Research Article

SOCIODEMOGRAPHIC PROFILE OF GALL STONE DISEASE IN AND AROUND MYSORE DISTRICT

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ARTICLE INFO	ABSTRACT
	Introduction:-Gallstone disease once more common in western world, is increasing considerably in India, possibly due to change in dietary habits and lifestyle modifications. Since not many extensive studies done in southern Karnataka population, the present study is aimed at quantifying the socio-demographic and lifestyle risk factors for gall stones among people residing in and around Mysore District. **Methods**:- The cross sectional study including 60 patients of sonographically confirmed cholelithiasis were selected for the study. Complete epidemiological and dietary data were collected with the help of questionnaire. **Results**:- Out of 60 gall stone patients, 20 were males (48.3%) and 31 were females(51.7%). 65% of the patients were hypertensive, 65% were non diabetic and 68% patients with normal BMI were mainly affected. Non-vegetarian diet, cereals like ragi, cow's milk, tea consumption and ground water usage were more in the study subjects. Majority of the patients were from rural areas with low socioeconomic status and low literacy rates. **Conclusion**:- Rural dwellers from low socioeconomic strata and illiteracy further adds fuel to the fire by decreasing the contact with the health professionals. Assessment of the characteristics are very important because considering the great socio-economic burden, an intervention strategy in the form of mass media campaign as well as small group discussions in such rural areas can be formulated and applied to high risk populations to reduce the burden and complications of gallstone disease.

INTRODUCTION

Once considered a disease of the western world, cholelithiasis has increasingly become a major cause of abdominal morbidity, leading to hospital admission in the developing world (Shaffer 2006, khuroo *et al.*, 1989). The prevalence in India is 2-29% and has increased in the recent years (Arpit Bansal *et al.*, 2014). Gallstone disease is 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 hepatic bile duct, common bile duct, or gallbladder. Gallstone disease, like cardiovascular disease, common disease worldwide, has considerable economical impact. A well-known mnemonic for the risk factors associated with gallstones is female, fat, fertile and fourty; which has been proven by various studies. Previously described risk factors include age, female gender, obesity, high cholesterol intake, decreased fibre intake, smoking, high parity, a family history of gallstones and decreased physical activity. The pathogenesis of gallstones is multifactorial. However several risk factors cannot be extrapolated to the south Indian population whose race, culture, ethnicity and diet patterns are different from north Indian and western patients. The increasing magnitude and epidemiological shift in the natural history of gall stone disease in India, there is a need for research in different geographical areas and also to explore the predictor variables. Therefore the present study is aimed at quantifying the socio-demographic and lifestyle risk factors for gall stones among people residing in and around Mysore District.

MATERIALS AND METHODS

This was a cross sectional study conducted at JSS hospital, a tertiary care hospital at Mysore district, Karnataka between January 2016 till September 2016. Totally 60 patients aged between 20 – 70 years of both genders were included in the study. All the patients were diagnosed based on history, physical examination and ultrasonography. Informed written consent was obtained from every patient after explaining aims and objectives of the study. A structured questionnaire was

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used to incorporate their personal, dietary and sociodemographic details. Patients below 20 years of age and non-cooperative patients, who refused to give written consent for participation in the study, were excluded from the study. Ethical clearance was obtained from institutional ethical committee of JSS University, Mysore.

Measurements:- From each participant weight and height measurements were obtained.

The patient's were weighed fully clothed with the exception of shoes using a digital scale, and the weight was then rounded to the nearest 0.05 kg. Height was measured to the nearest 0.5 cm using a height meter after removing their shoes, and placed his or her heels together. Body mass Index (BMI) was calculated as weight (kg) divided by height (m) squared (kg/m^2) and analysed using Asian cut-off values. Blood pressure was taken using a mercury sphygmomanometer.

