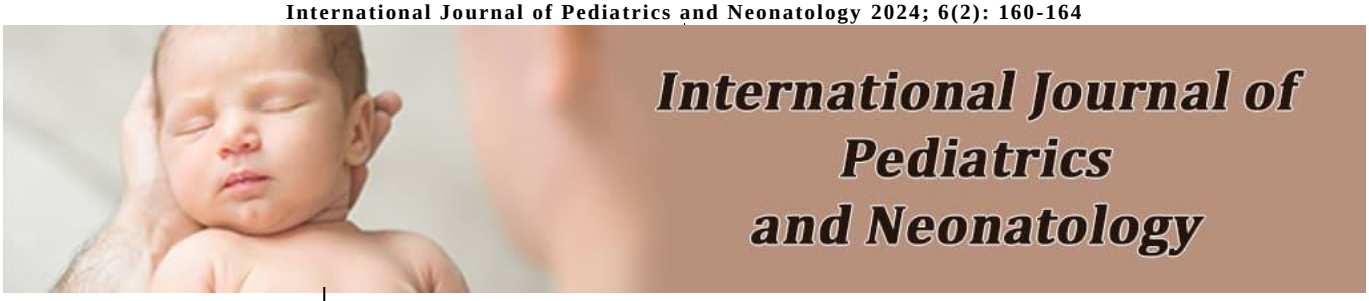

ISSN Print: 2664-8350
ISSN Online: 2664-8369
Impact Factor: RJIF 5.26
IJPN 2024; 6(2): 160-164
www.pediatricsjournal.net
Received: 04-07-2024
Accepted: 10-08-2024

Dr. Md. Kamrul Hasan
Registrar, Department of General Pediatrics, Bangladesh Shishu Hospital & Institute, Dhaka, Bangladesh

Dr. Syed Shafi Ahmed
Professor & Head, Department of Pediatric Gastroenterology, Hepatology & Nutrition, Bangladesh Shishu Hospital & Institute, Dhaka, Bangladesh

Dr. Salahuddin Mahmud
Professor, Department of Pediatric Gastroenterology, Hepatology & Nutrition, Bangladesh Shishu Hospital & Institute, Dhaka, Bangladesh

Dr. Shakh Farid
Assistant Professor, Department of Pediatrics, Monno Medical College & Hospital, Manikganj, Bangladesh

Dr. Rowshan Jahan Akhter
Associate Professor, Department of General Pediatrics, Bangladesh Shishu Hospital & Institute, Dhaka, Bangladesh

Dr. Akhand Tanzih Sultana
Professor, Department of General Pediatrics, Bangladesh Shishu Hospital & Institute, Dhaka, Bangladesh

Corresponding Author:
Dr. Md. Kamrul Hasan
Registrar, Department of General Pediatrics, Bangladesh Shishu Hospital & Institute, Dhaka, Bangladesh
E-mail:
hasan9nemc@gmail.com

Recurrent abdominal pain in children: Endoscopic findings and helicobacter pylori infection

Md. Kamrul Hasan, Syed Shafi Ahmed, Salahuddin Mahmud, Shakh Farid, Rowshan Jahan Akhter and Akhand Tanzih Sultana

DOI: https://doi.org/10.33545/26648350.2024.v6.i2c.97

Abstract
Background: Recurrent abdominal pain (RAP) in children is common and often leads to distress and frequent doctor visits. Endoscopic investigations are key in uncovering gastrointestinal issues that may contribute to recurrent abdominal pain (RAP), such as the presence of *H. pylori*. This study aimed to evaluate endoscopic findings and the status of Helicobacter pylori infection in children with recurrent abdominal pain.
Methods: The cross-sectional study was conducted at the Pediatric Gastroenterology, Hepatology & Nutrition Department of Dhaka Shishu (Children) Hospital, Dhaka, Bangladesh from January 2019 to December 2020. A total of 70 children with recurrent abdominal pain (RAP) were included in the study using purposive sampling technique. To confirm *H. pylori* infection, rapid urease tests and histopathology of gastric biopsy samples were performed. Data were analyzed using SPSS version 22.0.
Results: Helicobacter pylori infection was found in 35.7% of participants. The mean age of infected children was 9.49±2.47 years, with a male predominance (52%). A significant association was observed between *H. pylori* infection and lower socioeconomic status (p=0.003). Additionally, children with RAP lasting more than 6 months and lower BMI were significantly more likely to be infected (p=0.003). The source of drinking water did not affect the results.
Conclusion: Helicobacter pylori infection frequently occurs in children experiencing recurrent abdominal pain. This infection is linked to lower socioeconomic status and an extended duration of recurrent abdominal pain. Additionally, it can negatively impact the growth of children.

