

# Statistical Analysis of Risk Factors Associated with Cholelithiasis: A Case Control Study in Multan

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**Abstract-** Gallstones are crystal like collections that formed by merging of normal and abnormal gallbladder content. Usually there are two types of gallstones exist *i.e.* cholesterol stones & pigment stones. The current paper focuses on symptoms of the disease, major cause for the disease and on the treatments that majority of patients preferred. For this purpose, sample of size 170 data from different hospitals in Multan is collected by using convenience sampling. Main demographic factors involved in this study are Gender, Age group, marital status for patients of GSD. Frequency distribution has been formed for these different demographic and social factors and a bar chart is constructed for differentiating between gender as gender is also an important factor in GSD. For weight factor, paired t test is applied to see the difference between before and after weight after having treatment. Findings show that 67 percent people prefer govt. hospitals because of the people suffering from this disease were from backward areas or villages & their income not meet to pay the private hospitals expense.

**Index Terms-** Biostatistics, Gallstone, Treatment, Hospital, Descriptive Analysis.

## I. INTRODUCTION

This article summarize the factors that effected on Gallstone. People defined GSD in their own way as according to **Adler et al. (2004)** Gallstones are not really stones. They are pieces of solid material form in gallbladder, a small organ located under the liver. Gallstone may develop when there is too much cholesterol. However, if your liver makes more cholesterol than your bile can dissolve, hard stones may develop. In the majority of patients cholesterol stones are present. In many people the cause for gallstone appears to be interaction between hereditary cause and the diet. Many People Previously worked on gallstone as **Chen et al. (2006)** Studied the risk factors and prevalence of gallstone disease and their aim was to determine the prevalence and risk factors of gallstone disease (GSD) by taking adult Chinese population from Taiwan. **Loria et al. (2005)** reported insulin resistance is a risk factor of the gallstone disease in non-fatty liver (NAFLD). They diagnosed by ultrasonography complete with (NAFLD) in 61 patients out of 161 patients. **Festi et al. (2008)** studied the gallstone incidence and risk factors in a large population through questionnaire and physical examination. They found that 9618 out of 18179 (86.5%) subjects were gallstone free at the cross sectional study and age in men and BMI in females were predictors of pain. By using logistic regression analysis, odd ratio, hazard regression, multivariate analysis increasing age and BMI represent true risk factors for gallstones disease; pain in a right hypochondrium and epigastria is confirmed as the only symptoms related to gallstones. **Leitzmann et al. (1998)** discussed about physical activity that it cause decreases risk for symptomatic gallstone disease in men or not by taking data of 45813 men aged 40 to 75 years old were followed from 1886 to 1894. They used multivariate logistic model and found that 34% of cases of symptomatic gallstones disease in men could be prevented by increasing exercise to 30 minutes of endurance type training pre times per week. **Tsai et al. (2005)** studied consumption of trans fatty acids in relation to the risk of gallstone disease in a cohort of 45918 men transfatty acid consumption was assessed using a validated semi quantitative food frequency questionnaire. Newly diagnosed gallstones disease by radiology or cholecystectomy was ascertained biennially. During 14 years of follow up were documented 2356 new cases of symptomatic GS. They used multivariate analysis and the result suggested the higher intake of trans fatty acid modestly increase risk of GS disease. This adds to the concern that partial hydrogenation of vegetables oils to form shortening and margarine can lead to adverse health effects.

## II. Research Elaborations

For the analysis, data was taken from different private and govt. hospital from Multan by using convenience sampling. There were 170 observations of Patients in sample study. For the analysis, descriptive statistics is constructed on different questions from questionnaire and frequency distribution is formed for different variables. For percentage, a column of percentage is constructed for different characteristics in the sample. Paired t test is performed to see the difference between weight increments. For the analysis purpose *SPSS* software is used.

## III. Results or Findings

### A. Frequency Distribution

The total number of sample was 170 in which the male and female percentage can be shown from the following table also different age groups for the patients in sample can be categorized as below:

**Table 3.1** Socio-Demographic Characteristics of the Sample

Gender	Frequency	Percentage
Male	48	28.2%
Female	122	71.8%
<b>Age Group</b>		
18-27	27	15.8%
28-43	64	37.6%
44-60	65	38.2%
61 or above	11	8.2%
<b>Marital Status</b>		
Single	29	17%
Married	124	72.9%
Widowed	15	8.8%
Divorced	2	1.17%
<b>Occupational Status</b>		
Private Hospital	61	35.8%
Government Sector	109	64.1%

The sample description shows that there are 48 males and 122 females in the survey while if we talk about the age description then 27 persons were lying in the range of 18-27, 64 persons were lying in the range of 28-43, 65 persons were lying in the range of 44-60, and 14 persons were lying in the range of 61 or above. The selected sample was also distributed according to the marital status. There were 29 single persons, 124 were married, 15 were widowed and 2 was divorced person. The sample was also considered according to the profession. 61 persons were from private hospital, 109 persons were from govt. hospital. We also analysed about the last symptoms of the disease that the patients feel last time before diagnosis so there was following symptoms they feel last time before diagnose the disease:

**Table 3.2** Frequency Distribution Last symptoms of disease

Last Symptoms of Disease	Frequency	Percent
Pain	41	24.1%
Nausea	7	4.1%
Vomiting	35	20.6%
Pain & nausea	13	7.6%
Pain, nausea & Vomit	11	6.47%
Others	63	37.1%

Last Symptoms of Disease	Frequency	Percent
Pain	41	24.1%
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Vomiting	35	20.6%
Pain & nausea	13	7.6%
Pain, nausea & Vomit	11	6.47%
Others	63	37.1%
<b>Total</b>	<b>170</b>	<b>100%</b>

The above table shows the frequency and percentage of last symptoms of GSD. It is clear that the percentage of others symptoms is higher than the other factors which show that more person felt different other symptoms of GSD. Similarly nausea has less frequency as compare to other symptoms it means that only 7 people felt it as a last symptoms of GSD. There are certain treatments that people preferred for this disease. The following table represent the frequency distribution about the types of treatments that people took after diagnosis the disease.