Variables in study:- There were two sets of data. One was continuous, and the other was non-continuous data. The continuous data variables were age, weight, height, BMI, blood pressure, number of children, monthly family income, number of siblings, and number of family members.

The non-continuous variables were gender, marital status, educational qualification, occupation, residing area, addiction and substance, addiction material, family history of Cholelithiasis, history of diabetes, history of hypertension, type of food, vegetarian or non vegetarian food, cooking oil, cereals like ragi, rice, wheat etc, type and quantity of beverage, type of milk, cow, buffalo milk or pasteurised and toned dairy milk, type of drinking water tap water/ground water. Assessment of their dietary habit was done using semi-quantitative food frequency questionnaire (willette 2008). Economic status was classified by total monthly income with respect to Indian currency (less than Rs. 5,000 –poor; between Rs. 5,000-10,000 as lower middle class; between Rs. 10,000- 20,000 as middle; greater than 20,000 as upper middle class and rich).

Statistical analysis:- Statistical Software for Social Sciences (SPSS version 20) for statistical analysis. Descriptive analyses were performed to investigate the distribution of our data. Mean and standard deviation (SD) were calculated for continuous variables. Frequency and percentages were calculated for categorical variables. Weight of the individuals was categorized into underweight, normal weight, overweight, and obese by using the South Asian cut-off for BMI. Individuals were labelled as underweight if BMI was less than 18.5, normal if BMI was between 18.5 to 23.99, overweight if BMI was between 24 to 26.99, and obese if BMI is greater than or equal to 27. Individuals were labelled as hypertensive if his or her diastolic blood pressure was found to be greater than or equal to 90 mmHg, or if his or her systolic blood pressure was found to be greater than or equal to140 mmHg.

RESULTS

The socio-demographic determinants are given in Table 1and also in Graph 1 along with risk factors frequencies for cholelithiasis in Table 2 and also in Graph 2. The measured characteristic of the participants are given in Table 3 and Table 4 shows blood pressure, Diabetes and BMI profiles.

Out of 60 participants 51.7% were females and 48.3% were males. The mean ± S.D. for age was 43 ± 14.43 (95%C.I. 37.71 — 48.29) for females and 55.38± 11.75 % (95%C.I. 50.91-59.85) for males. All 31 female subjects were married. Mean parity ± S.D. was 2.37 ± 1.35. None of them used oral contraceptives. Nearly 38% were housewives.

Table 1 Sociodemographic characteristic of study subjects

Variable		Frequency	Percentage
Gender	Males	29	48.3
	females	31	51.7
Occupation	House wife	23	38.3
	Agriculture	12	20
	Unskilled labour	6	10
	Skilled labour	7	11.7
	Business	6	10
	Employee	6	10
	professional	0	0
Residing area	Rural	40	66.7
	urban	20	33.3
Socioeconomic status	Poor	19	31.7
	Low middle class	19	31.7
	Middle class	22	36.7
Education level	Illiterate	19	31.7
	Primary	18	30
	Secondary	15	25
	graduate	8	13.3
Alcohol (not applicable for females)	Yes	15	25
	no	15	25
	Not applicable	30	50
Smoking(not applicable for females)	Yes	13	21.7
	no	17	28.3
	Not applicable	30	50