Keywords: Abdominal tenderness, endoscopic findings, helicobacter pylori, rapid urease tests, recurrent abdominal pain

Introduction
The simultaneous occurrence of recurrent abdominal pain (RAP) and headache stands out as the most prevalent pain symptom among children [1]. Dr. J Apley, a pediatrician from Britain, conducted thorough research on children's abdominal pain and found that around 10% of school-aged children repeatedly experience abdominal pain, coining this phenomenon as RAP [2]. Estimates indicate that 4% to 25% of school-aged children endure RAP [3]. In Bangladesh, this condition affects 11.5% of children [4]. While recurrent abdominal pain is predominantly deemed functional (Nonorganic), organic causes account for 5% to 10% of the cases [5]. In one investigation, Gijsbers and colleagues [6] identified somatic origins in 26% of children with recurrent abdominal pain. Globally, Helicobacter pylori (*H. pylori*) is recognized as a widespread chronic bacterial infection, affecting at least half of the world's population [7]. *H. pylori* is a gram-negative bacterium with a spiral shape, measuring approximately 2-4 microns in length and about 1 micron in diameter. It is microaerophilic, possessing 2–6 flagella that contribute to its helical shape [8]. The main risk factors for *H. pylori* infection include socioeconomic status, family income, crowding within the household, the number of children, and sharing a room or bed. Certain eating habits, such as sharing utensils and tasting food before serving, have been linked to *H. pylori* infection [9]. The only known reservoir for *H. pylori* is the human stomach [10]. It is primarily transmitted from one person to another through fecal-oral, gastric-oral, or oral-oral routes. Among children, transmission can occur through contaminated water or oral-oral contact, such as kissing or feeding on pre-masticated food [11]. The clinical symptoms of *H. pylori* infection in

children are not well-defined. Approximately 85% of infected children exhibit no symptoms. This bacterium is a leading cause of duodenal ulcers and chronic gastritis in children, and it is also thought to be associated with recurrent abdominal pain [12]. There are numerous diagnostic tests, both invasive and noninvasive, available to detect *H. pylori*, each with specific advantages and limitations, but none is regarded as the definitive gold standard in clinical settings [13]. The urea breath test (UBT) is the most widely used noninvasive method for diagnosing *H. pylori* infection due to its simplicity and safety. Various factors, including those related to the patient, the bacterium, and the test itself, can impact the results of the urea breath test [13]. The *H. pylori* stool antigen test is a simple and cost-efficient method suitable for both clinical and epidemiological research. Stool samples are easy to collect, can be transported with ease, and stored for long periods, even when frozen or kept at room temperature in the laboratory [12]. Polymerase chain reaction (PCR) is a reliable and fast technique for detecting *H. pylori* in stool, making it a particularly appealing noninvasive option for children [14]. Pediatric treatment guidelines differ from those for adults [15]. When *H. pylori*-related gastritis is present, eliminating the microorganism is advised, as children tend to experience frequent relapses of gastritis if not properly treated [16]. The objective of this study was to evaluate endoscopic findings and the status of Helicobacter pylori infection in children with recurrent abdominal pain.

Methodology

This cross-sectional study was conducted in the Pediatric Gastroenterology, Hepatology & Nutrition Department of Dhaka Shishu (Children) Hospital in Bangladesh, spanning from January 2019 to December 2020. The study included 70 children suffering from recurrent abdominal pain, selected via purposive sampling. Researchers collected demographic data, clinical manifestations, and laboratory parameters using a standard data sheet. All participants underwent upper GI endoscopy, and gastric biopsies were obtained. The presence of *H. pylori* infection was confirmed through a rapid urease test and histopathological examination of the biopsy samples. The association of parameters with infection was assessed using unpaired t-tests, chi-square tests, and Fisher's exact test. The study included children aged 5 to 15 years, of both genders, who were clinically diagnosed with recurrent abdominal pain (RAP), as per the inclusion criteria. The exclusion criteria ruled out children with active upper gastrointestinal bleeding, pre-existing diagnoses of urinary tract infections, inflammatory bowel disease, malignancies, or other organic causes of pain. Additionally, children who had taken antimicrobials, proton-pump inhibitors, H2 receptor blockers, or NSAIDs within two weeks before the endoscopic examination were also excluded. Data analysis was performed using SPSS version 23.0.

