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Research Article

Comparative Analysis of Inflammatory Bowel Disease Presentation and Severity in Pediatric *vs.* Adult Patients

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Abstract

Background: Inflammatory bowel disease (IBD) encompasses chronic conditions that cause inflammation in the gastrointestinal tract, most notably Crohn's disease and ulcerative colitis. Both diseases present with variable clinical features, with significant differences observed between pediatric and adult populations. ***Objective***: To examine the clinical presentation, severity, and disease progression of IBD in children compared to adults. ***Methods***: A retrospective observational analysis included patients diagnosed with Crohn's disease or ulcerative colitis at a tertiary gastroenterology center over a 6-month period. Patients were allocated into pediatric patients (diagnosed at <15years) and adults (diagnosed at >15years). The collected data included demographical data, including age, sex, and body mass index. Clinical data including symptom duration, presenting symptoms, disease severity, and extraintestinal manifestations (EIMs). ***Results***: A total of 100 patients (50 children and 50 adults) with confirmed diagnoses of IBD were included. While there was no significant difference in gender distribution between the child IBD and adult IBD cohorts (p=0.272), the BMI was significantly higher in adults (p=0.028). The clinical presentations were comparable between groups, except for higher duration of symptoms and weight loss in adults (p=0.012, 0.048, respectively). No statistically significant difference was observed in the frequency of EIMs, disease severity, and disease distribution between groups, except for a higher trend for pancolitis in child IBD (p=0.036). ***Conclusions***: Pediatric patients with IBD may present with a more aggressive disease course and require tailored treatment strategies. Understanding these age-related differences is critical for optimizing early diagnosis, management, and long-term care of IBD patients.

Keywords: Crohn's disease, Pancolitis, Ulcerative colitis.

تحليل مقارن لعرض مرض التهاب الأمعاء وشدته لدى مرضى الأطفال مقابل المرضى البالغي

الخلاصة

الخلفية: يشمل مرض التهاب الأمعاء (IBD) الحالات المزمنة التي تسبب التهابا في الجهاز الهضمي، ولا سيما مرض كرون والتهاب القولون التقرحي. كلا المرضين يتمتعان بسمات سريرية متغيرة، مع ملاحظة اختلافات كبيرة بين الأطفال والبالغين. **الهدف**: فحص العرض السريري لمرض التهاب الأمعاء وشدته وتطوره لدى الأطفال مقارنة بالبالغين. **الطرائق**: شمل التحليل الرصدي بأثر رجعي المرضى الذين تم تشخيص إصابتهم بمرض التهاب الأمعاء إما بمرض كرون أو التهاب القولون التقرحي في مركز أمراض الجهاز الهضمي على مدى 6 أشهر. وفقا لعمر المرضى عند التشخيص، ينقسم المرضى إلى مجموعتين: مرضى الأطفال (قبل سن 15) والبالغين (في سن 15 أو بعد). تضمنت المعطيات المستخرجة بيانات ديموغرافية بما في ذلك العمر والجنس ومؤشر كتلة الجسم. البيانات السريرية بما في ذلك مدة الأعراض، والأعراض المقدمة، وشدة المرض، والمظاهر خارج الأمعاء EIMs. **النتائج**: تم تضمين ما مجموعه 100 مريض (50 طفلا و 50 بالغا) مع تشخيص مؤكد لمرض التهاب الأمعاء في الدراسة. في حين لا يوجد فرق كبير في التوزيع بين الجنسين بين مجموعات مرض التهاب الأمعاء لدى الأطفال والبالغين، كان مؤشر كتلة الجسم أعلى بشكل ملحوظ في المرضى البالغين) قيمة P = 0.028). كانت العروض السريرية قابلة للمقارنة بين المجموعات باستثناء ارتفاع مدة الأعراض وفقدان الوزن لدى المرضى البالغين0.012=p ، 0.048على التوالي. لم يلاحظ أي فرق كبير في تواتر EIMs وشدة المرض وتوزيع المرض بين كلا المجموعتين باستثناء الاتجاه الأعلى لالتهاب البنكوليت في التهاب القولون التقرحي لدى الأطفال (p=0.036) **الاستنتاجات**: قد يعاني مرضى الأطفال المصابون بمرض التهاب الأمعاء من مسار مرض أكثر عدوانية ويحتاجون إلى استراتيجيات علاج مخصصة. يعد فهم هذه الاختلافات المرتبطة بالعمر أمرا بالغ الأهمية للتشخيص المبكر والعلاج.

