



A CROSS-SECTIONAL STUDY TO DETERMINE THE ENDOSCOPIC FINDINGS IN PATIENTS WITH PPI RESISTANT DYSPEPSIA IN A TERTIARY CARE CENTRE

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ABSTRACT

Background: Dyspepsia, a common condition marked by upper abdominal discomfort, significantly affects quality of life. While proton pump inhibitors (PPIs) are the standard treatment, a substantial number of patients experience persistent symptoms, a condition known as PPI-resistant dyspepsia. The underlying causes of this resistance are complex and not fully understood, highlighting the need for further investigation, particularly through upper gastrointestinal (GI) endoscopy.

Aim: This cross-sectional study was conducted to determine the endoscopic findings in patients with PPI-resistant dyspepsia at a tertiary care centre. The primary objective was to identify the etiologies causing PPI resistance, while a secondary objective was to determine if associated comorbidities influence this resistance.

Materials and Methods: A total of 71 patients were enrolled in the study. All participants underwent a comprehensive evaluation, including a detailed clinical history, physical examination, and upper GI endoscopy. The study recorded demographic data, presenting symptoms, duration of symptoms, PPI usage, and associated comorbidities. Endoscopic findings were meticulously documented to identify both organic and functional abnormalities.

Results: The mean age of the participants was 41.25 years, with a female predominance (54.9%). The most common presenting symptoms were epigastric burning (97.2%), abdominal pain (94.4%), and bloating (90.1%). Endoscopic evaluation revealed a high prevalence of abnormal findings, with gastritis being the most common observation, followed by esophagitis and peptic ulcers. The study also found that a significant portion of patients had conditions such as *H. pylori* infection.

Conclusion: The findings of this study demonstrate that a significant number of patients with PPI-resistant dyspepsia have identifiable organic causes, which can be diagnosed through upper GI endoscopy. The results highlight the diagnostic utility of endoscopy in this patient population, as it can reveal underlying pathologies that necessitate a change in management strategy beyond standard acid suppression therapy. These findings support the hypothesis that endoscopic evaluation is a valuable tool for tailoring individualized treatment plans and improving outcomes for patients with PPI-resistant dyspepsia.

INTRODUCTION

Dyspepsia refers to pain or discomfort centred in the upper abdomen. It is group of symptoms thought to originate from anatomic or functional disorders of the upper GI tract and encompasses many symptoms including epigastric discomfort, bloating sensation, anorexia, early satiety, nausea, belching or regurgitation and heartburn.¹

However, "PPI-resistant dyspepsia" refers to ongoing or persistent symptoms of indigestion despite adequate and often optimized treatment with PPIs. This can be a challenging clinical scenario, as PPIs are very effective for acid-related conditions.

In Western nations, the estimated prevalence of dyspepsia among adults ranges from 10-20%. It accounts for 5% of all outpatient clinic referrals and constitutes between 40% and 70% of consultations for GI diseases.² Globally, studies have reported the prevalence of dyspepsia to vary widely, from 20% to 30%³ While the precise prevalence of dyspepsia in India is not available, different studies estimate that it affects 7.6–49% of the Indian population⁴, and in our area of study, the prevalence was found to be 3.5%.

METHODOLOGY

This observational cross-sectional study was conducted at NIMSR, Jaipur. The study period extended from June 2024 to May 2025. The study protocol was approved by the Institutional Ethics Committee (IEC) before commencement, and all procedures were performed in accordance with the Declaration of Helsinki and Good Clinical Practice guidelines.

Patients presenting to both outpatient and inpatient departments with symptoms of dyspepsia were screened for eligibility. Out of 210 patients presented to our department, 71 patients were included in the study based on inclusion criteria. Inclusion criteria included patients of both sex of age 18 years to 65 years who were refractory to 4 weeks on proton pump inhibitors (PPIs). Patients with alarm symptoms e.g. dysphagia, upper GI bleed, unintentional weight loss, and palpable epigastric mass were excluded. The diagnosis of dyspepsia was established using the Rome IV criteria, which included one or more of the following symptoms: postprandial fullness, early satiation, epigastric pain, and epigastric burning. These symptoms needed to be present for the last three months, with symptom onset at least six months before diagnosis.

All eligible patients were provided with detailed information about the study's nature, purpose, and procedures in their preferred language. Written informed consent was obtained from those who agreed to participate. A structured format was used to record demographic details, including age, gender, occupation, socioeconomic status, and contact information. Patient confidentiality was maintained throughout the study by assigning unique identification numbers to each participant.

A comprehensive clinical assessment was conducted for each participant. This included detailed medical history of present illness with onset, progression, and duration of symptoms, past medical and surgical history, family history, medication history, including use of NSAIDs and other drugs. Personal history including dietary habits, alcohol consumption and smoking. Physical Examination included general physical examination including vital signs, anthropometric measurements (height, weight, BMI), detailed systemic examination with special focus on the gastrointestinal system.

All participants underwent a standardized set of investigations like CBC, LFT, RFT, PT/INR, serum electrolytes, viral markers, ECG and other relevant investigations based on clinical findings. Ultrasonography of the whole abdomen was done after the patients had undergone an overnight fasting. Upper Gastrointestinal Endoscopy was performed after overnight fasting with standard protocol followed using Olympus video endoscope.

A standardized case report form was used to document all clinical findings, investigation results, and endoscopic observations. The form included sections for demographic data, clinical symptoms and their severity, physical examination findings, laboratory investigation results and endoscopic findings.

Patients taking PPI (Pantoprazole) regularly for 4 weeks without any improvement in symptoms were considered PPI refractory. As the patients did not show any improvement under PPI were asked to stop PPI completely and instead were given antacids (Digene) for next 2 weeks. After completion of 2 weeks of antacid therapy patients underwent UGI endoscopy after fasting for 8 hours and patients were evaluated as per questionnaire that we have developed.

RESULTS

A total of 71 patients were included in the study, 39 female (55%) and 32 male (45%) patients, with a mean age of 41.25 years. **Figure 1** presents data for both the sexes, 2 male participants in <25 years age group and 3 females in this age group. 20 male participants of 25-50 years of age, while 27 females in this age group. Similarly, there were 10 male participants of >50 years age and 9 females in this age group. Hence, the largest group in the study population is females between 25 and 50 years of age, while smallest group is males under 25 years old.

Mean body weight and mean height of the patients were 57 kg and 163.58 cm, respectively. Mean BMI (body mass index) of the patients was 21.2 kg/m². Among a total of 71 patients, 20 (28.2%) patients were alcohol users and 31 (43.7%) patients were smokers.

A total of 64 patients (90.1%) affirmatively responded to the questionnaire item regarding 'bloating symptoms'. Similarly, 43 (60.6%) patients affirmed experiencing early satiety when prompted by the corresponding item within the questionnaire. Out of a total of 71 patients, 67 (94.4%) patients had abdominal pain and when the correlation of this complaint with meals was investigated, 35 (52.2%) patients indicated that their pains worsened with intake of food. Most patients (69, i.e., 97.2%) had complaints of epigastric burning, while 63 patients (88.7%) had post prandial fullness.

As shown in **Table 1**, the most prevalent symptom reported was abdominal pain, with 42.3% of patients experiencing it 2-5 days a week and 52.1% experiencing it every day. Postprandial fullness was also a frequent complaint, with 62% of patients reporting it daily. Similarly, early satiety was reported by 59.1% of patients as a daily symptom, while bloating was experienced every day by 59.1% and 2-5 days a week by 31% of patients. Epigastric burning was the least common symptom, with only 2.8% of patients experiencing it on an infrequent basis and 22.5% experiencing it 2-5 days a week. These results indicate that abdominal pain, postprandial fullness, and early satiety are the most prominent and frequently reported symptoms in this patient cohort. Similarly, **figure 2** displays the frequency of various symptoms reported by patients through the questionnaire.

Figure 3 demonstrates the frequency of bloating among the study population. The results indicate that bloating is a prevalent issue among this group. Only a small minority of patients, 7 out of the 71, reported experiencing no bloating. A significantly larger number, 22 patients, reported bloating on a semi-regular basis, specifically 2-5 days per week. The majority of the study population, however, was in the most severe category, with 42 patients experiencing bloating every day. These findings highlight that bloating is not only a common symptom in this population but also a chronic condition for over half of the participants.

As shown in **figure 4**, the largest group of 29 patients report early satiety 2-5days/week. The second-largest group, comprising 28 patients reported experiencing no early satiety. The smallest group with 14 patients experiences early satiety every day.

Figure 5 indicates that abdominal pain is a common issue within this study population. A vast majority of the patients reported experiencing some form of abdominal pain. Only a small group of 4 patients reported experiencing no abdominal pain. The largest group, consisting of 37 patients, reported experiencing abdominal pain every day. A significant number of patients, 30 to be exact, experienced abdominal pain 2-5 days per week.

