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ORIGINAL ARTICLE

DISTRIBUTION OF GALL STONE DISEASE BY SEX, AGE GROUPS & SEVERITY IN POPULATION OF NAWABSHAH, PAKISTAN

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ABSTRACT

Background: Gall stone disease is one of the most common gastrointestinal diseases that affect huge population all over the globe. The pathogenesis of gall stone disease is related to environmental, individual and genetic factors. Our objectives were to determine the distribution of gall stone disease by sex, age groups and severity in population of Nawabshah, Pakistan.

Materials & Methods: This cross-sectional study was conducted in the Department of Surgery, People University of Medical & Health Sciences, Nawabshah, Pakistan from Feb. 2021 to Sep. 2021. A sample of 200 patients was included from People University of Medical & Health Sciences Hospital, Nawabshah. The distribution of gall stones by sex, age groups and severity were analyzed by counts & percentages for the sample with confidence interval for proportion at 95%CL using normal approximation method.

Results: Out of 200 patients of gall stones, 87 (43.5%) were men and 113 (56.5%) women, while 73 (36.5%) were in the age group ≤40 years and 127 (63.5%) in the age group >40 years. Out of 200 patients, 118 (59%) had uncomplicated gallstones and 82 (41%) had complicated gall stones.

Conclusion: Our study revealed that the prevalence of gall stones was higher in women than men and higher in age group >40 years than ≤40 years. Further the prevalence of uncomplicated gall stones was higher than complicated gall stones. So, early screening of gall stones in elderly patients and women by ultrasound is advantageous in terms of early detection of asymptomatic gall stones and prevention of complications.

KEY WORDS: Gall Stones; Cholelithiasis, Cholecystitis; Empyema; Gall Bladder Elective cholecystectomy; ERCP; Common Bile Duct Calculi; Biliary Calculi; Cholangiography; Acute Pancreatitis.

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1. INTRODUCTION

1.1 Background: Gall stone is very common gastrointestinal disease that affects huge population all over the globe.[1] The pathogenesis of gall stone disease is multifactorial. It is related to environmental, individual and genetic factors. Some other risk factors are glucose intolerance, obesity, insulin resistance, rapid weight loss, high dietary glycemic load, use of alcohol, diabetes mellitus, hypertriglyceridemia, drugs and pregnancy.[2] The synthesis of gallstone is due to super saturation of bile in gall bladder, cholesterol enucleation and gall bladder dysmotility.[1]

Gallstone disease is described by the presence of intraluminal echoes in gall bladder that are gravity dependent and that debilitate ultrasound transmission. Gallstone disease is a significant health problem affecting 10-20% of adult population in United States.[3] In Indian population, the incidence of gallstone disease was 6.12% in year 2010.[4] Almost near a million cholecystectomies are performed in United States in a year which poses a burden of $6.5 billion on economy.[5] In Pakistan, the prevalence of gallstone disease is about 10.2%.[6]

Gall stone disease can be clinically silent/ asymp-

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tomatic and occasionally diagnosed on abdominal ultrasound or it can be symptomatic due to stone obstructing the cystic duct.[7] The symptoms of gallstones include pain; frequently about two hours after meals, more with heavy meals. Usually the pain starts in right upper quadrant of the abdomen or in the epigastrium. It radiates frequently to the angle of the right scapula or shoulder, and in some cases to retrosternal area. Symptomatic gallstone disease may further be categorized as uncomplicated and complicated gallstone disease. Uncomplicated gallstone disease includes gallstones that are asymptomatic or those causing biliary colic. Impacted stone leads to complications. The spectrum of complicated gall stone disease includes acute cholecystitis, mucocele, empyema of gall bladder, porcelain gallbladder, common bile duct stones and carcinoma gall bladder. The CBD stones can cause life endangering cholangitis & pancreatitis.[8]

Chen, et al.[9] from Tulane University, New Orleans, Louisiana, USA for the period between August 2003 and April 2004 found that prevalence of gallstone disease was 55.95% (94*100/168=55.95) in women and 44.05% (74*100/168=44.05) in men, while the distribution by age was 7.74% (13*100/168=7.74) in <40 years age group & 92.26% (155*100/168=92.26) in ≥40 years age group.

Völzke, et al.[10] in cross-sectional population-based survey from West Pomerania, North-Eastern Germany found that prevalence of gall stones was 65.77% (586*100/891=65.77) in women and 34.23% (305*100/891=34.23) in men.

Shabanzadeh, et al.[11] from Denmark in October 1982 found that prevalence of gall stones was 55.08% (141*100/256=55.08) in women and 44.92% (115*100/256=44.92) in men.

