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RESEARCH ARTICLE

A STUDY OF DIETARY HABITS AND DEMOGRAPHIC STUDY OF PATIENTS OF GALLSTONE DISEASE

***Dr. Gurmeet Singh, Dr. Athar Parvez, Dr. Digamber Chaubey and Dr. Jain, K.B.**

Vivekananda Polyclinic and Institute of Medical Sciences

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ABSTRACT

Gallstones are the most common biliary pathology. In Asian population, cholelithiasis ranges from approximately 3 to 15% [1]. Women are three times more likely to develop gallstones than men. The study was performed on a group of 115 patients who were admitted in Department of General Surgery for Cholecystectomy (Laproscopic) during period of 1 year 20 days. The average age of the patients was 42.45 (±14.05) years. 52.2% of patients were from age group 30-50 years of which most were females (30-40 yr: 78.8%) (41-50 yr: 77.8%). 20% of total patients were of age group 51-60 yrs, 17.4% were less than 30 yrs and 10.4% of patients were more than 60 year old. 89.9% of total patients were females while only 19.1% were males. Mustard oil was used by most (75.7%) of the patients of which 82.8% were females and 17.2% males whereas refined oil as a cooking medium was used by 24.3% of patients of which 75% were females and 25% were males. Most of the patients were non-vegetarian (60.9%) of which 85.7% were females and 14.3% were males whereas 39.1% of the patients were vegetarian of whom 26.7% were males and 73.3% females.

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INTRODUCTION

Gallstones are the most common biliary pathology. In Asian population, cholelithiasis ranges from approximately 3 to 15% (Shaffer, 2005). Women are three times more likely to develop gallstones than men. First-degree relatives of patients with gallstones have a twofold greater prevalence (Novacek, 2006). The gallstones in 75% of patients are composed predominantly (70-95%) of cholesterol or mixed stones. The remaining 25% are pigment stones. There is a steep rise in incidence of cholelithiasis in Indian population. No definitive theory is there to explain this rise in incidence of gallstone disease. The most accepted hypothesis is the changing dietary habits. The Indian population for centuries is used to a low calorie and less refined diet. The incidence appears to be higher amongst population where there has been a dramatic change in life style in one generation. People moving from rural to urban areas far from their origin are also more susceptible. The disease runs in families probably due to similar dietary habits and environmental factors (Khuroo *et al*., 1989). Other reason of rise in incidence may be the advent of ultrasonography leading to early and easy diagnosis of asymptomatic gallstones patients.

****Corresponding author: Dr. Gurmeet Singh,***
Vivekananda Polyclinic and Institute of Medical Sciences

Although no gene has been identified in human beings but LITH gene has been identified in mice having role in formation of cholesterol gallstone (Helen *et al*., 2010). Asymptomatic gallstones in patients are commonly diagnosed incidentally on ultrasonography, CT scans and abdominal radiography or during laparotomy. Several studies have examined the likelihood of developing biliary colic or developing significant complications of gallstone disease. Approximately 3% of asymptomatic individuals become symptomatic per year (i.e. develop biliary colic). Complicated gallstone disease develops in 3 to 5% of symptomatic patients per year. Over a 20-year period, about two thirds of asymptomatic patients with gallstones remain symptom free (Attili *et al*., 1995).

MATERIALS AND METHODS

The prospective study design was used. The study was conducted in the Department of General Surgery and Department of Pathology in multispecialty hospital, Lucknow, India. The ethical committee and scientific committee of the institute approved the study and the consent was taken from each patient. Patients suffering from cholelithiasis confirmed by ultrasonography admitted in the surgical ward for laproscopic cholecystectomy were included in the study irrespective of their age, sex and parity. Patients suffering from empyema and mucocele of the gall bladder were excluded from the study.

The study was performed on a group of 115 patients who were admitted in Department of General Surgery for Cholecystectomy (Laproscopic) during period of 1 year 20 days. All the patients included in the study were asked about their dietary habits being vegetarian or non vegetarian and type of cooking oil they are using. The data obtained was statistically assessed against gender wise distribution for both above parameters.

DATA ANALYSIS AND RESULTS

Age and Sex distribution of Gallstone patients

Table no. 1 and Figure no. 1 depicts the age and sex distribution of the patients of gallstone disease. The average age of the patients was 42.45 (±14.05) years. 52.2% of patients were from age group 30-50 years of which most were females (30-40 yr: 78.8%) (41-50 yr: 77.8%). 20% of total patients were of age group 51-60 yrs, 17.4% were less than 30 yrs and 10.4% of patients were more than 60 year old. 89.9% of total patients were females while only 19.1% were males. There was no statistically significant difference between age and gender (p>0.05) of gallstone patients.

