

Body Mass Index and Waist to Height Ratio as an Indicator of Obesity in Gallstone Disease: Our 1 year experience

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Abstract

Original Research Article

Background: Obesity is an established risk factor for gallstones. Body mass index (BMI) is a calculation index of general obesity. Waist circumference (WC) is a measure of body fat distribution and always used to estimate abdominal obesity. Using one single measure of obesity could not estimate persons at risk for Gallstone disease precisely. **Aims:** To Study if there any change in trend of relationship between body mass index/ waist-to height ratio in cholelithiasis patients. **Objectives:** To associate BMI and waist to height ratio with cholelithiasis. **Materials and Methods:** **Type of study:** Descriptive study. **Sample size:** 90 consenting patients diagnosed to have gallstone disease. **Place of study:** Department of General Surgery KIMS Hospital Bengaluru. **Results:** In the present descriptive study, 90 cases diagnosed with gallstone disease were selected by purposive sampling technique. They were between the ages of 21-80 years. Out of the ninety cases, thirty were males (33%) and sixty were females (67%). The female to male ratio was 2:1 Maximum number of cases were seen in the 31-40 and 41-50 year age groups that is forty four cases (48%). With peak incidence in 3rd decade. Body mass index was above normal in fifty nine patients (66%). Waist to height ratio was found to be above normal in sixty one patients (68%). suggestive of strong association with obesity. **Conclusion:** From the present descriptive study conducted at Department of General Surgery, KIMS Hospital Bengaluru is concluded that obesity has a strong association with gall stone disease, the main indicators of obesity being body mass index and waist to height ratio. The dictum of gall stone disease stating, the disease being more common in a "fertile fatty female of forties" is still valid. **Keywords:** Cholelithiasis and BMI, Waist circumference (WC).

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INTRODUCTION

Gallstone disease (cholelithiasis) is one of the most prevalent gastrointestinal diseases, with a substantial burden to health care systems. Gallstones may form because of many different disorders. Gallstone disease a chronic recurrent hepatobiliary disease, the basis for which is the impaired metabolism of cholesterol, bilirubin and bile acids, which is characterized by the formation of gallstones in the bile duct or gallbladder [2]. Gallstone disease has been increasing off late in the Indian population. It is most commonly seen in the 3rd-4th decade of life and is more common in females. The etiology of gallstone disease is multifactorial [2, 3]. Hypercholesterolemia is a common finding in adults and pure cholesterol gallstones are more common as compared to other types of gallstones. The prevalence of cholesterol gallstones is increased in obese persons. The risk is especially high in those with the highest body mass index. The

increased prevalence of stones is mostly due to supersaturation of bile with cholesterol, because of an increased synthesis by the liver and secretion into bile [4].

Several studies have shown that advancing age, female gender and ethnicity are risk factors for gallstone disease which cannot be modified [11]. Also, previous studies have proven that obesity is closely related to GSD, although the evidence is not consistent [9]. Body mass index (BMI; in Kg/m²) is a calculation index of general obesity which is frequently analyzed in the studies that concerned the relation between obesity and GSD [12, 13]. However, growing evidence of comparison studies suggested that abdominal obesity was a more important risk factor for stones formation than general obesity. Waist circumference (WC; in cm) is a measure of body-fat distribution and always used to estimate abdominal obesity. Furthermore, a former study has already demonstrated that WC is positively

correlated with height, waist-to-height ratio (WHtR) may be a better measure for abdominal obesity [9].

Using one single measure of obesity could not estimate persons at risk for GSD precisely. It is highly doubted whether different combinations of measures for obesity have better predictive values than a single measure. Therefore, this study aimed to compare the predictive values of various combination of measures for obesity (BMI, WC, WHtR) for new-onset gallstone disease.

MATERIALS AND METHODS

Type of study: Descriptive study.

Sample size: 90 consenting patients diagnosed to have gallstone disease.

Place of study: Department of General Surgery KIMS Hospital Bengaluru.

Method of collection of data: A sample size of 90 consenting patients diagnosed to have gallstone disease coming to KIMS Hospital Bengaluru selected based on inclusion and exclusion criteria.

Inclusion Criteria

Patients above 18 years of age group diagnosed to have Gallstone disease seen on OPD basis or admitted in KIMS Hospital Bengaluru.

Exclusion Criteria

1. Patients less than 18 years of age.
2. Acalculous cholecystitis.
3. Patient not willing to participate in study.

Body Mass Index = Weight (in kg) / Height (in m²)

Waist to Height Ratio = Waist circumference (in cm) / Height (in cm)

Waist circumference is measured midway between lowest rib and the iliac crest in position of expiration.

