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SYMPTOMATIC GALLSTONES IN DIABETIC PATIENTS OF MANSEHRA AND ABBOTTABAD

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Abstract

ABSTRACT

Background:

Gallstone disease is a common gastrointestinal disorder and is frequently associated with diabetes mellitus. Diabetic patients are at increased risk of developing gallstones due to metabolic and physiological alterations. Ultrasonography is a reliable, non-invasive method for detecting gallstones and assessing their characteristics.

Objective:

To determine the ultrasonographic prevalence of symptomatic gallstones among diabetic patients in the regions of Mansehra and Abbottabad. Additionally, the study aims to assess the association between gallstone formation and various demographic and clinical factors, including age, gender, body mass index, and duration of diabetes. It also seeks to evaluate the common presenting symptoms, particularly gastrointestinal complaints such as postprandial abdominal pain, nausea, and vomiting

Methodology:

A cross-sectional observational study was conducted in the radiology departments of selected public and private hospitals in Mansehra and Abbottabad over a period of six months. A total of 290 diabetic patients aged above 18 years were included using non- probability purposive sampling. Data were collected through a structured questionnaire and ultrasound findings. The data were analyzed using SPSS version 25, and results were presented as frequencies and percentages.

Results:

The overall prevalence of gallstones among diabetic patients was 55.4%, indicating a high burden of the disease in this population. The majority of participants were aged 36–50 years (38.1%), with a slight female predominance (51.6%). In terms of body mass index, a considerable proportion of patients were either overweight (38.1%) or obese (30.8%), suggesting a possible association between increased body weight and gallstone formation. Most patients had duration of diabetes between 5–10 years (38.1%), reflecting the potential impact of long-standing diabetes on gallbladder function.

Regarding clinical presentation, the most commonly reported symptom was postprandial abdominal pain (51.9%), followed closely by nausea and vomiting (50.2%), while jaundice was less frequently observed (27.7%). Furthermore, patients diagnosed with gallstones demonstrated a significantly higher frequency of post-meal abdominal pain (75.0%) and nausea/vomiting (71.9%) compared to those without gallstones, highlighting the clinical relevance of these symptoms in predicting

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gallstone disease.

Conclusion:

The study concluded that gallstones are relatively common among diabetic patients, with a prevalence of 55.4%. The findings highlight the importance of routine ultrasonographic screening in diabetic individuals, particularly those presenting with gastrointestinal symptoms, for early detection and prevention of complications.

1. INTRODUCTION

Gallstone disease is a significant global health problem, with its prevalence increasing due to aging populations, urbanization, and the adoption of Westernized dietary habits. It affects approximately 10–20% of the adult population worldwide and represents a growing burden on healthcare systems, leading to increased hospitalizations, surgical interventions, and healthcare costs [1, 2].

The prevalence of gallstones increases with age and is more common in women than in men. A large proportion of patients with gallstones remain asymptomatic, and the condition is frequently detected incidentally during diagnostic imaging or surgical procedures performed for other reasons. It is reported that approximately 80% of cases are asymptomatic.Although Symptoms develop in about 10% of patients within 5 years and 20% within 20 years. Patients with symptomatic gallstones often experience recurrent symptoms, with around 70% having a recurrence within 2 years. The risk of complications is higher after the first colic episode, ranging from 1-3% per year, compared to 0.1-0.3% per year in asymptomatic patients [3, 4,5].

Gallstone formation is a multi factorial process involving cholesterol super saturation of bile, nucleation and crystallization, impaired gallbladder motility, and altered bile metabolism. Aging contributes to gallbladder hypomotility and bile stasis, further promoting stone formation [6].

Gallstones become symptomatic when a stone blocks the cystic duct. Typical symptoms include pain in the right upper abdomen or epigastrium, often starting about two hours after meals, especially heavy ones. This pain can radiate to the right shoulder or scapula, and sometimes to the chest. Symptomatic gallstones are classified as uncomplicated (asymptomatic or biliary colic) or complicated. Complications arise when a stone gets stuck, leading to issues like acute cholecystitis, gallbladder empyema, common bile duct stones, or even life- threatening cholangitis and pancreatitis [7].

Furthermore, symptomatic gallstones are clinically significant because they often require medical or surgical intervention, most commonly cholecystectomy. In this regard, it is noteworthy that each year, over 600,000 hospitalizations and approximately 1.8 million ambulatory care visits occur, resulting in costs exceeding USD 6.5 billion attributed to symptomatic gallstone disease and its treatment [8].

Gallstone disease is associated with various risk factors, which can be categorized into non-modifiable and modifiable factors. Non-modifiable risk factors include female gender, family history, age, and ethnicity. In contrast, modifiable risk factors comprise dyslipidemia, sedentary lifestyle, diet, and certain medications such as thiazide diuretics, ceftriaxone, octreotide, female sex

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hormones, obesity, and diabetes. Ethnic background and familial predisposition also play significant roles in gallstone formation [9].

Diabetes mellitus (DM), or simply diabetes, is a complex metabolic disorder marked by hyperglycemia, a condition with persistently high blood glucose levels, showing a physiological imbalance. Diabetes is broadly classified into type 1, type 2, and other specific types. Type 1 diabetes accounts for 5–10% of cases, previously known as insulin-dependent diabetes mellitus. Type 2 diabetes makes up 90–95% of cases, formerly called non-insulin- dependent diabetes mellitus. T1DM is an autoimmune condition where the body's immune system attacks insulin-producing beta cells in the pancreas, while T2DM is largely associated with insulin resistance and impaired insulin secretion. In 2019, about 463 million adults aged 20–79 years had diabetes, representing 9.3% of the global adult population. This number is estimated to rise to 578 million by 2030, representing 10.2% of the global adult population, and further increase to 700 million by 2045, representing 10.9% of the global adult population. In 2019, diabetes prevalence was 9.6% among men and 9.0% among women globally. Furthermore, in 2019, approximately 4.2 million adults aged 20–99 years died due to diabetes and its complications, with diabetes health expenditure estimated at least 760 billion USD, representing 10% of total adult spending. Diabetes in pregnancy affected over 20 million live births (1 in 6 live births) in 2019 [10].

