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Journal of Sulaimani Medical College

ISSN:2223-148X



Original Article

## Lower Gastrointestinal Bleeding in Children: Etiologies, Colonoscopic Findings, and Outcomes from a Single Tertiary Center

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### Article Info.

#### Article History

Received:30.11.2025

Revised: 28.1.2026

Accepted: 31.3.2026

Published online:

21.6.2026

#### Keywords:

Lower Gastrointestinal Bleeding,  
Colonoscopy,  
Children,  
patients.

### Abstract

**Background:** Lower gastrointestinal bleeding (LGIB) refers to bleeding that occur distal to the ligament of Treitz. It is a common problem in children. The aim of this study was to evaluate the clinical characteristics, etiologies, and diagnostic features of lower gastrointestinal bleeding (LGIB) in pediatric patients.

**Methods:** A retrospective cross-sectional study was conducted in the Department of Pediatric Gastroenterology and Hepatology at Dr. Jamal Ahmed Rashid Pediatric Teaching Hospital in Sulaimani from October 2023 to July 2025. Seventy-six children (aged 1–15 years) who presented with rectal bleeding and underwent colonoscopy were included. Data on demographics, clinical features, laboratory results, colonoscopic findings, and histopathology were collected from medical records.

**Results:** Seventy-six patients were included, with a male-to-female ratio of (1.7:1). The average age was  $6.96 \pm 4.26$  years. Common presenting symptoms were bleeding per rectum, followed by abdominal pain and diarrhea. Normal colonoscopies were observed in 27 patients (35.5%). Frequent abnormalities found during colonoscopy were non-specific colitis followed by inflammatory bowel disease, juvenile polyps, and solitary rectal ulcer syndrome. Solitary rectosigmoid polyps constituted 90.9% of the identified polyps. There was a significant association between a history of anemia, weight loss, and additional symptoms with underlying causes of lower gastrointestinal bleeding ( $P < 0.05$ ).

**Conclusions:** Lower gastrointestinal bleeding in children can be caused by many conditions, the most common being non-specific colitis, inflammatory bowel disease, and juvenile polyps. When assessing pediatric LGIB, colonoscopy is a crucial diagnostic and treatment tool.

DOI:

10.17656/jsmc.10518

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### 1. Introduction:

Gastrointestinal bleeding is classified as upper gastrointestinal bleeding (UGIB) or lower gastrointestinal bleeding (LGIB) (1). Bleeding per rectum is a common symptom of lower

gastrointestinal bleeding, which is defined as bleeding distal to the ligament of Treitz (1). It can be caused by different disorders affecting the gastrointestinal tract's blood vessels or mucosal lining, and it is a serious medical

concern at any age (2). Melena, hematochezia, or occult bleeding are common features of lower gastrointestinal bleeding, in addition to other symptoms like pallor and exhaustion. Patients may also find to have malaise, tachycardia, and even shock in cases of overt blood loss (3).

Causes of lower gastrointestinal bleeding are different between children and adults. Juvenile polyps and anal fissures are examples of conditions in pediatric patients that mostly require little or no treatment. However, more severe underlying disorders like intussusception, Meckel's diverticulum, or midgut volvulus may infrequently be indicated by lower gastrointestinal bleeding (4,5). A thorough medical history, perianal examination, digital rectal examination, and stool analysis can be useful to determine common causes of rectal bleeding in pediatric patients. Radiography, endoscopy, technetium-99m RBC scintigraphy, and angiography are helpful diagnostic workups. To confirm definitive diagnosis and apply appropriate treatment plan, proctosigmoidoscopy and colonoscopy are recommended for all patients after LGIB is proved (6).

Hematochezia commonly arises from the colon, although severe upper gastrointestinal bleeding can occasionally be the cause. High reported detection rate of colonoscopy which is about 48% to 90%, makes colonoscopy recommended initial diagnostic test after ruling out infectious causes when necessary (2). It has been found that colonoscopy is a safe and effective procedure to diagnose lower gastrointestinal disorders in children (5). Colonoscopy is vital for the final diagnosis of LGIB because it allows direct visualization and positioning of bleeding sources, permits different curative interventions, and provides both diagnostic and therapeutic goals. But it's an invasive procedure; it demands an endoscopy unit with all equipment, skilled personnel, sedation, and bowel preparation (7,8).

## **2. Materials and Methods:**

### **2.1. Study design and setting**

This retrospective cross-sectional study was managed in the Department of Pediatric Gastroenterology and Hepatology at Dr. Jamal Ahmed Rashid pediatric teaching hospital in Sulaimani from October 2023 to July 2025.

