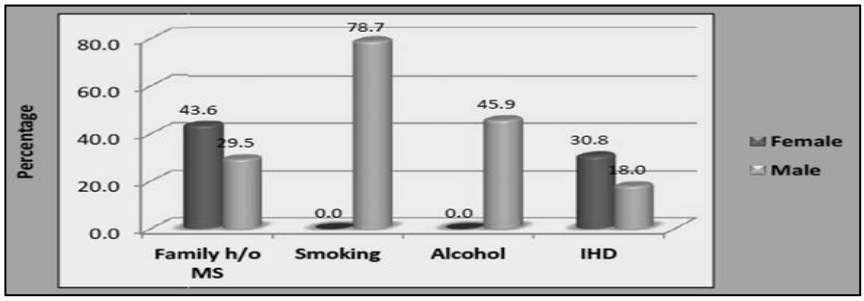

Fig 4: Distribution of patients based on family history and habits

In the present study, the distribution of patients based on family history and habits was carried out. The distribution of various risk factors was as follows. Positive family history of diabetes, hypertension, ischemic heart disease was observed in 17 female participants(43.6%) and 18 of male participants (29.5%) 48 (78.7%) of the male participants weresmokers where as no females had history of smoking. The alcohol history was present in 28(45.9%) subjects. No female subjects had history of alcohol. The history of IHD was present in 12 females (30.8%) and 11 male (18%).

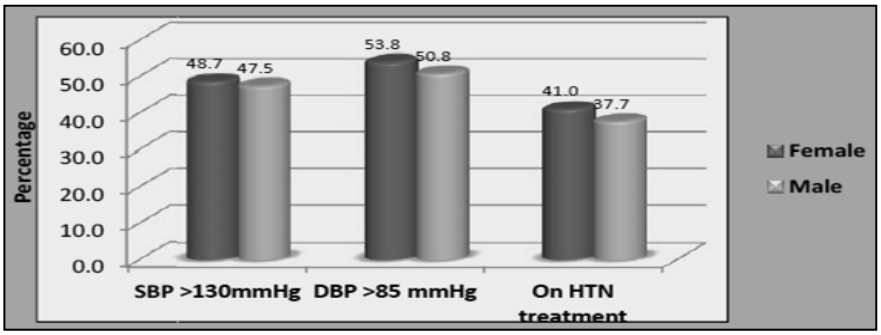

Fig 5:Distribution of patients based on profile of hypertension

In the present study, the distribution of patients based on profile of hypertension was undertaken. In this study, around 47.5% of male group and 48.7% of female group had systolic blood pressure more than 130 mm Hg. 50.8% of male and 53.8% of female had diastolic blood pressure more than 85mm Hg. 37.7% of males and 41% of females were on antihypertensive agents.

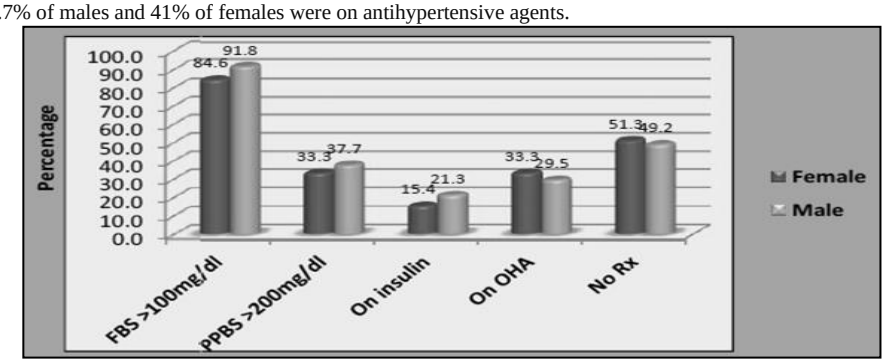

Fig 6: Distribution of patients based on diabetic profile

In the current study, the distribution of patients based on diabetic profile was carried out. The fasting blood sugar (FBS) of more than 100 mg% was observed in 56 male subjects (91%)and 33 female subjects (84%).In female study group 15.4% subjects with FBS > 100 mg were on treatment with insulin,33.3% on oral hypoglycemic agent, 51% patients were freshly detected and not on any treatment.In male study group 21.3% of subjects with FBS > 100 mg were on treatment with insulin,29.5% on oral hypoglycemic agent, 49.2% patients were freshly detected and not on any treatment.