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INTRODUCTION

Inflammatory bowel disease (IBD) is a chronic inflammatory condition of the gastrointestinal tract that is primarily classified into Crohn's disease and ulcerative colitis, each presenting with distinct yet overlapping clinical and pathological features [1]. The global prevalence of IBD has increased significantly over the past decades, with Western countries historically exhibiting the highest incidence, though emerging epidemiological data indicate a rising burden in developing regions [2]. The clinical presentation of IBD is highly variable, with patients experiencing differences in disease severity, anatomical distribution, and response to treatment, necessitating individualized management strategies [3]. Recent studies highlight the need for improved disease classification systems, as

traditional subtypes fail to capture the heterogeneity in IBD phenotypes, emphasizing the role of molecular and immunological profiling [4]. The complex interplay between genetic predisposition, environmental triggers, and gut microbiome dysbiosis further contributes to the variability in disease onset, progression, and treatment response, underscoring the importance of precision medicine approaches in IBD care [5,6]. Unlike adult-onset IBD, IBD in the pediatric age group tends to have a more aggressive disease course, often requiring earlier intervention to prevent severe complications such as growth impairment and extraintestinal manifestations, which are less common in adult-onset cases [7]. These differences also influence treatment strategies, with pediatric patients often needing more intensive therapy to achieve remission and prevent progression to surgery [8]. Moreover, long-term outcomes, such as the risk of cancer and transition difficulties, differ significantly, necessitating tailored care strategies to address the distinct clinical challenges faced by these patients [9]. Despite these differences, both pediatric and adult-onset IBD patients face challenges transitioning to adult care, as the disease's impact on psychosocial development and quality of life requires a comprehensive, ongoing approach [10]. Furthermore, studies have shown that the early diagnosis and treatment of pediatric-onset IBD can improve long-term outcomes, reinforcing the need for age-specific approaches in both clinical practice and research [11]. Given the complex nature of IBD and its varying manifestations across age groups, this study aimed to identify key distinctions in symptomatology, disease severity, and progression between pediatric and adult patients. Understanding these differences is crucial in improving diagnostic accuracy, tailoring treatment approaches, and optimizing patient outcomes across different age groups. This study sought to explore whether variations in immune response, disease location, and extraintestinal manifestations contributed to the differing clinical presentations observed in adults and children. Additionally, it aimed to investigate whether age-related disparities influenced disease onset, treatment response, and long-term prognosis. By analyzing these factors, the study provided valuable insights into age-specific characteristics of IBD, ultimately enhancing clinical decision-making and personalized management strategies for affected individuals.

METHODS

Study design and setting

This is a retrospective observational study conducted at Al-Yarmouk tertiary gastroenterology teaching center to compare the clinical presentation of inflammatory bowel disease in adults versus children. Data on patients with Crohn's disease or ulcerative colitis within a 6-month period, from October 2024 to April 2025, were reviewed, and a comparison was made of symptomatology, disease distribution, severity, and the presence of extraintestinal manifestations.

Patient selection and criteria

All patients with a confirmed diagnosis of IBD during the study period were enrolled regardless of age. The diagnosis was based on clinical, endoscopic, histologic, and radiologic findings. Patients with inconclusive diagnoses, cases that showed features typical for both diseases or possessed unresolved diagnoses or were designated as inflammatory bowel disease unclassified (IBD-U), missing medical records, and those with other gastrointestinal disorders were excluded from the study. According to the age of the patient at diagnosis, patients were assigned to one of two groups: child IBD (individuals diagnosed before the age of 15) and adult IBD (those diagnosed at 15 years or higher).