### **2.2. Participants**

The study involved 76 children, aged from 1 to 15 years of both sexes, who complained of bleeding per rectum and undergone colonoscopy. Participants were identified from hospital medical records. All eligible patients who met inclusion criteria were included in the analysis.

All patients go through a complete history taking, physical examination, laboratory tests, and a colonoscopy. Before colonoscopy, every patient completed 24 hours of bowel preparation, and the procedure was done under general anesthesia [(propofol (1 mg/kg) + ketamine (1-2 mg/kg) ± fentanyl (0.5-1 mcg/kg), no complication observed during anesthesia]. During the procedure, multiple mucosal biopsies were obtained from suspicious parts of colon under direct visualization of the mucosa and vasculature. The biopsy samples were fixed in phosphate-buffered formalin and sent to the laboratory for evaluation(9). Additionally, if a polyp was discovered during colonoscopy, it would be removed by snare polypectomy and subsequently sent for histopathological evaluation. No post-polypectomy complications were observed.

Inclusion criteria: all children aged 1 to 15 years who present with visible bleeding per rectum and diagnosed clinically and by laboratory tests as LGIB were included in our study. No patient less than one year old present with LGIB.

Exclusion criteria included patients with bleeding disorders, infectious colitis, anal fissures. Also, we excluded those patients who needed emergency surgical intervention (like

Meckel’s diverticulum) and critically ill children needing intensive care unit.

**2.3. Definitions**

Ileal intubation means inserting the colonoscope through the ileocecal valve into the terminal ileum. Also, Cecal intubation refers to the advancement of the colonoscope through the entire length of the colon until the tip of the scope reaches the cecum. Anemia was defined as a low hemoglobin result according to age (for example, hemoglobin < 11 g/dl in a 1-5-year-old child, hemoglobin< 11.5 g/dl in a 5-11-year-old child, and hemoglobin< 12 g/dl in a 12- 15-year-old child were considered anemia). Weight loss was defined as loss of more than 5% of usual body weight over a period of 6-12 months. Non-specific colitis means a diagnosis of colonic inflammation that lacks the distinct, hallmark microscopic features of specific diseases like ulcerative colitis, Crohn’s disease, or infection (10).

**2.4. Data collection**

A standardized electronic database in our department was used to retrieve all relevant information, like patient demographic data, additional symptoms, clinical examination findings, colonoscopy outcomes, and types of treatment.

**2.5. Ethical Considerations:**

Ethical approval was obtained from the Institutional Review Board (Dated: 23-7-2025, No.1581) and also from the Ethics Committee of the College of Medicine- University of Sulaimani (Dated: 3-8-2025, No.153).

**2.6. Statistical Analysis**

The data were analyzed using IBM SPSS Statistics for Windows, Version 25.0. Qualitative variables were presented as percentages and frequencies, while quantitative variables were displayed as mean ± standard deviation. The chi-squared test was used to analyze categorical variables. A P-value of less than 0.05 was considered statistically significant.

**3. Results:**

Among the 76 patients who underwent colonoscopy, 48 (63.2%) were male and 28 (36.8%) were female. The mean age was 6.96 ± 4.26 years. The age distribution was as follows: 33(43.4%) patients aged between 1 and 5 years, 19(25%) aged between 5 and 10 years and 24(31.6%) patients aged between 10 and 15 years. The ileum was successfully intubated in 74 patients (97.4%) (Table 1).

Regarding associated symptoms in our study, abdominal pain was reported in 23(30.3%), diarrhea 7(9.2%), constipation 3(3.9%), but 43(56.6%) of them had no associated symptom (only present with lower gastrointestinal bleeding). Only 15 patients (19.7%) exhibited weight loss, contrasting with 61 patients (80.3%) who showed no weight changes (Table 1).