The chronic hyperglycemia of diabetes is associated with damage, dysfunction and failure of various organs, especially the eyes, kidneys, nerves, heart and blood vessels. Various studies point towards the increased prevalence of gall bladder diseases like gall stones in diabetics. This has been attributed to cholecystomegaly & impaired gall bladder contraction, mainly due to autonomic neuropathy seen in diabetics .Since the asymptomatic period of hyperglycemia, is on an average of 5 to 7 years, many individuals tend to have complications of diabetes microvascular or macrovascular at the time of diagnosis itself. Among various microvascular complications like retinopathy, nephropathy and neuropathy, autonomic neuropathy although a well recognized complication. In autonomic neuropathy manifests as nocturnal diarrhea, esophageal dysmotility, constipation and gallbladder dysfunction, being consequence of vagal neuropathy leading to reduced gastrointestinal motility [11].

Numerous global studies have documented that diabetic patients have a higher prevalence of gallstones compared to non-diabetic individuals, with studies suggesting a relative risk ranging from 2 to 3 times higher the prevalence of gallstones is reported to be increased in patients with type 2 diabetes, with many studies indicating that diabetic individuals are two to three times more likely to develop gallstones compared to non-diabetics, although the association remains controversial. The underlying mechanisms are not well understood, but proposed contributing factors include hypertriglyceridemia, inadequate gallbladder emptying and increased volume, autonomic neuropathy leading to gallbladder hypomotility and biliary stasis, and hyperinsulinemia [12].

Studies have shown that diabetes is associated with increased morbidity and complications in gallstone-related conditions. For instance, one study of 566 cholecystectomies for acute cholecystitis reported higher morbidity (21% vs. 9%) and mortality rates in diabetics compared to

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non-diabetics. Another study demonstrated a significantly higher complication rate in diabetic patients (38.9% vs. 20.8%), with infections occurring three times more frequently, likely due to impaired immune response. Diabetics with gallstones should be closely monitored for signs of complications [13].

Despite cholecystectomy being the standard treatment for symptomatic gallstones, it carries potential risks and long-term consequences, making careful patient selection important. Additionally, recurrence of biliary complications such as cholecystitis, cholangitis, and pancreatitis can significantly impact patients' health and quality of life. Risk factors such as advancing age, genetic predisposition, use of certain medications, and underlying gallbladder dysfunction further contribute to disease severity [2].

Ultrasonography (USG) is the primary imaging technique for evaluating the biliary system, especially the gallbladder. On USG, a gallstone appears as an echogenic structure within the gallbladder lumen, casting a distal acoustic shadow, with a sensitivity of up to 96% for diagnosing gallstones [14].

Gallstone disease and Diabetes are significant global healthcare burden, In South Asia, especially Pakistan, diabetes mellitus poses a substantial health burden, affecting around 11.77% of the population [15].

The coexistence of gallstones and diabetes in Mansehra and Abbottabad is an underexplored public health concern. Local research is limited, and ultrasonography is ideal for epidemiological studies. Therefore, localized studies are needed to determine the ultrasonographic prevalence of symptomatic gallstones in diabetic patients, enhancing understanding and informing screening, prevention, and management strategies.

1.1 OBJECTIVE:

To determine the prevalence of symptomatic gallstones by using abdominal ultrasonography among diabetic patients attending healthcare facilities in Mansehra and Abbottabad ,and also evaluate associated clinical features such as nausea/vomiting and gallstone relation with duration of diabetes mellitus,age, gender, and BMI.

1.2 RATIONALE:

Most existing studies on gallstone disease include mixed populations of both symptomatic and asymptomatic cases, which may overestimate or misrepresent the true clinical burden of disease requiring medical attention. In addition, diabetic patients—who represent a known high-risk group due to metabolic and hormonal alterations—are often not analyzed separately or in sufficient detail using standardized ultrasonographic criteria. This creates a gap in understanding the true ultrasonographic prevalence of symptomatic gallstones specifically among diabetic patients. Therefore, there is a need for focused research to accurately determine the burden of symptomatic gallstone disease in diabetic individuals using ultrasound-based diagnosis in Mansehra and Abbottabad.

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1.3 SIGNIFICANCE OF STUDY:

This study is important due to the increasing prevalence of diabetes mellitus and its association with gallstone disease. It highlights the need for early detection of gallstones in diabetic patients to prevent complications. Clinically, the study emphasizes the role of ultrasonography as a reliable, non-invasive tool for diagnosis. From a public health perspective, it provides valuable local data from Mansehra and Abbottabad, where limited research exists. Academically, it contributes to understanding the relationship between diabetes and gallstones and supports future research. Overall, the study helps improve screening, management, and prevention strategies for gallstone disease in diabetic patients.

s. LITERATURE REVIEW

Gallstones disease has been extensively studied across different populations with numerous research articles highlighting its prevalence, risk factors and association with metabolic disorders such as Diabetes mellitus. The relationship between diabetes and gallstones has gained significant attention due to the increasing global burden of both conditions. Symptomatic gallstones pose a significant concern due to their complications and the need for surgical and medical management. Patients with diabetes mellitus have an increased risk due to metabolic changes and impaired gallbladder function. Ultrasonography is the first-line diagnostic tool because of its accuracy, safety, and availability [5, 14, 16].

A substantial body of literature has demonstrated a strong association between diabetes mellitus and gallstone disease. Studies suggest that diabetic patients have approximately two to three times higher risk of developing gallstones compared to non-diabetic individuals [12].

Evidence from different countries supports this association. A cross-sectional study conducted at a private hospital in Bangladesh investigated the frequency of diabetes mellitus among 51 adult patients diagnosed with gallstones via abdominal ultrasonography. The study found that 37.3% of patients had diabetes, with a higher prevalence among females. Additionally, 35.3% had overt diabetes, 21.6% had pre-diabetes, and 43.1% had normal fasting glucose levels. The study highlights the need for routine diabetes screening and integrated management in gallstone patients to reduce complications and improve outcomes [15].

