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**ORIGINAL RESEARCH**

# A prospective cohort study of predictive value of pre-operative symptoms in cholelithiasis

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## ABSTRACT

**Background:** Cholelithiasis, or gallstones, is a common surgical disease affecting a significant portion of the population, particularly in older individuals and women. The prevalence of gallstone disease varies globally, with a notable presence in Asian and Western populations. Majority of the patients remain asymptomatic. However, cholecystectomy is the primary treatment for symptomatic gallstones, but post-operative symptom persistence is a common concern. **Aim:** This study aimed to assess the predictive value of pre-operative symptoms in diagnosing cholelithiasis and to evaluate the persistence of symptoms post-cholecystectomy. **Method:** The study was conducted at the General Surgery Department of Sharda Hospital, Greater Noida. It included patients diagnosed with gallstones who met the inclusion criteria. Patients underwent clinical examination and investigations. Post-cholecystectomy, patients were followed up at 6 and 12 weeks to assess symptom persistence. Endoscopy was performed on patients with atypical symptoms to rule out other pathologies. **Results:** Out of 250 patients, 76% presented with pain, 48% with nausea, 21.6% with vomiting as typical symptoms. Atypical symptoms included dyspepsia (20.8%), fatty food intolerance (21.2%), gas bloating (20%), heartburn (16.8%), bad taste (9.6%), and diarrhoea (9.6%). Post-operatively, there was a significant reduction in typical symptoms: pain (11%), nausea (22.5%), and vomiting (20%) ($p<0.05$). Atypical symptoms also reduced, though changes in gas bloating, bad taste, and diarrhoea were not statistically significant as they remained persistent in more than 75% patients. **Conclusion:** Typical pre-operative symptoms such as pain, nausea and vomiting have significant predictive value for diagnosing cholelithiasis and show marked improvement post-cholecystectomy. However, atypical symptoms have low predictive value and may persist post-surgery. Patients with predominant atypical symptoms should be thoroughly evaluated to rule out other conditions and informed about the potential persistence of these symptoms before undergoing cholecystectomy.

**Keywords:** Bad Taste, Cholelithiasis, Cholecystectomy, Diarrhoea, Dyspepsia,Heartburn.



## INTRODUCTION

Cholelithiasis or gallstones is one of most common problem encountered in surgery.[1] Gallstone disease affects 5-10% of the Asian population, with the highest prevalence among older people and women. Gall stone disease affects around 7.9 percent of males and 16.6 percent of women in Western countries.[2] The prevalence of cholelithiasis varies and has been reported as 2-29% in India, and increased in the recent years.[3]

Patients with cholelithiasis experience typical symptoms of pain, vomiting and nausea. Whereas few experience atypical symptoms like fatty food intolerance, heart burn, gas bloating, dyspepsia, bad taste and diarrhoea. However atypical symptoms in people with gall stones is extremely likely to be associated with other upper gastrointestinal illnesses which requires pre-operative investigations to rule them out before proceeding for surgery.[4] Cholecystectomy is the treatment of choice for symptomatic gallstones. However, symptoms of dyspepsia and pain may persist after surgery. Several longitudinal investigations have shown that symptoms disappear in about 66% up to 95% of cholecystectomized patients, but persistence of postsurgical symptoms has been found in 20%–30% of patients. About 40% of patients have been found with at least one postoperative symptom in a recent large cohort study over a 6-month follow-up,[5–7] and this same prevalence has been confirmed in both short-term (1 year) and long term (5–10 years) longitudinal studies.[8] Present study aimed to measure

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the predictive value of pre-operative symptoms in diagnosis of cholelithiasis.

## AIM

This study aimed to assess the predictive value of pre-operative symptoms in diagnosing cholelithiasis and to evaluate the persistence of symptoms post-cholecystectomy

## MATERIAL & METHOD

This prospective analytical observational study was conducted among 250 patients with cholelithiasis attending the General Surgery department of Sharda Hospital, Greater Noida fulfilling inclusion criteria are included in the present study. Patients with acute abdomen, undergoing emergency procedure, GERD, hiatus hernia, cholangitis, pregnancy, pancreatitis, gallbladder neoplasm, or any psychiatric disorder were excluded from study. Patients were followed up at 12 weeks to see persistence of pre-operative symptoms, such as pain abdomen, nausea, vomiting, heart burn, fatty food intolerance, dyspepsia, bad taste experienced by the patients were assessed.

Endoscopy was performed in 30 patients who came to OPD with atypical complaints of dyspepsia and heartburn to rule out other causes. Out of these, 7 patients showed erosive gastritis, 4 had duodenal ulcer, 2 had small sliding hernia. Hence 13 patients out of 30 were diagnosed with other diseases and hence they were excluded from the study and rest 17 with normal endoscopy were included.