Figure 6 shows a vast majority of the patients experienced epigastric burning regularly with 53 patients experiencing epigastric burning every day. Only 2 patients reported no epigastric burning, while 16 patients reported this symptom 2-5 days per week.

As shown in **figure 7**, a total of 71 patients were evaluated for the frequency of post-prandial fullness. The results indicate that The largest group, consisting of 44 patients, reported experiencing

post-prandial fullness every day. A smaller but still significant group of 19 patients reported this symptom 2-5 days per week. Only 8 patients, the smallest group, reported no post-prandial fullness. Likewise, **figure 8** provides information on how long patients experienced these symptoms. **Table 2** presents the duration of various symptoms reported by patients, providing a different perspective from the frequency data. The most enduring symptoms were epigastric burning and abdominal pain. A significant majority of patients, 83.1%, reported experiencing epigastric burning for more than six months, making it the most chronic symptom. Similarly, 67.6% of patients suffered from abdominal pain for over six months. Bloating was also a long-lasting issue for most patients, with 76% reporting its duration as more than six months. While postprandial fullness and early satiety were also chronic for a considerable number of patients (56.3% and 43.7% respectively), they were less dominant in the '> 6 months' category compared to the other three symptoms. These findings highlight that a significant proportion of patients experienced these symptoms, particularly epigastric burning, abdominal pain, and bloating, on a long-term basis.

Figure 9 shows that for the vast majority of the study population, bloating is a long-term issue. Only 7 patients reported having no bloating. A slightly larger group of 10 patients experienced bloating for duration of 1-6 months. The overwhelming majority, however, consisting of 54 patients, reported having bloating for more than 6 months.

As shown in **figure 10**, a large portion of the study population, consisting of 31 patients, reported experiencing early satiety for more than 6 months. The second-largest group, with 28 patients reported having no early satiety and the smallest group, consisting of 12 patients, reported the duration of their early satiety to be between 1-6 months.

Figure 11 displays only a small group of 4 patients reported having no abdominal pain. A slightly larger group of 19 patients experienced abdominal pain for a duration of 1-6 months. The overwhelming majority, consisting of 48 patients, reported having abdominal pain for more than 6 months.

As demonstrated in **figure 12**, only a very small group of 2 patients reported having no epigastric burning. A slightly larger group of 10 patients experienced epigastric burning for a duration of 1-6 months. The overwhelming majority, consisting of 59 patients, reported having epigastric burning for more than 6 months.

Figure 13 displays that a total of 71 patients were evaluated for the duration of their post-prandial fullness. A small number of patients, 8, reported having no post-prandial fullness. A slightly larger group of 23 patients experienced this symptom for duration of 1-6 months. The largest group, consisting of 40 patients, reported having post-prandial fullness for more than 6 months.

Around 7 patients (9.9%) had previously undergone an endoscopic examination for dyspepsia due to distressing symptoms of more than 6 months duration. Frequency of PPI use among patients has been demonstrated in **figure 14** and the results show that a majority of the patients use PPIs frequently. Only a small group of 5 patients reported using PPIs 1-3 times a week. A much larger portion of the study population, consisting of 34 patients, reported taking PPIs every day. Similarly, a significant number of patients, 32, reported using PPIs whenever required.

Likewise, the frequency of treatment for H. pylori infection has been demonstrated in **figure 15** which shows the largest group, consisting of 46 patients, was treatment naive, meaning they had not received any prior H. pylori treatment. A smaller group of 13 patients had been treated for H. pylori once. The smallest group, with 12 patients, had been treated more than once. This indicates that the majority of the study population was new to H. pylori treatment.

Endoscopic findings among the patients are shown in **figure 16**. The results reveal a variety of conditions, with gastritis being the most prevalent finding. A total of 51 patients were diagnosed with gastritis. The next most common findings were a normal endoscopy, found in 7 patients, and duodenitis, found in 5 patients. A smaller number of patients were diagnosed with a duodenal ulcer (3), esophagitis (3), and gastric ulcer (2). For patients exhibiting normal endoscopic findings, their questionnaire responses were used to classify them, subsequently facilitating a diagnosis of

functional dyspepsia in accordance with the Rome IV diagnostic criteria. Of the 7 patients with normal endoscopic results, 6 were diagnosed with functional dyspepsia.

Correlations between bloating symptoms and endoscopic findings were evaluated and found to have higher rates of bloating in patients with pathological endoscopic results ($p=0.015$). Among 64 patients with complaints of bloating, gastritis was detected in 51 (71.8%) patients. Bloating was a more common daily complaint among patients with either normal endoscopic findings or gastritis ($p=0.0001$). Also, the frequency of bloating complaints was similar in patients with and without ulcers. Surprisingly, patients with gastritis or ulcers showed similar gastrointestinal symptoms to those with normal endoscopic results.

Epigastric burning was observed more often in patients with ulcers or gastritis as compared to those with normal endoscopic findings ($p=0.0001$ and $p=0.002$, respectively). However, the frequency of epigastric burning was similar in patients with normal endoscopic findings and those with ulcers.

Likewise, abdominal pain and endoscopic findings were correlated. A large majority of patients with gastritis (63.6%) reported frequent abdominal pain. This is the most common endoscopic finding and shows a strong association with the symptom ($p=0.0002$). All patients with a duodenal ulcer reported either occasional (33.3%) or frequent (66.7%) abdominal pain, with no patients reporting a complete absence of the symptom. In contrast, patients with normal endoscopic findings were less likely to report frequent abdominal pain (20.0%). The highest percentage in this group (60.0%) reported only occasional pain. So, there appears to be a positive correlation between the presence of specific endoscopic findings (gastritis, duodenal ulcer) and the frequency of abdominal pain. Patients with these conditions are more likely to experience abdominal pain, particularly on a frequent basis, compared to those with a normal endoscopy.

Gastritis and duodenitis are the most common endoscopic findings in patients reporting "frequent" post-prandial fullness. In the gastritis group, 43.2% of patients reported frequent fullness, while in the duodenitis group, 50% reported it. Patients with normal endoscopic findings had the lowest frequency of "frequent" post-prandial fullness (0%). This group was more likely to have no fullness (40%) or only occasional fullness (60%). Hence, there appears to be a link between the presence of gastritis and duodenitis and a higher frequency of post-prandial fullness ($p=0.0001$). Patients with a normal endoscopy are less likely to experience this symptom on a frequent basis.

The majority of patients with gastritis reported having no early satiety (47.7%), while a smaller but significant number reported occasional or frequent early satiety. Patients with normal endoscopic findings had the lowest frequency of "frequent" early satiety (0%). This group was most likely to have no early satiety at all (80%). Highest percentage of patients reporting "frequent" early satiety (66.7%) had shown endoscopic finding of duodenal ulcer. There appears to be a notable correlation between duodenal ulcers and frequent early satiety ($p=0.002$). In contrast, patients with normal endoscopic findings are far less likely to experience this symptom.

During endoscopic examinations, esophagitis was found in 3 (4.2%) patients, out of which 2 patients had LA (Los Angeles) grade A esophagitis, 1 patient had LA grade B esophagitis, and none of the patients had LA grade C or D esophagitis.

Also, most of the dyspepsia patients in our study (85.92%) were free of other major health conditions as shown in **figure 17**. Among those who did have comorbidities, hypertension was the most prevalent (11.27%), followed by diabetes mellitus (5.63%). A small percentage (2.82%) of patients had both conditions.