A study in Italy found, gallstones in 24.8% of diabetic patients compared to 13.8% in the general population, indicating a higher incidence in diabetic patients. The study suggests a significant association between diabetes and gallstone disease. This suggests that diabetes plays an independent role in gallstone formation, possibly through metabolic and hormonal mechanisms.

In Nigeria observational study reported that, gallstones were found in 17.5% of diabetic patients, showing a notable prevalence in this population. This highlights the need for regular screening in diabetic patients.

A case-control study claims that in Iraq (Baghdad), gallstones were found in 33% of type 2 diabetic patients compared to 17% of non-diabetic patients, highlighting a significant association. The study recommends further research on risk factors.

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Research in Libya reported that, gallstones were found in 39.8% of diabetic patients, indicating a high incidence in this group. The study emphasizes the importance of monitoring diabetic patients for gallstone disease [17].

In Pakistan, available studies also demonstrate a significant coexistence of diabetes and gallstone disease. One of the cross-sectional studies conducted at Liaqat University Civil Hospital, Hyderabad, Pakistan, reported that among 204 patients with cholelithiasis, 36.6% (74 patients) also had non-insulin-dependent diabetes mellitus, with a higher prevalence in females (56 females, 18 males). The majority of patients with both conditions were in the 50–60 age group. The study highlights a significant association between cholelithiasis and NIDDM, emphasizing the need for screening diabetic patients for gallstones [13].

Another study conducted at District Head Quarters Hospital, Swabi, Pakistan, reported that among 112 patients with upper right quadrant pain, 60% had multiple gallstones, with 36.4% of them being diabetic, indicating a significant association between diabetes and multiple gallstones. The study suggests routine ltrasonographic screening in diabetic patients with right hypochondriac pain for early detection and better management [18].

2. MATERIAL AND METHOD

2.1 Study Design:

Cross sectional observational study.

2.2 Study Settings:

Radiology department of public and private hospitals of Mansehra and Abbottabad.

Public settings include King Abdullah Teaching Hospital Mansehra DHQ Abbottabad and Ayyub Teaching Hospital Abbotttabad and private hospitals Include Mansehra Medical Complex, Chinar Hospital Abbottabad, Real Diagnostic Center Abbottabad, to get variety of patients.

2.3 Study Duration:

6 months

2.4 Sample Size:

The estimated prevalence (p)of asymptomatic gallstones among diabetic patients were taken as 25.2%, based on a previous cross-sectional study conducted in Iraq. A 95%confidence level and 5% margin of error was assumed by using statistical formula given below [8].

$n = z^2 \times p \times q / d^2$

where

Z = 1.96 for 95% confidence

p = 0.25 (expected prevalence), d = 0.05 (margin of error)

The calculation yielded a minimum sample size of 290 participants.

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2.5 Sampling Technique:

Non probability purposive sampling

2.6 SAMPLE SELECTION:

2.6.1 Inclusion Criteria:

- Adults' patient>18 years referred for abdominal ultrasound.
- Patients with a confirmed diagnosis of diabetes mellitus.
- Diabetic Patients presenting with symptoms suggestive of gallstones
- Diabetic patients attending outpatient or in patient departments of selected hospitals /clinics in Mansehra and Abbottabad

2.6.2 Exclusion Criteria:

- History of Cholecystectomy.
- Diabetic autonomic neuropathy (DAN) is excluded to avoid confounding bias because it independently affects gall bladder function and can alter the prevalence of GB stone.
- Patients with known gallbladder disease unrelated to diabetes diagnosed prior to diabetes
- Pregnancy is excluded, because of increased levels of estrogen and progesterone alter gallbladder function and promote gallstone formation, which can confound the true prevalence in diabetic patients.

2.7 DATA COLLECTION PROCEDURE:

After obtaining approvals from the Ethics Committee of FIMS Mansehra. The data were collected from diabetic patients referred for abdominal ultrasound in district Mansehra and Abbottabad hospitals. Informed consent was obtained prior to participation. Data were collect via structured questionnaire and ultrasound findings. Samples were collected until the necessary number is reached. Patient data will be kept confidential.

2.8 DATA ANALYSIS PROCEDURE:

The collected data were entered and analyzed using Statistical Package for Social Sciences (SPSS) version 25. Descriptive statistics were applied to summarize demographic and clinical variables, with continuous data expressed as mean ± standard deviation and categorical variables presented as frequencies and percentages. The prevalence of symptomatic gallstones among diabetic patients was calculated. Comparative analysis was performed to assess associations between gallstone presence and variables such as age, gender, duration of diabetes, and body mass index. The Chi-square test was used for categorical variables, while the independent sample t-test was applied for continuous variables where appropriate. A p-value of less than 0.05 was considered statistically significant. The analyzed data were presented in the form of tables and graphs to facilitate interpretation and comparison.

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3. RESULTS

3.1 AGE DISTRIBUTION OF PARTICIPANTS:

The age distribution shows that the majority of participants (38.1%) belonged to the 36–50 years of age group. A considerable proportion (32.9%) was aged 18–35 years, while 29.1% were above 50 years. This indicates that middle-aged individuals formed the largest group in the study. The variation in age groups helps in understanding the prevalence of gallstones across different age categories.

Table 3.1: Age Distribution of Diabetic patients

Age	Frequency	Percentage (%)
18–35 years	95	32.9%
36–50 years	110	38.1%
>50 years	84	29.1%
Total	289	100%

