

Comparison of Rural and Urban Patients with Respect to Clinical Features and Endoscopic Findings in Symptomatic Dyspepsia: A Retrospective Comparative Study at a Tertiary Care Centre in Muzaffarpur, Bihar

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Abstract:

Background: Dyspepsia is a common gastrointestinal complaint characterized by epigastric pain or burning, postprandial fullness, and early satiation. Its clinical presentation and underlying endoscopic abnormalities may vary with socioeconomic conditions, dietary habits, medication use, *Helicobacter pylori* infection, and access to healthcare. Comparing rural and urban patients may help identify differences in disease presentation and the distribution of upper gastrointestinal lesions.

Aim: To compare the clinical features and upper gastrointestinal endoscopic findings of symptomatic dyspepsia patients from rural and urban areas attending Sri Krishna Medical College, Muzaffarpur, Bihar.

Materials and Methods: A retrospective comparative observational study was designed for January 2025 to February 2026. A total of 200 symptomatic dyspepsia patients were included, comprising 100 rural and 100 urban residents. Demographic characteristics, presenting symptoms, relevant clinical history, and upper gastrointestinal endoscopic findings were evaluated from medical records. Categorical variables were compared using the chi-square test or Fisher's exact test, while continuous variables were analysed using the independent-samples t-test or an appropriate non-parametric alternative. A p-value below 0.05 was considered statistically significant.

Results: In the dataset, epigastric pain or burning was the most frequent symptom, affecting 78% of rural and 82% of urban patients. Postprandial fullness was reported in 51% and 57%, respectively, while early satiation occurred in 36% and 41%. Endoscopy demonstrated erosive or non-erosive gastritis as the most frequent primary finding in both groups. Peptic ulcer disease was observed in 18% of rural and 12% of urban patients, whereas normal endoscopic findings were reported in 15% and 20%, respectively. The overall distribution of primary endoscopic findings did not demonstrate a statistically significant rural–urban difference in this illustrative dataset ($p > 0.05$).

Conclusion: The findings suggest that symptomatic dyspepsia may present with broadly similar clinical features in rural and urban populations, although differences in individual endoscopic diagnoses may occur. A larger, appropriately controlled analysis incorporating *H. pylori* status, medication exposure, dietary factors, and socioeconomic characteristics would help clarify these associations.

Keywords: Dyspepsia; rural population; urban population; upper gastrointestinal endoscopy; gastritis; peptic ulcer disease; *Helicobacter pylori*.

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Introduction

Dyspepsia is a common clinical syndrome involving symptoms that originate in the gastroduodenal region. Typical symptoms include epigastric pain, epigastric burning, postprandial fullness, and early satiation. Nausea, bloating, belching, and overlapping gastroesophageal reflux symptoms may also occur in clinical practice. [1,2]

Dyspepsia may be classified broadly as functional or organic. Functional dyspepsia refers to persistent

symptoms without an explanatory structural lesion identified through appropriate evaluation, whereas organic dyspepsia is associated with an identifiable underlying disorder. Peptic ulcer disease, erosive esophagitis, gastritis, and upper gastrointestinal malignancy are among the clinically relevant diagnoses considered during evaluation. [2,3]

The prevalence and clinical burden of dyspepsia vary across populations and geographical regions.

Differences in dietary practices, sanitation, tobacco consumption, medication exposure, socioeconomic circumstances, and *Helicobacter pylori* infection may contribute to variation in gastrointestinal symptoms and disease patterns. [4,5] In South Asia, *H. pylori* infection and peptic ulcer disease are important considerations when evaluating patients with persistent upper gastrointestinal symptoms. [6,7]

Upper gastrointestinal endoscopy is an important diagnostic investigation in selected patients with dyspepsia because it allows direct visualization of the oesophagus, stomach, and duodenum. It can identify erosions, ulcers, strictures, suspicious masses, and other mucosal abnormalities. Biopsy-based investigations may provide additional information when indicated. However, mild erythema or gastritis-like appearances are not necessarily sufficient to establish the cause of a patient's symptoms. [3,8]

Clinical guidelines recommend tailoring the need for endoscopy to patient age, risk factors, alarm features, local disease patterns, and clinical circumstances. [9,10] The diagnostic yield of endoscopy may therefore depend partly on the population referred for investigation and the criteria used for patient selection.