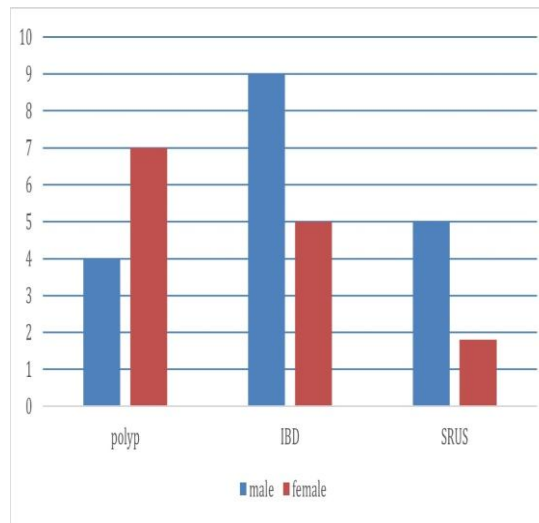
About types of therapy used for patients, in 46 patients (60.5%) no specific therapy used apart from dietary and lifestyle advice. But in 18(23.7%) of cases medications were used (for inflammatory bowel disease or constipation), In 11(14.5%) of cases endoscopic intervention (polypectomy) were done, and one (1.3%) patient required blood transfusion due to initial pathology (Table 1). The majority of patients (35.5 %, n=27) showed normal colonoscopy results. Non-specific colitis was observed in (23.7%, n=18), followed by inflammatory bowel disease (18.4%, n=14) and juvenile polyps (14.5%, n=11). Rare diagnoses included solitary rectal ulcer syndrome (SRUS) (7.9%, n=6) (Table 1).

**Table 1.** Demographic and clinical characteristics of the patients with lower gastrointestinal bleeding (LGIB).

Variable	Frequency/percentage
Gender	
Males	48 (63.2%)
Females	28 (36.8%)
Age (yrs.)	6.96 ± 4.26
Age distribution (years)	
1-5	33 (43.4%)

5-10	19 (25%)
10-15	24 (31.6%)
Ileal intubation	
Yes	74 (97.4%)
No	2 (2.6%)
Associated symptoms	
Constipation	3 (3.9%)
Diarrhea	7 (9.2%)
Abdominal pain	23 (30.3%)
No symptom	43 (56.6%)
Types of therapy	
Blood transfusion	1 (1.3%)
Endoscopic intervention	11 (14.5%)
Medication	18 (23.7%)
No treatment	46 (60.5%)
Causes of LGIB	
IBD	14 (18.4%)
Polyps	11 (14.5%)
SRUS	6 (7.9%)
Non-specific colitis	18 (23.7%)
Normal colonoscopy	27 (35.5%)
Weight loss	
Yes	15 (19.7)
No	61 (80.3%)

rectosigmoid region, with only one case in the left colon. All patients had solitary polyps, except one who presented with two. Histopathological analysis confirmed that all polyps (100%) were juvenile polyps.



**Figure 1.** Distribution of polyps, inflammatory bowel disease (IBD), and solitary rectal ulcer syndrome (SRUS) between males and females.

Polyps were more frequent in females (7 females vs. 4 males), whereas inflammatory bowel disease (9 males vs. 5 females) and solitary rectal ulcer syndrome (SRUS) (5 males vs. 1 female) were more common in males (Figure 1). Most polyps were located in the

No statistically significant associations were observed between patient sex or age groups and the underlying causes of lower gastrointestinal bleeding (LGIB) (P-value > 0.05) (Table 2).

**Table 2.** Association of patient demography with underlying causes of lower gastrointestinal bleeding (LGIB).

Variable	Category	Pathological causes (IBD, polyp, SRUS, Nonspecific colitis)	Normal colonoscopy	Total	P-value
Gender	Male	31	17	48	0.9
	Female	18	10	28	
	Total	49	27	76	
Age groups	1-5 yr.	20	13	33	0.8
	5-10 yr.	13	6	19	
	10-15 yr.	16	8	24	
	Total	49	27	76	

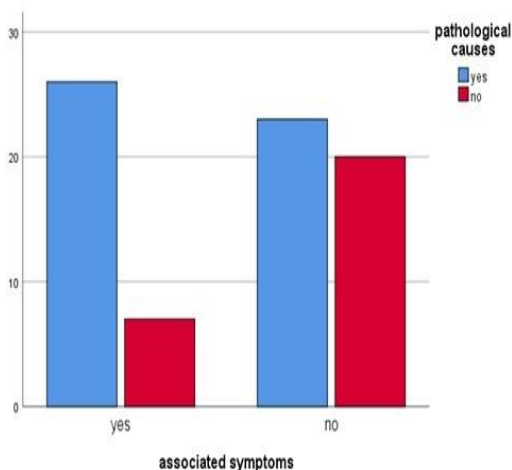
In contrast, statistically significant association were identified between a history

of anemia, weight loss, associated symptoms, and the underlying causes of lower

gastrointestinal bleeding (LGIB) (P-value < 0.05) (Table 3, Figure 2).