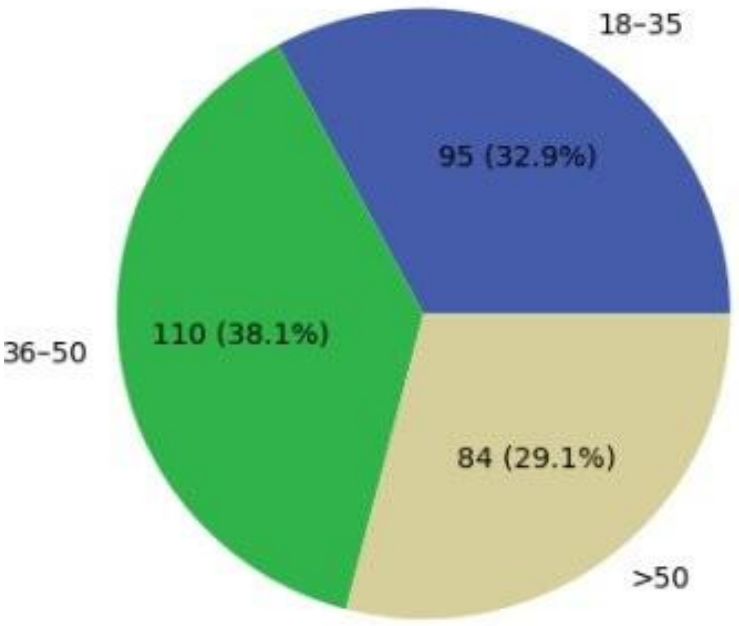

Figure: 3.2 Age Group Distribution

3.2 GENDER DISTRIBUTION OF PARICIPANTS:

The study population consisted of 51.6% females and 48.4% males, showing a slight female predominance. This suggests that females were more represented in the study sample. Gender

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distribution is important because gall stones are most common in females due to hormonal influences. However the nearly equal male to female ratio in this study ensures balanced representations and reduces gender related bias. Thereby improving the reliability of the findings.

Table 3.2: Gender Distribution

Gender	Frequency	Percentage
Male	140	48.4%
Female	149	51.6%
Total	**289**	**100%**

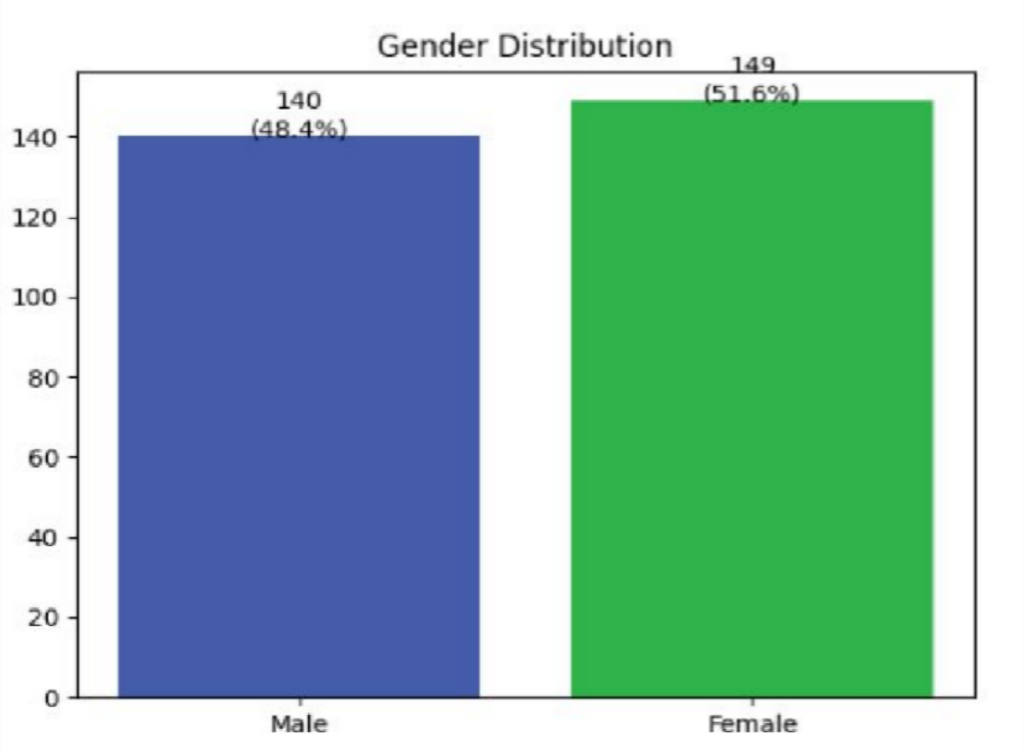

Figure:3.2 Gender Distribution

3.3 BMI CATEGORIES OF THE PARTICIPANTS:

The BMI analysis revealed that 38.1% of participants were overweight, followed by 31.1% with normal BMI and 30.8% obese individuals. This indicates that a large proportion of diabetic patients had increased body weight.

Table 3.3: BMI Categories

BMI Category	Frequency	Percentage

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Normal	90	31.1%
Overweight	110	38.1%
Obese	89	30.8%
Total	**289**	**100%**

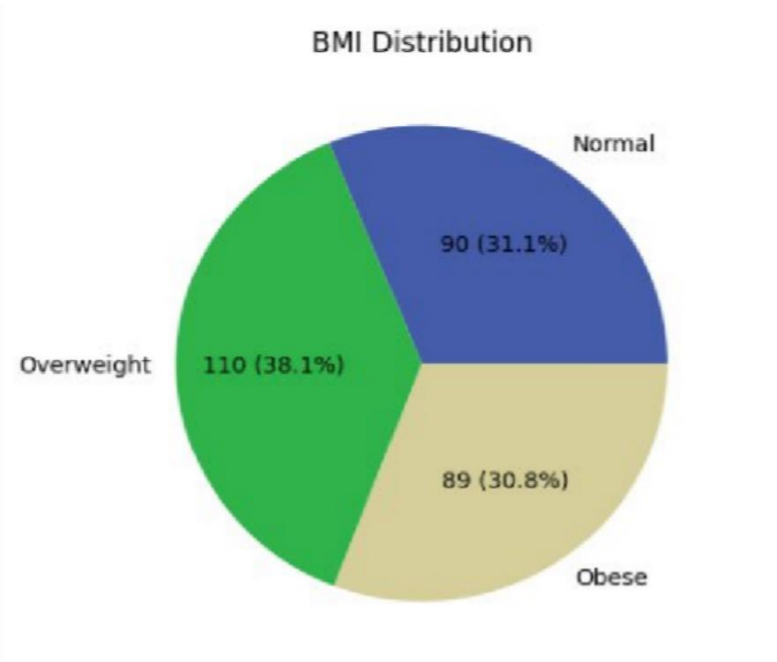

Figure: 3.3 BMI Distribution

3.4 DURATION OF DIABETES

Most participants (38.1%) had diabetes for 5–10 years, while 34.6% had duration less than 5 years and 27.3% had diabetes for more than 10 years. This shows that a significant number of patients had long-standing diabetes. Duration of diabetes is an important factor influencing complications like gallstones. Longer duration may increase risk.