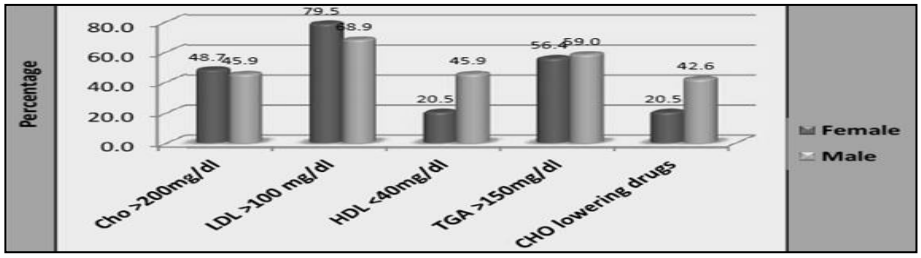

Fig 7: Distribution of patients based on lipid profile

In the current study, the distribution of patients based on lipid profile was also carried out. In the current study, out of 61 male patients 45.9% males had total cholesterol > 200 mg/dl,45.9% patients had HDL<40mg/dl, 59% patients had TGA>150 and 42.6% patients were on lipid lowering agents.Out of 39 female patients 48.7% had total cholesterol > 200 mg/dl, 20.5% patients had HDL<35mg/dl, 56.4% patients had TGA>150 and 20.5% patients were on lipid lowering agents.

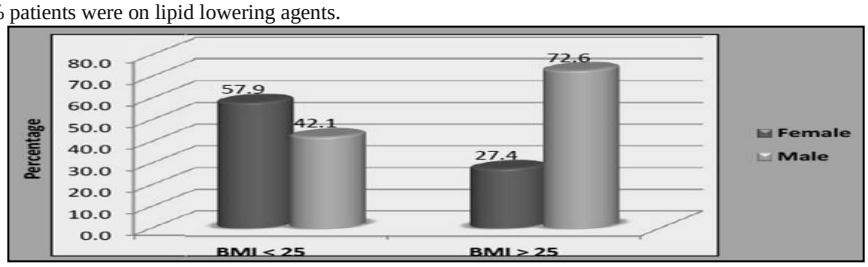

Fig 8: Distribution of patients based on Anthropometric profile

In the current study, the distribution of patients based on anthropometric profile was undertaken. Out of 61 male patients 72.6% patients had BMI >25 and 42.1% male patients had BMI <25. 27.4% female patients had BMI >25 and 57.9% female patients had BMI <25.

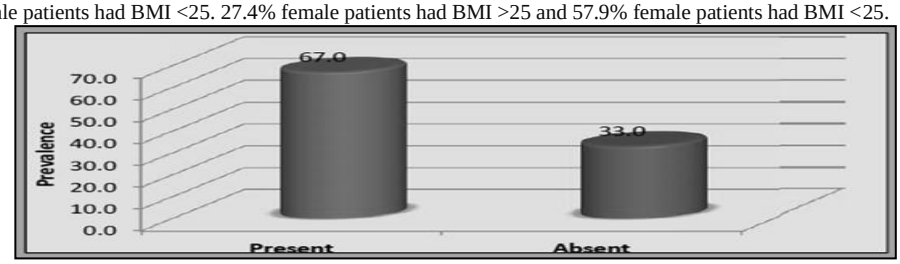

Fig 9: Prevalence of metabolic syndrome among the patients

In the current study, the prevalence of metabolic syndrome among the patient was identified. According to the observations of our study, the prevalence of metabolic syndrome was 67 % in our study group.

