

## “A STUDY ON THE CONTROVERSIAL RISK FACTORS IN PATHOGENESIS OF CHOLELITHIASIS”

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### ABSTRACT:

**Introduction:** Cholelithiasis remains one of the most common problems leading to surgical intervention. Over the past few decades several studies to determine the causes and risk factors of gall stone formation have been done. But some factors like Socioeconomic status, Alcohol intake, Smoking, Serum Cholesterol level, Family history, Total parenteral nutrition (TPN), Crohn's disease are still considered controversial regarding the formation of gall stone. Therefore, this work has been done with a view to study its relation to the mentioned predisposing risk factors, So prophylactic plan like dietary improvement, change in life style (e.g. cessation of smoking & alcoholism) & others measures should be taken to avoid gallstone formation.

**Aim:** To determine the significance of controversial risk factors i.e. Socioeconomic status, alcohol intake, smoking, serum cholesterol level, family history, total parenteral nutrition (TPN), Crohn's disease, in the formation of gall stones in different groups of populations and provide an insight to prevent the formation of galls stones by reducing these preventable and modifiable risk factors.

**Materials & Method:** This study was conducted in department of general surgery, Nalanda Medical College And Hospital Patna during February 2019 to February 2021.

A total of 80 patients were included in the study.

**Result:** In my study, 6% of the patients were from high socio-economic status, 34% were middle socioeconomic status and 60% were low socioeconomic status. 40% cases were seen with positive family history. 20% were smoker and 80% were non-smokers. 10% cases were alcoholics and 90% were found to be non-alcoholics. 2.5% cases suffered from Crohn's disease. 5% cases had history of total parenteral nutrition (T.P.N.). Serum cholesterol level was within normal level in 75% cases, hypercholesterolemia in 15% and hypocholesterolemia in 10% cases.

**Conclusion:** Modification of these risk factors should be stressed for reduction of occurrence of cholelithiasis and reducing the disease burden on the population.

**Keywords:** Cholelithiasis, Risk Factors, Controversial.

### **Main Article Text:**

**Introduction:** Cholelithiasis is one of the commonest disease of mankind. Every year, approximately 500,000 cholecystectomies are performed in the India. Cholelithiasis affects approximately 10% of the adult population in India[1]. It has been well demonstrated that the presence of gallstones increases with age[2]. An estimated 20% of adults over 40 years of age and 30% of those over age 70 have biliary calculi[3]. During the reproductive years, the female to male ratio is about 4:1, with the sex discrepancy narrowing in the older population to near equality[4]. Other risk factors are parity, obesity, intake of estrogen, Crohn's disease, T.P.N, socioeconomic status, alcohol & smoking. During the last two decades, the methods of treatment cholelithiasis have been dramatically altered. Today, laparoscopic cholecystectomy, laparoscopic common bile duct exploration, and endoscopic retrograde management of common bile duct (CBD) stones play important roles in the treatment of gallstones.

Over the past few decades several studies to determine the causes and risk factors of gall stone formation have been done. But some factors like

1. Socioeconomic status
2. Alcohol intake
3. Smoking
4. Serum Cholesterol level
5. Family history
6. Total parenteral nutrition (TPN)
7. Crohn's disease

are still considered controversial regarding the formation of gall stone. Therefore, this work has been taken up with a view to study its relation to the mentioned predisposing risk factors and also to know the factors which may be useful in reducing its occurrence. So prophylactic plan like dietary improvement, change in life style (e.g. cessation of smoking & alcoholism) & others measures should be taken to avoid gallstone formation.

**Aims And Objectives:** To determine the significance of controversial risk factors i.e. Socioeconomic status, alcohol intake, smoking, serum cholesterol level, family history, total parenteral nutrition (TPN), Crohn's disease, in the formation of gall stones in different groups of populations and provide an insight to prevent the formation of gall stones by reducing these preventable and modifiable risk factors.

**Materials & Method:** This study was conducted in department of general surgery, Nalanda Medical College And Hospital Patna during February 2019 to February 2021. A total of 80 patients were included in this study after prior informed consent. Approval from the ethical committee of institution was taken before starting the study.

Study Design : Non randomized prospective study

Study Period : February 2019 to February 2021

Sample Size : 80 patients

### **Inclusion Criteria:**

Patients with symptomatic gall stone disease admitted in department of general surgery NMCH Patna.

**Exclusion Criteria :**

Patients not given consent to include in study.