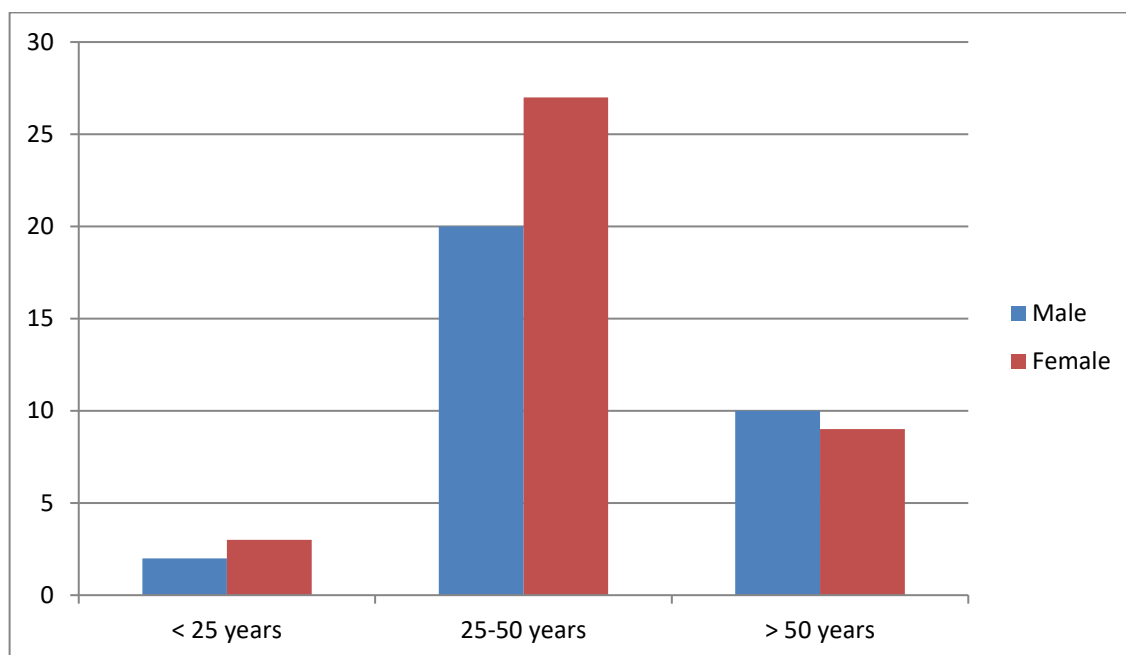


FIGURE 1- Age and Sex wise representation of the study population

	BLOATING	EARLY SATIETY	ABDOMINAL PAIN	EPIGASTRIC BURNING	POST PRANDIAL FULLNESS
NONE	7 (9.9 %)	28(39.4%)	4 (5.6%)	2 (2.8%)	8 (11.3%)
2-5 DAYS/WEEK	22 (31 %)	29(40.9%)	30 (42.3%)	16 (22.5%)	19 (26.7%)
EVERY DAY	42 (59.1 %)	14(19.7%)	37 (52.1%)	53 (74.7%)	44 (62%)