Statistical analysis: All the data were entered in the proforma and analysed using SPSS v21 operating on windows 10. The descriptive analysis was used to summarise as frequency, percentage, proportion, mean and standard deviation. The statistical difference between the continuous variable were analysed using unpaired t-test and categorical variable were analysed using the chi-square test. A p-value of 0.05 was considered statistically significant.

## RESULT

Total of 250 patients have been enrolled in this study, of which majority are females with female to male ratio of 4:1. Age distribution of the study was as shown in Figure1.

In the study involving 250 patients(N), 190 (76%) experienced pain, 120 (48%) had nausea, and 54 (21.6%) reported vomiting as their typical symptoms.The study revealed that among the 250 patients(N), 54 (20.8%) experienced dyspepsia, 53 (21.2%) had intolerance to fattyfoods, 50 (20%) suffered from gas bloating, 42 (16.8%) experienced heartburn, and 24 (9.6%) reported bad taste and 24 (9.6%) had diarrhoea as atypical symptoms.**Table 1**

During the postoperative period, with follow-up assessments at 6 and 12 weeks, there was a notable decrease in the occurrence of typical symptoms of pain, nausea, and vomiting.

At 6$^{th}$ week follow up, among the initial 190 patients who experienced pain pre-operatively only 26 reported persistence of pain post-operatively. Out of 120 patients who had nausea pre-operatively, only42 continued to experience nausea following cholecystectomy and 54 patients who had vomiting before surgery only 12 still suffered from vomiting at the 6$^{th}$ week.**Table 2**

At 12$^{th}$ week follow up, only 21patients reported persistence of pain post-operatively, 27 patients continued to experience nausea following cholecystectomy, and only 11 patients still suffered from vomiting.**Table 3**

**For atypical symptoms**

At 6 weeks follow up, dyspepsia decreased from 52 patients preoperatively to 24 patients postoperatively. Gas bloating decreased from 50 patients preoperatively to 42 patients. Heartburn incidence dropped from 42 patients preoperatively to 18 patients.Intolerance to fatty foods decreased from 53 patients preoperatively to 29patients. However, 22out of the 24 patients with preoperative complaints of bad taste and 23 out of 24 patients having diarrhoea still had these symptoms postoperatively.**Table 2**

At 12$^{th}$ week follow up, no further reduction was seen in dyspepsia and similarly heartburn incidence continuedin 18 patients.Gas bloating decreased down to 39 patients. Intolerance to fatty foods decreased from 53 patients preoperatively to 26 patients at 12 weeks.Also, there was persistence of symptoms of bad taste and diarrhoea in 22 patients each. **Table 3**

Upon comparison, a substantial decrease in typical symptoms was noted among the patients during the postoperative period. At the 12-week follow-up, pain levels dropped to 11%, while incidences of nausea and vomiting were reported in 22.5% and 20.37% of cases, respectively which were statistically significant ($p<0.05$). Similarly, there was a significant reduction in atypical symptoms, with dyspepsia declining to 46.15%, heartburn to 42.85%, and fatty food intolerance to 49% ($p<0.05$). However, the persistence of gas bloating was seen in 78%, bad taste in 91.66%, and diarrhoea in 91.66% of patients which were statistically insignificant ($p>0.05$). **Table 4**

**Table 1: Pre-operative typical and atypical symptoms**

| | | Count(n) | % |
|---|---|---|---|
| **Pre operative typical symptoms** | **Pain** | 190 | 76.0% |
| | **Nausea** | 120 | 48.0% |
| | **Vomiting** | 54 | 21.6% |
| **Pre operative atypical symptoms** | **Dyspepsia** | 52 | 20.8% |

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| | | | |
|---|---|---|---|
| | **Gas bloating** | 50 | 20.0% |
| | **Heartburn** | 42 | 16.8% |
| | **Bad taste** | 24 | 9.6% |
| | **Diarrhoea** | 24 | 9.6% |
| | **Fatty food intolerance** | 53 | 21.2% |

**Table 2: Post-operative typical and atypical symptoms at 6 weeks**

| | | **Count(n) %** | |
|---|---|---|---|
| **Typical symptoms** | **Pain** | 26 | 13.68 |
| | **Nausea** | 42 | 35 |
| | **Vomiting** | 12 | 22.22 |
| **Atypical symptoms** | **Dyspepsia** | 24 | 46.15 |
| | **Gas bloating** | 42 | 84 |
| | **Heartburn** | 18 | 42.85 |
| | **Bad taste** | 22 | 91.66 |
| | **Diarrhoea** | 23 | 95.83 |
| | **Fatty food intolerance** | 29 | 54.71 |