Table 3.4: Duration of Diabetes Mellitus

Duration	Frequency	Percentage
<5 years	100	34.6%
5–10 years	110	38.1%
>10 years	79	27.3%
Total	**289**	**100%**

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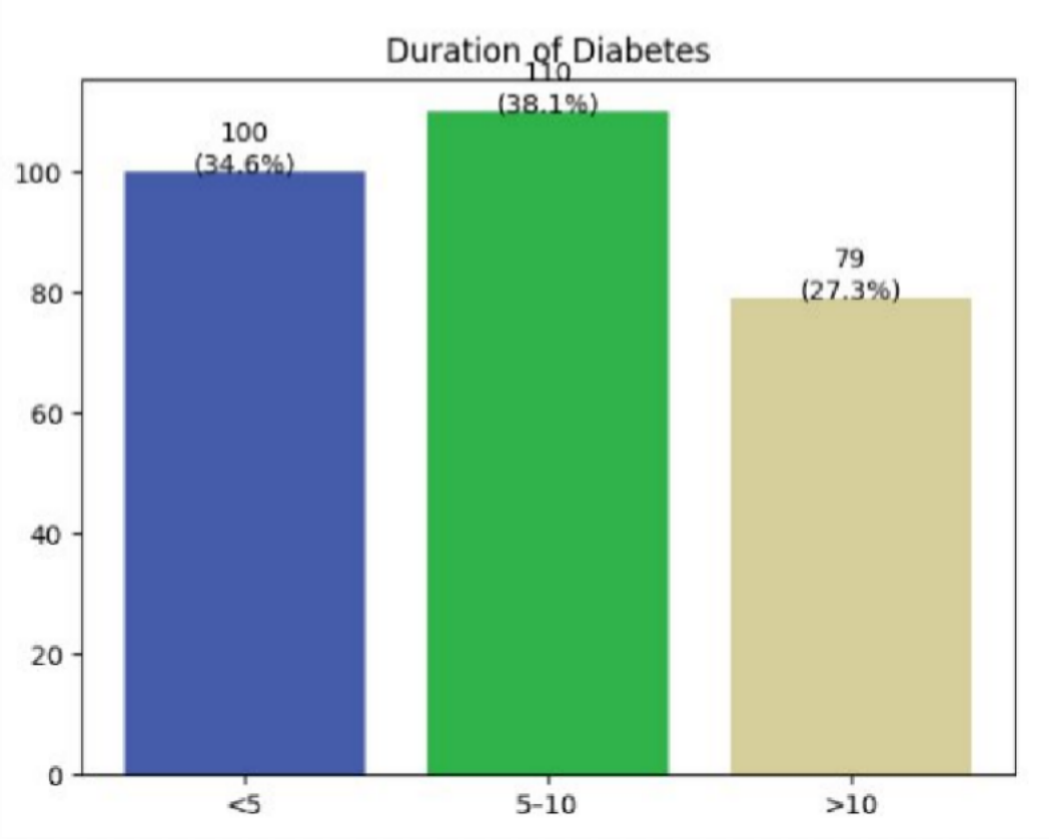

Figure: 3.4 Duration of Diabetes

3.5 GALLSTONES DISTRIBUTION OF PATIENTS:

Gallstones were detected in 55.4% of patients, while 44.6% had no gallstones. This indicates a high prevalence of gallstones among diabetic patients. The findings highlight the clinical importance of screening in such populations. Ultrasound proved effective in detection.

Table 3.5: Gallstones on Ultrasound

Gallstones	Frequency	Percentage
Yes	160	55.4%
No	129	44.6%
Total	289	100%

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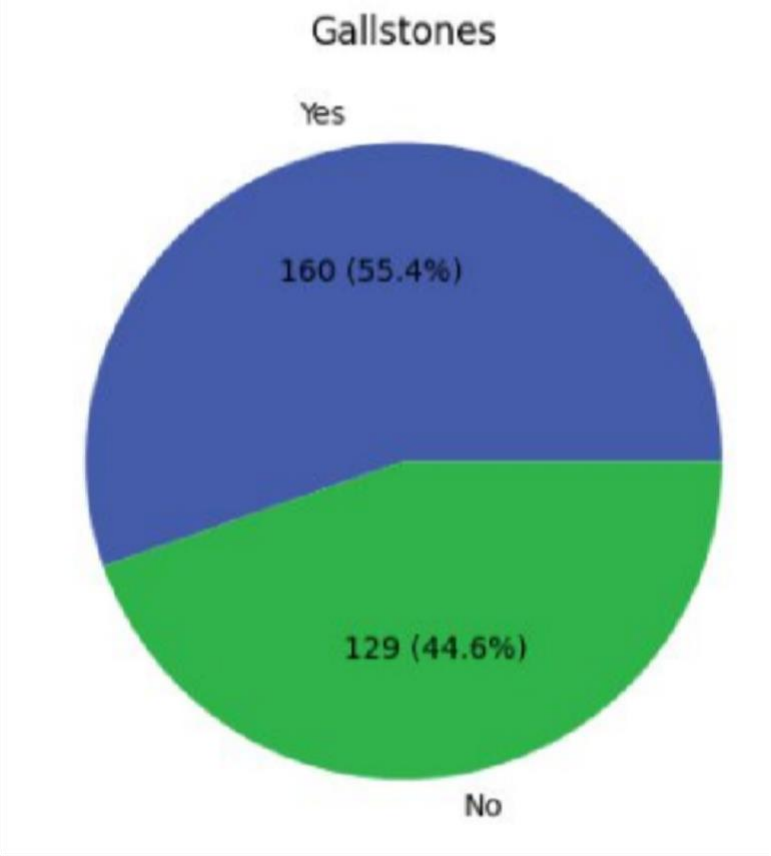

Figure: 3.5 Gallstone on Ultrasound

3.6 EPIGASTRIC PAIN AFTER MEAL:

More than half of the participants (51.9%) reported epigasric pain after meals, while 48.1% did not. This suggests that postprandial pain is a common symptom among patients. It is often associated with gallstone disease. The presence of this symptom helps in identifying symptomatic cases.