Results

Table 1 presents the baseline characteristics of the study participants. The majority were male, and most were younger than 11 years. The subjects predominantly came from middle-class families and utilized tap water for drinking. Furthermore, the majority maintained a normal Body Mass Index (BMI). According to Table 2, endoscopic gastritis was identified in 45.7% of subjects. Additionally, 41.4% tested positive via the rapid urease test, while 35.7% were diagnosed with *H. pylori*-positive gastritis. Table 3 demonstrates a significant association between gastritis and recurrent abdominal pain. Moreover, Table 4 indicates that the rapid urease test yielded a significant positive result in subjects experiencing recurrent abdominal pain. Table 5 indicates a significant occurrence of *H. pylori* gastritis in subjects with recurrent abdominal pain. Table 6 reveals that the mean age was higher in the *H. pylori*-positive group (9.49±2.47 years) compared to the negative group (8.07±2.86 years), and this difference was statistically significant. Furthermore, *H. pylori* infection was more prevalent in the 11-15 years' age group than in the 5-10 years' age group. Table 7 shows that males were marginally more affected than females, though this difference was not statistically significant. Table 8 demonstrates that while the majority of subjects (45.7%) were from middle-class families, a statistically significant portion (60%) of those from lower-class families tested positive for *H. pylori*. Table 9 indicates that tap water was the primary source of drinking water for the majority of subjects (68.6%); however, this was not statistically significant. Table 10 illustrates the duration of recurrent abdominal pain (RAP), highlighting that subject with a prolonged duration of RAP (exceeding 6 months) demonstrated a significant association with *H. pylori* infection. Table 11 reveals that while the majority of RAP subjects (60%) had a normal weight, those who were underweight had a significant association with being *H. pylori* positive.

Table 1: Baseline characteristics of participants (N=70)

Variables	n	%
Age (Years)		
5-10 Yrs.	46	65.7%
11-15 Yrs.	24	34.3%
Mean±SD	8.58±2.80%	
Gender		
Male	37	52.9%
Female	33	47.1%
Socioeconomic status		
Lower class	24	34.3%
Middle class	32	45.7%
Upper class	14	20.0%
Water source		
Tube well	22	31.4%
Tap water	48	68.6%
BMI		
Normal weight	42	60.0%
Underweight	19	27.1
Overweight	9	12.9

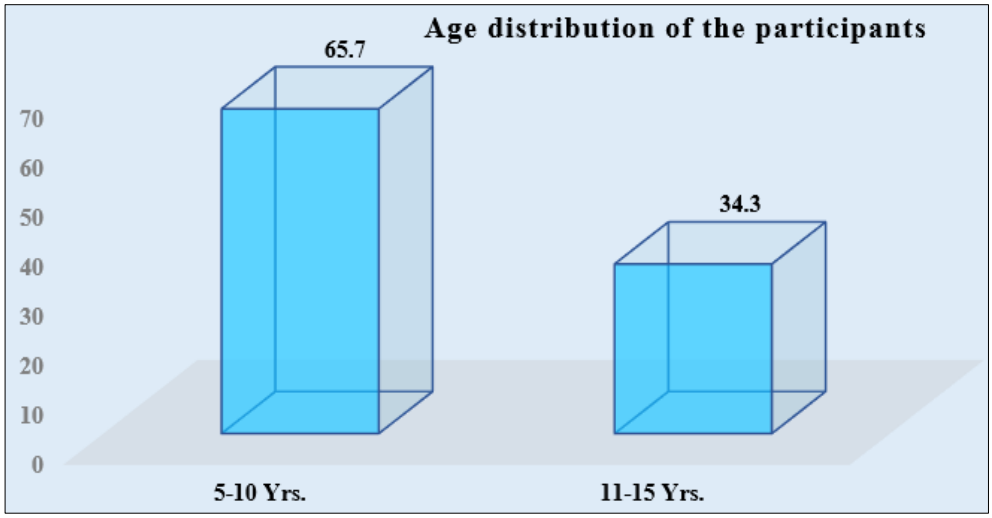

Fig 1: Column chart showed age wise patients distribution (N=70)

