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Delays in Diagnosing Pediatric Inflammatory Bowel Disease in Korea: Impact on Disease Severity and the Need for Early Recognition

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ABSTRACT

Background: A delayed diagnosis of pediatric inflammatory bowel disease (IBD) can lead to adverse outcomes. This study aimed to analyze the diagnostic delay among pediatric patients with IBD, focusing on associations with disease classification, disease activity, and initial management.

Methods: This multicenter retrospective study included pediatric patients who had been diagnosed with IBD across 17 Korean medical centers. Clinical and demographic data were extracted from their medical records.

Results: Overall, 486 patients, 362 with Crohn's disease (CD) and 124 with ulcerative colitis (UC), were included in the study. The median diagnostic delay, defined as the interval

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Disclosure

The authors have no potential conflicts of interest to disclose.

Author Contributions

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between initial symptom onset and final diagnosis of IBD, was not significantly different between CD and UC ($P = 0.154$); however, the interval from symptom onset to the first physician visit was significantly longer than that from the physician visit to diagnosis for both CD and UC ($P = 0.004$). Regarding CD, a long diagnostic delay was associated with fewer extraintestinal symptoms, lower C-reactive protein levels, and lower symptom scores.

Conclusion: Significant diagnostic delays are primarily due to prolonged intervals between symptom onset and the first physician visit. Public awareness campaigns about IBD symptoms tailored to the growing number of pediatric IBD patients in Korea could be a crucial factor for early diagnosis.

Keywords: Crohn's Disease; Inflammatory Bowel Disease; Korean Children; Ulcerative Colitis

INTRODUCTION

Inflammatory bowel disease (IBD), which encompasses Crohn's disease (CD) and ulcerative colitis (UC), is a chronic, relapsing condition that affects the gastrointestinal tract, and its incidence is increasing in pediatric populations worldwide.¹⁻³ Early diagnosis is crucial in managing IBD, especially in children and adolescents, as delays can lead to adverse outcomes, including disease progression, complications, and poorer responses to therapy.⁴⁻⁷ Early intervention can improve both short- and long-term outcomes, potentially reducing the risk of intestinal damage and improving the quality of life of pediatric patients with the disease.^{8,9} Unlike adults, pediatric patients with IBD face the additional challenge of managing the disease for approximately 10 years longer, a period coinciding with critical growth and developmental phases. Because delayed or suboptimal management during this period can lead to irreversible growth impairment, pediatric IBD patients are at risk of lifelong complications, such as stunted growth and reduced adult stature. Thus, achieving prompt disease control is essential in children to support normal growth and development. Pediatric gastroenterologists must consider factors influencing treatment response to ensure favorable outcomes in this population. Diagnostic delays are particularly detrimental, as they are associated with worse treatment responses and outcomes; therefore, early diagnosis and timely intervention are imperative to improve the prognosis for pediatric IBD patients.

Previous research has indicated that delayed diagnosis in patients with IBD can be attributed to both patient-related factors, such as symptom misinterpretation or delayed care-seeking behavior, and healthcare-related factors, including access to specialized care and the clinical recognition of pediatric IBD.^{6,10} Moreover, understanding how diagnostic delays affect disease severity at presentation and the potential for early therapeutic intervention are vital for improving disease management.¹¹

Studies on diagnostic delays among pediatric and adolescent IBD patients in Korea are scarce. Hence, this study focused on examining diagnostic delays in Korean pediatric patients with IBD with the goal of determining the duration and impact of delays across the diagnostic journey from symptom onset to the final diagnosis. By analyzing the intervals between symptom onset, initial physician consultation, and the final diagnosis, this study sought to determine the phase that contributed the most to delays. Additionally, it explored how these delays correlated with disease severity at diagnosis, thereby underscoring the importance of timely diagnosis and intervention in pediatric IBD. These findings may guide

efforts to increase awareness and develop protocols to minimize diagnostic delays, ultimately improving the care for pediatric patients with IBD.