Table 3.6: Pain After Meals

Response	Frequency	Percentage
Yes	150	51.9%
No	139	48.1%
Total	289	100%

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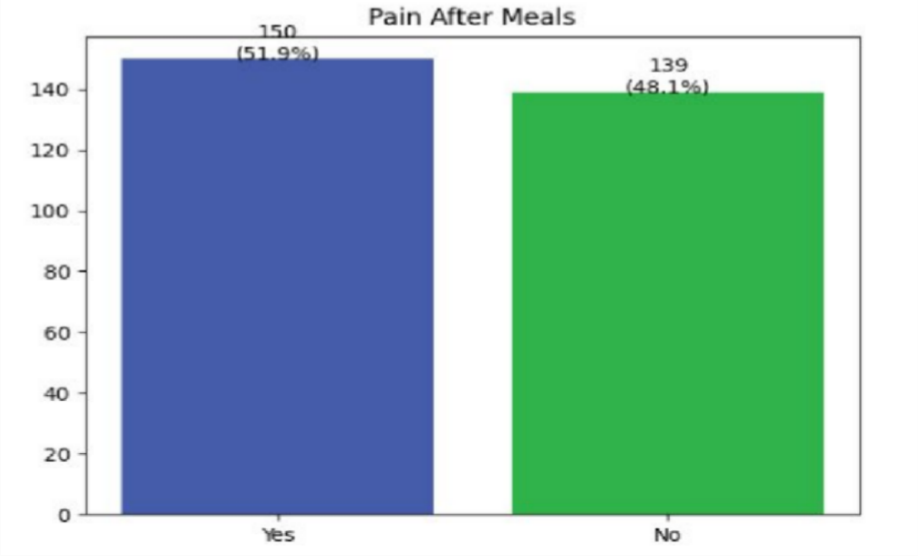

Figure 3.6 Pains After Meal

3.7 NAUSIA / VOMITING IN PATIENTS:

Approximately equal distribution was observed, with 50.2% experiencing nausea/vomiting and 49.8% not reporting it. This indicates that nausea is a frequent but not universal symptom. It may be associated with gallbladder pathology. Clinical correlation is necessary for diagnosis.

Table 3.7: Nausea/Vomiting

Response	Frequency	Percentage
Yes	145	50.2%
No	144	49.8%
Total	**289**	**100%**

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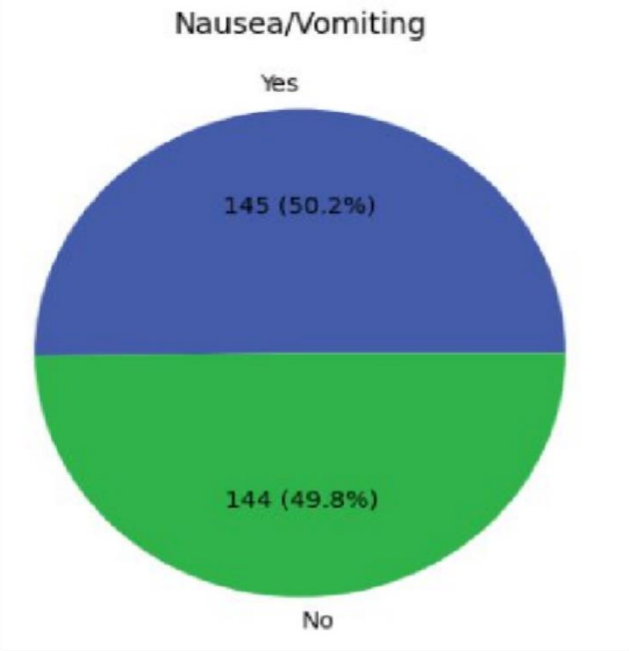

Figure: 3.7 Nausea / Vomiting

3.8 JAUNDICE IN PARTICIPANS:

Only 27.7% of participants reported jaundice, while the majority (72.3%) did not. This shows that jaundice is less common among patients with gallstones. It usually occurs in more severe or complicated cases. Therefore, it is not a primary presenting symptom in most cases.

Table 4.8: Jaundice

Response	Frequency	Percentage
Yes	80	27.7%
No	209	72.3%
Total	**289**	**100%**

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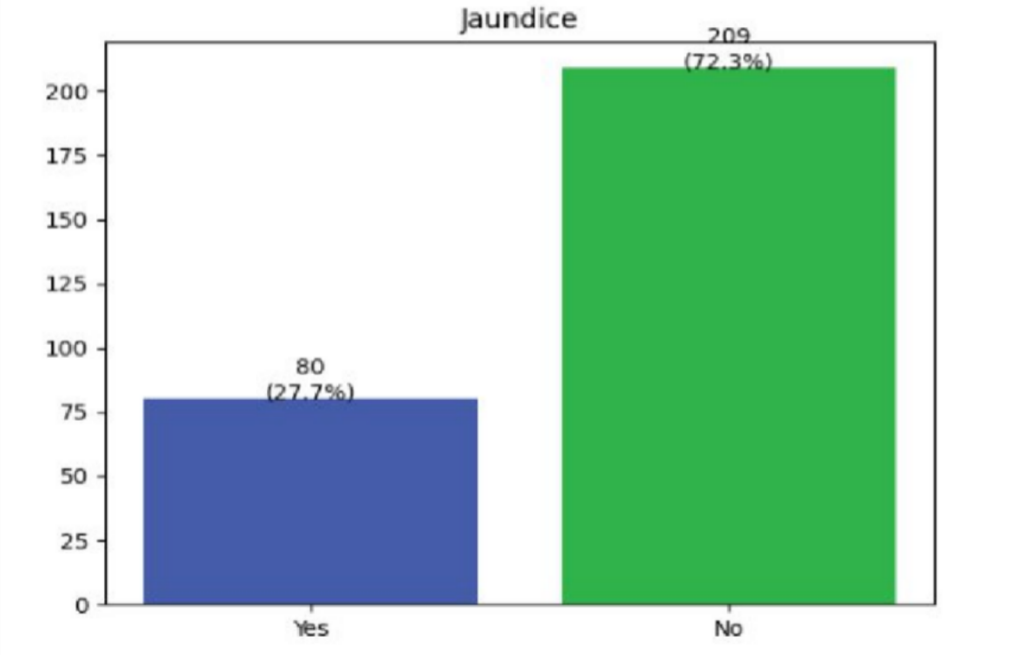