**Table 3.** Association of anemia status and weight loss with underlying causes of lower gastrointestinal bleeding (LGIB).

Variable	Category	Pathological causes (IBD, polyp, SRUS, Nonspecific colitis)	Normal colonoscopy	Total	P-value
Anemia	yes	13	2	15	0.04
	No	36	25	61	
	Total	49	27	76	
Weight loss	yes	14	1	15	0.009
	No	35	26	61	
	Total	49	27	76	



P-value = 0.02

**Figure 2.** Comparison of associated symptoms with underlying causes of lower gastrointestinal bleeding (LGIB).

**4. Discussion:**

The primary objective of our study was to evaluate the clinical characteristics, etiologies, and diagnostic features of lower gastrointestinal bleeding (LGIB) in pediatric patients. Normal colonoscopies were observed in 35.5% of patients. Among Frequent pathological causes found during colonoscopy were non-specific colitis followed by inflammatory bowel disease, juvenile polyps and solitary rectal ulcer syndrome.

Mean age of patients in our study were 6.96 ± 4.26 years. Previous studies have also observed

that younger children tend to present with LGIB more frequently(11,12,13,14).

In our study, abdominal pain was the most commonly associated symptom. Similar finding was found in other studies from Pakistan and Egypt(11,12). However, the majority of patients had no accompanying symptoms and presented solely with lower gastrointestinal bleeding. This is similar to other studies, which found that 80% and 73.3% of patients presented with isolated bleeding per rectum (10,12).

We revealed that anemia affected 19.7% of patients. In contrast, studies conducted in Pakistan and Egypt found that 64.2% and 61.3% of patients, respectively, were anemic(11,12). In our study, only one patient required blood transfusion. This is in contrast to a study from India, which found that 19% of cases required a blood transfusion (15). Colonoscopy is a low-risk procedure for children, with serious complications being rare. Diagnostic procedures carry a bleeding risk of 0.008–0.1%, post-polypectomy bleeding occurs in 0.26–2.5% of cases, and perforation risk ranges from 0.06–0.3% (16). We achieved high rate of ileal intubation. Another study from Saudi Arabia revealed ileal intubation in 80% of patients (17). Historically, pediatric data demonstrate a consistent rise in successful ileal and cecal intubation, from 22% in 1996 to 66% in 2000, 79% in 2008–2009,

and 95–97% in recent studies(18), paralleling adult findings (19,20).

Normal colonoscopy findings were detected in most of our patients. This finding correlates with previous studies, which reported normal colonic mucosa in 30.7% and 30% of examined cases (21,22). Unlike our findings, previous study documented normal results in 10.6% of cases(14). Even in advanced medical centers, colonoscopy fails to detect abnormalities in 10%–30% of cases of LGIB. Possible explanations for high percentage of normal colonoscopy may include lesions missed within intestinal folds during colonoscopy, incomplete examinations due to poor bowel preparation, pathology in segments not visualized during the procedure, bleeding from upper gastrointestinal source, auto-amputation of polyps, spontaneous healing of ulcers or other lesions before colonoscopy(23). Regarding the pathological causes of LGIB in our study, non-specific colitis, followed by inflammatory bowel disease and juvenile polyps, were most frequently found (Figures 3 and 4). In comparison to our research, polyps were identified as the leading cause of LGIB in studies conducted in Pakistan (39.2%), Egypt (44%), and India (47.2%)(11,12,15). This is probably explained by difference in environmental factors, genetic influences and dietary intake among different populations (24).

In our study, polyps were detected more frequently in female patients. In contrast to our findings, studies by Thakkar et al. and Albasri et al. reported a male predominance in polyp occurrence (25,26). Similar to our findings, Poddar et al. reported that 76% of polyps were solitary, with 85% of these occurring in the rectosigmoid region(27). Histopathological examination in our study, correlates with Egyptian study, demonstrated that all polyps were juvenile polyps(12).

A prior Iranian study, consistent with our findings, reported no statistically significant association between patient sex or age and the

causes of LGIB(21). Unlike our findings, Egyptian researchers reported a statistically significant relationship between patient age categories and LGIB etiologies(12).

We found significant associations between history of anemia, weight loss and concomitant symptoms when correlated with LGIB causes. Parallel findings from Saudi Arabia indicated that weight loss, diarrhea, and anemia were significantly associated with the underlying causes of LGIB (17).

