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CROSS SECTIONAL STUDY ON CORRELATION OF WAIST TO HEIGHT RATIO WITH DYSLIPIDAEMIA

General Medicine

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ABSTRACT

Introduction: Cardiovascular diseases are the major problem in today's world. Dyslipidemia is one of the major cardiovascular risk factor. Atherosclerosis is a progressive condition marked by the build-up of lipids and fibrous materials in the major arteries. Initial atherosclerotic lesions involve the accumulation of cholesterol-filled macrophages, known as "foam cells," in the subendothelial layer. In humans, these early "fatty streak" lesions often manifest in the aorta during childhood, in the coronary arteries during adolescence, and in the cerebral arteries during adulthood. Variations in blood flow dynamics contribute to the preferred sites of lesion formation within the arteries. Insulin resistance impacts lipoprotein lipase (LPL) activity, impairing the clearance of VLDL-C. Consequently, hypertriglyceridemia leads to the formation of small dense LDL cholesterol (sdLDL-C), which is highly atherogenic, despite only mild increases in total LDL-C levels. Furthermore, contributes to decreased quality and quantity of high-density lipoprotein cholesterol (HDL-C). Cholesteryl ester transfer protein plays a crucial role in enriching LDL-C and HDL-C with triglycerides (TG), promoting their breakdown by hepatic lipase. This process results in elevated levels of sdLDL-C and decreased levels of HDL-C and apolipoprotein A-I. The sdLDL-C particles are particularly atherogenic due to their smaller size, which facilitates penetration into vessel walls, reduced affinity for the LDL-C receptor, prolonged half-life, and heightened susceptibility to oxidation. So, this study to use Waist to Height ratio as a parameter in identifying dyslipidaemia. **Aims & Objectives:** To correlate Waist/Height ratio with dyslipidaemia. Methodology: This was a cross sectional study was carried out with 130 individuals in Navodaya Medical College Hospital and Research Centre, Raichur ,in the department of General Medicine for a duration of 12 months. **Results:** Out of 130 patients, The waist height ratio was high in 74 patients (56.9%).This, was also found to be having statistically significant association with dyslipidemia. **Conclusion:** In our study, we found the Waist height ratio has significant association with dyslipidemia. With higher waist height ratio patients were found to be have dyslipidemia compared to lower waist height ratio. Hence, our study concludes waist height ratio is the simple and better indicator of dyslipidemia which is a cardiometabolic risk factor.

KEYWORDS

Dyslipidaemia, cardiometabolic risk factor, Waist /Height ratio.

INTRODUCTION

Obesity is associated with an adverse cardiovascular risk profile and consequently with excess cardiovascular morbidity and mortality.[1,2] The prevalence of obesity has in- creased dramatically in industrialized and developing countries.[3,4] The world Health Organization (WHO) has recently defined obesity as a disease.[5]

Abdominal or central adiposity is considered the most important determinant of cardiovascular disease (CVD) and type 2 diabetes mellitus (DM) .[6,7]

Intra-abdominal deposition of adipose tissue is major contributor to the development of hypertension ,insulin resistance ,diabetes and dyslipidemia. waist to height ratio is being accepted as best anthropometric indicator of abdominal adiposity and metabolic risk.8-10

Waist-To-Height Ratio:

Dr Margaret Ashwell introduced the concept of waist-to-height ratio, suggesting that physicians should view it as a singular screening marker for cardiometabolic risk and dyslipidaemia. She even recommended a specific cut off value of WHtR=0.538 as a tool for assessing cardiometabolic risk.[13]

The WHtR is obtained by dividing waist circumference by an individual's height. It offers a simple reporting method and is not influenced by common factors such as age, gender, or ethnicity, making it a convenient tool that doesn't require the use of scales. Simplifying health risk communication could be significantly easier if the same anthropometric index and public health message could be universally applied across different regions. The straightforward message being: Maintain a waist circumference that is less than half of your height.[14]

MATERIALS AND METHODS

Studydesign:

Hospital based cross-sectional study.

Source Of Data: The material of study will be collected from patients The patients consulting the department of General Medicine of Navodaya Medical College Hospital and Research Centre, considering the inclusion and exclusion criteria for the duration of 12 months.

