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Clinico-Pathological and Etiological Profile of Dyspepsia in Children - A Retrospective Observational Study from A Tertiary Care Center.

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Abstract

Background & Objectives: Dyspepsia is a common complaint in pediatric GI practice, often there is a diagnostic dilemma between functional and organic etiologies. In this study, we aimed to analyze the clinico-pathological and etiological profile of children presenting with dyspepsia and to correlate clinical presentations with endoscopic findings.

Methods: A retrospective observational study was conducted on 226 children (aged 5–18 years) who underwent Upper Gastrointestinal (UGI) endoscopy for dyspepsia between April 2023 and April 2025. Data regarding demographic profile, clinical indications, and endoscopic findings were analyzed. Statistical significance was determined using the Chi-Square test.

Results: The study cohort comprised 113 males (58.3%) and 81 females (41.7%), with a mean age of 9.8 years. The indications were feeling of fullness, early satiety (51.1%) and Reflux symptoms (24.9%). Endoscopic evaluation revealed a normal study (Functional Dyspepsia) in 63.3% of cases. Organic pathologies included erosive gastritis (11.6%), various duodenal modularity, ulcers (8.4%), and esophagit is (7.1%). A highly significant correlation was found between clinical symptoms and endoscopic findings ($p = 0.0015$). Notably, dysphagia demonstrated a 100% organic yield. Age and gender were not significant predictors of organic disease.

Conclusion: Functional Dyspepsia is the leading cause of upper GI symptoms in children. However, the presence of specific clinical markers, particularly

dysphagia, significantly increases the likelihood of organic pathology. Clinical symptom clustering remains a vital tool in prioritizing patients for endoscopic evaluation.

Keywords: Pediatric Dyspepsia, Upper GI Endoscopy, Functional Dyspepsia, H. pylori, Gastritis, Alarm Symptoms.

Introduction

Dyspepsia, derived from the Greek words *"dys"* (bad) and "peptein" (digestion), is a common complaint in pediatric GI practice characterized by persistent or recurrent pain and/or discomfort in the upper abdomen or epigastrium, feeling of fullness and early satiety[1, 2]. According to the recently published Rome V criteria, pediatric dyspepsia encompasses upper gastrointestinal symptoms such as postprandial fullness, early satiety, epigastric pain, and epigastric burning, which are not attributable to structural, metabolic, or systemic causes upon routine evaluation[1, 3, 4]. In pediatric literature, dyspepsia is categorized under Functional dyspepsia, post prandial distress syndrome and Epigastric pain syndrome. In most cases, distinguishing an organic pathology from functional distress becomes necessary in order to initiate proper treatment and offer adequate patient counseling[1, 2.]

Epidemiologically, upper gastrointestinal complaints and recurrent abdominal pain account for up to 2% to 4% of all pediatric general outpatient visits and up to 50% of consultations in pediatric gastroenterology clinics globally[1, 5]. In children, a meta-analysis reported a global functional dyspepsia pooledprevalenceof 2.1%, although rates vary widely by region.[5,6] Functional dyspepsia is recognized as a major contributor to chronic GI distress, accounting for a significant proportion of school absenteeism and healthcare utilization among school-aged children and adolescents [7, 8].

In developing countries like India, the burden of pediatric gastrointestinal discomfort and abdominal pain is compounded by environmental factors, nutritional deficiencies, and infections [9]. Studies from North India, including data from Western Uttar Pradesh by Malik et al., report that recurrent abdominal pain and upper GI discomfort affect a substantial proportion of children presenting to tertiary care centers. Organic etiologies - such as Helicobacter pylori gastritis, duo denitis, and intestinal parasites are not uncommon[9]. However, routine testing for H pylori colonisation is not recommended.

The pathophysiology of pediatric dyspepsia is heterogeneous and likely involves common abnormalities such as impairedgastricaccommodation (40%), hypersensitivity to gastric distension (30%), and abnormal gastric emptying (25%). Duodenal eosinophilia and increased mast cell activity, sometimes with food triggers, may also contribute. Central sensitization to pain, low-grade inflammation, genetic predisposition, and psychological factors, mainly anxiety are also implicated.[3, 10]. Pediatric patients diagnosed with functional dyspepsia often experience persistent symptoms that extend into adolescence and adulthood, accompanied by elevated anxiety levels, emotional distress, and a markedly reduced quality of life[11].