Considering both males and females, nearly 32% of the patients were illiterate, and the remaining included primary (30%), secondary (25%) and post secondary education(13%).The main occupations were housewives (38%), Agriculture (20%), unskilled labours (10%), skilled labours(11.7%) and private and government employees(10%), business (10%).
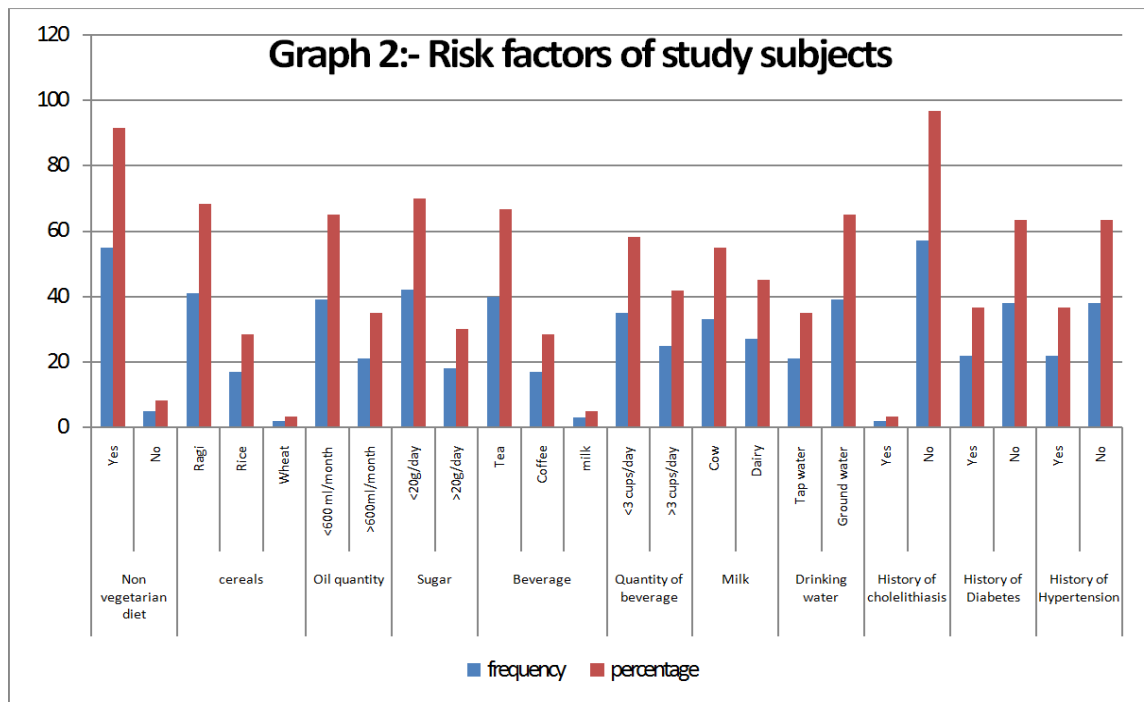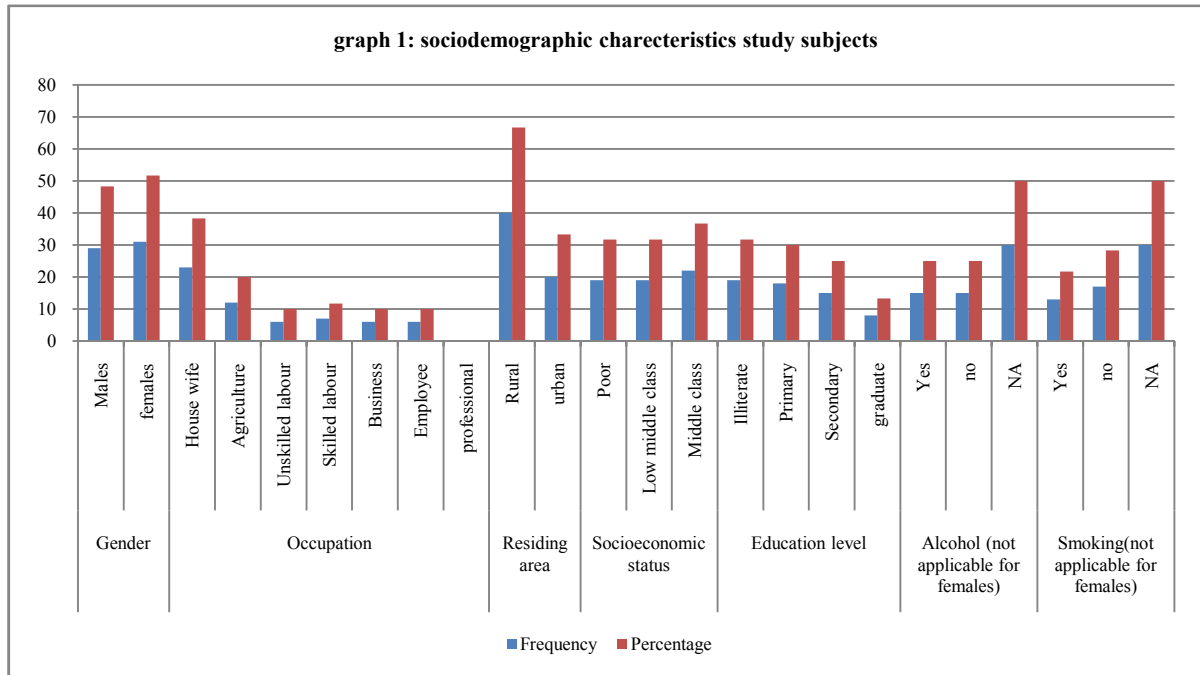
Table 2 Risk factors of study subjects