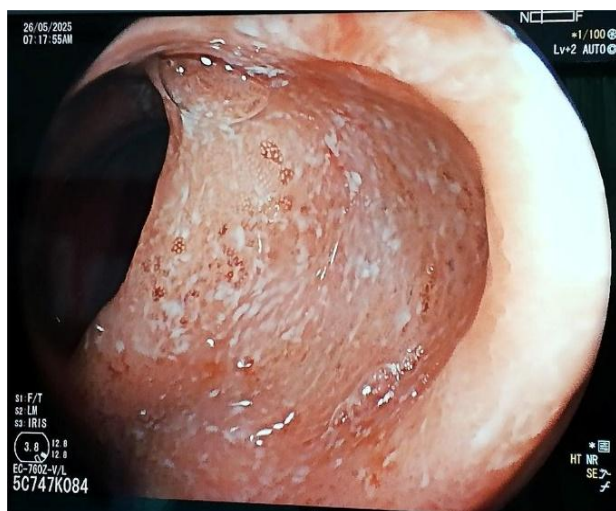
Alarming clinical features to decide to do colonoscopy in children include gastrointestinal and extraintestinal manifestations such as hematochezia, unexplained chronic diarrhea, perianal fistula, unexplained failure to thrive and unexplained anemia (28).

There are some limitations in our study that should be noted like:

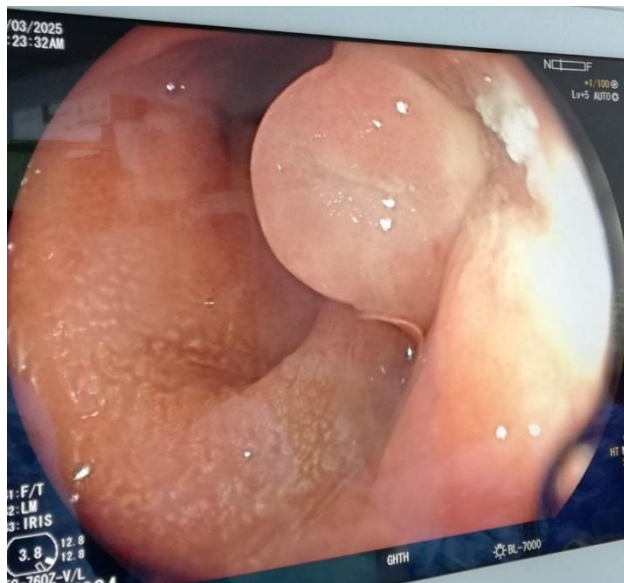
1. There may be biases in its retrospective design.
2. It is possible that patients who needed emergency surgery for conditions like severe necrotizing colitis, volvulus, or intussusception were overlooked.
3. Patients presented with lower gastrointestinal bleeding who were admitted to pediatric intensive care units not recorded.
4. Single-center setting of our study highlights the need for more extensive, multicenter studies involving a variety of populations in order to gain a deeper understanding of the causes and manifestations of childhood lower gastrointestinal bleeding in our country.
5. Small sample size.
6. Only patients who underwent colonoscopy were included in our study, so the study population may represent a selected subgroup of lower gastrointestinal bleeding (LGIB) cases.

Despite these drawbacks, this study provides useful information as one of the few studies

examining pediatric lower gastrointestinal bleeding.



**Figure 3.** endoscopic appearance of inflammatory bowel disease (IBD).



**Figure 4.** A rectal polyp's endoscopic appearance.

### Conclusion:

Several etiologies can result in the clinical presentation of lower gastrointestinal bleeding (LGIB) in pediatric patients. In our research, nonspecific colitis, inflammatory bowel disease, and juvenile polyps were most common pathologic causes of lower gastrointestinal bleeding. Colonoscopy is considered as a safe and effective tool for assessment of lower gastrointestinal bleeding

in pediatric populations. It is important for both diagnostic and therapeutic plans of management.

### Recommendations :

1. Lower gastrointestinal bleeding is a worrisome sign. So early evaluation and management is crucial.
2. Colonoscopy has a high diagnostic yield in lower gastrointestinal bleeding. it is also important as a therapeutic measure in certain causes of lower gastrointestinal bleeding in children, so we recommend using it, as long as it is a safe and effective measure.
3. Education of parents about lower gastrointestinal bleeding and importance of seeking medical advice early during its occurrence in their children.

**Funding:** None.

**Acknowledgment:** I would like to express my sincere gratitude to everyone who contributed to the success of this study.

**Conflict of interest:** Not declared.

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