Figure: 3.8 JAUNDICE

*1.2*CROSS TABULATION:

3.9.1 Association of Gallstones with Clinical Symptoms

The combined cross-tabulation demonstrates a strong association between gallstones and clinical symptoms. A higher proportion of patients with gallstones reported pain after meals (75.0%) and nausea/vomiting (71.9%) compared to those without gallstones. Jaundice was less frequent but still more common in patients with gallstones (37.5%). These findings indicate that symptomatic presentation is significantly associated with gallstone presence. Overall, postprandial pain emerged as the most prominent symptom.

Table:3.9.1 Association of Gallstones with Clinical Symptoms

Variable	Category	Gallstones Yes (%)	Gallstones No (%)	Total
Pain after meals	Yes	120 (75.0%)	30 (23.3%)	150
	No	40 (25.0%)	99 (76.7%)	139
Nausea/Vomiting	Yes	115 (71.9%)	30 (23.3%)	145
	No	45 (28.1%)	99 (76.7%)	144
Jaundice	Yes	60 (37.5%)	20 (15.5%)	80
	No	100 (62.5%)	109 (84.5%)	209

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DISCUSSON

The present study was conducted to determine the ultrasonographic prevalence of symptomatic gallstones among diabetic patients in Mansehra and Abbottabad and to evaluate associated clinical features. The findings of this study highlight a strong association between diabetes mellitus and gallstone disease, consistent with existing literature.

In this study, the prevalence of gallstones among diabetic patients was found to be 55.4%, which is relatively higher compared to several international studies. For instance, studies conducted in Iraq reported a prevalence of approximately 33%, while research in Libya showed a prevalence of 39.8% among diabetic patients. Similarly, studies from Pakistan reported a prevalence of around 36.6% in diabetic individuals with gallstones. The higher prevalence observed in the current study may be explained by the inclusion of symptomatic diabetic patients only, which increases the likelihood of detecting gallstones. This difference suggests that prevalence is significantly influenced by study design, population characteristics, and regional lifestyle factors such as diet and physical activity **(Ali et al., 2018; Khalaf et al., 2016; Rangeen et al., 2024).**

The association between diabetes mellitus and gallstone formation is well established. Diabetic patients are reported to have a two to three times higher risk of developing gallstones compared to non-diabetics **(Abdul-Abbas & Strak, 2016).** This can be attributed to multiple pathophysiological mechanisms, including autonomic neuropathy, which impairs gallbladder motility, leading to bile stasis. Additionally, metabolic disturbances such as hyperinsulinemia, dyslipidemia, and obesity contribute to cholesterol supersaturation of bile, facilitating gallstone formation **(Shirale & Zawar, 2023).**

Age distribution in the present study showed that the majority of participants (38.1%) were in the 36–50 years age group, which is consistent with previous studies indicating that gallstone prevalence increases with age due to reduced gallbladder contractility and metabolic changes (Portincasa et al., 2023). Furthermore, a slight female predominance (51.6%) was observed, aligning with global evidence that gallstones are more common in females due to hormonal influences, particularly estrogen, which increases cholesterol secretion in bile **(Alam et al., 2022).**

The analysis of BMI revealed that most participants were either overweight (38.1%) or obese (30.8%), supporting the well-established role of obesity as a major risk factor for gallstone disease. Previous studies have demonstrated that increased body mass index is associated with higher cholesterol levels in bile and impaired gallbladder emptying, both of which promote gallstone formation **(Seth et al., 2025).** This finding reinforces the importance of lifestyle modification in preventing gallstone disease among diabetic patients.

Regarding the duration of diabetes, the majority of participants had diabetes for 5–10 years (38.1%). This suggests that prolonged exposure to hyperglycemia and metabolic imbalance increases the risk of gallstone formation. Similar findings have been reported in other studies, where longer duration of diabetes was associated with higher prevalence of gallstones due to chronic autonomic dysfunction and gallbladder hypomotility **(Banday et al., 2020).**

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Clinical symptoms analysis revealed that pain after meals (51.9%) was the most common symptom, followed by nausea/vomiting (50.2%), while jaundice (27.7%) was less frequent. These findings are consistent with the typical clinical presentation of symptomatic gallstones described in the literature, where postprandial pain is considered the hallmark symptom due to gallbladder contraction after fatty meals **(Alam et al., 2022).**

Nausea and vomiting are common associated symptoms but are less specific, while jaundice is usually seen in complicated cases such as biliary obstruction or choledocholithiasis.

The cross-tabulation analysis in this study demonstrated a strong association between gallstones and clinical symptoms. A significantly higher proportion of patients with gallstones reported pain after meals (75.0%) and nausea/vomiting (71.9%) compared to those without gallstones. These findings are in agreement with previous studies that have reported a strong correlation between gallstone presence and gastrointestinal symptoms. The relatively lower frequency of jaundice suggests that most cases in this study were uncomplicated gallstones rather than advanced biliary disease.

Ultrasonography played a central role in this study as a diagnostic tool. It is widely regarded as the gold standard for initial evaluation of gallstones, with a sensitivity of up to 96% **(Hayat et al., 2025).** Its non-invasive nature, cost-effectiveness, and accessibility make it particularly suitable for large-scale screening in developing countries such as Pakistan.

Overall, the findings of this study strongly support the existing body of evidence that diabetes mellitus is a significant risk factor for gallstone disease. The higher prevalence observed in this study highlights the importance of regional data and suggests that local lifestyle, dietary habits, and healthcare access may influence disease patterns.

CONCLUSION

In conclusion, this study demonstrated that the prevalence of gallstones among diabetic patients in Mansehra and Abbottabad is considerably high (55.4%), indicating a significant clinical burden in this population. The findings confirm that diabetes mellitus is strongly associated with gallstone formation due to underlying metabolic and physiological changes.