Data collection

For all patients included in the study, four sets of data were extracted from medical records: 1) Demographical data: age, sex, and body mass index; 2) Clinical characteristics: duration of symptoms before diagnosis and presence of any of the following gastrointestinal symptoms: abdominal pain, diarrhea, rectal bleeding, and weight loss. In addition, extraintestinal manifestations (EIMs) that involve joints (arthritis/arthralgia), skin (erythema nodosum/pyoderma gangrenosum), and eyes (uveitis/episcleritis) were reported. 3) Disease classification and distribution: The endoscopic, radiologic, and histologic findings were used to determine the distribution and disease classification. Based on the Montreal classification system, the location of disease in Crohn's disease was classified as ileal, colonic, ileocolonic, or upper gastrointestinal involvement. Disease extent of ulcerative colitis was assessed endoscopically for proctitis, left-sided colitis, or pancolitis, and 4) disease severity at the time of diagnosis: severity assessment was performed using validated clinical indices. In children with Crohn's disease, the Pediatric Crohn's Disease Activity Index (PCDAI) was used [12], and in adults, it was used for the Crohn's Disease Activity Index (CDAI) [13]. The Pediatric Ulcerative Colitis Activity Index (PUCAI) and Mayo score were used to classify disease severity at the time of diagnosis in the case of ulcerative colitis [14]. To let us make such comparisons, the scores were categorized as mild, moderate, or severe disease.

Statistical analysis

IBM SPSS Statistics (Version 26.0) was used to perform the statistical analysis. The demographic characteristics, disease severity, and symptomatology of the study population were summarized with descriptive statistics. Independent samples t tests were used to compare continuous variables (age at diagnosis, duration of symptoms). Comparisons

between categorical variables, including distribution of gender, clinical symptoms, and disease classification, were performed via chi-square tests. Statistical significance was considered significant if the *p-value was* < 0.05.

RESULTS

A total of 100 patients (50 children and 50 adults) diagnosed with inflammatory bowel disease were enrolled in the present study. The age range of enrolled patients was 6-65 years (Table 1).

Table 1: Statistical comparison of demographic data between child and adult IBD (n=50 in each group)

Characteristic	Child IBD	Adult IBD	*p*-value
Age at Diagnosis (year)	13.08±3.0	35.20±13.08	<0.001
Gender			
Male	24(48)	32(64)	0.272
Female	26(52)	18(36)	
BMI (kg/m²)	20.12±3.52	22.63±5.46	0.028

Values were expressed as frequency, percentage, and mean±SD.

The mean age at diagnosis was 13.08±3 years for children and 35.20±13.08 years for adults. Males outnumbered females in adult patients, but there is no significant difference in gender distribution between the child IBD and adult IBD cohorts. The body mass index was significantly higher in adult patients. Regarding clinical presentation, only two factors were found to have statistically significant differences between adult and pediatric IBD: the mean duration of symptoms and weight loss. The mean duration of symptoms was significantly higher in adult patients (p=0.012), while weight loss was significantly more in adult patients (p=0.048) (Table 2).

Table 2: Statistical comparison of clinical presentations at diagnosis between child and adult IBD patients (n=50 in each group)

Characteristic	Child IBD	Adult IBD	*p*-value
Duration of symptoms (months)	6.80±3.1	9.50±4.7	0.012
Abdominal pain	40(80)	36(72)	0.534
Diarrhea	38(76)	42(84)	0.522
Rectal bleeding	34(68)	38(76)	0.582
Weight loss	42(84)	30(60)	0.048

Values were expressed as frequency, percentage, and mean±SD.