**Table 3:Post-operative typical and atypical symptoms 12 weeks**

| | | **Count(n) %** | |
|---|---|---|---|
| **Typical symptoms** | **Pain** | 21 | 11.05 |
| | **Nausea** | 27 | 22.5 |
| | **Vomiting** | 11 | 20.37 |
| **Atypical symptoms** | **Dyspepsia** | 24 | 46.15 |
| | **Gas bloating** | 39 | 78 |
| | **Heartburn** | 18 | 42.85 |
| | **Bad taste** | 22 | 91.66 |
| | **Diarrhoea** | 22 | 91.66 |
| | **Fatty food intolerance** | 26 | 49 |

**Table 4: Comparison of the persistence of symptoms in preoperative and post-operative period**

| | | **Pre-Op** | **Follow-up 6wks** | | **Follow-up 12wks** | | **p-value** |
|---|---|---|---|---|---|---|---|
| | | **Count(n)** | **Count(n)** | **%** | **Count(n)** | **%** | |
| **Typical symptoms** | **Pain** | 190 | 26 | 13.68 | 21 | 11.05 | 0.01* |
| | **Nausea** | 120 | 42 | 35 | 27 | 22.5 | 0.01* |
| | **Vomiting** | 54 | 12 | 22.22 | 11 | 20.37 | 0.01* |
| **Atypical symptoms** | **Dyspepsia** | 52 | 24 | 46.15 | 24 | 46.14 | 0.01* |
| | **Gas bloating** | 50 | 42 | 84 | 39 | 78 | 0.31 |
| | **Heartburn** | 42 | 18 | 42.85 | 18 | 42.85 | 0.01* |
| | **Bad taste** | 24 | 22 | 91.66 | 22 | 91.66 | 0.51 |
| | **Diarrhoea** | 24 | 23 | 95.83 | 22 | 91.66 | 0.24 |
| | **Fatty food intolerance** | 53 | 29 | 54.71 | 26 | 49 | 0.01* |

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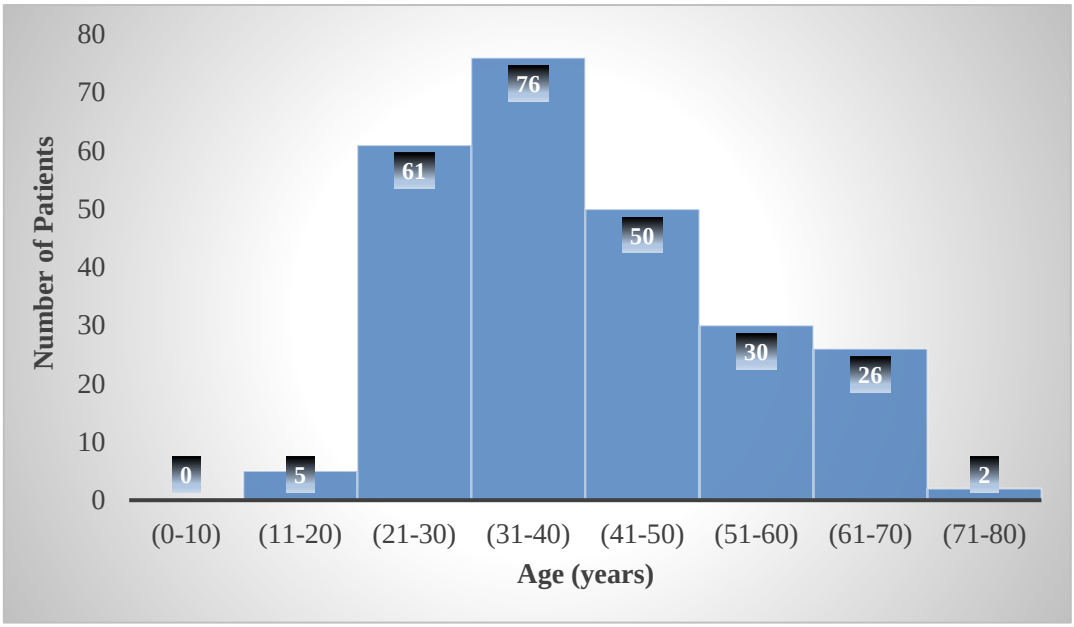


**FIGURE 1: Age distribution of patients in study**

## DISCUSSION

Cholelithiasis affect many individuals, with 80% remaining asymptomatic. Diagnosing gallstones is challenging due to symptom overlap with other conditions. Laparoscopic cholecystectomy has improved recovery times and reduced hospital stays, leading to potentially broader criteria for surgical intervention. Currently, 70% of patients with symptomatic cholelithiasis undergo elective cholecystectomy to relieve pain and prevent complications. However, many patients continue to experience symptoms post-surgery.