Risk factors		Frequency	Percentage
Non vegetarian diet	Yes	55	91.7
	No	5	8.3
cereals	Ragi	41	68.3
	Rice	17	28.3
	Wheat	2	3.3
Oil quantity	<600 ml/month	39	65
	>600ml/month	21	35
Sugar	<20g/day	42	70
	>20g/day	18	30
Beverage	Tea	40	66.7
	Coffee	17	28.3
	Milk	3	5
Quantity of beverage	<3 cups/day	35	58.3
	>3 cups/day	25	41.7
Milk	Cow	33	55
	Dairy	27	45
Drinking water	Tap water	21	35
	Ground water	39	65
History of cholelithiasis	Yes	2	3.3
	No	57	96.7
History of Diabetes	Yes	22	36.7
	No	38	63.3
History of Hypertension	Yes	22	36.7
	No	38	63.3

Around 67% of the patients were rural dwellers and remaining 33% patients were from semi urban and urban areas. Out of 29 male participants 13 were smokers and 15 were addicted to alcohol. None of the female participants were addicted to any

forms of tobacco or alcohol, so they were placed in not applicable category. Nearly 92% of the participants were consuming non vegetarian food and only 8% were strict vegetarians.

dwellers and remaining 45% people used pasteurized and homogenized toned dairy milk. Around 65% of the participants are dependent on ground water for drinking.

graph 1: sociodemographic charecteristics study subjects

Graph 2:- Risk factors of study subjects

Ragi was commonly used cereals with 68% followed by rice (28%) and then by wheat (3%). Widely used cooking oil is sunflower oil and 65% of the patients used < 600ml of oil/month and 35% used >600ml/month in their diet. Sugar consumption was <20g/day in 70% of the patients and >20 g/day in 30% of the patients. Common beverage consumed was tea by 66.7% patients followed by coffee consumption by 28% of the patients. Nearly 58% of the patients had the habit of beverage consumption > 3cups/day. Cow's milk was more commonly used milk around 55% especially by the rural

Table 3 Hypertension, Diabetes and BMI profile of survey respondents

Parameter		Frequency	Percentage
Hypertension	Normotensive	21	35
	Hypertensive	39	65
Diabetes mellitus	Diabetic	21	35
	Non diabetic	39	65
BMI		6	10
	Under weight	41	68.3
	Normal Over weight	9	15
	Obese	4	6.7