All other clinical presentations studied, including abdominal pain, diarrhea, and rectal bleeding, did not show statistical difference between adult and child IBD. There was no statistically significant difference in disease classification between adult and child IBD (p= 0.426) (Table 3). On the other hand, only the distribution of patients with ulcerative colitis shows a statistical difference, as pancolitis was significantly higher in child IBD (p= 0.036).

Table 3: Statistical comparison of disease classification and distribution, and severity between child and adult IBD patients (n=50 in each group)

Characteristic		Child IBD	Adult IBD	*p*-value
Classification	Crohn's Disease	30(60)	24(48)	0.426
	Ulcerative Colitis	20 (40)	26 (52)	0.426
Distribution	Ileocolonic in Crohn's Disease	22(73)	12(50)	0.158
	Ileal Crohn's Disease	4(13)	6(25)	0.429
	Colonic Crohn's Disease	2(7)	4(17)	0.583
	Upper GI Involvement Crohn's Disease	2(7)	2(8)	1.0
	Pancolitis in Ulcerative Colitis	14(70)	8(30)	0.036
	Left-sided Colitis in Ulcerative Colitis	4(20)	12(46)	0.224
	Proctitis In Ulcerative Colitis	2(10)	6(23)	0.375
Severity	Mild Disease Activity	6(12)	12(24)	0.269
	Moderate Disease Activity	16(32)	20(40)	0.564
	Severe Disease Activity	28(56)	18(36)	0.194

Values were expressed as frequency and percentage.

No statistically significant difference was found between adult and child IBD through all degrees of severity, including mild, moderate, and severe disease. Arthritis was the predominant extraintestinal manifestation reported in 56% of the sample studied. Both joint and skin complaints were more highly reported in adult IBD; on the other hand, eye involvement was reported in higher frequencies in child IBD (Figure 1).

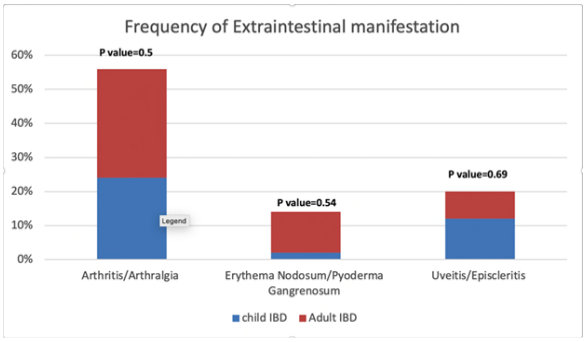

Figure 1: Comparison of extraintestinal manifestations in adult *vs.* child IBD.

Overall, the EIMs did not show a statistically significant difference between child and adult IBD. By Pearson correlation, a significant negative correlation was found between age of onset of IBD and distribution of the disease (r= - 0.41, p= 0.036) and weight loss (r= -0.35, p= 0.046). The duration of symptoms was positively correlated with age with statistical significance (r= 0.32, p= 0.023) (Table 4).

Table 4: Correlation between age onset of IBD and clinical parameters

Variables	Correlation coefficient (r)	*p*-value
Disease severity	-0.24	0.194
Disease distribution	-0.41	0.036
Duration of symptoms	0.32	0.023
Weight loss	-0.35	0.046
Extraintestinal manifestation	0.12	0.502

DISCUSSION

Clinical manifestation of inflammatory bowel disease (IBD) is broad, with great difference in clinical manifestation among pediatric and adult patients