In our study of 250 patients, we observed a female predominance (4:1 female-to-male ratio) and a mean age of 40.96 years, consistent with other studies. Mertens et al.[12] found a mean age of 46 years with 74.3% female patients, and Karmacharya et al.[3] reported a mean age of 43.1 years with a female-to-male ratio of 4.8:1. Finan et al.[13] found a mean age of 49 years, with 78.2% female patients. These studies support the observed gender and age trends in gallstone disease.

In our study, 76% of patients experienced pain preoperatively, aligning with Mertens et al.[12] (66.5%) and Finan et al.[13](87%). Post-cholecystectomy, 89% of our patients reported significant pain improvement at 12 weeks, similar to Mertens et al.[12], who showed over 80% pain reduction at six weeks. Singh et al.[14] and Larsen et al.[18] reported significant pain improvement in 88.8% and 78% of patients, respectively, at six months to one-year post-cholecystectomy, while Finan et al.[13] observed over 90% reduction. Borly et al.[19] reported pain reduction in 75% of patients postoperatively. This indicates that pain is a reliable indicator for cholecystectomy and often improves post-surgery.

Nausea and vomiting were present in 48% and 21.6% of patients preoperatively, respectively. Post-cholecystectomy, 81.5% were free from nausea, and 80% from vomiting. Mertens et al.[12] reported preoperative nausea in 39.3% and vomiting in 14.8% of patients, with postoperative reductions of 86.5% and 96%, respectively. Singh et al.[14] also noted significant improvements in nausea and vomiting (72.5%) post-surgery. Bates et al.[20] and Finan et al.[13] found that 81% and 91% of patients experiencing nausea and 90% and 95% of those experiencing vomiting, respectively, were relieved post-surgery. These findings highlight that cholecystectomy effectively reduces these symptoms.

At 12 weeks post-cholecystectomy, 44.44% of our patients experienced persistent dyspepsia, 42.85% had ongoing heartburn, and 49% continued to struggle with fatty food intolerance. However, gas bloating, bad taste, and diarrhoea persisted in over 75% of patients. Scriven et al.[21] found 55% relief in dyspepsia postoperatively, while McMohan et al.[22] and Karmacharya et al.[3] reported cure rates of 86% and 92.8%, respectively. Singh et al.[14] observed dyspepsia persistence in over 70% of patients. Vander et al.[10] and McMohan et al.[22] reported 57.2% and 73% heartburn relief, respectively, post-cholecystectomy, whereas Luman et al.[23] found no change.

Fatty food intolerance significantly reduced by more than 50% postoperatively in our study, consistent with Singh et al.[14] and Luman et al.[23], who reported cure rates of 82.5% and 80%, respectively. Diarrhoea, gas bloating, and bad taste persisted in most patients. Luman et al.[23] found 100% persistence of diarrhoea and 30% of gas bloating postoperatively. Finan et al.[13] reported no significant improvement in symptoms like dyspepsia, belching, and bloating, with less than 15% resolution in diarrhoea. Weinert et al.[15] found dyspeptic symptoms five times more likely to persist than biliary symptoms post-cholecystectomy.

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We performed endoscopy on 30 patients with dyspepsia and heartburn, excluding 13 patients with significant findings. Karmacharya et al.[3] found normal endoscopy results in patients with typical pain patterns but associated other pathologies with atypical symptoms. Faisal et al.[24] and Mozafar et al.[25] observed abnormal upper gastrointestinal endoscopy (UGE) findings in 77.2% and 83% of patients with atypical symptoms, respectively. Thybusch et al.[26] noted pathological findings in 50% of patients undergoing endoscopy prior to cholecystectomy, altering management plans for 8.3% based on endoscopy results.

In summary, while typical symptoms like pain, nausea, and vomiting are valuable for diagnosing cholelithiasis and justifying cholecystectomy, atypical symptoms require careful consideration. Our findings suggest that typical symptoms have significant predictive value for diagnosing cholelithiasis, but atypical symptoms are not reliable indicators. The persistence of atypical symptoms post-surgery underscores the need for comprehensive diagnostic approaches and informed patient discussions. These findings emphasize the importance of tailored patient management strategies, ensuring effective and appropriate care for those with gallstones. Further research could refine diagnostic criteria and explore additional therapeutic options for patients with atypical symptom presentations.

## CONCLUSION

Predictive value of pre-operative typical symptoms of pain, nausea and vomiting is significant and can be helpful in the diagnosis of Cholelithiasis whereas the predictive value of atypical symptoms is not significant. Our study confirms that certain symptoms associated with gall stones are not alleviated by cholecystectomy itself. Hence, patients with predominant atypical symptoms should be evaluated further to rule out other pathologies and explain about the persistence of these symptoms before taking them up for cholecystectomy.

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