**Table No -(1)****Showing Relation between Incidence of Gall Stone and Socio-economic status of the patients**

Socioeconomic status	No. of cases	Percentages
High	5	6
Middle	27	34
Low	48	60
Total	80	100

**Table no – (2)****Showing Incidence of Positive Family History in the first degree relatives of the patients in cases of gall stone**

Family History (Among first degree relatives)	No. of cases	Percentages
Present	32	40
Absent	48	60

**Table no – (3)****Showing Incidence of Smoking in Cases of Gall stone patients**

Smoking history	No. of cases	Percentage
Smoker	16	20
Non-smoker	64	80
Total	80	100

**Table no. – [4]****Showing Incidence of Alcoholism in cases of Gall stone**

Alcoholism History	No of cases	Percentage
Alcoholics	8	10
Non-alcoholics	72	90
Total	80	100

**Table no. – [5]****Showing Incidence of Crohn's disease in Cases of Gall stone**

Crohn's disease	No. of cases	Percentage
Present	2	2.5
Absent	78	97.5
Total	80	100

**Table no. – [6]****Showing Relation between Serum Cholesterol levels in Cases of Gall stones**

<b>Cholesterol level in mg%</b>	<b>No. of cases</b>	<b>Percentage</b>
<b>Hypocholesterolemia (100-150)</b>	<b>8</b>	<b>10</b>
<b>Normal Serum Cholesterol (150-250)</b>	<b>60</b>	<b>75</b>
<b>Hypercholesterolemia (more than 250)</b>	<b>12</b>	<b>15</b>
<b>Total</b>	<b>80</b>	<b>100</b>

**Table no – (7)****Showing Incidence of Total Parenteral Nutritionin Cases of Gall stone**

<b>History of TPN</b>	<b>No. of cases</b>	<b>Percentage</b>
<b>Present</b>	<b>4</b>	<b>5</b>
<b>Absent</b>	<b>76</b>	<b>95</b>
<b>Total</b>	<b>80</b>	<b>100</b>

**RESULTS:** 80 cases of cholelithiasis were studied for their relation with Socio-economic status, Family history, Smoking, Alcoholism, Crohn's disease, T.P.N, Serum Cholesterol level and also to know the factors which may be protective against gallstone disease.

The results obtained in my study are:

1. 5 (6%) were from high socio-economic status, 27 (34%) from middle socio-economic status and 48 (60%) were from low socio-economic status.
2. 40% cases were seen with positive family history.
3. 20% were smokers and 80% were non-smokers. Out of the smokers, 8 patients were female and 8 patients were male.
4. 10% cases were alcoholics and 90% were found to be non-alcoholics. Out of alcoholic patients, 5 patients were male and 3 patients were female.
5. 2.5% cases suffered from Crohn's disease.
6. 5% cases had history of total parenteral nutrition (T.P.N.).
7. Serum cholesterol level was within normal level in 75% cases, hypercholesterolemia in 15% and hypocholesterolemia in 10% cases.

**DISCUSSION;** There are some established risk factors in the formation of gallstone e.g. Age, Sex, Place, Obesity, Estrogen related medications, Fasting, Vagotomy, Cirrhosis of Liver. Besides these, there are some controversial risk factors that have been investigated by several investigators and publications.[19] The present series of work deals with the result of observation on 80 cases of Cholelithiasis that were admitted from Outdoor Patient department & Emergency ward in Department of Surgery in Nalanda Medical College & Hospital, Patna during February 2019 to February 2021 with the aim to determine the significance of controversial risk factors i.e.

- Socioeconomic status

- Alcohol intake
- Smoking
- Serum cholesterol level
- Family history
- Total parenteral nutrition
- Crohn's disease

in the formation of gall stones in different groups of population and provide an insight to prevent the formation of galls stones by reducing these preventable and modifiable risk factors.

[Vide Table No. – 1] Socioeconomic status reflects about the literacy, type of job and income of the family. In present series of work - high socio-economic status were 5(6%), middle socio-economic status 27 (34%) and low socio-economic status 48 (60%).

According to Kotwal MR[5] high socio-economic status were 32.6%, middle socio-economic status 40.2% and low socio-economic status 27.2%.

M. Acalovschi[6] found 36.5% were belong to rich class, 40.5% were middle class & 27% poor class. The present work is more comparable with study of Kotwal MR[5]. Because of most of the cases admitted in NMCH were of poor & middle class family, the result is slightly defer in rich class from above authors. May other authors found relationship between incidence of gallstone was inversely related with education, income and social status but as other studies fail to find an association. Its relation is still controversial[7].

[Vide table No -2] Family history is one of the important risk factor for the pathogenesis of cholelithiasis. In the present series of work positive family history among the first degree relatives was present in 40% cases. Gilat T. Feldman[8] found that relative risk for gallstone formation was higher among first degree relative for patients with gallstones. Thus, it appeared that positive family history is correlated positively with prevalence of gallstone disease. Family history in pathogenesis of gall stone seems to be genetically related derangement in metabolism of cholesterol.[20]

[Vide Table No. – 3] Smoking probably alter the lithogenicity of the bile and predisposes to the formation of Gall bladder stones. Nicotine is the culprit for this. In present series of work 20% were smokers and 80 were non-smokers. Out of the 16 smokers, 8 patients were females and 8 patients were males. Wenbin D, Zhuo C, Zhibing M[9] showed in their study that current-smokers versus never-smokers had an increased risk of 1.3 in females and 1.6 in males. It was further shown that current smoker females, less than 35 of age, had an increased risk by 3.5 times, and women who had been smoking for 1-8 years increased their risk by 2.8 times. Smoking were reported in few female patients in this study due to less prevalence of smoking in Indian female population but most of cases observed during the study were female.