Graph 3:- Hypertension, diabetes and BMI profile of study subjects
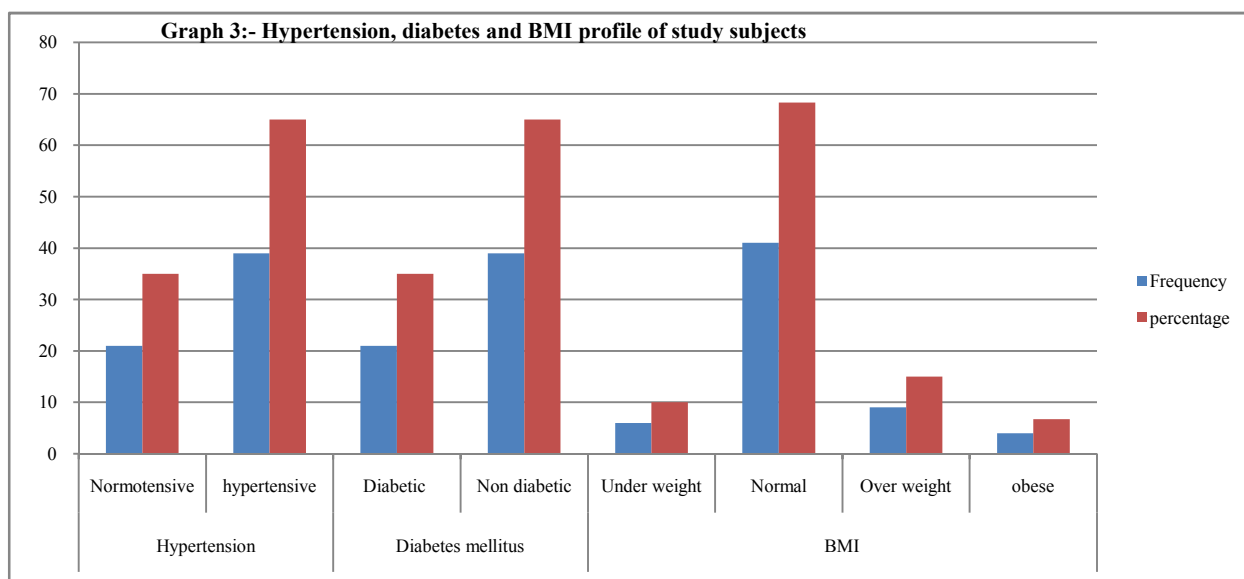
Table 4 Measurement of characteristics of study subjects

Variables	Mean ± S.D.	95% confidence Interval
Age (in years)	42.43± 14.32	37.09 – 47.78
Males (N=29)	55.38± 11.75	50.91 – 59.85
Females (N=31)	43 ± 14.43	37.71 – 48.29
Weight (Kg)	55.33 ± 9.63	51.74 – 58.93
Height (feet)	5.22 ± 0.25	5.12 – 5.31
BMI	21.80 ± 3.11	20.64 – 22.97
Parity (for females only)	2.37 ± 1.35	1.86 – 2.87

Positive history of diabetes mellitus and hypertension was reported by only 37% of participants. A family history of cholelithiasis was not reported in 97% respondents. Asian cut off values for BMI showed 10% participants were underweight, 68% normal, 15% overweight and 7% clinically obese. 95% C.I. for BMI was 20.64 - 22.97. 65% of participants were hypertensive (cut off value 140/90 mm. hg.) and 35% were diabetic.

DISCUSSION

There has been a remarkable shift in the trend of gall stone disease from middle aged, fertile, fat females to young asthenic females in their twenties(Gupta *et al*., 1998). In the present study also, gall stone disease was frequent in females and elderly males. 48% males and 52 % females were affected in which females were mostly affected in their 3rd and 4th decade of life whereas males were mostly affected in 5th and 6th decade of life. Pregnancy and female sex hormones are believed to place women at a higher risk and the view has been supported by several classical epidemiological studies (Friedman *et al*., 1996; Barbara *et al*., 1987). A relatively higher prevalence of 48% among males when compared to reports from past studies (Muhrbeck *et al*., 1995) is an indicator of significant shift in epidemiology of gallstone disease. Our study justifies The Wheeler Study, which showed significant association between marital status and gallstone occurrence, as 100% of our female subjects were married (Wheeler *et al*.,1970). According to several researchers (Singh *et al*., 2001; Sarin *et al*., 1986), multiparity and use of oral contraceptive pills (OCP) contributed to the risk of gall stone formation in females. In our study, mean parity was 2.37± 1.35 (95% CI 1.86- 2.37) and use of OCP was reported in none of the female patients.