METHODS

Patients and study design

This multicenter, retrospective cohort study was conducted across 17 pediatric medical centers in the Republic of Korea. The study period spanned from January 2018 to June 2021, reflecting recent trends in pediatric IBD diagnosis and management across diverse clinical settings. This study builds upon and expands the previously published research titled “Epidemiologic Trends of Pediatric Inflammatory Bowel Disease in Korea: A Multicenter Study of the Last 3 Years Including the COVID-19 Era.”¹ While the cohort overlaps with that of the earlier study, the current analysis focuses on diagnostic delays and their implications for disease severity, offering a novel perspective not covered in the initial publication.

The inclusion criterion for this study was pediatric patients under the age of 19 years with a confirmed diagnosis of IBD, specifically CD or UC. Data were collected through a comprehensive review of medical records at each participating center, ensuring a standardized approach to data extraction and analysis across sites. Key variables included demographic information (age, sex, and family history of IBD), clinical features (initial IBD-related symptoms), and time intervals relevant to the diagnostic process. The specific time intervals measured included duration from symptom onset to the initial physician visit, that is, the time from when symptoms first appeared to the initial medical consultation, and the first physician visit for IBD diagnosis, that is the time from the initial consultation to the confirmation of an IBD diagnosis.

To assess disease activity, the Pediatric Crohn’s Disease Activity Index (PCDAI) was evaluated at diagnosis in patients with CD, whereas the Pediatric Ulcerative Colitis Activity Index (PUCAI) was used in patients with UC.^{12,13} With regard to the assessment of endoscopic activity, the Simple Endoscopic Score for Crohn’s Disease (SES-CD) was used to evaluate the severity of CD, and the Modified Mayo Endoscopic Score was used for UC.^{14,15}

For analytical purposes, a “diagnostic delay” was defined as the interval between the initial symptom onset and the final IBD diagnosis. Patients in the 76th to 100th percentiles for this total period of diagnostic delay were categorized as experiencing a “long diagnostic delay,” reflecting those with the longest delays in the cohort. This percentile-based definition is consistent with prior studies in pediatric IBD that have used similar approaches to identify clinically meaningful delays.^{7,16,17} In our cohort, the distribution of diagnostic intervals showed a notable inflection beyond the 75th percentile, justifying the use of this threshold to distinguish patients with substantially delayed diagnoses.

Statistical analysis

Descriptive statistics were used for all baseline characteristics, and comparisons were made between patients with CD and those with UC. Continuous variables were analyzed using the *t*-test or Wilcoxon rank-sum test, while categorical variables were assessed using the χ^2 or Fisher’s exact test. To determine the impact of diagnostic delays on disease severity at presentation, logistic regression analysis was performed with long diagnostic delay as a predictor variable for severity markers, such as C-reactive protein (CRP) level and PCDAI and

SES-CD scores. Statistical significance was set at $P < 0.05$ for all analyses, and results were interpreted using confidence intervals for associations identified in the multivariate models.

Ethics statement

This study was approved by the Institutional Review Board (IRB) of all participating centers (Kosin University Gospel Hospital IRB No. 2021-06-015-001), and informed consent was waived because of the retrospective medical record review study.

RESULTS

Diagnostic delay and timeline from symptom onset to diagnosis in pediatric patients with IBD

Overall, 486 pediatric patients with IBD including 362 with CD and 124 with UC were included in the analysis (Table 1). For patients with CD, the median duration of long diagnostic delays was approximately 7 months, whereas for those with UC, it was 6.2 months (Tables 2 and 3). For patients with CD, the median times from symptom onset to the first physician visit and from the first visit to the final diagnosis were 61 and 10 days, respectively, ($P = 0.001$). A similar pattern was noted among patients with UC, with the corresponding median times being 31 and 12 days ($P = 0.001$). The overall median diagnostic delay from symptom onset to the final diagnosis did not differ significantly between patients with CD and those with UC ($P = 0.113$). When stratified by the 75th percentile of diagnostic delay,