The study also revealed that symptoms such as pain after meals and nausea/vomiting are commonly associated with gallstones, while jaundice is less frequent and usually indicates more severe disease. Additionally, factors such as increasing age, female gender, higher BMI, and longer duration of diabetes contribute to the increased risk of gallstone disease.

Ultrasonography was found to be an effective, safe, and reliable diagnostic tool for detecting gallstones and should be routinely utilized in diabetic patients, particularly those presenting with gastrointestinal symptoms.

Overall, the study emphasizes the need for early screening, timely diagnosis, and proper management of gallstones in diabetic patients to prevent complications and improve patient outcomes.

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RECOMMENDATIONS

- Routine ultrasonographic screening should be implemented for diabetic patients, especially those presenting with gastrointestinal symptoms such as pain after meals and nausea.
- Healthcare professionals should increase awareness regarding the association between diabetes mellitus and gallstone disease for early identification and management.
- Lifestyle modification programs focusing on weight control, diet, and physical activity should be promoted to reduce modifiable risk factors like obesity.
- Early diagnosis and timely management should be emphasized to prevent complications such as cholecystitis, pancreatitis, and biliary obstruction.
- Future studies should include larger sample sizes and multiple centers to improve generalizability of findings.
- Longitudinal (cohort) studies are recommended to establish a cause-and-effect relationship between diabetes and gallstone formation.
- Additional variables such as lipid profile, dietary habits, and physical activity levels should be included in future research for deeper analysis.

LIMITATIONS OF THE STUDY

- The study was conducted in selected hospitals of Mansehra and Abbottabad, which may limit the generalizability of results to other regions.
- The cross-sectional study design does not allow establishment of causal relationships between diabetes and gallstone formation.
- Only symptomatic diabetic patients were included, which may have led to an overestimation of gallstone prevalence.
- Important variables such as diet, lipid profile, and lifestyle factors were not assessed in detail.
- The sample was selected using non-probability purposive sampling, which may introduce selection bias.
- Ultrasonography findings are operator-dependent, which may result in observer bias.
- Some missing or limited cross-tabulation data may affect the accuracy of associations.

4. REFFERENCES

Hailesilassie, N.Y., S.A. Geneti, and B. Agonafir, *The prevalence of gallstone disease and associated factors among patients who visited the surgical department of Debre Birhan Comprehensive Specialized Hospital, Debre Birhan, Ethiopia: an institution- based cross-sectional study.* BMC gastroenterology, 2025. **25**(1): p. 767.

SARI, Ö. and A.M. Bashir, *Prevalence of gallbladder disease in Type 2 DM and prediabetes in Mogadishu Somalia: A single center experience.* Professional Medical Journal, 2022. **29**(4).

Portincasa, P., et al., *Metabolic dysfunction-associated gallstone disease: expecting more from critical care manifestations.* Internal and emergency medicine, 2023. **18**(7): p. 1897-1918.

Pakistan Journal of Medical & Cardiological Review
https://pakjmcr.com/index.php/1/about
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Print ISSN 3007-2379
Awan et al - 2026
DOI: http://doi.org/10.5281/zenodo.20605552

KHAN, R. and B. PARI, *Risk factors of gallbladder stone in lady reading hospital peshawar, pakistan.* Quantum Journal of Social Sciences and Humanities, 2023. **4**(5):
p. 195-213.
Seth, U.S., et al., *A Cross-Sectional Analysis of Body Mass Index With Cholesterol Gallstones in Patients With Cholelithiasis in Tertiary Healthcare Settings.* Cureus, 2025. **17**(11).
Lodha, M., et al., *Clinical profile and evaluation of outcomes of symptomatic gallstone disease in the senior citizen population.* Cureus, 2022. **14**(8).
Alam, R., et al., *DISTRIBUTION OF GALL STONE DISEASE BY SEX, AGE GROUPS & SEVERITY IN POPULATION OF NAWABSHAH, PAKISTAN.* Gomal
Journal of Medical Sciences, 2022. **20**(3): p. 142-146.
Wirth, J., et al., *A healthy lifestyle pattern and the risk of symptomatic gallstone disease: results from 2 prospective cohort studies.* The American journal of clinical nutrition, 2020. **112**(3): p. 586-594.
Jadoon, S., et al., *Study on the prevalence of gallstones in patients undergoing cholecystectomy in Benazir Bhutto Shaheed Hospital (DHQ) Abbottabad.* Journal of Ayub Medical College Abbottabad, 2021. **33**(1): p. 102-104.
Banday, M.Z., A.S. Sameer, and S. Nissar, *Pathophysiology of diabetes: An overview.*
Avicenna journal of medicine, 2020. **10**(04): p. 174-188.
Shirale, S. and S. Zawar, *Prevalence of Gall-Bladder Disorders in Diabetic Patients with Autonomic Neuropathy.* European Journal of Cardiovascular Medicine, 2023. **13**(1).
Abdul-Abbas, M.J. and S.K. Strak, *Gallstones among patients with type 2 diabetes mellitus.* Bas J Surg, 2016. **22**(2): p. 10-16.
Ali, S., et al., *Prevalence of non-insulin-dependent diabetes mellitus among patients with cholelithiasis: a single-centered, cross-sectional study.* Cureus, 2018. **10**(4).
Hayat, W., et al., *Prevalence of Gallstones in Patients Undergoing Abdominal Ultrasonography at Hayatabad Medical Complex, Peshawar.* Link Medical Journal, 2025: p. e49-e49.
Islam, M.S., et al., *Frequency of Diabetes Mellitus among the Gallstones Patients: An Observational Study.* 2022.
Pradesh, H. and A. Kumar, *Cross-Sectional Study of Risk Factors and Ultrasound Prevalence of Gallstone Disease in Adults Presenting to a General Surgery OPD.* 2025.
Khalaf, S.K., *ASYMPTOMATIC GALLSTONES IN DIABETIC PATIENTS.*
Rangeen, L., et al., *Sonographic Evaluation of Cholelithiasis in Diabetic Patients at District Swabi.* Journal of Health and Rehabilitation Research, 2024. **4**(2): p. 1439- 1443.