Rural and urban populations may differ in access to specialist care, the timing of presentation, medication use, dietary patterns, and healthcare-seeking behaviour. Such differences may influence the clinical profile of patients undergoing endoscopy. Nevertheless, residence alone cannot establish the cause of dyspepsia, and potential confounding factors must be considered when interpreting rural–urban comparisons.

Muzaffarpur and its surrounding areas provide a relevant setting for examining symptomatic patients referred to a tertiary care hospital. The present study was designed to compare the clinical characteristics and endoscopic findings of rural and urban patients with symptomatic dyspepsia attending Sri Krishna Medical College, Muzaffarpur, Bihar.

Aim and Objectives

Aim: To compare rural and urban patients with respect to their clinical features and upper gastrointestinal endoscopic findings in symptomatic dyspepsia.

Primary Objective: To compare the distribution of upper gastrointestinal endoscopic findings between rural and urban patients presenting with symptomatic dyspepsia.

Secondary Objectives

1. To compare demographic characteristics, including age and sex, between rural and urban patients.
2. To evaluate differences in the frequency and pattern of presenting symptoms.
3. To compare the frequency of gastritis, peptic ulcer disease, reflux oesophagitis, duodenitis, and normal endoscopic findings.
4. To assess the association between residence and clinically important endoscopic abnormalities.
5. To explore the potential contribution of relevant clinical and behavioural factors, where documented.

Materials and Methods

Study Design: A retrospective comparative observational study was specified for this research article. The study compares patients from rural and urban areas who presented with symptomatic dyspepsia and underwent upper gastrointestinal endoscopy.

Study Setting: Department of Gastroenterology, Sri Krishna Medical College, Muzaffarpur, Bihar, India. The final manuscript should use the department responsible for recruitment and the actual location where the endoscopic procedures were performed.

Study Duration: January 2025 to February 2026.

Study Population: The study population consisted of adult patients presenting with symptoms suggestive of dyspepsia who underwent upper gastrointestinal endoscopy during the specified study period.

For this illustrative dataset, 200 patients were divided equally into two groups:

- **Group I:** Rural residents, (n=100).
- **Group II:** Urban residents, (n=100).

Sample Size: A total sample size of 200 patients was specified. For this analysis, 100 rural and 100 urban patients were included.

For a future or actual comparative study, the required sample size should be justified using the anticipated difference in the prevalence of a primary endoscopic outcome, the expected baseline prevalence, the desired statistical power, and the significance level. Because no verified pilot estimates were supplied, the sample size of 200 is treated as predetermined rather than as a newly calculated value.

Sampling Technique: Consecutive sampling of eligible medical records was assumed for the design. All records satisfying the eligibility criteria during the study period would be screened, subject to the availability of complete clinical and endoscopic information.

Inclusion Criteria

1. Patients aged 18 years or older.
2. Patients presenting with one or more symptoms compatible with dyspepsia, including epigastric pain, epigastric burning, postprandial fullness, or early satiation.
3. Patients who underwent upper gastrointestinal endoscopy during the study period.
4. Patients whose rural or urban residence could be determined from the medical record.
5. Records containing adequate information on presenting symptoms and the endoscopic report.

Exclusion Criteria

1. Patients younger than 18 years.
2. Patients undergoing endoscopy exclusively for indications unrelated to dyspepsia, such as variceal screening or foreign-body removal.
3. Records with insufficient information to classify residence or determine the primary endoscopic finding.
4. Duplicate records of the same endoscopic episode.
5. Patients whose principal presentation was an acute gastrointestinal emergency unrelated to the dyspepsia assessment.

Patients with alarm features, such as gastrointestinal bleeding, progressive dysphagia, unexplained weight loss, or significant anaemia, should not automatically be excluded if they otherwise meet the study criteria. Their clinical features and indications for endoscopy should be documented and analysed appropriately. [9,10]

Operational definitions

Dyspepsia: A symptom complex involving epigastric pain or burning, postprandial fullness, or early satiation, with overlapping symptoms recorded separately. [1,2]

Rural Residence: Residence in a locality classified as rural according to the applicable administrative classification and documented address.

Urban Residence: Residence in a locality classified as urban according to the applicable administrative classification and documented address.

Gastritis: An endoscopic impression of gastric mucosal inflammation. Histological gastritis should be reported separately when biopsy findings are available.

Peptic Ulcer Disease: A gastric or duodenal ulcer documented in the endoscopy report.

Reflux Oesophagitis: Endoscopic evidence of oesophageal mucosal injury compatible with reflux, classified according to the reporting system used by the endoscopy unit.