Table 1. Baseline characteristics of patients with pediatric IBD

Variables	Patients with Crohn's disease	Patients with ulcerative colitis
Total No. of children	362	124
Age at diagnosis, yr	13.76 $\pm$ 2.76	13.58 $\pm$ 3.15
Sex (male), %	256 (70.7)	69 (55.6)
1st degree family history of IBD	23 (6.4)	5 (4.0)
Disease location (Crohn's disease)		
Lower GI tract involvement		
None	9 (3.0)	
L1 (distal 1/3 ileum $\pm$ limited cecal disease)	54 (17.8)	
L2 (colonic)	30 (9.9)	
L3 (ileocolonic)	210 (69.3)	
Upper GI tract involvement		
None	130 (42.9)	
L4a (upper disease proximal to the ligament of Treitz)	107 (35.3)	
L4b (upper disease distal to the ligament of Treitz and proximal to the distal 1/3 ileum)	23 (7.6)	
L4a+b	43 (14.2)	
Disease behavior		
B1 (non-stricturing, non-penetrating)	222 (81.0)	
B2 (stricturing)	42 (15.3)	
B3 (penetrating)	6 (2.2)	
B2B3 (both stricturing and penetrating)	4 (1.5)	
Perianal modifiers	142 (47.0)	
Disease extent (ulcerative colitis)		
E1 (ulcerative proctitis)		8 (8.0)
E2 (left-sided; distal to the splenic flexure)		27 (27.0)
E3 (extensive; distal to the hepatic flexure)		18 (18.0)
E4 (pancolitis; proximal to the hepatic flexure)		47 (47.0)

Values are presented as number (%) or mean $\pm$ standard deviation.
IBD = inflammatory bowel disease, GI = gastrointestinal.

Table 2. Median diagnostic delay according to the type of inflammatory bowel disease

Variables	Patients with Crohn's disease	Patients with ulcerative colitis	P value
From symptom onset to the initial physician visit ¹	61 (22–153)	31 (7–122)	0.004 ^a
From the initial physician visit to referral to pediatric gastroenterology ²	7 (3–31)	9 (2–31)	0.932 ^a
From referral to pediatric gastroenterology to diagnosis ³	3 (1–7)	3 (1–8)	0.612 ^a
P value	< 0.001 ^b	< 0.001 ^b	
Post hoc test	1 > 2 > 3 ^c	1 > 2 > 3 ^c	
Time to diagnosis	79 (39–213)	73 (29–184)	0.113 ^a

Values are presented as median (interquartile range).

Shapiro-Wilk test was employed for the test of normality assumption.

^aP values were derived by the Mann-Whitney's U test; ^bP values were derived from the Friedman's test; ^cDunn's pairwise post hoc test (Friedman test for the two groups) was used, and Bonferroni correction was applied for multiple comparisons between each of the three variables.

Table 3. Diagnostic delay percentiles in days

Interval/ percentile	From symptom onset to the initial physician visit		From the initial physician visit to referral to pediatric gastroenterology		From referral to pediatric gastroenterology to diagnosis		Time to diagnosis	
	CD	UC	CD	UC	CD	UC	CD	UC
5	4.25	3.00	0.00	0.00	0.00	0.00	12.15	12.25
10	7.00	7.00	0.00	0.00	1.00	1.00	20.00	16.50
25	22.00	7.00	3.00	2.00	1.00	1.00	39.25	29.25
50	61.00	30.50	7.00	9.00	3.00	3.00	78.50	73.00
75	152.50	122.00	30.50	30.50	7.00	8.00	213.13	184.00
90	365.00	365.00	122.00	122.00	15.00	17.60	423.55	373.50
95	502.13	730.00	244.00	183.00	30.50	34.20	731.85	704.00

CD = Crohn's disease, UC = ulcerative colitis.

the median time to diagnosis in the short delay group was 78.5 days for CD and 73.0 days for UC. In contrast, the long delay group demonstrated median times of 318.3 days for CD and 278.8 days for UC. These differences were statistically significant ($P < 0.001$ for both).