Acalovschi, et al.[12] from Cluj-Napoca, Romania in 2003 found that prevalence of gall stone disease was 50.71% (71*100/140=50.71) in women and 49.29% (69*100/140=49.29) in men, while prevalence was 30.71% (43*100/140=30.71) for complicated gall stone disease and 69.29% (97*100/140=69.29) for uncomplicated gall stone disease.

Sun, et al.[13] from Chengdu, Sichuan Province, China for the period between January and December 2007 found that prevalence of gall stone disease was 52.86% (203*100/384=52.86) in women and 47.14% (181*100/384=47.14) in men, while distribution of gall stones was 23.18% (89*100/384=23.18) in <40 years old and 76.82% (295*100/384=76.82) in ≥40 years group.

Mishra, et al.[14] from Hyderabad, India for the period from January 2007 to December 2013 found that prevalence of gall stone disease was 84.71% (216*100/255=84.71) in women and 15.29% (39*100/255=15.29) in men, while prevalence was 17.25% (44*100/255=17.25) for complicated and 82.75% (211*100/255=82.75) for uncomplicated gall stones.

Jadoon, et al.[15] from Abbottabad, Pakistan for January-December 2017 found that prevalence of gall stone disease was 88.16% (283*100/321=88.16) in women and 11.84% (38*100/321=11.84) in men, while it was 22.12% (71*100/321=22.22) in ≤40 years and 77.88% (250*100/321) in >40 years old.

1.2 Research problems (RPs), Knowledge Gaps (KGs) & Research Questions (RQs): Unawareness about the distribution of gall stone disease by sex, age groups and severity in population of District Nawabshah, Pakistan were our three RPs. Our three KGs were non-availability of data regarding these three RPs. What is the distribution of gall stone disease by sex, age groups & severity are our three RQs.

1.3 Research Objectives (ROs)

RO 1-3: The objectives of this study were to determine the distribution of gall stone disease by sex, age groups and severity in population of Nawabshah, Pakistan.

1.4 Significance: Having local data available about the distribution of gall stone disease by sex and age groups, we can identify groups with the higher risk of gall stones. This data will guide health professionals about the complications rate in patients presenting with gall stone disease.

2. MATERIALS AND METHODS

2.1 Design, Setting & Duration: This cross-sectional study was conducted in the Department of Surgery, People University of Medical & Health Sciences, Nawabshah, Pakistan from Feb. 2021 to Sep. 2021 after approval from the Hospital Ethical Committee.

2.2 Population & Sampling: All adult patients with gall stone disease were eligible. Gall stone patients with pregnancy were excluded. A sample of 200 patients was included from People University of Medical & Health Sciences Hospital, Nawabshah.

2.3 Conduct of procedure: Ultrasonic evaluation of the right hypochondrium/ hepatic area was performed using Versa Plus Ultrasound Unit (Siemens, Erlangen, Germany). All ultrasonic studies were carried out by a single experienced radiologist. All patients were examined on ultrasound in supine position. To acquire the desirable access for both the liver and gallbladder examination, patients were guided to put their right arm on their head in order to properly allocate the hepatic area on ultrasound by maximizing the distance between the lower costal margin and the iliac crest.

If hyperechoic structures were detected within gall bladder lumen on ultrasound, further evaluation was done on standing position to confirm whether the structures are mobile and gravity dependent (gall bladder stones) or adherent to the gall bladder wall (e.g. gall bladder polyps).

2.4 Data collection plan: The presence of gall stones (yes & no) was our research variable. Sex (men & women), age groups (≤40 years & >40 years) and severity of gall stones (uncomplicated & complicated) were our three demographic variables/ disease factors. The data for all these variables was collected on nominal scale.

2.5 Data Analysis plan: The distribution of gall stones by sex, age groups & severity were analyzed by counts & percentages for the sample with confidence interval for proportion at 95% CL by normal approximation method.[16]

3. RESULTS

3.1 Distribution of gall stone disease by sex & age group: Out of 200 patients of gall stones, 87 (43.5%) were men and 113 (56.5%) were women, while 73 (36.5%) patients were in the age group ≤ 40 years & 127 (63.5%) in the age group >40 years.