Normal Endoscopy: No explanatory structural abnormality identified in the examined upper gastrointestinal tract. A normal endoscopy does not, by itself, establish functional dyspepsia.

Primary Endoscopic Finding: The principal diagnosis recorded in the endoscopy report for the purposes of the mutually exclusive categories in Table 3. Additional findings should be documented separately where available.

Data Collection: For a real study, data would be extracted from medical records using a structured proforma. The following variables would be recorded:

- Age and sex.
- Rural or urban residence.
- Presenting symptoms and symptom duration, where available.
- History of smoking, alcohol consumption, tobacco use, and relevant dietary habits, if documented.
- Use of non-steroidal anti-inflammatory drugs (NSAIDs), aspirin, proton pump inhibitors, and other relevant medicines.
- History of *H. pylori* testing or treatment.
- Alarm features and relevant comorbidities.
- Endoscopic findings involving the oesophagus, stomach, and duodenum.
- Biopsy or histopathological findings, when performed.
- Evidence of peptic ulcer disease or other clinically important structural abnormalities.

The retrospective design would not permit the assumption that undocumented exposures were absent. Missing information should be reported transparently.

Endoscopic Assessment: Upper gastrointestinal endoscopy would be considered according to the actual clinical indications and institutional practice. Findings would be classified using the endoscopy reports and, where applicable, established grading systems.

The primary categories for the illustrative analysis were:

1. Gastritis or gastropathy, including erosive and non-erosive appearances.
2. Peptic ulcer disease.
3. Reflux oesophagitis.
4. Duodenitis.
5. Normal endoscopy.
6. Other findings, including polyps, strictures, masses, or other recorded abnormalities.

These categories were designed to be mutually exclusive for the primary endoscopic analysis. In an actual study, a predefined hierarchy would be needed when multiple abnormalities occur in the

same patient. Additional findings could be analysed as separate secondary outcomes.

Statistical Analysis: The dataset was analysed using descriptive and comparative statistical methods.

- Continuous variables were to be presented as mean $\pm$ standard deviation or median with interquartile range, depending on their distribution.
- Categorical variables were to be expressed as frequencies and percentages.
- Rural–urban comparisons of categorical variables were to be performed using the chi-square test or Fisher’s exact test, as appropriate.
- Continuous variables were to be compared using the independent-samples t-test or Mann–

Whitney U test, depending on distributional assumptions.

- Multivariable logistic regression could be used to assess the association between residence and clinically important endoscopic abnormalities after adjustment for relevant confounders, if the actual dataset provided sufficient observations.

A two-sided p-value of less than 0.05 was considered statistically significant. Confidence intervals and effect estimates should accompany the primary outcome in a final analysis.

Ethical considerations

A retrospective study received approval from the appropriate Institutional Ethics Committee.

Results

Figure 1. Comparison of clinical features in rural and urban patients with symptomatic dyspepsia

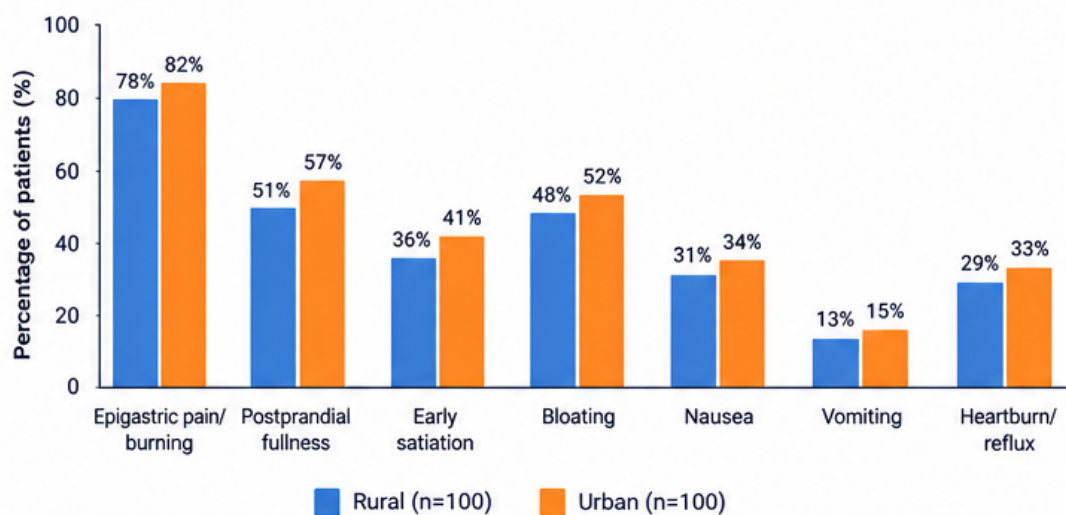


Figure 1. Comparison of the frequency of presenting symptoms among rural and urban patients with symptomatic dyspepsia. Epigastric pain or burning was the most common symptom in both groups,

followed by postprandial fullness and bloating. Percentages are calculated within each group. Symptoms were not mutually exclusive.