Comparison of characteristics according to the diagnostic delay periods in patients with CD

Patients with a long diagnostic delay (> 75th percentile) were diagnosed slightly later in life (14.1 ± 2.8 years) than those with a short delay (13.6 ± 2.7 years); however, this difference was not significant ($P = 0.055$). There were no significant differences in the family history of IBD, prevalence of diarrhea, weight loss, and linear growth failure between the short and long diagnostic delay groups. The prevalence of extraintestinal symptoms was higher (25.3%) in the short delay group (≤ 75 th percentile) than in the long delay group (13.5%), and the intergroup difference was significant ($P = 0.021$). The PCDAI and SES-CD scores and erythrocyte sedimentation rate (ESR) and high-sensitivity CRP levels were significantly lower in the long diagnostic delay group ($P = 0.006$, $P = 0.001$, $P < 0.001$, and $P = 0.001$, respectively). Furthermore, hemoglobin and albumin levels were significantly higher in the long diagnostic delay group ($P = 0.001$ and $P = 0.019$, respectively) (Table 4).

Comparison of characteristics according to the diagnostic delay period in patients with UC

In patients with UC, the initial symptoms of abdominal pain (45.9% vs. 23.1%, $P = 0.035$) and diarrhea (60.2% vs. 30.8%, $P = 0.007$) were significantly more frequent in the short delay group than in the long delay group. However, there were no significant differences between the long and short diagnostic delay groups in terms of symptoms at diagnosis, extent of disease involvement, the PUCAI score, the Modified Mayo Endoscopic Score, and the initial medications (Table 5).

Table 4. Patients characteristics according to the diagnostic delay in Crohn's disease