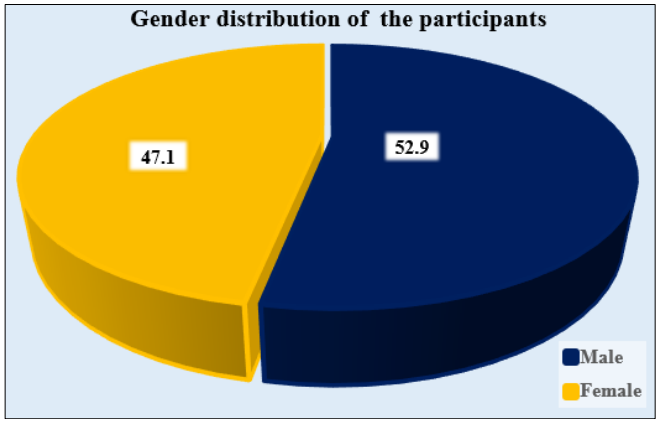

Fig 2: Pie chart showed gender wise patients distribution (N=70)

Table 2: Investigation findings (N=70)

Diagnosis	n	%
Endoscopy		
Gastritis	32	45.7%
Normal	38	54.3%
Rapid urease test		
Positive	29	41.4%
Negative	41	58.6%
Histopathology		
H. pylori gastritis	25	35.7%
H. pylori absent	45	64.3%

Table 3: Endoscopic findings of studied subjects (N=70)

Endoscopy	*H. pylori*			P value
	Positive	Negative	Total	
	No. (%)	No. (%)	No. (%)	
Gastritis	24(96.0%)	8(17.8%)	32(45.7%)	<0.001**
Normal	1(4.0%)	37(82.2%)	38(54.3%)	

Table 4: Rapid urease test results of studied subjects (N=70)

Rapid urease	*H. pylori*			P-value
	Positive	Negative	Total	
	No. (%)	No. (%)	No. (%)	
Positive	25(100.0%)	4(8.9%)	29(41.4%)	<0.001**
Negative	0(0.0%)	37(91.1%)	41(58.6%)	

Table 5: Histopathological findings of studied subjects (N=70)

Histopathology	*H. pylori*			P value
	Positive	Negative	Total	
	No. (%)	No. (%)	No. (%)	
H. pylori gastritis	25(100.0%)	0(0.0%)	25(35.7%)	<0.001**
H. pylori absent	0(0.0%)	45(100.0%)	45(64.3%)	

Table 6: Association of *H. pylori* positive subjects with age group (N=70)

Age group (Years)	*H. pylori*			p-value
	Positive	Negative	Total	
	No. (%)	No. (%)	No. (%)	
5-10 Yrs.	12(48.0%)	34(75.6%)	46(65.7%)	0.042*
11-15 Yrs.	13(52.0%)	11(24.4%)	24(34.3%)	
Total	25(100.0%)	45(100.0%)	70(100.0%)	
Mean±SD	9.49±2.47	8.07±2.86	8.58±2.80	

Table 7: Association of *H. pylori* positive subjects with gender (N=70)

Gender	*H. pylori*			p-value
	Positive	Negative	Total	
	No. (%)	No. (%)	No. (%)	
Male	13(52.0%)	24(53.3%)	37(52.9%)	0.915
Female	12(48.0%)	21(46.7%)	33(47.1%)	

Table 8: Association of *H. pylori* positive subjects with socioeconomic status (N=70)

Socioeconomic status	*H. pylori*			p-value
	Positive	Negative	Total	
	No. (%)	No. (%)	No. (%)	
Lower class	15(60.0%)	9(20.0%)	24(34.3%)	0.003**
Middle class	8(32.0%)	24(53.3%)	32(45.7%)	
Upper class	2(8.0%)	12(26.7%)	14(20.0%)	

Table 9: Association of *H. pylori* positive subjects with source of drinking water (N=70)

Source	*H. pylori*			p-value
	Positive	Negative	Total	
	No. (%)	No. (%)	No. (%)	
Tube well	5(20.0%)	17(37.8%)	22(31.4%)	0.125
Tap water	20(80.0%)	28(62.2%)	48(68.6%)	

Table 10: Association of *H. pylori* positive subjects with duration of illness (N=70)

