



GENDERWISE RELATIONSHIP BETWEEN DIFFERENT ANTHROPOMETRIC INDICATORS OF OBESITY AND CARDIOVASCULAR RISK FACTORS.

General Medicine

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ABSTRACT

Background: This study was undertaken to study the genderwise relationship between different anthropometric indicators of obesity and cardiovascular risk factors. **Methodology:** it was a cross sectional observational study conducted in the department of general medicine from January 2019 to December 2019 and a total of 150 patients were studied. **Results:** Out of 150 patients with CVD risk factors studied 50 patients were with hypertension, 50 were having type 2 DM and 50 were with dyslipidemia. BMI in females with dyslipidemia and WC in females with all three CVD risk factor (type 2 DM, HTN and dyslipidemia) proved to be a better predictor of cardiovascular risk as compared to other anthropometric indices.

KEYWORDS

obesity, anthropometry, cardiovascular risk factors

INTRODUCTION:

Due to the demographic transition and epidemiological transition too has taken place where non communicable diseases like obesity, hypertension, diabetes mellitus, coronary heart disease are on a rise while usual communicable diseases are decreasing. Obesity can be defined as abnormal or excessive fat accumulation that may impair health. (1)

In India, there are more overweight/obese (body mass index ≥ 25 kg/m²) women (6.6%) than men (3.5%). The percentage of women who are overweight or obese is highest in Punjab (30%), followed by Kerala (28%) and Delhi (26%), all of which are relatively richer states. The prevalence of overweight among men shows similar variations by age, education and wealth index. (2)

Approximately 177 million people worldwide are diabetic. This number is likely to double by 2030. India has been called "the diabetes capital of the world" and "every fifth diabetic in the world is an Indian". (3)

Hypertension (HTN) is directly responsible for 24% of all coronary heart disease (CHD) deaths in India. Asian Indians are known to have a unique pattern of dyslipidemia with lower HDL cholesterol, increased TGs levels and higher proportion of low density lipoprotein (LDL) cholesterol. Hypercholesterolemia was found in 13.9%, hypertriglyceridemia in 29.5%, low HDL in 72.3% and high LDL in 11.8% of the population. (4)

Hence this study was undertaken to study the genderwise distribution of risk factors among the anthropometric indices of obesity associated with the CVD risk factors.

Methodology:

It was a cross sectional observational study carried out in the department of general medicine at a tertiary care teaching hospital from January 2019 to December 2019 for a period of 1 year.

INCLUSION CRITERIA:

- Patients having age > 18 yrs, male or female.
- Patients having either of cardiovascular disease risk factors like hypertension or type 2 diabetes mellitus or dyslipidemia.

EXCLUSION CRITERIA

- Patients having age < 18 yrs.
- Patients having other chronic illness like Chronic Kidney Disease (CKD),

Chronic Obstructive Airway Disease (COPD), Ascites, Lump in the abdomen.

- Pregnant women.

- Patient having multiple CVD risk factors (Hypertension, type 2 Diabetes Mellitus and Dyslipidemia).

- Patients on weight-loss programme like diet or heavy exercise

- (Gymnasium).

- Patients on metformin and lipid lowering drugs.

- Patient unwilling to take part in above study.

- Patient not meeting above inclusion criteria.

By using simple random sampling method, total 150 patients taken for study. 50 patients each of hypertension, type 2 diabetes mellitus and dyslipidemia selected in each group of disease, 25 patients of either sex were taken.

Statistical analysis:

SPSS version 16 was used for analysis and P value less than 0.05 were considered as statistically significant.

Observation and results:

In the present study, Body mass index (BMI) (50.91%) and Waist circumference (WC) (74.42%) was found above cut-off value in more percentage in females. WHR were found above the cut off value in more percentage (54.72%) in males. WHtR were found above the cut off value in more percentage (55.56%) in males.

(table 1 comes here)

In the present study, mean age of male patients was 44.51 ± 4.73 and of females was 44.25 ± 3.99 . In males, the mean SBP was 131.39 ± 12.74 and mean DBP was 84.99 ± 5.72 while in females the mean SBP was 131.79 ± 10.62 and DBP was 84.88 ± 7.03 . The mean FBS was 125.23 ± 25.92 in males and 112.15 ± 12.43 in females. The mean PPBS were 209.56 ± 54.86 in males and 210.47 ± 40.05 in females. The mean HDL was 35.51 ± 4.13 in males and 38.71 ± 3.83 in females.

(table 2 comes here)

In the present study, for BMI, there was genderwise no statistically significant difference in patients with HTN, type 2 DM but in dyslipidemia patients, BMI was statistically significant more in females than in males. WC was statistically significant more in females than in males, in HTN, type 2 DM and dyslipidemia.

(table 3 comes here)

DISCUSSION:

In our study, anthropometric indices of obesity studied (BMI, WC, WHR, WHtR) were studied in equal proportion of males and females with respect to association with Hypertension, type 2 DM and hyperlipidemia which are cardiovascular risk factors.