Diagnostic workup, particularly Upper Gastrointestinal (UGI) endoscopy, plays a vital role in differentiating organic lesions from functional conditions[12]. While studies by Kurt et al. demonstrate that a significant percentage of pediatric endoscopies yield normal findings (pointing toward functional dyspepsia), macroscopic or microscopic pathologies—such as

erosive gastritis, duodenal nodularity, esophageal inflammation, and peptic ulcer disease—are identified in a critical subset of patients presenting with specific alarm features such as in older children, symptoms lasting longer than 6 months, family history of gastric or duodenal ulcers, or symptoms bearing a significantimpact on daily life. [12,13]

Given the variable overlap between clinical presentation and underlying pathology, evaluating the local clinico-pathological and etiological landscape is essential for optimizing management protocols[8,12]. Therefore, this study was undertaken to analyze the clinico-pathological and etiological profile of children presenting with dyspeptic symptoms at a tertiary care facility, aiming to establish meaningful correlations between presenting symptoms and Endoscopic-Histopathological outcomes.

Materials and Methods

Study Design: This was a hospital-based, retrospective observational study conducted to evaluate the clinico-pathological and etiological profile of pediatric patients presenting with dyspepsia.

Setting: The study was conducted in the Department of Pediatric Gastroenterology / Endoscopy Suite of a tertiary hospital in Kolkata, using Pen tax (R) esophago duo deno scope EG - 290 KP make. All UGI endoscopies were performed by a single paediatric gastroenterologist after careful consideration.

Study Period: The study covered a 2-year period from 13th April 2023 to 14th April 2025.

Study Population: The study population comprised pediatric patients aged 5 to 18 years who presented with complaints of dyspepsia and underwent upper gastrointestinal (UGI) endoscopy during the specified study period.

Inclusion Criteria

1. Pediatric patients aged between 5 and 18 years presenting with chronic or recurrent upper gastrointestinal symptoms (epigastric pain, early satiety, postprandial fullness, nausea, vomiting, regurgitation, or heartburn) fulfilling the clinical criteria for dyspepsia.
2. Patients who underwent diagnostic UGI endoscopy within the study period (April 13, 2023, to April 14, 2025).
3. Patients with complete medical records detailing clinical symptoms, endoscopic findings, and available rapid urease test (RUT) or Histopathological biopsy results.

Exclusion Criteria:

1. Patients aged **below 5 years** or **above 18 years**.
2. Patients with a known history of prior gastric or esophageal surgery.
3. Patients undergoing emergency therapeutic endoscopy (e.g., acute foreign body ingestion, active variceal bleeding management without prior evaluation for dyspepsia).
4. Patients with incomplete clinical or endoscopic records.

Data Collection & Procedure

- **Clinical Data:** Patient demographics (age, gender), duration of symptoms, specific clinical indications (epigastric pain, reflux, regurgitation, excessive belching, vomiting, dysphagia, appetite loss, feeling of fullness after meals and early satiety), and history of Proton Pump Inhibitor (PPI) use were retrieved from medical records.
- **Endoscopic Evaluation:** All UGI endoscopies were performed under standard clinical protocol. Macroscopic endoscopic findings (e.g., normal mucosa, antral/

duodenal erosions, duodenal nodularity, esophagi is, or peptic ulcers) were recorded.

Etiological Categorization: Cases were classified into

- **Functional Dyspepsia (including Post prandial distress syndrome and epigastric pain syndrome):** Macroscopically normal endoscopic examination without evidence of organic lesion.
- **Organic Pathologies:** Visible mucosal or structural lesions or microscopic pathology (e.g., Gastritis, Peptic Ulcer Disease, Esophagi is, Duodenitis).

Rapid Urease Test (RUT) for Helicobacter pylori detection was done in select cases where indicated. Mucosal biopsy histopathology findings were recorded wherever performed.

Results

Although clinical symptoms are common across all age groups, a large portion of endoscopic findings are normal, pointing toward a high prevalence of **Functional Dyspepsia** in pediatric population.

Demographic Profile

The study population consists primarily of children in the school-age and early adolescent range, with a slight male predominance. The mean age of the study cohort was 9.80 ± 2.93 years (range: 5 to 18 years). The distribution of organic pathology did not differ significantly across age groups (5–10 years vs. 11–15 years vs. 16–18 years, ($p = 0.216$), indicating that age was not a significant predictor of organic disease yield. Chi-square analysis demonstrated no statistically significant association between gender and endoscopic outcome ($p = 0.934$).