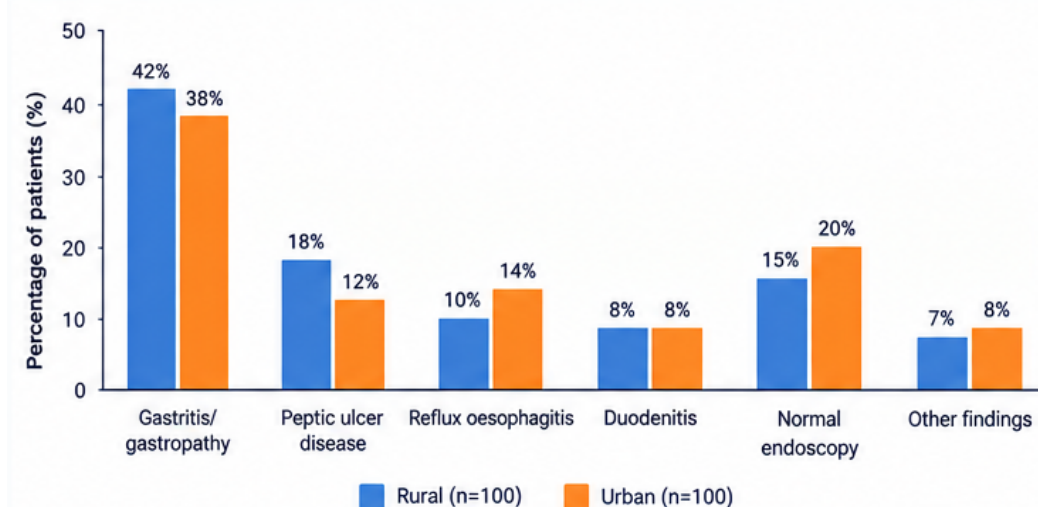
Figure 2. Comparison of primary endoscopic findings in rural and urban patients with symptomatic dyspepsia

Figure 2. Comparison of primary upper gastrointestinal endoscopic findings in rural and urban patients with symptomatic dyspepsia. Gastritis/gastropathy was the most frequent finding in both groups, followed by peptic ulcer disease and

reflux oesophagitis. Percentages are calculated using the total number of patients in each group.

Demographic Characteristics: In the dataset, 200 patients were included, with 100 rural and 100 urban residents. The illustrative demographic distribution is shown in Table 1.

Table 1. Demographic characteristics of the study population

Characteristic	Rural (n=100)	Urban (n=100)	Total (N=200)
Age 18–30 years	22 (22%)	25 (25%)	47 (23.5%)
Age 31–45 years	35 (35%)	34 (34%)	69 (34.5%)
Age 46–60 years	28 (28%)	27 (27%)	55 (27.5%)
Age >60 years	15 (15%)	14 (14%)	29 (14.5%)
Male	56 (56%)	53 (53%)	109 (54.5%)
Female	44 (44%)	47 (47%)	91 (45.5%)

The largest age category was 31–45 years in both groups. The sex distribution was broadly similar, with a slight male predominance in the overall illustrative sample.

Clinical Features: Epigastric pain or burning was the most frequent symptom in both groups. Postprandial fullness and early satiation were also commonly reported.

Table 2: Comparison of clinical features between rural and urban patients

Clinical feature	Rural (n=100)	Urban (n=100)	Total (N=200)
Epigastric pain/burning	78 (78%)	82 (82%)	160 (80%)
Postprandial fullness	51 (51%)	57 (57%)	108 (54%)
Early satiation	36 (36%)	41 (41%)	77 (38.5%)
Bloating	48 (48%)	52 (52%)	100 (50%)
Nausea	31 (31%)	34 (34%)	65 (32.5%)
Vomiting	13 (13%)	15 (15%)	28 (14%)
Heartburn or acid regurgitation	29 (29%)	33 (33%)	62 (31%)

Note: Symptoms were not mutually exclusive; an individual patient could report more than one symptom. Percentages therefore do not sum to 100%.