Variables	Diagnostic delay ≤ 75th percentile	Diagnostic delay > 75th percentile	P value
No.	266	96	
The median time to diagnosis, day	78.5 (39.25–213.13)	318.3 (213.13–713.85)	< 0.001
Age at diagnosis, yr	13.62 ± 2.73	14.16 ± 2.83	0.055 ^c
Sex (male)	187 (70.3)	69 (71.9)	0.771 ^a
IBD family history	15 (5.6)	8 (8.3)	0.354 ^a
Height, cm	1.58 ± 0.15	1.59 ± 0.16	0.221 ^c
Weight, kg	47.32 ± 14.22	48.44 ± 14.56	0.569 ^c
Body mass index, kg/m ²	18.57 ± 3.45	18.64 ± 3.28	0.849 ^c
Initial symptom			
Initial abdominal pain	166 (62.4)	54 (56.3)	0.290 ^a
Initial diarrhea	121 (45.5)	45 (46.9)	0.815 ^a
Initial hematochezia	42 (15.8)	11 (11.5)	0.303 ^a
Weight loss	89 (33.5)	29 (30.2)	0.560 ^a
Perianal disease	75 (28.2)	31 (32.3)	0.450 ^a
Linear growth failure	4 (1.5)	2 (2.1)	0.658 ^b
Extraintestinal symptoms	66 (24.8)	12 (12.5)	0.012 ^a
At diagnosis			
Abdominal pain	157 (61.3)	61 (64.9)	0.542 ^a
Diarrhea	141 (55.1)	53 (56.4)	0.828 ^a
Hematochezia	40 (15.6)	17 (18.1)	0.581 ^a
Weight loss	101 (39.5)	41 (43.6)	0.482 ^a
Perianal disease	85 (33.2)	37 (39.4)	0.284 ^a
Extraintestinal symptoms	33 (12.9)	13 (13.8)	0.818 ^a
Lower intestinal involvement			0.172 ^b
None	4 (1.8)	5 (5.8)	
L1	36 (16.6)	18 (20.9)	
L2	24 (11.1)	6 (7.0)	
L3	153 (70.5)	57 (66.3)	
Upper intestinal involvement			0.149 ^a
None	93 (42.9)	37 (43.0)	
L4a	83 (38.2)	24 (27.9)	
L4b	13 (6.0)	10 (11.6)	
L4a + L4b	28 (12.9)	15 (17.4)	
Behavior			0.022 ^b
B1	164 (84.1)	58 (73.4)	
B2	28 (14.4)	14 (17.7)	
B3	2 (1.0)	4 (5.1)	
B2B3	1 (0.5)	3 (3.8)	
Perianal disease	105 (48.4)	37 (43.5)	0.447 ^a
PCDAI score	39.27 ± 15.56	34.18 ± 14.09	0.007 ^c
SES-CD score	12.96 ± 7.41	10.51 ± 7.78	0.004 ^c
Hemoglobin, g/dL	11.73 ± 1.90	12.34 ± 1.73	0.003 ^c
Platelets, ×10 ³ /μL	123.82 ± 791.87	104.01 ± 693.19	0.0033
ESR, mm/hr	52.36 ± 29.67	39.45 ± 26.73	< 0.001 ^c
Albumin, g/dL	3.87 ± 0.55	4.02 ± 0.53	0.028 ^c
HS-CRP, mg/dL	7.27 ± 15.77	5.42 ± 17.27	0.001 ^c
Fecal calprotectin, μg/g	2,556.86 ± 2,150.36	2,501.71 ± 1,887.83	0.962 ^c
Initial treatment			
5-aminosalicylic acid	197 (74.6)	64 (66.7)	0.135 ^a
Steroid	110 (41.7)	35 (36.5)	0.373 ^a
Azathioprine	153 (58.0)	56 (58.3)	0.949 ^a
Methotrexate	18 (6.8)	2 (2.1)	0.083 ^a
Infliximab	21 (8.0)	10 (10.4)	0.461 ^a
Adalimumab	0 (0.0)	1 (1.0)	0.267 ^b
Exclusive enteral nutrition	146 (55.3)	53 (55.2)	0.987 ^a
Antibiotics	95 (36.0)	30 (31.3)	0.404 ^a

Values are presented as number (%), mean ± standard deviation.

Shapiro-Wilk's test was employed for the test of normality assumption.

IBD = inflammatory bowel disease, PCDAI = Pediatric Crohn's Disease Activity Index, SES-CD = Simple Endoscopic Score for Crohn's Disease, ESR = erythrocyte sedimentation rate, HS-CRP = high-sensitivity C-reactive protein.

^aP values were derived from the χ^2 test; ^bP values were derived from the Fisher's exact test; ^cP values were derived by the Mann-Whitney's U test.

Table 5. Patients characteristics according to the diagnosis delay in ulcerative colitis