Table 1: Age and Sex Distribution

Parameter / Category	Overall Cohort (n = 225)	Functional / Normal n (%)	Organic / Pathological n (%)
Age Distribution			
• 5–10 Years	134 (59.6%)	90 (67.2%)	44 (32.8%)
• 11–15 Years	77 (34.2%)	43 (55.8%)	34 (44.2%)
• 16–18 Years	11 (4.9%)	7 (63.6%)	4 (36.4%)
Sex Distribution			
• Male	129 (57.3%)	81 (62.7%)	48 (37.2%)
• Female	96 (42.6%)	57 (59.3%)	39 (40.6%)

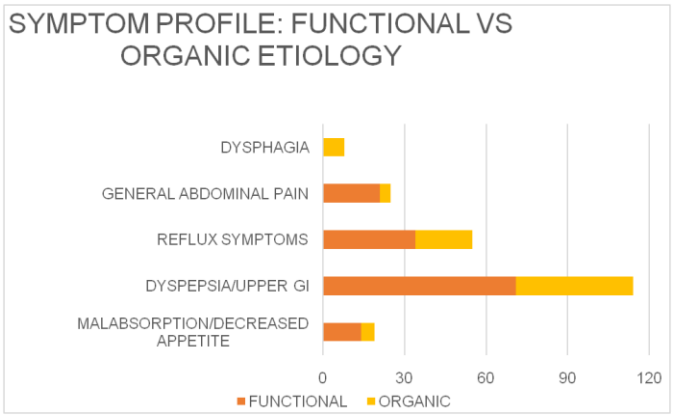
Symptom Prevalence.

Table 2: Clinical features

Indication / Symptom Distribution	Total Patients n (%)	Functional/ Normal n (%)	Organic/ Pathological n (%)
• Dyspepsia / Upper GI Symptoms	114 (50.7%)	71 (62.3%)	43 (37.7%)
• Reflux Symptoms (GERD)	55 (24.4%)	34 (61.8%)	21 (38.2%)
• General Abdominal Pain / Vomiting	25 (11.1%)	21 (84.0%)	4 (16.0%)
• Malabsorption / Decreased Appetite	19 (8.4%)	14 (73.7%)	5 (26.3%)
• Dysphagia	8 (3.6%)	0 (0.0%)	8 (100.0%)
• Other / Miscellaneous	4 (1.8%)	3 (75.0%)	1 (25.0%)

Epigastric pain, early satiety, postprandial fullness, nausea were the most common reasons for referral, present in 50.7% of children (n = 114), followed by reflux symptoms (24.4%, n = 55) and non-specific abdominal pain with vomiting (11.1%, n = 25). Cross-tabulation demonstrated a statistically significant association between the presenting symptom profile and the likelihood of organic pathology (p = 0.001). Notably, 100% of children presenting with dysphagia had organic findings on endoscopy. Conversely, children presenting with non-specific abdominal pain and vomiting were significantly more likely to have a normal endoscopy (84.0% normal)

Figure 1: Correlation of presenting symptoms with Endoscopic Findings.



Endoscopic Findings

Table 3:

Endoscopic Findings	
• Normal Mucosa (Functional)	143 (63.6%)
• Gastritis / Mucosal Erosions	26 (11.6%)
• Duodenal Pathologies (Nodularity / Duodenitis)	23 (10.2%)
• Esophageal Pathologies (Esophagitis / Candidiasis)	16 (7.1%)
• GERD-related structural changes (Lax GE / Hernia)	11 (4.9%)
• Peptic Ulcer Disease (PUD)	4 (1.8%)
• Other Findings	2 (0.9%)

The endoscopic analysis shows that a majority of the children had a normal macroscopic appearance, suggesting a functional etiology in many cases.

Among the cohort, 63.6% of children (143 out of 225) had normal endoscopic findings, thereby confirming that functional dyspepsia emerged as the most common diagnosis. 36.4% of patients demonstrated organic pathologies on evaluation. While classic dyspepsia predominantly mapped to normal endoscopic mucosa (62.3%) followed by gastritis (14.0%) and duodenal nodularity (12.3%), reflux indications strongly correlated with esophageal pathologies and GE junction laxity. Confirmed peptic ulcer disease (PUD) was present in 4% cases.

Cross-tabulation between primary clinical indications and specific endoscopic diagnoses demonstrated a statistically significant association (p = 0.002).