Inclusion Criteria

1) The study subjects should be aged more than or equal to 40 years.

Exclusion Criteria:

1) Patients aged less than 40 years
2) Excluding some patients because they produced falsely elevated anthropometric parameter, waist circumference and weight due to ascites and volume overload. They were:

- Chronic renal failure
- Cirrhosis of liver
- Nephrotic syndrome
- Pregnant women

Sample Size Of Estimation

Sample size was calculated based on the formula,

$$n = \frac{\{Za/2 + Z\beta\} + 3}{cr}$$

Za/2 = 1.96 standard normal variate at 95% confidence level
Zß = 0.84 power of test 80%
r = 0.529
cr = ½ log (1+0.529/1-0.529) = 0.2557
n = (1.96+ 0.84/ 0.2557)2 + 3 = 122.909 = 123
By substituting the values in the above formula, the sample size was calculated n = 123. (Considering the non-response rate the sample size was rounded off to 130) So, finally the sample size was estimated to be 130.

Sampling Method :

The 130 patients were selected for our study after they fulfilled the inclusion criteria and exclusion criteria based on simple random sampling technique.

Statistical Analysis:
The data collected from the patients were coded and entered into MS Excel sheet and master chart was prepared. The data was presented as rates, ratios and proportions. The data were presented in pie charts, bar diagram and associations were presented with line diagram. The association between the desired variables were established using chi-square test, t-test and ANOVA test. The association was considered statistically significant if the p value was found to be less than 0.05. EPI info software was used for the statistical analysis.

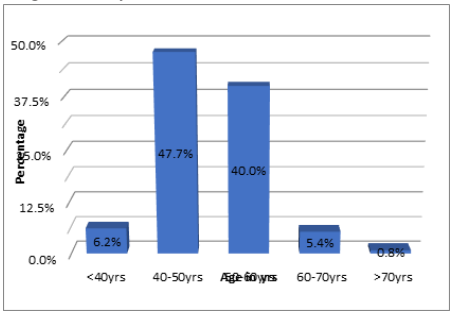
RESULTS:

Table 1. Distribution Of Study Subjects Based On Age

Age	Frequency	Percentage
≤40yrs	8	6.2%
40-50yrs	62	47.7%
50-60yrs	52	40%
60-70yrs	7	5.4%
>70yrs	1	0.8%
Total	130	100%

Majority of the patients belonged to the age group of 40-50yrs (62, 47.7%), followed by 50-60yrs (52,40%), ≤40yrs (8,6.2%), 60-70yrs (7,5.4%) and >70yrs (1, 0.8%) respectively.

The Mean age is 50.49yrs ± 8.05

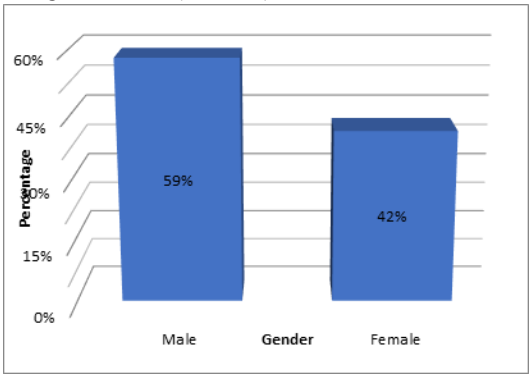


Graph 1. Distribution of study subjects based on Age

Table 2. Distribution Of Study Subjects Based On Gender

Gender	Frequency	Percentage
Male	76	58.5%
Female	54	41.5%
Total	130	100%

Among 130 patients, majority of were males (76,58.5%) and remaining were females (54,41.5%).