Haun D et al (5) in their on 968 people found that the mean age was 45.34 ± 10.44 for males and 45.73 ± 11.64 for females. Cai Li et al (6) in their study on 5720 adults found that the mean age was 43.4 ± 414.4 for males and 44.30 ± 13.6 for females. The association between the anthropometric indices and CVD risk factors was stronger in people aged 18–44 years.

In present study, male and female constituted 50% of the total patients. There was no difference in terms of gender, in association of WHR and WHtR with CVD risk factors (HTN or type 2 DM or Dyslipidemia) in present study except for BMI in dyslipidemia and WC in all the three CVD risk factors, in which there was more significant association with females than males.

The present study clearly indicates that BMI in females with dyslipidemia and WC in females with all three CVD risk factor (type 2 DM, HTN and dyslipidemia) proved to be a better predictor of cardiovascular risk as compared to other anthropometric indices. One of the probable reasons could be that an increase in the amount of fat with age may be more pronounced in females as compared to males. (7)

In addition to ethnic differences, sedentary lifestyle in females of the region might be a contributing factor as also mentioned by Sarrafzadegan N et al (8)

Sex differences in metabolic syndrome prevalence are not universal; the differences within specific countries may also be due, for example, to differing socio-economic status, work related activities and cultural views on body fat. (9)

In the present study, in patients with hypertension, among the four anthropometric indices studied, WHtR was highly significantly correlated while WHR was non-significantly correlated with HTN. WC was significantly associated with HTN in females than males. In patients with type 2 DM, among the four anthropometric indices WC was significantly associated with type 2 DM in females than males.

Also, in patients with dyslipidemia we found that among the four anthropometric indices studied, all i.e. WHtR, WHR, WC and BMI were highly significantly correlated. BMI was significantly associated with dyslipidemia in females than males

Ashwell M et al (10) in their meta-analysis found WHtR to be significantly better than WC for diabetes, HTN, CVD and all outcomes ($p < 0.005$) in men and women and thus depicting the superiority of WHtR over WC and BMI for detecting cardio-metabolic risk factors in both sexes. Their study suggested that WHtR should therefore be considered as a screening tool.

Genderwise in the present study, BMI in dyslipidemia and WC in HTN, type 2 DM, dyslipidemia were more significantly correlated in females than males.

In contrast to the present study, Bener A et al (11) in a cross sectional study concluded that WC at cut off 99.5cm in men and 91 cm in women was the best predictor of metabolic syndrome.

In a meta-analysis, WHtR was found to be significantly better than WC for diabetes, hypertension, CVD and all outcomes in men and women. (12)

Thus, WHtR may be the best simple anthropometric index for predicting a wide range of cardio-metabolic risk factors associated with central obesity. (10) Also, WHtR can be served as a standard screening tool for better comparisons of epidemiological data between different studies. (12)

CONCLUSION:

BMI in females with dyslipidemia and WC in females with all three CVD risk factor (type 2 DM, HTN and dyslipidemia) proved to be a better predictor of cardiovascular risk as compared to other anthropometric indices.

Tables and figures:

TABLE 1 showing gender wise distribution of anthropometric indices of obesity (>cut off value)

Sex	BMI	WC	WHR	WHtR
Male	27 (49.09%)	22 (25.58%)	29 (54.72%)	25 (55.56%)
Female	24 (50.91%)	64 (74.42%)	24 (45.38%)	20 (44.44%)
Total	55	86	53	45

Table 2 showing baseline characteristics of the study:

Baseline characteristics	Male	Female
Age (yrs)	44.51 ± 4.73	44.25 ± 3.99
SBP (mm of Hg)	131.39 ± 12.74	131.79 ± 10.62
DBP (mm of Hg)	84.99 ± 5.72	84.88 ± 7.03
FBS (mg/dl)	125.23 ± 25.92	112.15 ± 12.43
PPBS (mg/dl)	209.56 ± 54.86	210.47 ± 40.05
Total cholesterol (mg/dl)	195.31 ± 26.10	185.45 ± 8.93
Triglycerides (mg/dl)	142.48 ± 17.76	134.89 ± 6.49
LDL (mg/dl)	94.51 ± 10.76	134.89 ± 6.49
HDL (mg/dl)	35.51 ± 10.76	85.15 ± 6.81
BMI	27.99 ± 1.89	28.04 ± 1.94
WC (cm)	84.27 ± 5.26	82.49 ± 3.86
WHR	0.91 ± 0.04	0.87 ± 0.06
WHtR	0.51 ± 0.03	0.51 ± 0.03

Table 3 shows gender-wise association of anthropometric indices with CVD risk factors.

Anthropo metric index	Sex	HTN	P value	Type 2 DM	P value	Dyslipidemia	P value
BMI (>cut off value)	M F	50% 50%	1.00 NS	56.25% 43.75%	0.544 (NS)	37.93% 62.07%	0.045 (S)
WC (>cut off value)	M F	37.14% 62.86%	0.005 HS	33.33% 66.67%	<0.001 HS	41.46% 58.54%	0.023 (S)
WHR (>cut off value)	M F	50% 50%	1.00 NS	54.17% 45.83%	0.571 NS	50% 50%	1.00 NS
WHtR (>cut off value)	M F	62.50% 37.50%	0.089 NS	60% 40%	0.157 NS	54.29% 45.71%	0.355 NS

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