Table 1- Frequency of various symptoms reported by patients

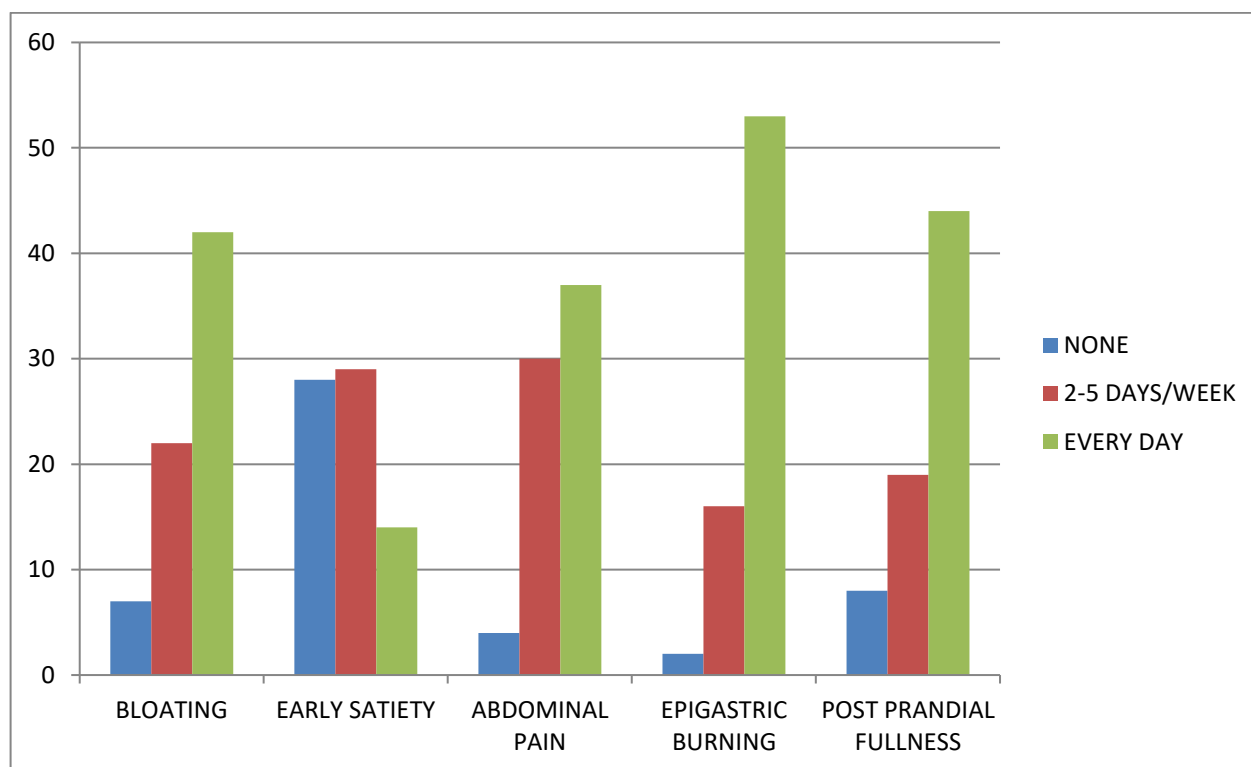


FIGURE 2- Frequency of various symptoms enquired from the patients

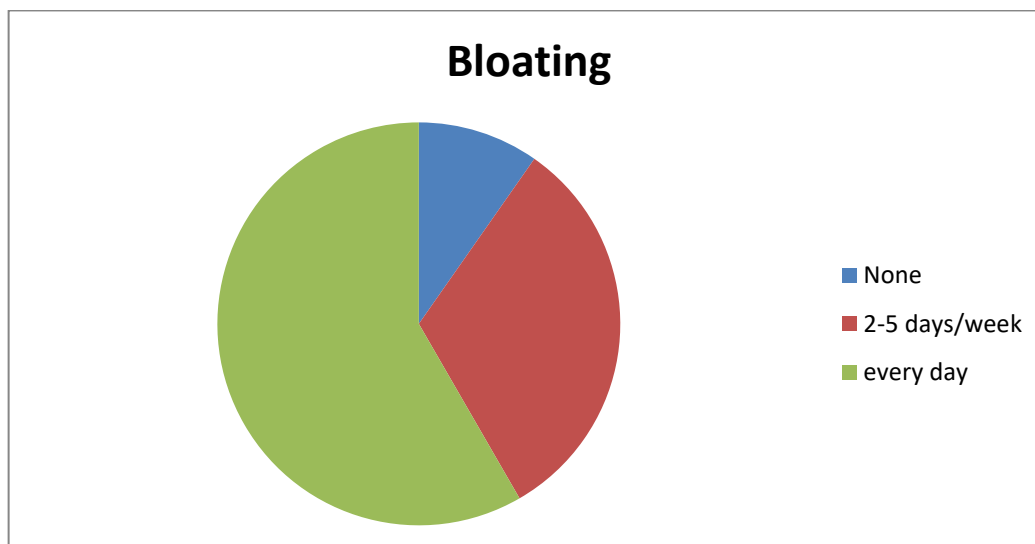


FIGURE 3- Frequency of Bloating in the study population

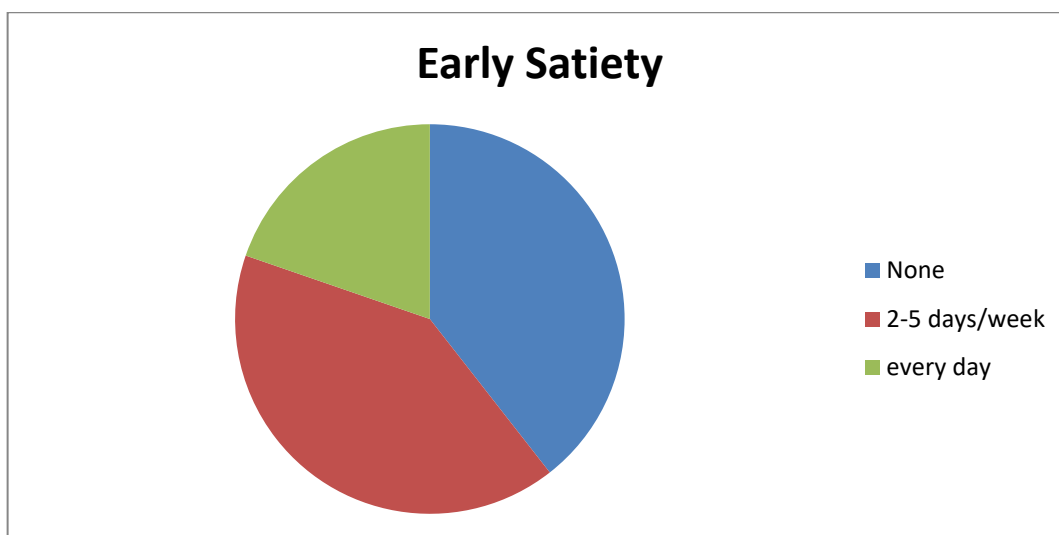


FIGURE 4- Frequency of Early Satiety in the study population

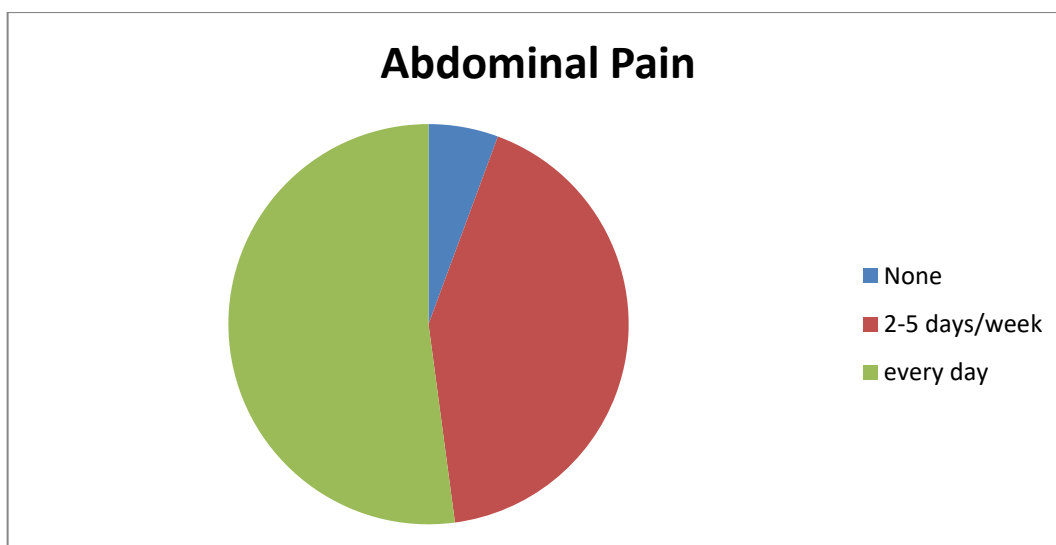


FIGURE 5- Frequency of Abdominal Pain in the study population

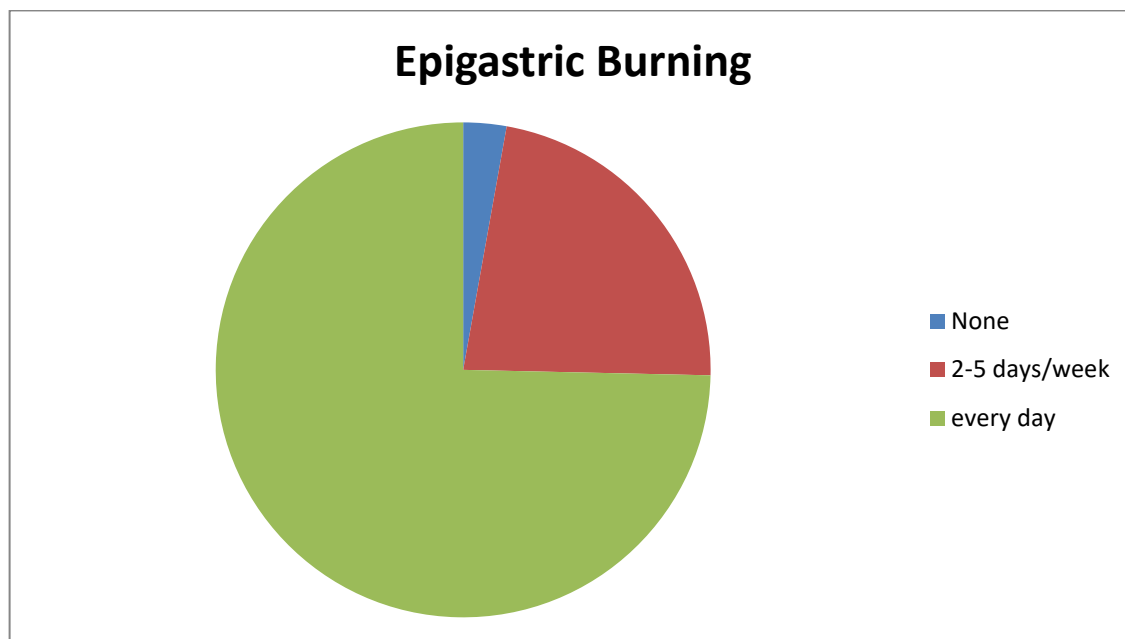


FIGURE 6- Frequency of Epigastric Burning in the study population

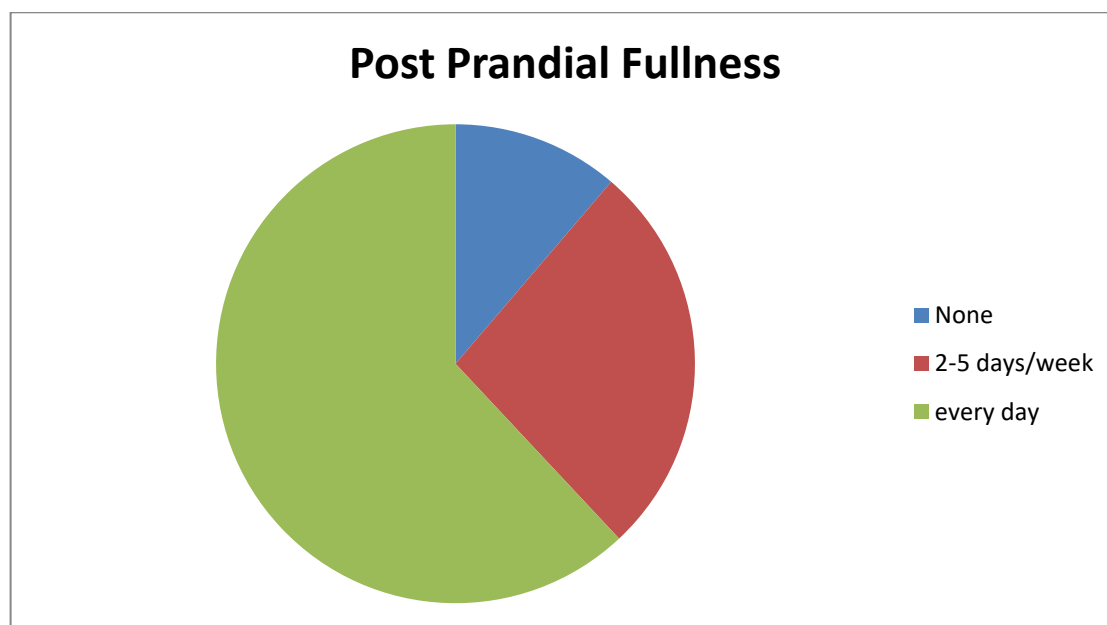


FIGURE 7- Frequency of Post Prandial Fullness in the study population

	BLOATING	EARLY SATIETY	ABDOMINAL PAIN	EPIGASTRIC BURNING	POST PRANDIAL FULLNESS
NONE	7 (9.9%)	28(39.4%)	4 (5.6%)	2 (2.8%)	8 (11.3%)
1-6 MONTHS	10 (14.1%)	12(16.9%)	19 (26.8%)	10 (14.1%)	23 (32.4%)
> 6 MONTHS	54 (76%)	31(43.7%)	48 (67.6%)	59 (83.1%)	40 (56.3%)