Table 1. Age and Sex distribution of the Gallstone patients

Age in years	Male		Female		Total	
	No.	%	No.	%	No.	%
<30	3	15.0	17	85.0	20	17.4
30-40	7	21.2	26	78.8	33	28.7
41-50	6	22.2	21	77.8	27	23.5
51-60	3	13.0	20	87.0	23	20.0
>60	3	25.0	9	75.0	12	10.4
Total	22	19.1	93	80.9	115	100.0

Chi-square=1.29, p=0.86 (Age vs. gender)

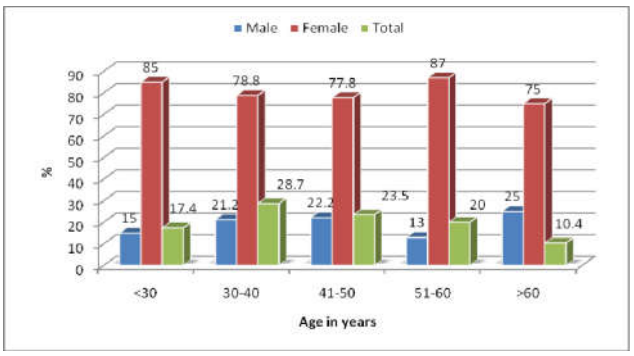

Fig. 1. Age and sex distribution of the patients

Dietary habit among gallstone patients

Table 2. Gender wise distribution of the Gallstone patients according to dietary habits

Dietary habit	Male(22)		Female(93)		Total(115)	
	No.	%	No.	%	No.	%
Vegetarian	12	26.7	33	73.3	45	39.1
Non-vegetarian	10	14.3	60	85.7	70	60.9

Chi-square=2.71, p=0.09 (Dietary habits vs. gender)

The distribution of gallstone patients according to different dietary habit among males and females is shown below in table no.2 and figure no. 2. Most of the patients were non-vegetarian (60.9%) of which 85.7% were females and 14.3% were males whereas 39.1% of the patients were vegetarian of which 26.7% were males and 73.3% females.

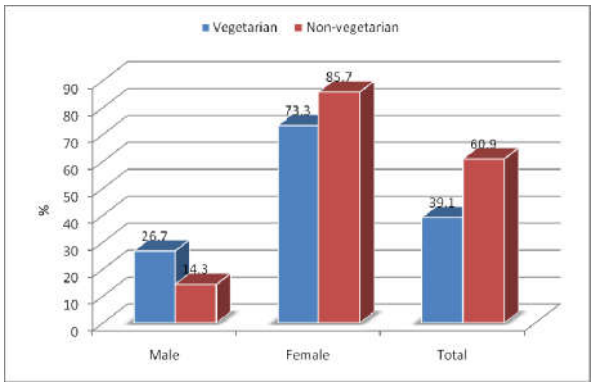

Fig. 2. Gender wise distribution of the patients according to dietary habits

There was no statistically significant (p>0.05) difference in the dietary habits and gender of gallstone patients.

Cooking oil used among gallstone patients

Table 3. Gender wise distribution of the patients according to type of oil used for cooking

Oil used for	Male(22)		Female(93)		Total(115)	
cooking	No.	%	No.	%	No.	%
Mustard oil	15	17.2	72	82.8	87	75.7
Refined oil	7	25.0	21	75.0	28	24.3

Chi-square=0.82, p=0.36 (Cooking oil vs. gender)

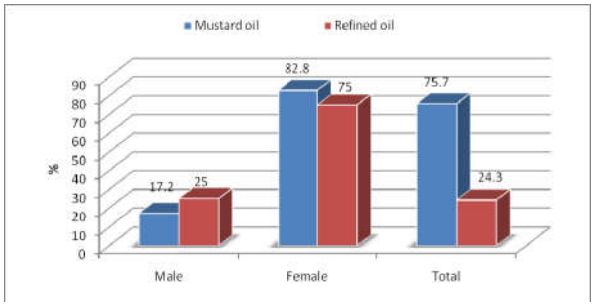

Fig. 3. Gender wise distribution of the Gallstone patients according to type of oil used for cooking

The distribution of the gallstone patients according to type of oil used for cooking among males and females is presented in the Table3& Fig.3. Mustard oil was used by most (75.7%) of the patients of which 82.8% were females and 17.2% males whereas refined oil as a cooking medium was used by 24.3% of patients of which 75% were females and 25% were males. There was no statistically significant difference (p>0.05) among cooking oil and gender of gallstone patients.

DISCUSSION

There are three types of gallstones (i) Pure cholesterol stones, which contain at least 90% cholesterol, (ii) pigment stones either brown or black, which contain at least 90% bilirubin and (iii) mixed composition stones, which contain varying proportions of cholesterol, bilirubin and other substances such as calcium carbonate, calcium phosphate and calcium palmitate (Edward, 2013; Channa, 2008). In the present study the average age of the patients was 42.45 (±14.05) years of which most were from age group 30-50 yrs. About one fourth of the patients were in the age groups of 30-40 (28.7%) and 41-50 (23.5%) years.