Duration of illness	*H. pylori*			p-value
	Positive	Negative	Total	
	No. (%)	No. (%)	No. (%)	
>6 months	15(60.0%)	11(24.4%)	26(37.1%)	0.003**
≤6 months	10(40.0%)	34(75.6%)	44(62.9%)	

Table 11: Association of *H. pylori* positive subjects with BMI (N=70)

BMI	*H. pylori*			p-value
	Positive	Negative	Total	
	No. (%)	No. (%)	No. (%)	
Normal weight	13(52.0%)	29(64.4%)	42(60.0%)	0.003**
Underweight	12(48.0%)	7(15.6%)	19(27.1%)	
Overweight	0(0.0%)	9(20.0%)	9(12.9%)	

Fig 3: Chart showed association of H. pylori positive subjects with BMI (N=70)

Discussion

In this study, *H. pylori* infection was detected in 35.7% of subjects, determined through the rapid urease test and histopathological examination of gastric biopsy samples. This prevalence aligns with findings from Memon *et al.* [17], who reported a prevalence rate of 31% in children, and Yu *et al.* [18], who reported 32.1%. Similarly, the mean age of *H. pylori*-positive patients in our study was 9.49±2.47 years, which was significantly higher compared to *H. pylori*-negative subjects. These results are consistent with those of Punhal, Malik, and Iqbal [19], who found that the mean age of *H. pylori*-positive patients was 9.40±3.54 years, whereas it was 7.12±3.12 years for negative patients. In this study, males (52%) were marginally more affected by *H. pylori* infection than females (48%), though this difference was not statistically significant. This finding is consistent with studies by Nadeem *et al.* [20] and Mansour, Al Hadidi, and Omar [21], which also indicated that gender is not a significant factor influencing *H. pylori* infection. Furthermore, our study found that 60% of the patients who were *H. pylori* positive belonged to a low socioeconomic status, a statistically significant association. Similar observations were reported by Senbanjo *et al.* [22] and Alimohammadi *et al.* [23], with 68.4% and 72.1% of those affected being from low socioeconomic class groups, respectively. In this study, the majority of subjects experienced recurrent abdominal pain (RAP) lasting six months or less. However, a significant association was observed between *H. pylori* infection and subjects with a RAP duration exceeding six months, with 60% being affected. Alimohammadi *et al.* [23] similarly reported that infection progressed with the increasing age of children. There was no significant relationship identified between *H. pylori* infection and the source of drinking water, with 68.6% of subjects consuming tap water. A significant difference was noted concerning body weight and *H. pylori* infection (p=0.003); while 60% of RAP subjects had normal weight, 12 out of 19 underweight subjects with RAP were *H. pylori* positive. Similar findings were documented by Richter *et al.* [24], who found that infected subjects exhibited poor growth (p=0.02).

Conclusion & Recommendation

Helicobacter pylori infection is a common occurrence in children who experience recurrent abdominal pain, with a significant correlation to lower socioeconomic status and prolonged pain duration. This infection not only contributes to discomfort but can also adversely affect the growth and overall development of affected children. The association with socioeconomic factors suggests that targeted public health initiatives and improved living conditions could help reduce infection rates. Moreover, early detection and appropriate treatment strategies are crucial in alleviating symptoms and preventing growth-related complications, ensuring better health outcomes for children struggling with this infection.