TABLE 2- Duration of various symptoms reported by patients

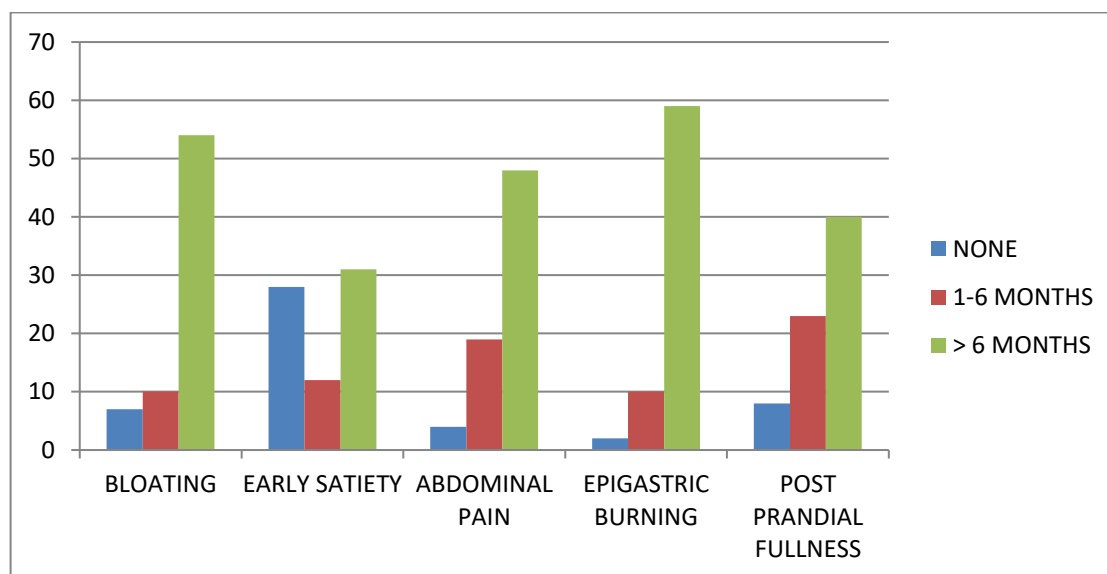


FIGURE 8- Duration of various symptoms enquired from patients

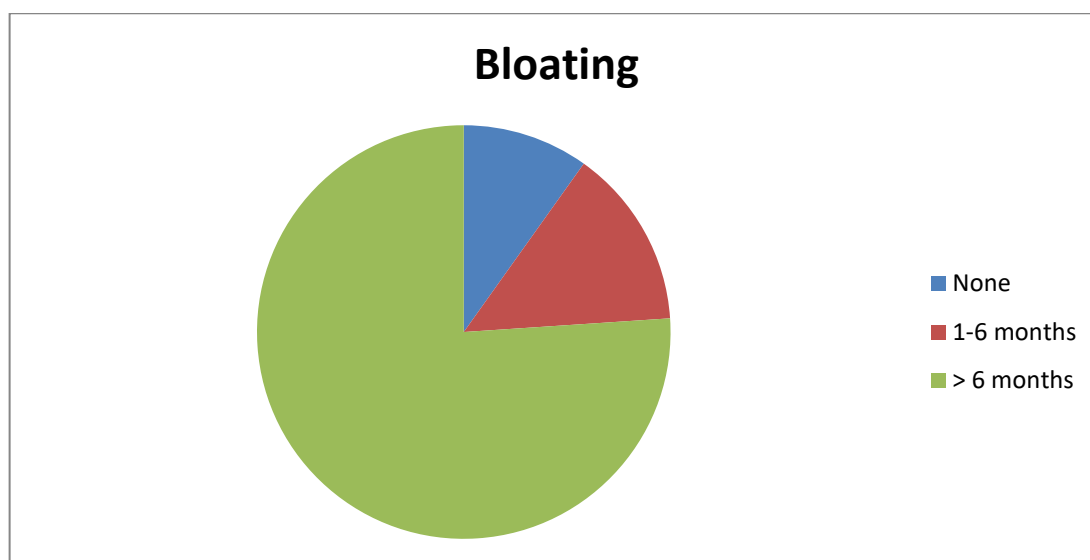


FIGURE 9- Duration of Bloating enquired from the study population

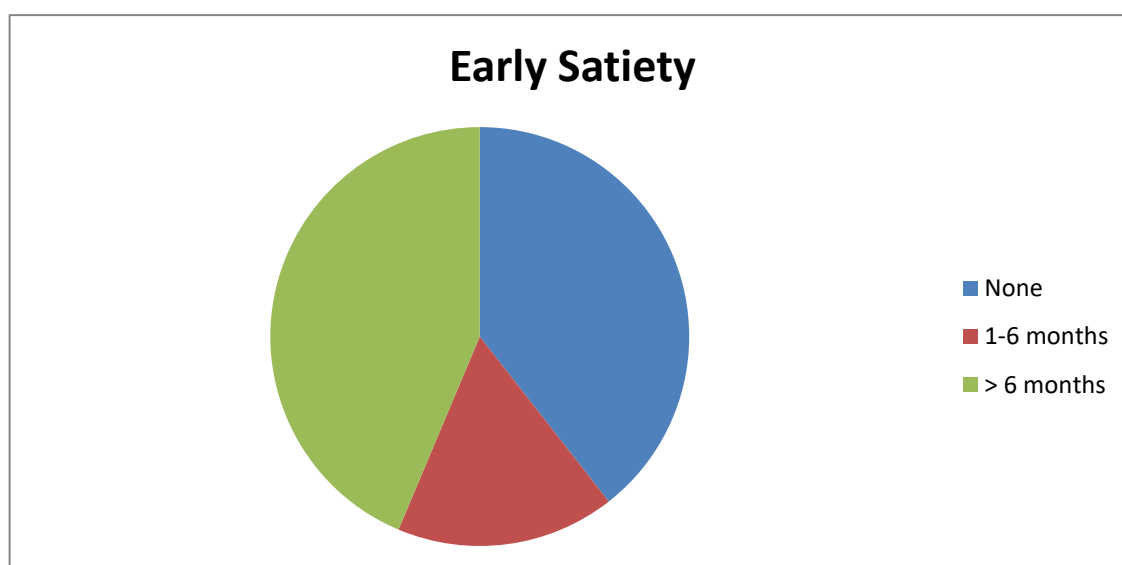


FIGURE 10- Duration of Early Satiety enquired from the study population

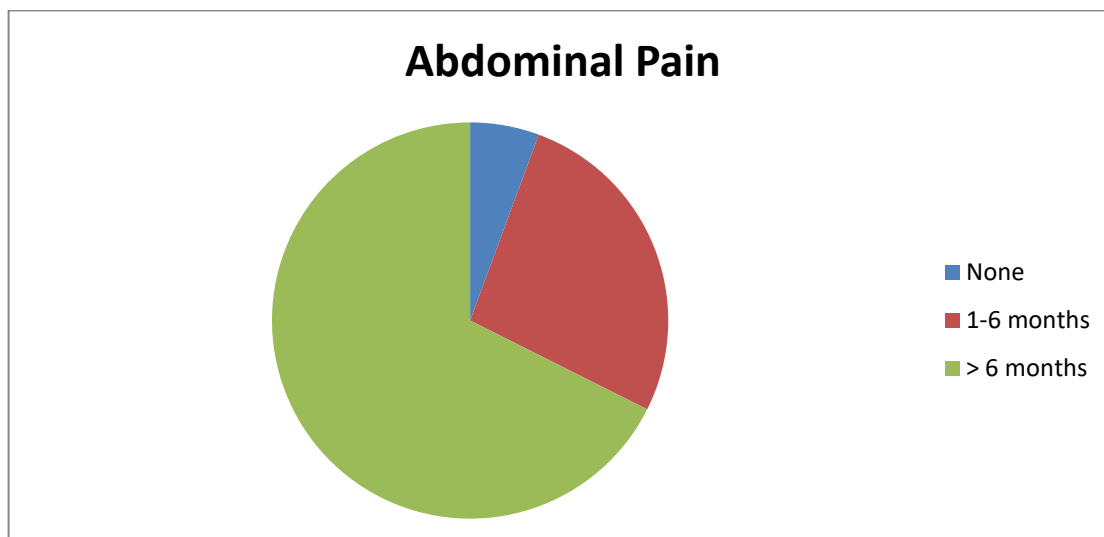


FIGURE 11- Duration of Abdominal Pain enquired from the study population

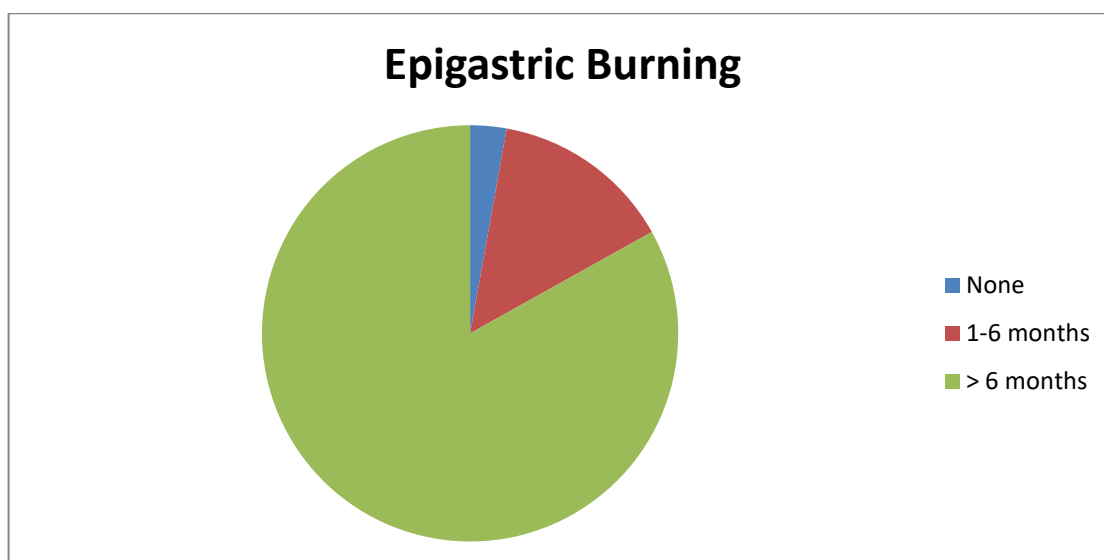


FIGURE 12- Duration of Epigastric Burning enquired from the study population

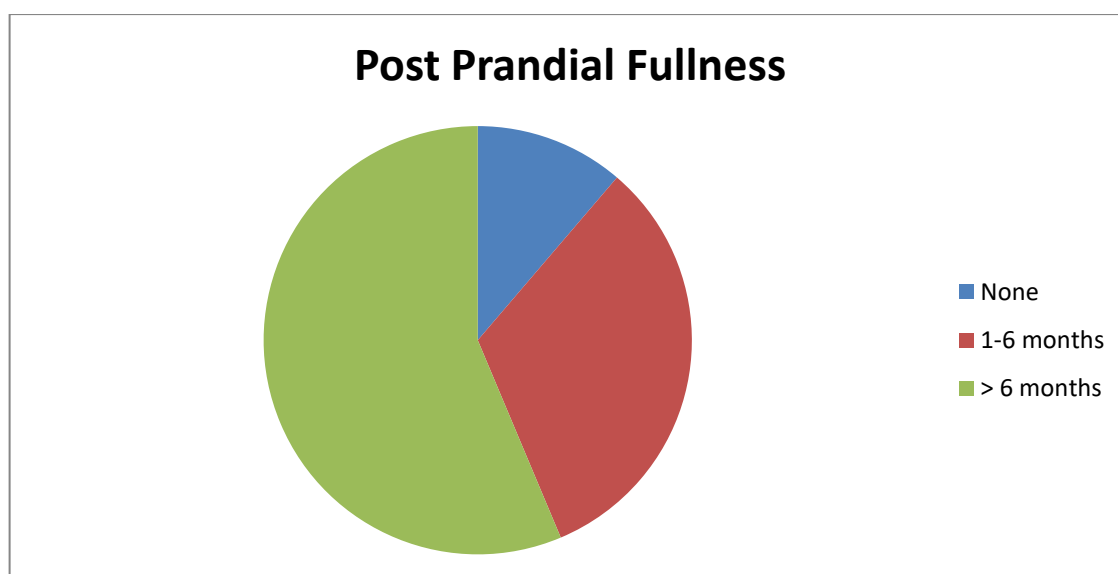


FIGURE 13- Duration of Post Prandial Fullness enquired from the study population

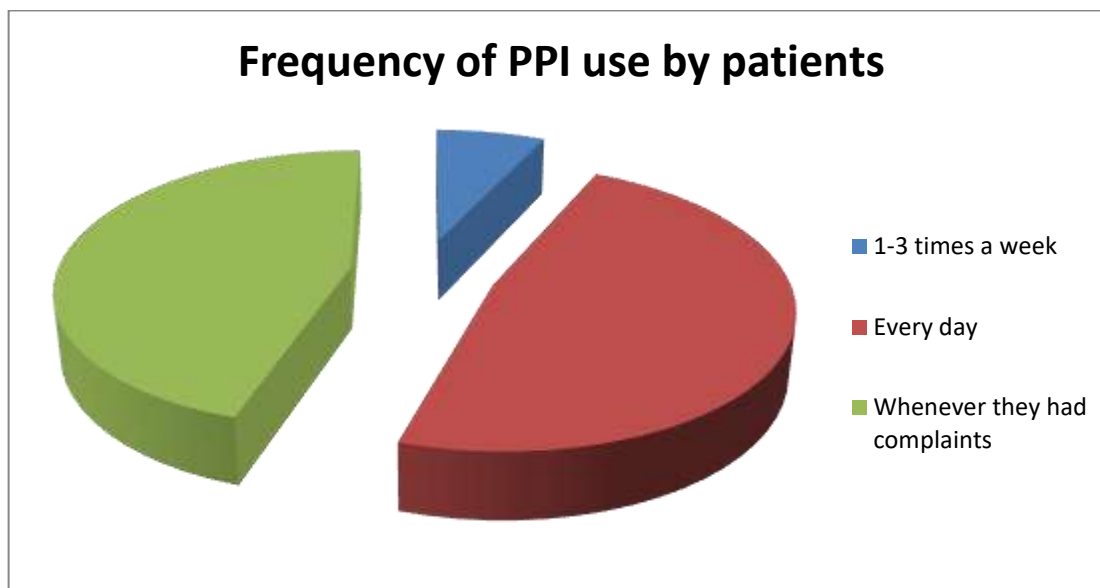


Figure 14- The frequency of PPI use by patients

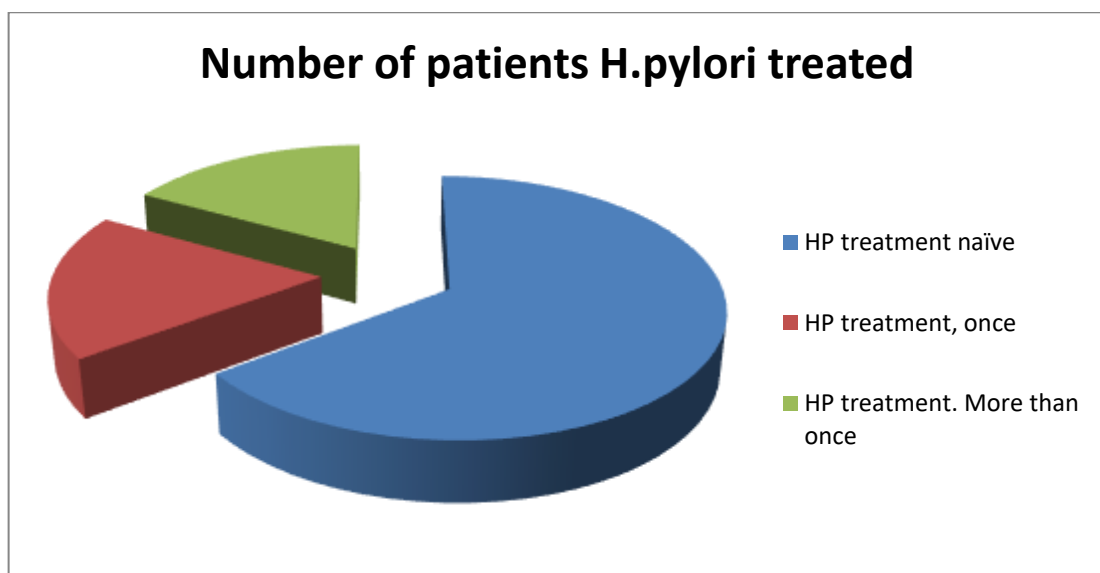


Figure 15- The number of patients who received treatment for H. pylori infection

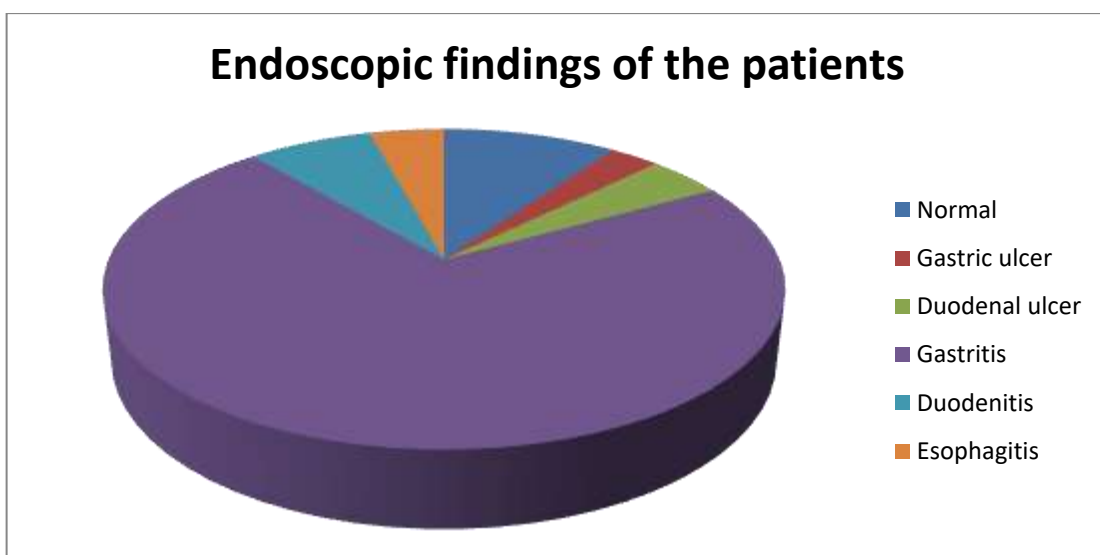


Figure 16- Endoscopic findings of the patients

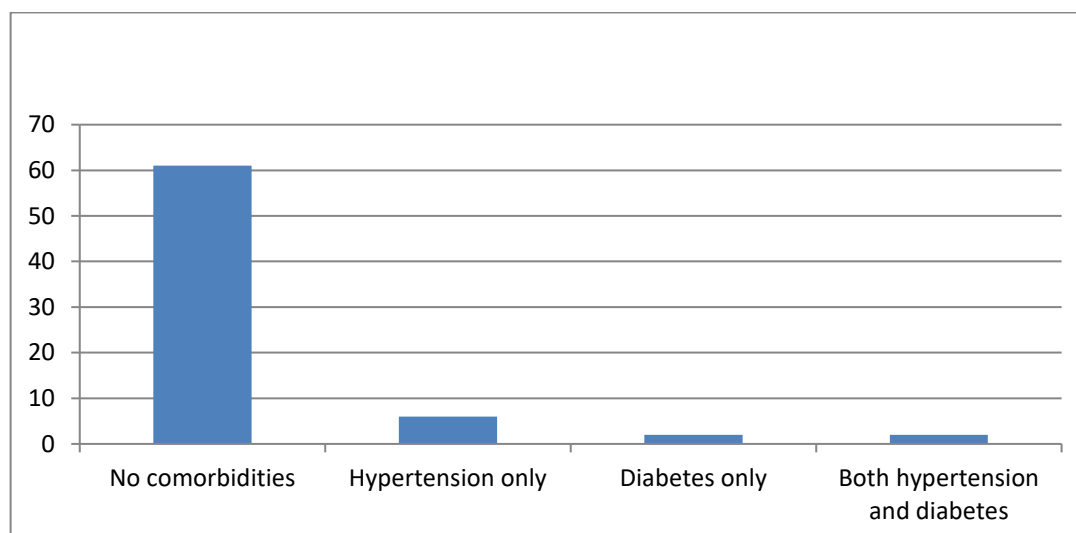


Figure 17- Prevalence of comorbidities in dyspepsia patients of our study

DISCUSSION

As dyspepsia is often persistent or recurring in nature, it negatively impacts patients' daily lives, and therefore, dyspepsia commonly warrants endoscopic evaluation.

In our study, a total of 71 patients were included with a mean age of 41.25 years. The cohort comprised 39 females (54.9%) and 32 males (45.1%). This contrasts with the findings of Sarkar S et al.,⁵ who reported a significant male preponderance with 71% male participants compared to 29% female participants undergoing endoscopy for dyspepsia. The observed gender disparity in the prevalence of dyspepsia suggests a complex interplay of socio-cultural influences, disparities in healthcare access, and potential biological differences that warrants further evaluation.

When analyzing, 3 female patients (4.2%) and 2 male patients (2.8%) were in the less than 25 years age group. The 25-50 years age group included 27 female patients (38.0%) and 20 male patients (28.2%). Similarly, the greater than 50 years age group consisted of 9 female patients (12.7%) and 10 male patients (14.1%). This distribution indicates that the largest group in the study population is females between 25 and 50 years of age, while the smallest group is males under 25 years old. This age distribution is consistent with findings by Sarkar S et al.⁵ who observed that functional dyspepsia primarily affects individuals aged between 20 and 50 years, with most commonly affected age group being 31-40 years (24.7%). In another study by Yellapu et al.⁶ also, out of 207 patients with dyspepsia, maximum of these were in age groups between 35-44 years accounting for 25%, followed by 45-54 years accounting for 22% and more than 55 years of age accounting for 16.9%. The predominance of young and middle-aged adults in our dyspepsia cohort suggests that management strategies should consider age-related factors, including work stress, dietary habits, and lifestyle modifications.