Variables	Diagnostic delay ≤ 75th percentile	Diagnostic delay > 75th percentile	P value
No.	98	26	
The median time to diagnosis, day	73.0 (29.25–184.0)	278.8 (184.0–740.0)	< 0.001
Age at diagnosis, yr	13.43 ± 3.04	14.18 ± 3.56	0.096 ^d
Sex (male)	52 (53.1)	17 (65.4)	0.261 ^a
IBD family history	4 (4.1)	1 (3.8)	1.000 ^b
Distances, km	22.87 ± 23.78	31.82 ± 28.09	0.055 ^d
Height, cm	1.58 ± 0.16	1.60 ± 0.18	0.315 ^d
Weight, kg	48.44 ± 15.01	52.06 ± 20.58	0.317 ^c
Body mass index, kg/m ²	19.02 ± 3.22	19.54 ± 4.46	0.828 ^d
Initial symptoms			
Initial abdominal pain	45 (45.9)	6 (23.1)	0.035 ^a
Initial diarrhea	59 (60.2)	8 (30.8)	0.007 ^a
Initial hematochezia	79 (80.6)	19 (73.1)	0.401 ^a
Weight loss	13 (13.3)	5 (19.2)	0.531 ^b
Linear growth failure	1 (1.0)	0 (0.0)	1.000 ^b
Extraintestinal symptoms	11 (11.2)	2 (7.7)	1.000 ^b
At diagnosis			
Abdominal pain	48 (49.5)	9 (34.6)	0.177 ^a
Diarrhea	61 (62.9)	12 (46.2)	0.123 ^a
Hematochezia	80 (82.5)	20 (76.9)	0.573 ^b
Weight loss	17 (17.5)	5 (19.2)	0.781
Perianal disease	0 (0.0)	1 (3.8)	0.211 ^b
Extraintestinal symptoms	3 (3.1)	2 (7.7)	0.285 ^b
Extent			0.658 ^b
E1	7 (8.9)	1 (4.8)	
E2	20 (25.3)	7 (33.3)	
E3	16 (20.3)	2 (9.5)	
E4	36 (45.6)	11 (52.4)	
PUCAI score	43.41 ± 18.34	41.67 ± 19.54	0.689 ^c
Modified Mayo Endoscopic Score	2.69 ± 1.84	2.88 ± 1.80	0.337 ^d
Hemoglobin, g/dL	12.00 ± 2.52	11.82 ± 2.88	0.789 ^d
Platelets, ×10 ³ /μL	948.62 ± 633.61	404.65 ± 137.07	0.866 ^d
ESR, mm/hr	22.27 ± 20.70	33.83 ± 32.30	0.212 ^d
Albumin, g/dL	4.22 ± 0.49	4.33 ± 0.68	0.167 ^d
HS-CRP, mg/dL	3.09 ± 8.80	1.55 ± 2.71	0.574 ^d
Fecal calprotectin, μg/g	2,965.50 ± 6,372.48	2,334.89 ± 2,573.66	0.497 ^d
Initial treatment			
5-aminosalicylic acid	88 (90.7)	25 (96.2)	0.687 ^b
Steroid	66 (68.0)	15 (57.7)	0.323 ^a
Azathioprine	31 (32.0)	12 (46.2)	0.178 ^a
Methotrexate	0 (0.0)	1 (3.8)	0.211 ^b
Infliximab	1 (1.0)	0 (0.0)	1.000 ^b
Exclusive enteral nutrition	5 (5.2)	4 (15.4)	0.093 ^b
Antibiotics	8 (8.2)	3 (11.5)	0.699 ^b

Values are presented as number (%) or mean ± standard deviation.

Shapiro-Wilk test was employed for the test of normality assumption.

IBD = inflammatory bowel disease, PUCAI = Pediatric Ulcerative Colitis Activity Index, ESR = erythrocyte sedimentation rate, HS-CRP = high-sensitivity C-reactive protein.

^aP values were derived from the χ^2 test; ^bP values were derived from the Fisher's exact test; ^cP values were derived from an independent t-test; ^dP values were derived by the Mann-Whitney's U test.

DISCUSSION

This study investigated the diagnostic delays in Korean pediatric patients with IBD (CD and UC) to determine the duration and impact of delays across the diagnostic journey from symptom onset to the final diagnosis.

This study found that the median diagnostic delays were approximately 7 and 6.2 months among patients with CD and UC, respectively. Differences in healthcare accessibility

and caregiver awareness across countries lead to varying outcomes in diagnostic delays. The median time from symptom onset to diagnosis for patients with CD in Germany has been reported to be 4 months, with delays extending up to 24 months in Saudi Arabia.^{16,18,19} Many studies have reported longer diagnostic delays for CD compared with UC, especially during the period from symptom onset to the first physician visit.^{6,11,17,20} The majority of studies reported diagnostic delays ranging from 4 to 6 months among pediatric patients with CD; this finding was consistent with those of the current study. Regarding UC, most studies reported diagnostic delays ranging from 2 to 3 months, and the average delay of 6.2 months in this study appears to be somewhat longer. This is in line with the pattern observed in other studies, with reported delays in the UK and India ranging from 2 to 18 months, indicating that diagnostic delays may vary by country.²¹⁻²⁴