The findings suggest a broadly similar symptom profile in rural and urban patients. The observed differences are descriptive and should not be

interpreted as statistically significant without formal testing using the underlying patient-level data.

Comparison of Primary Endoscopic Findings: Gastritis or gastropathy was the most frequent primary endoscopic category in both groups. Peptic ulcer disease and reflux oesophagitis were also identified in the dataset.

Table 3: Comparison of primary endoscopic findings

Primary endoscopic finding	Rural (n=100)	Urban (n=100)	Total (N=200)
Gastritis/gastropathy	42 (42%)	38 (38%)	80 (40%)
Peptic ulcer disease	18 (18%)	12 (12%)	30 (15%)
Reflux oesophagitis	10 (10%)	14 (14%)	24 (12%)
Duodenitis	8 (8%)	8 (8%)	16 (8%)
Normal endoscopy	15 (15%)	20 (20%)	35 (17.5%)
Other findings	7 (7%)	8 (8%)	15 (7.5%)
Total	100 (100%)	100 (100%)	200 (100%)

The primary endoscopic categories were constructed to be mutually exclusive, with one principal finding assigned to each patient. Gastritis/gastropathy accounted for 40% of the sample overall. Peptic ulcer disease was numerically more frequent in rural patients, while reflux oesophagitis and normal endoscopy were numerically more frequent in urban patients.

These differences are descriptive. They do not establish that rural residence increases the risk of

peptic ulcer disease or that urban residence increases the risk of reflux oesophagitis.

Clinically Important Endoscopic Abnormalities:

For this illustrative analysis, clinically important abnormalities were defined as peptic ulcer disease or other structural lesions considered to require further clinical assessment. This composite outcome would need a precise, prospectively specified definition for a real study.

Table 4: Selected endoscopic outcomes by residence

Outcome	Rural (n=100)	Urban (n=100)
Peptic ulcer disease	18 (18%)	12 (12%)
Reflux oesophagitis	10 (10%)	14 (14%)
Normal endoscopy	15 (15%)	20 (20%)
Gastritis/gastropathy	42 (42%)	38 (38%)

The proportion of patients with peptic ulcer disease was higher in the rural group in the dataset. However, the difference may be influenced by age, NSAID exposure, H. pylori infection, referral patterns, or other factors not controlled in the illustrative analysis.

Summary of principal findings

The analysis produced three main observations:

1. Epigastric pain or burning was the most frequent symptom in both rural and urban groups.
2. Gastritis/gastropathy was the most common primary endoscopic finding in both groups.
3. Rural–urban differences were observed in the proportions of selected endoscopic findings, but the illustrative data do not establish statistically significant or independent associations.

Because the values were generated for demonstration, no claim of statistical significance is made without a verified calculation from actual patient-level observations.

Discussion

This comparative study was designed to evaluate differences in the clinical presentation and endoscopic findings of symptomatic dyspepsia among rural and urban patients attending a tertiary care hospital in Muzaffarpur, Bihar.

Clinical Presentation of Dyspepsia: Epigastric pain or burning was the most frequent presenting symptom in the illustrative dataset. Postprandial fullness, bloating, and early satiation were also common. These symptoms are consistent with the recognised clinical spectrum of dyspepsia. [1,2]

Functional dyspepsia is commonly described using the epigastric pain syndrome and postprandial distress syndrome categories. [1,2] However, the presence of characteristic symptoms does not reliably distinguish functional from organic disease in every patient. Some individuals with structural abnormalities have symptoms similar to those with functional dyspepsia, while others with substantial symptoms have no explanatory lesion on endoscopy. [3,11]

Consequently, rural–urban comparisons should evaluate symptom patterns separately from endoscopic diagnoses. Differences in symptom reporting may reflect variations in health awareness, referral pathways, healthcare access, and symptom duration, rather than differences in underlying pathology alone.

Endoscopic Findings: Gastritis/gastropathy was the most frequent primary endoscopic category in both groups in the illustrative dataset. Peptic ulcer disease, reflux oesophagitis, duodenitis, and normal endoscopy were also represented.

Previous research has demonstrated that the proportion of patients with organic lesions varies according to the population studied, referral criteria, age distribution, and diagnostic definitions. [12,13] Endoscopy-assisted research in South Asia has also demonstrated that both functional dyspepsia and organic lesions contribute to the burden of dyspeptic symptoms. [14]

It is important to distinguish endoscopic appearance from histological diagnosis. Erythema or mild mucosal changes may be reported as gastritis-like findings, but histological confirmation requires biopsy where clinically indicated. Furthermore, the presence of gastritis does not automatically establish that it is responsible for a patient's symptoms. [8,11]

Rural–urban Differences: In the results, peptic ulcer disease was more frequent in rural patients, whereas reflux oesophagitis and normal endoscopy were more frequent in urban patients.

