

The Association of the Serum Lipid Abnormalities in Cholelithiasis Patients

Dr. Mohammad Shaha Alam^{1*}, Dr. A.K.M. Harun-Ar-Rashid², Dr. Md. Nazrul Islam³, Dr. Fatima Jannat⁴¹Assistant Prof of Surgery, Cox's Bazar Medical College, Cox's Bazar, Bangladesh²Assistant Professor (Orthopaedic Surgery), Cox's Bazar Medical College, Cox's Bazar, Bangladesh³Assistant Professor of Surgery, Cox's Bazar Medical College, Cox's Bazar, Bangladesh⁴Consultant Obs & Gynae, Fouad Al Khateeb Hospital, Cox's Bazar, BangladeshDOI: [10.36347/sjams.2021.v09i01.022](https://doi.org/10.36347/sjams.2021.v09i01.022)

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*Corresponding author: Dr. Mohammad Shaha Alam

Abstract

Original Research Article

Background: Cholelithiasis is a common disease and notable advances have been made in studying the possible causes and mechanisms involved. It is not only important to study the prevalence of gallstone disease regionally, but also to explore the demographic and biological markers related to the development of gallstone disease, so that appropriate preventive measures may be undertaken. Many previous studies have shown a positive correlation between altered lipid profile and formation of gallstones. **Objective:** This study is to compare the serum lipid abnormalities in cholelithiasis patients. **Method:** This cross-sectional analytical study was carried out at Cox's Bazar Medical College and Hospital, Cox's Bazar, Bangladesh. Where data were collected from July 2019 to June 2020. A total of 76 who underwent cholecystectomy for gallstone disease considered for the study population. Sample were collected through purposive sampling as per inclusion criteria. **Results:** During the study, most of the patients belong to 36-56 years age group 47.4% and 80.3% were female. In female most patients TC were normal, 93.44% followed by 40.99% had TG in borderline, 61.94% had below normal level of LDL. Where as in male group 86.6% cases TC were in normal level followed by 26.67% cases had borderline level of TG and 60% had below normal level of LDL. There is no significant association of lipid profile level with gender. On the basis of Pearson correlation TG was positively correlated with TC, LDL and HDL, where coefficient was .474, .148, .110. Similarly, the profile of LDL and HDL were negatively correlated with each other. We also found that, age was significantly and positively correlated with TC, TG and HDL and negatively correlated with LDL. **Conclusion:** From our result we can conclude that, female was high risk of gallstone formation and in both male and female group more 50% cases had abnormal LDL level. Further studies are needed for better outcome.

Keywords: Serum lipid abnormalities, cholelithiasis, Gallstone disease.

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INTRODUCTION

Cholelithiasis is one of the most encountered pathology of gastrointestinal system. Gall stones are mainly of three types: cholesterol stones-80%, pigment stones and mixed stones [1]. Most of the patients with this disease are asymptomatic [2]. These risk factors include increasing age, sex, dietary, high calorie intake, low fiber intake, high refined carbohydrates, hypertriglyceridemia, physical inactivity, pregnancy, parity, overweight and obesity [3].

Gallstone disease is a common disorder of the gastrointestinal tract, having a prevalence of 10%–15% and an incidence of 1.4% per year in the adult population of developed countries [1, 2]. Women are

more common victims of the gall stone disease as compared to men [4]. Cholesterol gallstones are primarily made up of cholesterol crystals (70%) which are held together in an organic matrix of glycoproteins, calcium salts, and bile pigments. They could be present either singly or multiply, in various sizes, shapes and surfaces [1].

Alteration of lipid metabolism is highly accepted in the pathogenesis of cholesterol stones [2]. Due to altered lipid metabolism there is relative increase of cholesterol level compared to other lipids secreted by liver into the bile which is considered as main trigger for entire pathophysiological process in formation of cholesterol gall stone [2-4].

Multiple studies have shown an association between gallstones and abnormal lipids. Even though a positive correlation between serum triglycerides (TG) and nucleation time of cholesterol in bile is identified, a relationship between serum lipids and biliary cholesterol saturation index has not been identified. Moreover, controversial results have been obtained for the serum lipid profiles of patients with GS. In some case control studies, serum hypertriglyceridemia and low HDL-cholesterol (HDL-C) have shown a significant association with GS disease.