However, 20% of the patients were in the age group of 51-60 years and 17.4% were below 30 years. Only 10.4% of the patients were above 60 years. Majority of the patients were females (80.9%). Vegetarian diet was consumed by 39.1% of patients while 60.9% were non-vegetarian. The phrase "fair, female, fat, and fertile" summarizes one of the major risk factors for development of gallstones. Although gallstones and cholecystitis are more common inwomen, men with gallstones are more likely to develop cholecystitis (and more severe cholecystitis) than women with gallstones (Havel, 1989). Marschall *et al*. (2007)assume that age and sex are profoundly associated with the incidence of gallstone disease; the metabolic risk factors for gallstone disease are different between men and women. Elevated estrogen levels are known to increase cholesterol excretion into the bile by causing its supersaturation with cholesterol. During pregnancy, in addition to the elevated level of estrogens, gallbladder evacuation function suffers, giving rise to bile sludge and gallstones. Hormone replacement therapy (HRT) with estrogen-containing agents in postmenopausal women (Cirillo *et al*., 2005) and the use of hormonal oral contraceptives (Stuart, 2007) may increase the risk of symptomatic gallstones.

It was observed in various studies that consumption of a vegetarian diet, and particularly vegetable protein, may decrease the risk of developing gallstones (Tsai *et al*., 2004; Tsai *et al*., 2005; Tsai *et al*., 2008). It was found that increased consumption of fruits and vegetables was associated with decreased risk of gallstones (Tsai *et al*., 2006). It has been reported that majority of gallstone patients use rapeseed oil as the source of cooking and frying food (Beckingham, 2001; Channa *et al*., 2002). In the present study, mustard oil was used by 75.7% of the patients and 24.3% were using refined oil. Both the oils were used by the majority of the females. It has been seen that higher intake of saturated fat or Trans-fatty acid was associated with increased incidence of gallstones. Khan and Khan (2010) had reported that the majority of the gallbladder patients were using mustard oil for cooking (Khan *et al*., 2010). In a study published in the *British Medical Journal*, it was shown that vegetarian women had a much lower incidence of gallstones than non-vegetarian women. Of the 632 non-vegetarians, overall occurrence of gallstones was 25%. Vegetarians had only half as many problems, with only 12% being found to have gallstones (Fiona Pixley, 1988).

"Bile acid concentrations within the vegetable protein fed groups were significantly higher than within the meat protein fed groups. The meat protein fed animals showed a significantly higher percentage of cholesterol in the bile fluid. As the percentage of cholesterol increased in the bile, the percentage of bile acids was found to decrease."Upon administration of a diet containing vegetable protein (in the form of soybeans), gallstones were dissolved (Rolleston, 1929)." Mustard oil is successfully and variously used in cooking. This product processing mustard seeds and is widely used in the canning industry, baking and confectionery industry, the industrial production of solid edible fats, lubricants and coolants, glycerin, fatty acids, cosmetic creams. Mustard oil is also part of various drugs (cake, which remains in the production of mustard oil, is used to make mustard powder, mustard plasters used in the production). Mustard oil abundantly used in north India “may be responsible” for cholelithiasis and possibly “we can try to use coconut oil instead of it since the number of gallstone cases in South India is less.

Studies are available to support it as factor in carcinoma gallbladder. A high level of cholesterol as a cause is getting closer, but it’s regulation of cholesterol, not cholesterol per se that’s responsible for gallstones. In mustard oil large amount of linoleic acid are present (referring to the group of omega-6) and linolenic acid, similar in its effect on the human body polyunsaturated omega-3 contained in linseed oil or fish oil. In a complex combination of these two essential fatty acids contribute to: Coordinated work of the cardiovascular system (inhibit development of atherosclerosis, preventing deposits of cholesterol plaques in blood vessels, reduce blood viscosity and increase the elasticity of blood vessels). Not much is studied about role of mustard oil in cholelithiasis. But it is one of the causative factors carcinoma gallbladder Carcinoma of the gallbladder (CaGB) is a common health problem in Northern India. Exact causative factors are still obscure. Dietary habits are also known to be a major factor in the gallbladder carcinogenesis. Mustard oil is mostly used as cooking media, which is adulterated by sanguinarine, diethyl nitrosamine and repeated frying may be one of the factors (Shukla *et al*., 1981).

Conclusion

- About more than half (52.2%) of the gallstone patients were in the age groups of 30-50 years.
- Majority of the gallstone patients were females (80.9%).
- Most of the gallstone patients (60.9 %) were non-vegetarian.
- Mustard oil as a cooking medium was used by 75.7% of the gallstone patients whereas 27% of the patients used refined oil.
- There was no statistically significant difference between age and gender of gallstone patients, dietary habits and gender of gallstone patients and cooking oil and gender of gallstone patients**.** Although statistically no correlation of diet has been found but still prevalence of disease in specific demographic belts, points towards need of further evaluation of dietary habits and food consumed.

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