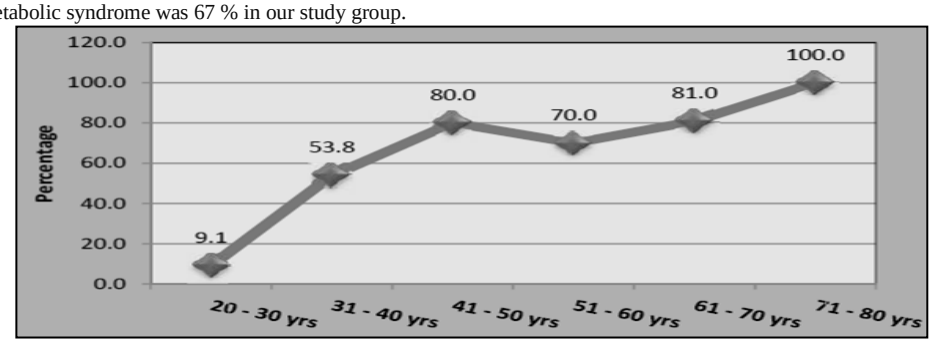

Fig 10: Age wise prevalence of metabolic syndrome

In the current study, age-wise prevalence of metabolic syndrome was identified.From the current study, it was noted that as the age increased the prevalence of metabolic syndrome increased.Further, this current study noted that the prevalence of MS was found to be significantly less in lower age groups (particularly in 20-30 years).

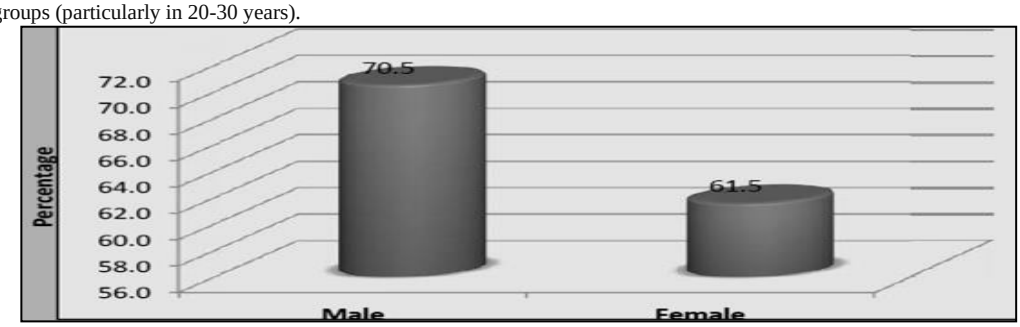

Fig 11: Sex wise prevalence of metabolic syndrome

In the current study, the sex wise prevalence of metabolic syndrome was detected. Among the study population, males 70% had MS, 61.5% of females had MS.

Discussion

There are various studies conducted regarding prevalence of metabolic syndrome in general population and the various risk factors [6-10].Our study was conducted to study the prevalence of metabolic syndrome among the subjects with abdominal obesity. Few Indian studies like Ramachnadran et al, Rajeev Gupta et al, G.P.Parale et aland western studies like Ford, Shaper et al and Shephard et al have studied prevalence of metabolic syndrome and other associated risk factors [11-16].The mean age of males in this study is 50.87±13.33yrs. This is comparable with the other studies

[17-20]. Age is an important independent factor more the age (>45yrs) greater the risk. Our findings of age-adjusted prevalence of metabolic syndrome are similar to studies conducted by Qin et alwhere increasing age had a linear association with MSand its risk factors [19].Different studies uses different criteria, in this analysis, we have used the ATP III criteria, with a modification to the value for waist circumference (WC) that is more applicable to the Asian Indian population. The waist circumference criteria followed in this study is comparable with A. Ramachandran et aland DongfengGuet al[11,21].In our study the percentage of subjects with impaired fasting sugars are high both in males and females compared to other studies because the subjects were inpatients, comparing other community based studies, and also total study population had one component of MS i.e., abdominal obesity.The percentage of high blood pressure is comparable SBP of males in our study group compared to other studies and marginally high DBP because all subjects had at least one component of metabolic syndrome and the sample size of our study is less comparing others [13].The characteristic dyslipidemia described is elevation of blood LDL levels with decrease in Hdl levels. However in the present study at least one lipid abnormality is present in > 90% of subjects. When our observation is compared with the various studies the total cholesterol and triglycerides level are significantly higher in the female subjects [13].

Conclusion

Average prevalence of metabolic syndrome was 67% in our study group. Moderate age group (41 to 60 years) comprised 37% prevalence of metabolic syndrome. Waist circumference was found to be the better predictor of metabolic syndrome when compared to BMI. All the components defining the metabolic syndrome correlate positively with the abdominal obesity. Systolic blood pressure values were significantly higher than diastolic blood pressure in subjects with abdominal obesity.

Acknowledgement

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