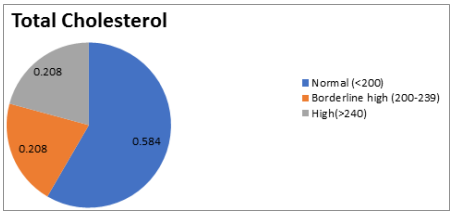


Graph 2. Distribution of study subjects based on Gender

Table 3. Distribution Of Study Subjects Based On Total Cholesterol

Total Cholesterol	Frequency	Percentage
Normal (<200)	76	58.5%
Borderline high (200-239)	27	20.8%
High(>240)	27	20.8%
Total	130	100%

Among 130 patients, majority of the patients with normal Total Cholesterol (76,58.5%) , followed by borderline high (27, 20.8%) and remaining 27 patients (20.8%) presented with high T.Cholesterol respectively. The Mean T.Cholesterol is 197.60±44.88



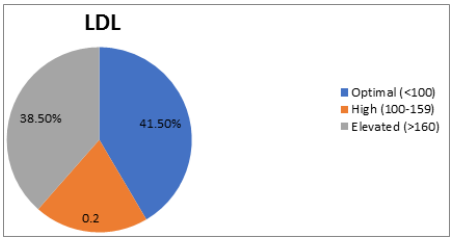
Graph 3. Distribution of study subjects based on Total Cholesterol

Table 4. Distribution of study subjects based on LDL

LDL	Frequency	Percentage
Optimal (<100)	54	41.5%
High (100-159)	26	20%
Elevated (>160)	50	38.5%
Total	130	100%

Among 130 patients, majority of the patients presented with optimal LDL level (54, 41.5%), followed by 50 patients (38.5%) and remaining 26 patients presented with high LDL level (26,20%) respectively.

The Mean LDL is 114.26±35.97.

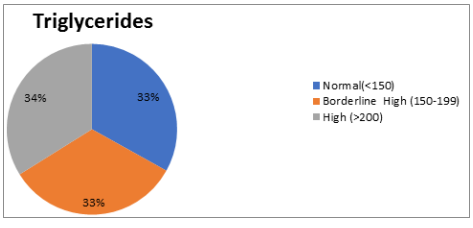


Graph 4. Distribution of study subjects based on LDL

Table 5. Distribution Of Study Subjects Based On Triglycerides

Triglyceride	Frequency	Percentage
Normal(<150)	43	33.1%
Borderline High (150-199)	43	33.1%
High (>200)	44	33.9%
Total	130	100%

Among 130 patients, majority of the patients presented with high level triglycerides (44, 33.9%), followed by borderline high and normal in 43 patients (33.1%) each respectively. The Mean Triglycerides is 180.54±68.88



Graph 5. Distribution of study subjects based on Triglycerides

Table 6. Association Of Waist Height Ratio With Respect To Dyslipidaemia

Waist height ratio	Dyslipidemia		Total	P value
	Present	Absent		
Normal(<0.5)	45 (80.4%)	11 (19.6%)	56 (100%)	0.033*
High(≥0.5)	69 (93.2%)	5 (6.8%)	74 (100%)	
Total	114 (87.7%)	16 (12.3%)	130 (88.8%)	

*- Significant

Majority of the patients (69, 93.2%) with the high waist height ratio presented with Dyslipidaemia than compared to the normal waist height ratio. Hence, this was found be statistically significant association (p=0.033).

DISCUSSION

Dyslipidemia: Fasting serum values of total cholesterol, triglycerides, and HDL are measured in our study. Asians have a high triglyceride, high LDL, and low HDL lipid pattern. The average levels of total cholesterol in our study are 197.60 mg/dl± 44.88, triglycerides are 156 mg/dl ± 180.54± 68.88, and low-density lipoproteins are 114.26

mg/dl± 35.97. The same distribution of lipids among Asians is also shown by our study [11]. In his study group, Shiun Dong Hsieh et al. (2005) [12] also discovered the similar dyslipidemia pattern. Similar findings to the current study were found in the Prasadar Y et al study [13], where the mean total cholesterol was 137.69±84.32, the mean triglyceride level was 185.51±38.02, and the mean LDL was 102.08±25.

CONCLUSION

In our study, we found the Waist height ratio has significant association with dyslipidemia**.** With higher waist height ratio patients were found to be have dyslipidemia compared to lower waist height ratio. Hence, our study concludes waist height ratio is the simple and better indicator of dyslipidemia which is a cardiometabolic risk factor.

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