Normal reference values:

BMI: 18.5 - 25 kg/m²

WHtR: 0.49-0.54

RESULTS

Table-1: Gender distribution of cases

GENDER	NO. OF CASES	PERCENTAGE
MALE	30	33
FEMALE	60	67
TOTAL	90	100

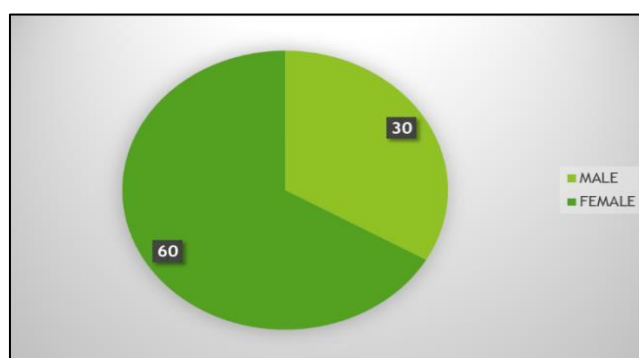


Fig-1: Gender distribution of cases

Table-2: Age group and sex wise distribution of study population

AGE GROUP	MALE	FEMALE	TOTAL
<20	0	0	0
21-30	2	8	10
31-40	4	20	24
41-50	11	9	20
51-60	8	10	18
61-70	2	12	14
71-80	3	1	4
TOTAL	30	60	90

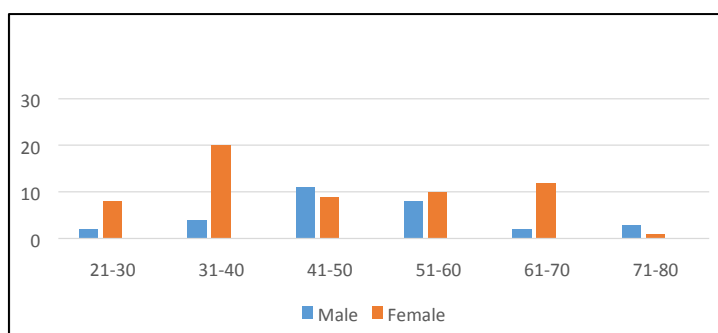


Fig-2: Age group and sex wise distribution of study population

Table-3: Age group wise distribution of cases

AGE GROUP	NO. OF CASES	PERCENTAGE
<20	0	0
21-30	10	10.9
31-40	24	26.3
41-50	20	21.9
51-60	18	19.7
61-70	14	16.4
71-80	4	0.04
TOTAL	90	100

Table-4: Distribution of study subject as per Body Mass Index

BMI	NO. OF CASES	PERCENTAGE
<18.5	0	0
18.5-25	31	34
>25	59	66
TOTAL	90	100

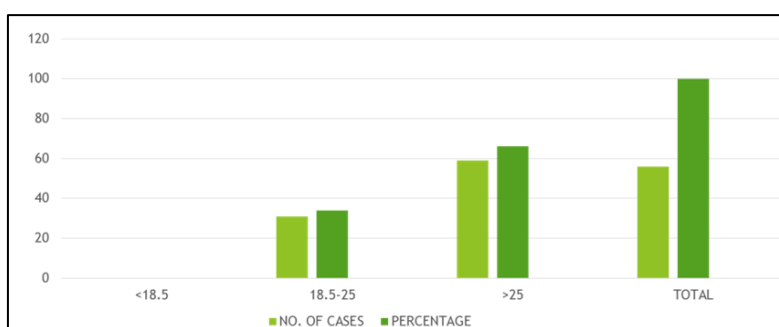


Fig-3: Distribution of study subject as per Body Mass Index

Table-5: Distribution of study subjects as per waist to height ratio

WAIST TO HEIGHT RATIO	NO. OF CASES	PERCENTAGE
<0.54	29	32
>0.54	61	68
TOTAL	90	100

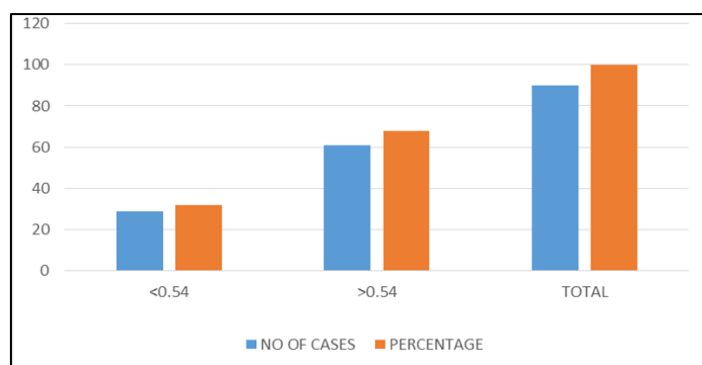


Fig-4: Distribution of study subjects as per waist to height ratio

DISCUSSION

In the present descriptive study conducted at the Department of General Surgery, KIMS Hospital Bengaluru, 90 cases diagnosed with gallstone disease were selected by purposive sampling technique. They were between the ages of 21-80 years. Out of the ninety cases, thirty were males (33%) and sixty were females (67%). Similar observations were noted by Ganey et al [1, 7], Major Alok Sharma et al [1,8] The female to male ratio was 2:1 with Maximum number of cases were seen in the 31-40 and 41-50 year age groups that is forty four cases (48%). With peak incidence in 3rd decade. These findings are correlated with other studies [1, 5, 6]. Body mass index was above normal in fifty nine patients (66%). similar observations were noted by Tsai CJ, Leitzmann MF et al [9], Harpreet Singh, D G Mote et al [1]. Waist to height ratio was found to be above normal in sixty one patients (68%). similar observations were noted by Liu Tet al [10] suggestive of strong association with obesity.

CONCLUSION

From the present descriptive study conducted at Department of General Surgery, KIMS Hospital Bengaluru is concluded that obesity has a strong association with gall stone disease, the main indicators of obesity being body mass index and waist to height ratio. We also conclude that waist to height ratio is a better parameter of obesity than body mass index. The dictum of gall stone disease stating that disease being more common in a "fertile fatty female of forties" is still valid.

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