How dietary factors influence the formation of gallstones is still unclear, but many studies have proven that dietary risk factors such as increased cholesterol intake, increased consumption of refined sugars, increased saturated fat intake, tamarind, consumption of high glycemic index foods, decreased calcium intake, and low dietary fibre intake are risk factors for gall stones. In the present study, 92% (55 out of 60) patients consumed a mixed diet, predominantly non vegetarian diet which includes poultry, meat and eggs whereas only 8% (5 out of 60) patients were strict vegetarians. The cause could be due to consumption of high proteins and fat of animal source (Maskey and Shrestha 1990). Oil and sugar consumption also did not influence gallstone formation. However there is an observation of <12 g sugar intake per day being associated with a higher risk (Jorgensen *et al*., 1989; Scragg *et al*., 1984). Our study also supports this view revealing that 65% patients consumed oil <600ml/month and 70% consumed sugar <20g/day. Tea consumption was reported in 67% of the patients on an average of 3 cups/day. Cow's milk was used by 55% cases seems to be interesting results. In the present study area, ragi is commonly used cereal, around 68% patients were consuming ragi regularly. Though Mysore and Mandya districts are situated in the Cauvery river belt, bore well water is also supplied by the corporation for domestic purposes. So, around 65% participants were drinking bore well water. In one of the studies (Nirmala *et al*., 2012), researchers analyzed certain physico-chemical parameters in the ground water samples in Mysore city. The parameters analyzed have shown that they are all well within the permissible limits for drinking water except Total alkalinity, Chloride and Total hardness in certain water samples. Regarding addictions, only male subjects were addicted to various forms of tobacco and alcohol but addiction was not applicable for Indian females. A study in Taiwan documented that cholelithiasis in Asian obese patients, with increased diastolic blood pressure were significantly associated with a higher risk of gallstone (Liew *et al*., 2007; Misciagna *et al*., 2000). The present study partially supports the view where 68% of the patients were non-obese and had a normal BMI but 65% of the patients were hypertensive. Previous studies indicated that diabetes mellitus was a risk factor for GSD (Nakeeb *et al*., 2006; Shebl *et al*., 2011;

Liondaki *et al.,* 2011). GSD appeared strongly associated with fasting glycemia (Cojocarn *et al.,* 2010). But in our study, 65% of the gall stone patients were non diabetic. A study in Pakistan, suggests 61% of Patients had a positive family history of cholelithiasis (Naeem *et al.,* 2012). Our study completely deviated from Pakistani study and 97% of the cases did not have family history of cholelithiasis.

CONCLUSION

It is important to note that the major limitation of our study is the cross-sectional hospital based design, which is not meant to assess the risk factors. Rather, we have studied the frequencies of proposed risk factors, which were present in the survey respondents.

48% males and 52 % females were affected in which females were mostly affected in their 3rd and 4th decade of life whereas males were mostly affected in 5th and 6th decade of life. Cholelithiasis was more common among rural dwellers with lower socioeconomic status and low literacy rates. People consuming non vegetarian diet, Ragi, tea, cow's milk and drinking borewell water had a higher occurrence of gall stone disease. Majority of the patients had normal BMI and no family or personal history of diabetes. None of them had a family history of cholelithiasis. None of the female patients used OCPs and many had two children. This study adds to the knowledge of the gall stone risk factors in the study area. However, more studies with respect to the pathogenesis of gall stones with more number of patients has to be done, to further conclude the gall stone analysis and the risk factors.

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