Hence, Smoking was not significantly associated with prevalent gallstone or either newly diagnosed gallstones in this study. However if the study have been carried on only male cases, who have high prevalence of smoking, results of study would have been different.[15,16,20]

[Vide Table No.-4] In the present series only 10% cases were alcoholics & 90% were non-alcoholics. Out of 8 alcoholic patients, 5 patients were male and 3 patients were female. Thornton[10] concluded in his study 18% were alcoholic & MacClure[11] found 16% were alcoholics. The present finding is more in accordance with MacClure[11]. In this series female were excluded from this study because alcoholism was not reported among any female patients. Use of alcohol is related to

increase in amount of HDL cholesterol that probably protect against gallstone diseases. The findings of this study regarding alcoholism are not showing a clear-cut association for gall stone disease.

[Vide Table No. – 5] In present series of work only 2.5% cases of gallstone were found to be suffering from Crohn's disease. Fabrizio et al.[12] found 14.35% cases of gallstone had Crohn's disease. Colli A. found 15.8% cases of Crohn's disease and Allen R. N. found 12.2% cases of Crohn's disease.[13] Finding of our results are very different from above authors. The reason behind this is that it is more prevalent in higher socioeconomic population and in India Crohn's disease is very uncommon disease due to most of the population are of lower and middle socioeconomic status and most of cases are not diagnosed due to poor investigatory facilities. Crohn's disease affecting mainly small intestine especially ileum interferes with the enterohepatic circulation of bile acid, which maintains the bile acid pool in the body which prevent the nucleation of bile, and hence may lead to formation of lithogenic bile that may lead to the gall stone formation.

[Vide Table No. – 6] In the present series of studies normal serum cholesterol level was found in 60 (75%), hypercholesterolemia in 12 (15%) and hypocholesterolemia in 8 (10%) of cases. Doren[14] estimated serum cholesterol level of 66 of his patients and found average level to be 158 mg% and Burghardt noticed serum cholesterol level between 125 mg to 150 mg%. The result of the present series of study compared favorably with Doren[14] & Burghardt. So serum cholesterol level had no definite relationship with cholelithiasis. Although gallstone disease is associated with metabolic syndrome in various studies.[15,16,18]

[Vide Table No. – 7] Total parenteral nutrition is an important form of nutrition in critical patients. In present series only 4 (5%) cases had history of T.P.N. Matos C, Avni EF stated that 8.2% cases had positive history of T.P.N. Roselin JJ & Pittha found 11.5% had positive history of T.P.N. Whittington PF & Black DD had found only in 7.46% cases. The result of the present series of work is more agreed with Whittington PEF & Black DD. Long term T.P.N. usually associated in causing cholelithiasis, probably due to stasis of the bile because of lack of enteral stimulation and hence decreased cholecystokinin secretion than may lead to gall bladder stasis and formation of lithogenic bile.[17]

### **SUMMARY And CONCLUSION;**

To summarise my study, 6% of the patients were from high socio-economic status, 34% were middle socioeconomic status and 60% were low socioeconomic status. 40% cases were seen with positive family history. 20% were smoker and 80% were non-smokers. 10% cases were alcoholics and 90% were found to be non-alcoholics. 2.5% cases suffered from Crohn's disease. 5% cases had history of total parenteral nutrition (T.P.N.). Serum cholesterol level was within normal level in 75% cases, hypercholesterolemia in 15% and hypocholesterolemia in 10% cases.

The old concept that cholelithiasis occurs in fair, fatty, fertile, female of forty does not hold true anymore. In the present series even thin patients are also affected. Male is not exempted from the disease. The age incidence is equally variable as the disease appeared at the earlier age. Maximum incidence was seen between 21 years to 40 years. In female cases incidence was seen to occur earlier than the males.[19]

Family history was also present in a significant number of cases. Smoking and alcoholism were not found to have a significant association with the incidence of cholelithiasis due to the low prevalence of smoking and alcohol habit in Indian female population who were the major part of study. History

of Crohn's disease and T.P.N Were found less significant in the formation of gallstone disease due to lower prevalence in Indian population. Abnormal serum cholesterol levels were found in moderate number of case and can be considered as a factor in the occurrence of the disease.

Certain risk factors e.g. obesity, life style, dietary factor, socioeconomic status, smoking, alcoholism, hypercholesterolemia which can be modified are important up to certain extent in reducing the incidence of cholelithiasis. Thus, modification of these risk factors should be stressed for reduction of occurrence of cholelithiasis and reducing the disease burden on the population.

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