Conflict of Interest

Not available

Financial Support
Not available

References

1. Mahmud S, Shah SAUH, Ali S. Frequency of Helicobacter pylori (HP) infection in children with recurrent abdominal pain (RAP). Pak Armed Forces Med J. 2015;65(3):358-362.
2. Devanarayana N, Rajindrajith S, De Silva HJ. Recurrent abdominal pain in children. Indian Pediatr. 2009;46(5):389-398.
3. Abbott RA, Martin AE, Delgado TVN, Bethel A, Whear RS, Coon JT, *et al*. Recurrent abdominal pain in children: Summary evidence from 3 systematic reviews of treatment effectiveness. J Pediatr Gastroenterol Nutr. 2018;67(1):23-33.
4. Alam HSK, Ahsan MR, Hoque MA, Al Mamun AMH, Ahmed SS. Diagnosis pattern and outcome of adolescents admitted with recurrent abdominal pain in a tertiary care hospital. Bangladesh J Child Health. 2017;41(1):4-8.
5. Reust CE, Williams A. Recurrent abdominal pain in children. Am Fam Physician. 2018;97(12):785-793.
6. Gijsbers CF, Kneepkens CM, Schweizer JJ, Benninga MA, Büller HA. Recurrent abdominal pain in 200 children: somatic causes and diagnostic criteria. Acta Paediatr. 2011;100(11):208-214.
7. Zangana KO, Abdullah MK. Helicobacter pylori infection among children with recurrent abdominal pain. Med J Babylon. 2020;17(1):93-96.
8. Nicolescu F. Particulars of the Helicobacter pylori infection in children. Trends Helicobacter Pylori Infect. 2014;8(1):177-203.
9. Ertem D. Clinical practice: Helicobacter pylori infection in childhood. Eur J Pediatr. 2013;172(11):1427-1434.
10. Rajindrajith S, Devanarayana NM, De Silva HJ. Helicobacter pylori infection in children. Saudi J Gastroenterol. 2009;15(2):86-94.
11. Poddar U, Yachha SK. Helicobacter pylori in children: An Indian perspective. Indian Pediatr. 2007;44(10):761-770.
12. Sabbagh P, Javanian M, Koppolu V, Vasigala VR, Ebrahimpour S. Helicobacter pylori infection in children: an overview of diagnostic methods. Eur J Clin Microbiol Infect Dis; c2019. p. 1-11.
13. Wang YK, Kuo FC, Liu CJ, Wu MC, Shih HY, Wang SS, *et al*. Diagnosis of Helicobacter pylori infection: Current options and developments. World J Gastroenterol. 2015;21(40):11221-11235.
14. Sicinschi LA, Correa P, Bravo LE, Peek RM, Wilson KT, Loh JT, *et al*. Non-invasive genotyping of Helicobacter pylori cagA, vacA, and hopQ from asymptomatic children. Helicobacter. 2012;17(12):96-106.
15. Peng C, Hu Y, Ge ZM, Zou QM, Lyu NH. Diagnosis and treatment of Helicobacter pylori infections in children and elderly populations. Chronic Dis Transl Med. 2019;5(4):243-251.
16. Kalach N, Bontems P, Cadranel S. Advances in the treatment of Helicobacter pylori infection in children. Ann Gastroenterol. 2015;28(1):10-18.
17. Memon IA, Lal MN, Murtaza G, Jamal A, Bhatti RN, Tariq S. Recurrent abdominal pain in children. Pak J Med Sci. 2009;25(1):26-30.
18. Yu Y, Su L, Wang X, Wang X, Xu C. Association between Helicobacter pylori infection and pathological changes in the gastric mucosa in Chinese children. Intern Med. 2014;53(2):83-88.
19. Punhal M, Malik Q, Iqbal A. Helicobacter pylori infection in children presenting with recurrent abdominal pain. Pak Armed Forces Med J. 2016;66(2):266-269.
20. Nadeem MT, Abbas M, Hassan T, Masood S. Recurrent abdominal pain; the frequency of H. pylori infection in children. Prof Med J. 2006;13(4):563-571.
21. Mansour MMHK, Al Hadidi Kh M, Omar MA. Helicobacter pylori and recurrent abdominal pain in children: Is there any relation? Trop Gastroenterol. 2012;33(1):55-61.
22. Senbanjo IO, Oshikoya KA, Njokanma OF. Helicobacter pylori associated with breastfeeding, nutritional status and recurrent abdominal pain in healthy Nigerian children. J Infect Dev Ctries. 2014;8(4):448-453.
23. Alimohammadi H, Fouladi N, Salehzadeh F, Alipour SA, Javadi MS. Childhood recurrent abdominal pain and Helicobacter pylori infection, Islamic Republic of Iran. EMHJ-Eastern Med Health J. 2016;22(12):860-4.
24. Richter T, List S, Müller DM, Deutscher J, Uhlig HH, Krumbiegel P, *et al*. Five-to 7-year-old children with Helicobacter pylori infection are smaller than Helicobacter-negative children: A cross-sectional population-based study of 3,315 children. J Pediatr Gastroenterol Nutr. 2001;33(4):472-475.

How to Cite This Article
Hasan MK, Ahmed SS, Mahmud S, Farid S, Akhter RJ, Sultana AT. Recurrent abdominal pain in children: Endoscopic findings and helicobacter pylori infection. International Journal of Pediatrics and Neonatology. 2024;6(2):160-164.