If impaired lipid homeostasis is the main cause for cholesterol supersaturation and crystallization, a significant difference between serum lipid profiles of patients with cholesterol and pigment GS should be observed, as cholesterol hypersecretion is not a recognized cause for the pathogenesis of pigment stones. Therefore comparison of lipid profiles in patients with two types of GS would be important in detecting the significance of different lipid parameters on the development of compositionally different GS [6]. Moreover, serum lipids might have an effect on the high incidence of GS disease among females [7] and on the age-related changes in the chemical composition of GS [8].

This study is to compare the serum lipid abnormalities in cholelithiasis patients.

OBJECTIVE

- To assess the serum lipid profile in cholelithiasis patients.

METHODOLOGY

Types of study

- It was a cross-sectional and observational study.

Place and period of the study

- The study place was carried out at Cox’s Bazar medical College Hospital, Cox’s Bazar, Bangladesh. Where data were collected from July 2019 to June 2020.

Study Population

- A total of 76 respondents who underwent symptomatic cholecystectomy considered for the study population. The sample was collected through purposive sampling as per the inclusion criteria.

Method

- Both qualitative and quantitative (Mixed Method) data were collected by using a pre designed questionnaire. The questionnaire was prepared reviewing literature and consulting with medical research experts.

Data Analysis

- All collected data were coding and input in SPSS-25 for further analysis. Both descriptive and inferential statistics done. Descriptive statistics included frequency distribution, percent, mean, standard deviation; graph, tables, figures and inferential statistics.

RESULTS

In Table-1 shows age distribution of the patients where most of the patients belong to 36-56 years age group 47.4%, followed by 43.4% cases belong to 15-35 years age group, 7.9% cases belong to 57-77 years age group and 1.3% cases belong to >77 years age group. The following table is given below in detail:

Table-1: Age distribution of the patients

Age group	n	%	Mean	St. Deviation
15-35 years	33	43.4	38.16	13.098
36-56 years	36	47.4		
57-77 years	6	7.9		
>77 years	1	1.3		
Total	76	100.0		

In Figure-1 shows gender distribution of the patients where maximum patients were female. The following figure is given below:

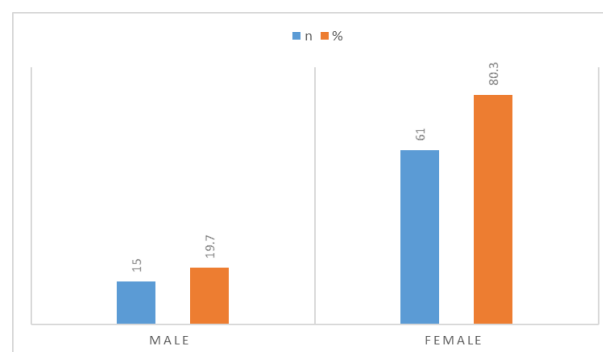


Fig-1: Gender distribution of the patients

In Table-2 shows distribution of the patients according lipid profile. The following table is given below in detail:

Table-2: Distribution of the patients according lipid profile

Lipid profile	N	Minimum	Maximum	Mean	Std. Deviation
TG	76	85.0	357.0	158.192	51.0137
HDL	76	18.0	85.0	38.496	9.6489
LDL	76	30.0	142.0	93.728	21.5684
TC	76	102.0	242.0	161.096	27.5494

In Table-2 shows distribution of lipid profile according to gender wherein female most patients TC were normal, 93.44% followed by 40.99% had TG in borderline, 61.94% had below normal level of LDL. Where as in male group 86.6% cases TC were in normal

level followed by 26.67% cases had borderline level of TG and 60% had below normal level of LDL. There is no significant association of lipid profile level with gender. The following table is given below in detail:

Table-3: Distribution of lipid profile according to gender

Total cholesterol	Female, n (%)	Male, n (%)	P value
Normal	57(93.44)	13(86.67)	0.526
Borderline	3(4.93)	1(6.67)	
High	1(1.63)	1(6.67)	
Triglycerides	Female, n (%)	Male, n (%)	0.585
Normal	27(44.26)	8(53.33)	
Borderline	25(40.99)	4(26.67)	
High	9(14.75)	3(20)	0.675
LDL	Female, n (%)	Male, n (%)	
Normal	19(31.15)	4(26.67)	
Borderline	4(6.56)	2(13.33)	0.675
Below normal	38(61.94)	9(60)	

Here, in Table-4 correlation among lipid profile. One the basis of Pearson correlation TG was positively correlated with TC, LDL and HDL, where

coefficient was .474,.148.110. Similarly, the profile of LDL and HDL were negatively correlated with each other. The following table is given below in detail:

Table-4: Correlation among lipid profile

Correlations		TG	TC	HDL	LDL
TG	Pearson Correlation	1	.474**	.148	.110
	Sig. (2-tailed)		.000	.201	.343
	N	76	76	76	76
TC	Pearson Correlation	.474**	1	.338**	.787**
	Sig. (2-tailed)	.000		.003	.000
	N	76	76	76	76
HDL	Pearson Correlation	.148	.338**	1	-.037
	Sig. (2-tailed)	.201	.003		.750
	N	76	76	76	76
LDL	Pearson Correlation	.110	.787**	-.037	1
	Sig. (2-tailed)	.343	.000	.750	
	N	76	76	76	76

** . Correlation is significant at the 0.01 level (2-tailed).

In Table-5 shows correlation between age and lipid profile where according to Pearson correlation age was significantly and positively correlated with TC, TG

and HDL and negatively correlated with LDL. The following table is given below in detail:

Table-5: Correlation between age and lipid profile

Correlations		Age	TC	TG	HDL	LDL
Age	Pearson Correlation	1	.031	.258*	-.108	-.063
	Sig. (2-tailed)		.790	.024	.352	.591
	N	76	76	76	76	76
TC	Pearson Correlation	.031	1	.474**	.338**	.787**
	Sig. (2-tailed)	.790		.000	.003	.000
	N	76	76	76	76	76
TG	Pearson Correlation	.258*	.474**	1	.148	.110
	Sig. (2-tailed)	.024	.000		.201	.343
	N	76	76	76	76	76
HDL	Pearson Correlation	-.108	.338**	.148	1	-.037
	Sig. (2-tailed)	.352	.003	.201		.750
	N	76	76	76	76	76
LDL	Pearson Correlation	-.063	.787**	.110	-.037	1
	Sig. (2-tailed)	.591	.000	.343	.750	
	N	76	76	76	76	76

*. Correlation is significant at the 0.05 level (2-tailed).

** . Correlation is significant at the 0.01 level (2-tailed).

DISCUSSION

Gall stone disease is one of the most common and most expensive conditions to treat of all digestive disorders requiring admission to hospital [1].

A similar study was conducted by Weerakoon *et al.*, 2014 stated that the mean age of the patients was 40.90 ± 12.65 years [6]. Similar results were also seen in the studies conducted by two studies with the mean ages of 43.18 ± 13.970 years and 44.6 ± 10.4 years respectively [7, 8]. However, in another study illustrated that mean age of the patients was 52.6 ± 13.07 years [9]. Studies done by several studies showed that the majority of the patients belonged to the female gender showing hormonal role in pathogenesis of gallstones [6, 7]. Which was quite similar to our study where most of the patients belong to 36-56 years age group 47.4%, followed by 43.4% cases belong to 15-35 years age group, 7.9% cases belong to 57-77 years age group and 1.3% cases belong to >77 years age group. Also, maximum patients were female, 80.3%. The prevalence of GS depends on the gender where females have a higher incidence. Multiple reasons have been evaluated in the identification of the cause for this gender difference. However a possible effect of serum lipids causing high incidence of GS among females was not identified in study [8].

The mean serum total cholesterol, serum triglycerides was high in gall stone patient but not significant. In the study, LDL cholesterol was significantly high in the case than the control group. Some study found a positive association between gallstone disease and increased levels of serum triglycerides, LDL cholesterol and decreased HDL cholesterol. Some investigators reported a positive association between gallstone and serum triglycerides levels [1].

On the basis of Pearson correlation TG was positively correlated with TC, LDL and HDL, where coefficient was .474, .148, .110. Similarly, the profile of LDL and HDL were negatively correlated with each other. We also found that, age was significantly and positively correlated with TC, TG and HDL and negatively correlated with LDL. Where as in one study reported that, in age group >40 years serum LDL of gallstone patients were statistically significantly raised ($P < 0.05$) (95% CI -22.077; -850) serum total cholesterol and triglycerides were not statistically significantly high ($P > 0.05$). Serum HDL and VLDL were lower in gallstone patients [10].

CONCLUSION

From the result of this study can conclude that, female was high risk of gallstone formation and in both

male and female group more 50% cases had abnormal LDL level. With the increased in serum lipid concentrations, a high number of gallstones were observed in females. Further studies are needed for better outcome.

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