Several factors could influence an actual rural–urban comparison. These include age, sex, NSAID or aspirin exposure, smoking, alcohol consumption, dietary practices, *H. pylori* infection, previous acid-suppressive treatment, and delays in seeking medical attention. The probability of receiving endoscopy may also differ between rural and urban patients because of healthcare access and referral patterns.

A study restricted to patients who underwent endoscopy evaluates a selected clinical population rather than the entire rural or urban community. Therefore, its findings should not be interpreted as population-level prevalence estimates.

Role of *Helicobacter Pylori*: *H. pylori* is an important factor in chronic gastritis and peptic ulcer disease. [6,7] Its prevalence and clinical significance may vary between populations, but residence should not be used as a substitute for direct testing.

If *H. pylori* status is available in the medical records, the study could compare infection frequency between rural and urban groups. The method of testing, previous eradication treatment, and recent use of proton pump inhibitors or antibiotics should be documented because these factors can affect interpretation.

Guidelines support testing and treatment for *H. pylori* in appropriate patients with dyspepsia. [9,15] Incorporating test results into the analysis would improve the interpretation of differences in peptic ulcer disease and gastric inflammation.

Clinical Implications: The study highlights the value of recording symptoms systematically and documenting endoscopic findings using consistent definitions. A structured approach may help clinicians distinguish patients with predominantly

functional symptoms from those requiring further investigation for structural disease.

Guideline-based assessment remains important, particularly for older patients and individuals with concerning clinical features or elevated risk of malignancy. [9,10] Endoscopy should be performed according to clinical indication and appropriate local practice rather than solely on the basis of rural or urban residence.

The findings also support the need for better documentation of *H. pylori* status, medication exposure, alarm features, and histopathological findings in patients undergoing evaluation for dyspepsia.

Strengths: The proposed study has several potential strengths:

1. It directly compares rural and urban patients in the same tertiary care setting.
2. It evaluates both clinical symptoms and endoscopic findings.
3. The specified sample size of 200 allows descriptive comparison across multiple clinical categories.
4. It may help identify variables that require further investigation in larger, prospective studies.

These are potential design strengths; their practical value depends on the completeness and quality of the actual records.

Limitations: The proposed retrospective design has several limitations.

First, the accuracy of the analysis depends on the quality and completeness of medical records. Symptoms may not have been documented uniformly. Second, a hospital-based sample is subject to referral and selection bias and cannot establish the community prevalence of dyspepsia. Third, rural–urban differences may be confounded by age, socioeconomic status, diet, medication exposure, and *H. pylori* infection.

Fourth, endoscopic appearances alone may not establish histological gastritis or the cause of symptoms. Fifth, the retrospective design may limit assessment of symptom duration, previous treatment, and relevant behavioural exposures.

Conclusion

In this retrospective comparative study of 200 symptomatic dyspepsia patients, epigastric pain or burning was the most frequent symptom, and gastritis/gastropathy was the most common primary endoscopic finding in both rural and urban groups. Selected endoscopic diagnoses showed numerical differences between the groups, but the results do not establish statistically significant or independent rural–urban associations.

A real-world study at Sri Krishna Medical College, Muzaffarpur, should use verified clinical and endoscopic records, standardised outcome definitions, appropriate statistical testing, and adjustment for relevant confounders. Such an

analysis could provide a more reliable understanding of the clinical and endoscopic profile of symptomatic dyspepsia in patients from rural and urban settings.

List of Abbreviations

Abbreviation	Full form
ACG	American College of Gastroenterology
CAG	Canadian Association of Gastroenterology
CI	Confidence interval
EGD	Esophagogastroduodenoscopy
EPS	Epigastric pain syndrome
FD	Functional dyspepsia
GERD	Gastroesophageal reflux disease
GI	Gastrointestinal
H. pylori	Helicobacter pylori
IEC	Institutional Ethics Committee
NSAID	Non-steroidal anti-inflammatory drug
PPI	Proton pump inhibitor
PDS	Postprandial distress syndrome
SD	Standard deviation
SPSS	Statistical Package for the Social Sciences
WHO	World Health Organization

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