- Etiological association with H. pylori: Rapid Urease Testing (RUT) for Helicobacter pylori was positive in 8.4% of the total study cohort (n = 19/225). There was a strong, statistically significant association between RUT positivity and the presence of organic pathology (p < 0.001), with 94.7% (n = 18/19) of RUT-positive children exhibiting structural mucosal lesions on

endoscopy. Specifically, RUT positivity strongly correlated with antral gastritis, erosions, and duodenal nodularity ($p < 0.001$)

- Gastric or duodenal mucosal biopsy was performed in 28.0% of the patient cohort ($n = 63/225$). There was a highly significant association between performing a mucosal biopsy and the presence of endoscopic organic pathology ($p < 0.001$). Among patients who underwent tissue sampling, 98.4% ($n = 62/63$) had confirmed macroscopic or microscopic organic lesions, compared to 12.3% ($n = 20/162$) in the non-biopsied group.

Functional Dyspepsia is the leading cause of dyspepsia in this cohort, representing over 60% of the cases. Among those with organic disease, Gastritis and Duodenal nodularity (often associated with H. pylori) are the most frequent findings.

Statistical Analysis

Chi-Square test of independence was done to see if specific clinical symptoms could predict whether a child would have "Organic" (pathological) or "Functional" (normal) results on endoscopy.

Analysis revealed a highly significant association between presenting symptoms - specifically dysphagia (100% organic yield), reflux symptoms/GERD (heartburn, regurgitation), classic dyspepsia (epigastric pain, early satiety), and general abdominal pain/vomiting—and specific macroscopic endoscopic findings, including gastritis/erosions, duodenal nodularity, esophagi is, gastro esophageal junction laxity, and normal mucosa (p=0.0015), underscoring the predictive value of clinical presentation. Notably, all patients with dysphagia (8/8) demonstrated organic pathology, marking dysphagia as a high-risk clinical indicator for organic pathology. Conversely, children presenting with poorly localised/generalised abdominal pain or vomiting were predominantly functional. Dyspepsia and reflux showed a mixed distribution (71 functional vs. 43 organic in dyspepsia). These results highlight the importance of symptom-based stratification in anticipating endoscopic outcomes.

Age was not a significant predictor of endoscopic findings (p=0.216), indicating that the likelihood of detecting organic pathology such as ulcers or gastritis did not differ substantially between the 5–10 year and 11–18 year age groups in this study.

Discussion

The clinico-pathological profile of pediatric dyspepsia in this study highlights a significant diagnostic challenge [8,14]. Our finding that 63.6% of endoscopies were normal is consistent with global literature, which suggests that Functional Dyspepsia (FD) is the predominant cause of upper gastrointestinal distress in the pediatric population [3, 8].

A key finding in this study was the absolute correlation between dysphagia and organic pathology (100% organic yield). This reinforces the importance of using dysphagia as a primary "alarm symptom" to fast-track endoscopic evaluation. In contrast, non-specific abdominal pain and vomiting showed a low organic yield (16.0%), suggesting that these symptoms, when occurring in isolation, may not immediately warrant invasive procedures unless red flags are present. [13,14]

While functional cases were the majority, the 36.4% organic yield cannot be overlooked. Gastritis and duodenal nodularity were the most frequent findings[8, 13]. The presence of duodenal nodularity, often a surrogate marker for H. pylori infection in children, suggests that infectious etiologies remain a notable factor in our demographic. This is supported by the positive Rapid Urease Test (RUT) results observed in nearly 8.4% of

our total cohort, reinforcing the need for targeted bioptic evaluation according to established pediatric guidelines [3, 15].

Interestingly, age did not significantly influence the likelihood of finding organic disease. This suggests that the pathophysiology of dyspepsia—whether organic or functional—is relatively consistent across the school-age and adolescent spectrum [3,8,13]

Conclusion

Functional Dyspepsia is the most frequent diagnosis in children undergoing endoscopy for dyspeptic symptoms. Clinical symptoms are strong predictors of endoscopic findings, whereas age and gender are not. Among symptoms, dysphagia is a high-yield clinical marker for organic disease and warrants immediate endoscopic investigation. Endoscopy remains a vital tool not just for diagnosing organic conditions like PUD and Gastritis, but for providing the necessary reassurance to manage functional cases effectively. We recommend a "symptom-based" approach to endoscopy in children, prioritizing those with dysphagia or persistent reflux over those with generalized abdominal pain.

Study Limitation

Since this was a retrospective study, some RUT and Biopsy data were missing, which may underestimate the true prevalence of H. pylori.

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