**Table 3.3** Frequency Distribution of Types of treatment

Type of Treatment	Frequency	Percent
X-ray	51	30%
Scan	2	1.2%
Endoscopy	8	4.7%
Ultrasound	76	44.7%
X-ray, scan and ultrasound	33	19.42%
<b>Total</b>	<b>170</b>	<b>100%</b>

The above table shows the frequency and percentage of type of treatment of GSD. It is clear that the percentage of ultrasound is higher than the other factor which shows that more persons follow the treatment of ultrasound. Similarly scanning has less frequency as compare to other type of treatments it means that only 2 people took it as a treatment of GSD. From literature, it is clear that there are certain causes by which people effects from this disease so the following table show the analysis of different reasons people think are the reason of effecting for this disease:

**Table 3.4** Frequency Distribution of causes of GSD

Causes of GSD	Frequency	Percent
your genes	3	1.8%
Weight	17	10%
Diet	97	57.1%
Others	51	30%
Weight & Diet	2	1.2%
<b>Total</b>	<b>170</b>	<b>100%</b>

The above table shows the frequency and percentage of causes of GSD. It is clear that the percentage of other causes is higher than the other factors which shows that more person felt different other causes of GSD. Similarly weight & diet less frequency as compare to other causes it mean that only 2 people felt it as a causes of GSD. There was a question about the general symptoms of GSD. All the responses are calculated and given in the table below;

**Table 3.5** Frequency Distribution of General symptoms of GSD

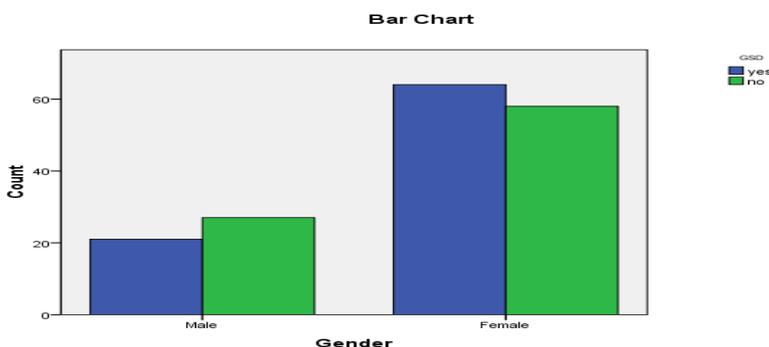
General Symptoms	Frequency	Percent
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Constipation	22	12.9%
Swelling	20	11.8%
Indigestion	14	8.2%
Pain in abdomen	46	27.1%
Any two or three from above	40	24%
Others	28	16.5%
<b>Total</b>	<b>170</b>	<b>100.0</b>

The above table shows the frequency and percentage of general symptoms of GSD. It is clear that the percentage of pain in abdomen is higher than the other factor which shows that more people felt pain in abdomen. Similarly indigestion has less frequency as compare to other symptoms it means that only 14 people felt it as a general symptoms of GSD.

*B. Bar Char*

Gender is considered as an important factor in GSD as female effected more as compare to male in general from this disease so the following graphical representation can help us to see the situation in our sample. The following figure of diseased & Non Diseased in Gender are given below.



**Figure 3.1** Frequency Distribution of Disease or no Disease in Gender

The above bar chart shows the gender and the GSD, from chart it is clear that female have more chances of gallstone disease as compare to men and also from our collected data, more female were observed to having this disease.

*C. Paired t-Test*

As on gallstone, cholesterol level is a very important factor in having this disease. We can see that almost patients have more weight before the treatment than having after the treatment. So we checked this assumption by using paired t test as follows.

$H_0$ : Patients have more weight after the treatment i.e.  $\mu_D \geq 0$

$H_1$ : Patients have less weight after the treatment i.e.  $\mu_D < 0$

**Table 3.6** paired samples Statistics

	Mean	N	Std. Deviation	Std. Error Mean
Pair 1 Weight before treatment	66.95	170	10.151	.779
weight after treatment	65.34	170	9.617	.738

**Table 3.7 Paired Samples Correlations**

	N	Correlation	Sig.
Pair 1 Weight before treatment & weight after treatment	170	.884	.000

From the above table, it can be seen that before treatment sample mean is greater than after treatment sample mean and the result can be justified by testing of hypothesis as  $P < 0.05$ , so the results are significant i.e. patients have less weight after the treatment as compare to before treatment.

#### IV. CONCLUSION

From the above results, the frequency for different causes and symptoms of the GSD can be seen and overall the majority reasons for GSD, main symptoms of GSD and the treatments that majority of patients preferred can be seen from the descriptive analysis. From Paired t test it is clear that people have less weight after the treatment as compare to before treatment while mostly people like to go in govt. hospitals for the purpose of treatment because majority of them was from backward areas.

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