Median BMI value of the study participants was 20.8 kg/m². A survey conducted in Turkey (TEKHARF) on obesity prevalence found that the median BMIs for individuals aged 30-79 were 26.85 kg/m² for men and 29.22 kg/m² for women.⁷ However, our study didn't find a correlation between obesity and dyspepsia. This could be due to the limited number of obese patients in our study, and the fact that the median BMI of our participants was lower than the estimated median for the general Turkish population.

In our study, similar rates of bloating (90.1%), abdominal pain (94.4%), Epigastric burning (97.2%), and post prandial fullness (88.7%) were detected, while early satiety (60.6%) was the least encountered complaint relative to the frequencies of other 4 symptoms. Similar study was conducted by Maheshwari et al.,⁸ in which the common presenting complaints were epigastric pain and discomfort (78.9%) followed by nausea and vomiting (72.8%) and the other complaints were heart burn (59.9%), food intolerance (49.3%), indigestion (45.8%) and loss of appetite and weight (33%), the observations which were comparable. The high prevalence of postprandial fullness (88.7%)

suggests that many of our patients might have postprandial distress syndrome (PDS) according to Rome IV criteria. This subtyping could guide targeted therapies, such as prokinetics for PDS and acid suppressants for epigastric pain syndrome (EPS).

Similarly, in Chinese study by Xiao YL et al⁹, out of 186 FD patients enrolled, predominant symptoms had similar frequency, like epigastric pain (36.6%), epigastric burning (25.3%), bothersome post prandial fullness (29%), while early satiety (9%) was not as common. In studies performed in Europe and Asia, rates of epigastric pain were detected as 36-66% and 25-44.5%, respectively. We think that, our relatively higher rate of dyspeptic symptoms is related to our evaluation of young-middle aged group of patients, PPI unresponsive cases, and those without alarm features. Similar to our study, in studies from Turkey¹⁰ also reported increased rate and frequency of epigastric burning to be 78-90% and 92-95%, respectively. Symptoms of early satiety in studies on dyspeptic patients have demonstrated variations between 9% and 68%.

In our study of dyspepsia patients, most (85.92%) had no other significant health conditions. Among the patients who did have other conditions, hypertension was the most frequent comorbidity, affecting 11.27% of patients. This included 8.45% with only hypertension and 2.82% who also had diabetes. However, diabetes mellitus was the second most common comorbidity, present in 5.63% of patients. Both hypertension and diabetes mellitus have been associated with dyspepsia in some studies, although the causal relationship remains unclear. The low number of other health conditions in our study group is likely due to the fact that over half of our patients (66.2%) were young, between 25 and 50 years old. The absence of significant comorbidities in the majority of our patients suggests that dyspepsia often occurs independently of other systemic diseases, particularly in younger patients.

In our study, 28.2% of patients were alcohol users and 43.7% patients were smokers. This is similar to the study by Kumar M et al.¹¹, that reported the lower prevalence of alcohol consumption, either alone (5.7%) or in combination with tobacco chewing (5.7%), was relatively infrequent. The finding that the majority of our dyspepsia patients (62.8%) had no significant habits suggests that while lifestyle factors may contribute to dyspepsia in some but they are not necessary for its occurrence supporting the multifactorial etiology of dyspepsia, encompassing physiological, environmental and psychological factors.