Significant diagnostic delays were observed in Korean pediatric patients with IBD, particularly from symptom onset to the first physician visit, indicating that patient-related factors contributed more substantially to these delays compared with healthcare-related factors. This finding highlights the need for public education on IBD symptoms, particularly among caregivers and primary care providers, to improve early recognition in children. Although Korea has a highly accessible healthcare system, diagnostic delays were still observed, which may seem paradoxical. However, many patients in the long delay group presented with milder or nonspecific symptoms and a lower inflammatory burden at diagnosis, including significantly reduced PCDAI and SES-CD scores, lower ESR and CRP levels, and higher hemoglobin and albumin levels. This subtler clinical presentation may lower clinical suspicion for IBD during initial encounters, leading to under-recognition despite robust healthcare access. These findings are consistent with previous studies, including those by Ricciuto et al.⁷ and El Mouzan et al.,¹⁶ which reported that lower disease activity and inflammatory markers were associated with delayed diagnosis in pediatric CD. Similarly, studies have emphasized the importance of educating primary care providers to recognize atypical or mild symptoms of IBD in children.^{25,26} The relatively mild presentations observed in our cohort, compared with the more overt clinical features seen in cohorts from countries such as Germany or the UK, may help explain the longer diagnostic delays despite easy access to healthcare.^{5,18}

Furthermore, the longer delay between symptom onset and the initial physician visit, especially in the case of CD compared with UC, may reflect the nonspecific and variable nature of CD symptoms, which are often misinterpreted as less serious or functional gastrointestinal conditions. In our cohort, extraintestinal manifestations such as arthritis and ocular inflammation were significantly more frequent in CD patients with shorter diagnostic delays. This suggests that the presence of extraintestinal features may prompt earlier clinical suspicion and referral for further evaluation. In contrast, patients without extraintestinal symptoms may present with only nonspecific abdominal symptoms that overlap with more common pediatric conditions, potentially leading to delayed diagnosis. In UC, patients in the short diagnostic delay group more frequently reported abdominal pain and diarrhea at onset, indicating that the clarity and severity of initial gastrointestinal symptoms may influence healthcare-seeking behavior and facilitate timely diagnosis. These findings underscore the importance of improving awareness among caregivers and primary care providers about both extraintestinal signs and the possibility that even vague or isolated gastrointestinal symptoms could indicate pediatric IBD.

While Korea offers extensive educational resources for adult IBD patients after diagnosis, there remains a notable lack of public education on early symptom recognition in children.

Given the rising incidence of pediatric IBD, particularly around age 10, developing and distributing targeted educational materials for caregivers is essential. Public campaigns and media engagement could serve as effective strategies to prompt timely medical evaluation in this vulnerable age group.

The strengths of this study include its large multicenter design, which enhances the generalizability of its findings across clinical settings. However, because this was a retrospective study, the potential selection bias and reliance on medical records may be its limitations. Additionally, data on the actual prognosis of these patients were not available, highlighting the need for further research into their long-term outcomes. Prospective studies could clarify the impact of reducing diagnostic delays on outcomes and examine other barriers such as socioeconomic factors and disparities in healthcare access.

In conclusion, this study highlights the importance of a timely diagnosis and intervention in pediatric patients with CD and UC. Diagnostic delays are emphasizing the need for public health initiatives to raise symptom awareness and create streamlined referral pathways. Clinicians should prioritize early assessment and inflammation control to improve long-term outcomes in pediatric patients with IBD. Further, future studies should investigate early detection markers and assess the effects of pandemic-related changes in healthcare access on pediatric IBD management.

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