The prevalence of gall stone disease was higher in women as compared to men, while it was higher in age group >40 years. (Table 3.1)

3.2 Distribution of gall stone disease by Severity: Out of 200 patients of gall stones, 118 (59%) had uncomplicated gallstone disease and 82 (41%) had complicated gall stones. So the prevalence of uncomplicated gall stones was higher than complicated gall stones. (Table 3.2)

4. DISCUSSION

The prevalence of gallstones varies among different regions, having 5.9%-21.9% in West and 5.9%-21.9% in Asia and <5% in Africa.[17] The prevalence is higher in developed countries as compared to developing countries.[15]

About 75% gall stones are asymptomatic and occasionally diagnosed on ultrasound, whereas 25% are symptomatic causing biliary colic, acute cholecystitis or acute cholangitis.[18] The early screening of gall stones by ultrasound is advantageous in terms of early detection of asymptomatic gall stones, which can prevent complications e.g. acute cholangitis or acute pancreatitis.[19]

4.1 Distribution of gall stone disease by sex: In our study, the prevalence of gall stones was more in women 56.5% than men 43.5%. Seven studies are placed here with similar results to our study.

Jadoon, et al.[15] from Abbottabad, Pakistan found that prevalence of gall stone disease was 88.16% in women and 11.84% in men. Mishra, et al.[14] from Hyderabad, India found that prevalence of gall stone disease was 84.71% in women and 15.29% in men. Sun, et al.[13] from Chengdu, Sichuan Province, China found that prevalence of gall stone disease was 52.86% in women and 47.14% in men. Acalovschi, et al.[12] from Cluj-Napoca, Romania found that prevalence of gall stone disease was 50.71% in women and 49.29% in men. Shabanzadeh, et al.[11] from Denmark found that prevalence of gall stones was 55.08% in women and 44.92% in men. Völzke, et al.[10] in cross-sectional population-based survey from West Pomerania, North-Eastern Germany found that prevalence of gall stones was 65.77% in women and 34.23% in men.

4.2 Distribution of gall stone disease by age groups: As per our study, the prevalence of gall stones was higher in age group >40 years 63.5% as compared to ≤40 years 36.5%. Following three studies have similar results as ours.

Table 3.1: Distribution of gall stone disease by sex and age groups in population of Nawabshah, Pakistan

Variables	Attributes	Sample Statistics		95% CI for proportion	
		Count	Percentage	Lower	Upper
Sex	Men	87	87*100/200=43.5%	36.63	50.37
	Women	113	113*100/200=56.5%	49.63	63.37
Age groups	≤40 years	73	73*100/200=36.5%	29.83	43.17
	>40 years	127	127*100/200=63.5%	56.83	70.17
Total		200	100%	Population parameters	

Table 3.2: Distribution of gall stone disease by severity in population of Nawabshah, Pakistan

Variable	Attributes	Sample Statistics		95% CI for proportion	
		Count	Percentage	Lower	Upper
Severity	Uncomplicated	118	118*100/200=59%	52.18	65.82
	Complicated	82	82*100/200=41%	34.18	47.82
Total		200	100%	Population parameters	

Jadoon, et al.[15] found that prevalence of gall stone disease was 77.88% in >40 years age group and 22.12% in ≤40 years age group. Sun, et al.[13] from China found that prevalence of gall stone disease was 76.82% in ≥40 years group and 23.18% in <40 years age group. Chen, et al.[9] from Tulane University, New Orleans, Louisiana, USA found that prevalence of gall stones was 92.26% in ≥40 years age group and 7.74% in <40 years age group.

4.3 Distribution of gall stone disease by severity: On the basis of severity, our study revealed that the prevalence of uncomplicated gall stones 59% was higher than complicated gall stones 41%. Following two studies had similar results.

Mishra, et al.[14] from Hyderabad, India found that prevalence of gall stone disease was 82.75% for uncomplicated and 17.25% for complicated gall stones. Acalovschi, et al.[12] from Cluj-Napoca, Romania found that prevalence of gall stone disease was 69.29% for uncomplicated gall stone disease and 30.71% for complicated gall stone disease.

4.4 Marwat Logical Trajectory of Research Process: We have adapted this logical trajectory by following its seven out of eight steps; research problems, knowledge gaps, research questions, research objectives, data collection, data analysis and data interpretation.[20-23]

5. CONCLUSIONS

Our study revealed that the prevalence of gall stones was higher in women than men and higher in age group >40 years than ≤40 years. Further the prevalence of uncomplicated gall stones was higher than complicated gall stones. So, early screening of gall stones in elderly patients and women by ultrasound is advantageous in terms of early detection of asymptomatic gall stones and prevention of complications.

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CONFLICT OF INTEREST
Authors declare no conflict of interest.
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AUTHORS' CONTRIBUTION

The following authors have made substantial contributions to the manuscript as under:

Conception or Design:	RA, LR
Acquisition, Analysis or Interpretation of Data:	RA, LR, EK, AHJ, UM, MS
Manuscript Writing & Approval:	RA, LR, EK, AHJ, UM, MS

All the authors agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.