Given the prolonged duration of their symptoms (exceeding 6 months), nearly 10% of our study participants had previously undergone upper gastrointestinal endoscopy at least once. Our study evaluated the upper gastrointestinal endoscopic findings of dyspeptic patients who did not respond to PPI treatment. Previous studies analyzing dyspeptic complaints and endoscopic findings have shown that 73.3% to 85% of endoscopic results did indicate gastritis. In our study, this rate was 71.8%. We believe that our observed rate was likely lower than that reported in the literature, is a consequence of excluding patients with alarm symptoms and individuals over the age of 65 from our assessment.

The most prevalent endoscopic finding in our study was gastritis (71.8%) followed by normal endoscopy (9.9%) and other findings, in descending order of frequency, included duodenitis in 5 patients (7.0%), and both duodenal ulcer and esophagitis in 3 patients each (4.2%). Gastric ulcers were the least common finding, seen in 2 patients (2.8%). This finding is similar to the study conducted by Yellapu et al. where gastritis was the most common endoscopic finding reported in 52.6%, while in contrast to our study, the endoscopic findings were normal in only 6.3% of dyspeptic patients.

Gastric ulcers were found in only 2.8% cases, while comparatively, the duodenal ulcer in our study was found to be present in 4.2% cases only, the number being quite insignificant which is in contrast to the study by Sarkar S et al. where Gastric ulcers were observed in 7.5% of the study population, and duodenal ulcers in 20.4%, both statistically significant. This lower prevalence might reflect the declining global trend in peptic ulcer disease, attributed to improved hygiene, decreased H. pylori infection rates, and increased use of PPIs.

In the study by Yellapu et al., various other findings such as esophageal candidiasis (1.1%), gastric polyps (2.2%), and varices (3.2%) have also been observed. These findings suggest a broad differential diagnosis in patients with dyspeptic symptoms, reinforcing the utility of upper gastrointestinal endoscopy as both a diagnostic and stratification tool, especially in patients with alarm symptoms or non-responsiveness to empirical therapy. Similarly, the number of patients with other lesions such as oesophageal stricture is too small to compare with prior published data. Some patients with dyspepsia had post cricoid web, gastric polyp, hook worm infestation and oesophageal varices as incidental findings, which may not be attributed to their symptomatology.

A staggering 90.1% of our study participants had abnormal endoscopic findings. This high rate suggests that endoscopy may be a valuable diagnostic tool for our population and could challenge the "test and treat" approach recommended in regions where endoscopic abnormalities are less common. However, the clinical significance of these findings, particularly cases of mild gastritis, requires careful interpretation. The correlation between clinical symptoms and endoscopic findings in our study suggests that structural abnormalities contribute significantly to symptom generation in many patients.

The largest segment of our study population, comprising 46 patients (64.8%), was treatment-naïve, indicating no prior *H. pylori* therapy. A smaller group of 13 patients (18.3%) had undergone one previous course of treatment, while the smallest group, 12 patients (16.9%), had been treated more than once. This distribution shows that the majority of our cohort had no history of *H. pylori* eradication therapy. Interestingly, only 8.6% of patients tested positive for *H. pylori* by Rapid Urease Test (RUT), indicating a low prevalence in study under Sarkar et al. as well. This contrasts with studies done in Japan, which reported *H. pylori* positivity rates exceeding 60% in dyspeptic patients. This discrepancy may be attributed to regional differences in bacterial colonization, antibiotic use, and socioeconomic factors.

Notably, we did not identify any cases of gastric malignancy in our cohort. This is reassuring but could be due to exclusion of patients with alarm symptoms and those with old age. As the gastric cancer is often a concern in patients with dyspepsia, particularly in high-risk regions, the association cannot be completely overlooked. Previous studies showed that the incidence and risk of gastric malignancy was high after 50 years of age with its highest peak in the seventh decade. The prevalence of significant lesions in young patients is low and is consistent with previous studies.

We evaluated patients' dyspeptic symptoms using our questionnaire forms. Functional dyspepsia was identified in 85% of patients with normal endoscopic findings, based on Rome IV criteria. Park et al.¹² detected median FD rate as 49.7% in patients with chronic dyspeptic symptoms according to Rome IV criteria, with 44.9% cases in primary clinic and 53.5% cases in tertiary hospitals. In a population based study performed in Japan, only 12.3% patients could be diagnosed with FD according to Rome III criteria. Also, criteria used to diagnose dyspepsia may influence its prevalence. In a study conducted on Chinese individuals in Taiwan¹³, 27.8% (561 out of 2,018 respondents) reported dyspeptic symptoms. Among these 561 subjects, 80 (14.3%) were found to have structural abnormalities on esophagogastroduodenoscopy (EGD). The study also noted the frequency of functional dyspepsia (FD) as 23.8% using Rome I criteria and 11.8% using Rome II criteria. Though FD is not a fatal condition, it is associated with substantial impairment of quality of life and poses significant burden to the society due to work absenteeism, reduced productivity and use of health care resources.¹⁴

Our questionnaire survey investigated the link between the frequency of dyspeptic complaints and endoscopic findings. We found a significantly higher number of patients with gastritis reported experiencing bloating, epigastric pain, or burning every day ($p=0.000$, $p=0.002$, and $p=0.002$, respectively). A notable finding in patients with ulcers was that epigastric pain was experienced daily ($p=0.000$). These results suggest that gastritis may be present in patients with general dyspeptic symptoms, and a gastrointestinal ulcer could be detected in individuals who frequently suffer from epigastric pain.

In our study, endoscopic examinations of dyspeptic patients unresponsive to PPIs demonstrated the presence of gastritis in majority (71.8%), normal findings in nearly 10%, gastric ulcer or esophagitis in around 7% of these cases. In 85% cases with normal endoscopic findings FD was detected. While PPI treatment is effective for many other diagnoses, the vast majority of patients with FD did not find significant benefit from PPI monotherapy. In nearly two-third of dyspeptic patients younger than 65 years of age without alarm symptoms, upper gastrointestinal endoscopy reveals diagnoses requiring PPI treatment. Therefore, a thorough patient evaluation should precede endoscopy to identify potential issues stemming from the disuse or misuse of medication. Additionally, our study assessed the frequency of dyspeptic complaints and endoscopic findings, revealing a higher incidence of gastritis among patients experiencing daily dyspeptic symptoms.

SUMMARY

- This study included 71 patients (55% female, 45% male) with a mean age of 41.25 years. The observed gender disparity in the prevalence of dyspepsia suggests a complex interplay of socio-cultural influences, disparities in healthcare access, and potential biological differences that warrants further evaluation.
- Average body weight and height were 57 kg and 163.58 cm, respectively, with a mean BMI of 21.2 kg/m². No significant link between BMI and dyspepsia was observed, possibly due to the relatively lean study population. The study emphasizes a need for careful evaluation before resorting to endoscopy.
- Among participants, 28.2% used alcohol and 43.7% were smokers. The finding that the majority of our dyspepsia patients (62.8%) had no significant habits suggests that while lifestyle factors may contribute to dyspepsia in some but not all.
- In our study, most patients (85.92%) had no other significant health conditions, hypertension was present in 11.27% of patients. This included 8.45% with only hypertension and 2.82% who also had diabetes. However, no causal relationship could be established.
- Most patients reported dyspeptic symptoms: bloating (90.1%), abdominal pain (94.4%), epigastric burning (97.2%), and postprandial fullness (88.7%). Early satiety was less common (60.6%). Symptoms lasted over 6 months in the majority of cases.
- Only 9.9% had previously undergone endoscopy. Gastritis was the most frequent endoscopic finding (71.8%), while 9.9% had normal findings. Among those with normal endoscopy, 85% met criteria for functional dyspepsia (FD) per Rome IV.
- Bloating was more common in patients with gastritis or normal endoscopy ($p=0.000$), while epigastric burning was significantly associated with ulcers or gastritis ($p=0.000$ and $p=0.002$). Esophagitis was found in 4.2% of patients.
- Daily bloating, epigastric burning, and pain were more frequently reported by those with pathological endoscopy results. However, symptom severity did not always correlate with structural findings.
- The study suggests that PPI-unresponsive dyspepsia often involves gastritis or FD, particularly in younger patients without alarm signs. Functional symptoms were prevalent even in the absence of endoscopic abnormalities.

CONCLUSION

In dyspeptic patients under 45 years old who lack alarm symptoms and haven't responded to proton pump inhibitors (PPIs), upper gastrointestinal endoscopy often reveals diagnoses that actually require high-dose PPI treatment. Our findings also indicate a higher incidence of gastritis in patients who experience dyspeptic symptoms daily.

Therefore, it's crucial that patient complaints and endoscopic findings are meticulously evaluated. This detailed assessment can help avoid unnecessary endoscopies in some cases, while ensuring that those who do need treatment receive the appropriate, often higher, doses of PPIs for their specific condition.

This study adds to the increasing evidence of regional variations in the presentation and pathophysiology of dyspepsia. It emphasizes the need for diagnostic and management approaches tailored to specific contexts rather than relying on universal algorithms. By integrating clinical, endoscopic, and epidemiological data, we can develop more effective, personalized strategies to reduce the significant burden of dyspepsia in our community.

QUESTIONNAIRE-

Name:

Age:

Reg No. :

Gender: ☐ Male ☐ Female

Alcohol use: Gms/day. Type of alcoholic drink: Duration:

Smoking status: cigarettes/day; Duration:

Tobacco chewer: Duration:

Body weight: Kg; Height: cm, BMI -

Q1. Within the last 3 months, how often have you felt disturbing abdominal bloating after eating a normal amount of food?

0. Never

1. 2-5 days a week

2. Every day

Q2. How long have you had this disturbing bloating?

0. No bloating

1. For the last 1 -6 months

2. For more than 6 months

Q3. Within the last 3 months how often have you stopped eating your meal because of your stomach problems?

0. Never

1. 2-5 days a week

2. Every day

Q4. How long have you had problems of stopping eating your meal because of your stomach problems?

0. Early satiety is absent

1. For the last 1-6 months

2. For more than 6 months

Q5. Within the last 3 months, how often have you felt pain on the middle of your abdomen?

0. Never

1. 2-5 days a week

2. Every day

Q6. How long have you had this pain?

0. Never

1. For the last 1 -6 months

2. For more than 6 months

Q7. Is this pain related to eating a meal?

0. It does not change with eating?

1. The pain worsens after eating a meal?

2. The pain decreases after eating a meal?

Q8. Within the last 3 months, how often have you felt a burning sensation at the middle of your Abdomen?

0. Never

1. 2-5 days a week

2. Every day

Q9. How long have you had problems of this burning sensation?

0. Never

1. For the last 1-6 months

2. For more than 6 months

Q10. How often do you feel like food just sits in your abdomen after you eat?

0. Never

1. 2-5 days a week

2. Every day

Q11. How long have you had this complaint of fullness after meals?

0. Never

1. For the last - 6 months

2. For more than 6 months

Q12. Within the last year how often have you used a PPI (omeprazole, lansoprazole, pantoprazole, rabeprazole or esomeprazole)?

0. 1-3 times a day

1. Every day

2. Whenever I had complaints

Q13. How many times have you had treatment for “Helicobacter pylori” infection?

0. Never

1. Once

2. More than once

Q14. Have you ever undergone an endoscopic examination?

0. Never

1. Yes

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