[15]. Accurate understanding of these variations is of key importance to refinement of diagnostic accuracy, to fine-tuning therapeutic approaches, and to optimization of long-term disease management. The present study found that patients with childhood IBD have significantly lower BMI and duration of symptoms (p= 0.028, 0.012) and higher weight loss at presentation than adults with IBD (p= 0.048). The extraintestinal manifestation and disease classification did not significantly vary with age of onset. Pancolitis is the only type of disease distribution that shows a significant association with child IBD (p= 0.036). In the present study, the time intervals between onset of symptoms and diagnosis were shorter for children (mean 6.80 months) versus 9.50 months in adults. This implies pediatric individuals may be detected and evaluated more promptly. The weight loss was much more common in children (84% versus 60% in adults), suggesting a more severe growth impairment and metabolic impact on younger patients. It illustrates the fact that, although IBD has the same symptoms, such as abdominal pain, diarrhea, and rectal bleeding, in children and adults, the metabolic effects and the rate of the disease progression are different. These findings are in accord with the recent literature on pediatric versus adult IBD clinical patterns. Bouhuys *et al*. [16] stressed that children with IBD tend to have more aggressive disease with early onset of weight loss and growth impairment, and therefore, earlier intervention is indicated. Like the above, Khavkin *et al.* also corroborates that pediatric patients with IBD oftentimes present with more severe and highly prevalent disease at diagnosis, which mirrors their findings of more pronounced weight loss and nutritional deficits among children [17]. Furthermore, Yablokova *et al*. had also noted that pediatric patients carry a higher frequency of systemic involvement, such as malnutrition, anemia, and extraintestinal manifestations, contributing to findings from the present study of higher metabolic burden in children [18]. However, others suggest that adults may have a longer delay in diagnosis because of wrong interpretation of symptoms as functional gastrointestinal disorders. According to the study of Atia *et al*. [19], the reason for this is the fact that adults tend to have less severe initial symptoms, and their symptoms are more often overlapping with irritable bowel syndrome. This parallels our present study's finding that adults were more likely to have had the longer duration of symptoms prior to diagnosis, perhaps because adults had a more insidious disease onset. The findings of Medina Carbonell and Chandan [20] on malnutrition and impaired growth at diagnosis in pediatric patients with IBD, increased metabolic demands, and reduced nutrient absorption support the fact that patients of this age who are diagnosed with IBD are more likely to experience weight loss. In addition, Parente *et al*. pointed out that early-onset IBD has a more aggressive phenotype and poorer nutritional status, and that, in particular, is why they found a higher prevalence of weight loss in children [21]. Our results are consistent with those of recent studies of children with IBD identifying differences between disease classification and distribution compared with adults. In follow-up of this, Granot *et al*. found that pediatric onset of ulcerative colitis was associated with significantly higher prevalence of pancolitis compared to adult onset of ulcerative colitis, further supporting the fact that pediatric patients are more likely to present with more extended disease at first diagnosis [22]. Martinez *et al*. also reported that pediatric IBD patients possessed unique genetic and immunological profiles that may contribute to the more severe, more widespread phenotype of disease in these patients [23]. Overall, the findings of the present study are consistent with the observations of the study by Murugesan *et al*. [5], as they show that pediatric IBD is characterized by profound changes in gut microbiome composition and may also explain the more aggressive disease pattern in children. Furthermore, Sandberg *et al*. noted that a vast majority of pediatric IBD cases were then reclassified as Crohn's disease or ulcerative colitis later on, suggesting that the majority of pediatric IBD presentations are not that different at birth, but with time, it gets more specific subtypes [24]. Subsequently, the work of Onidi *et al*. found that pediatric IBD patients transitioning to adult care have a high disease burden, and therefore early-onset disease is more severe and needs longer and stronger management [25]. Heterogeneity in extraintestinal manifestation of Crohn disease based on age of onset had been reported previously. For instance, Ruel *et al*. [26] observed a decrease in prevalence of extraintestinal manifestation with increasing age in patients with Crohn's disease. However, in this study, patients with IBD did not show a correlation between age of onset and presence of extraintestinal manifestations regardless of disease classification. The trend for higher frequency of extraintestinal manifestation in pediatric Crohn disease was attributable to more severe phenotype, including extensive gastrointestinal involvement, rapid progression, and a stronger immune activation profile in child-onset IBD [27,28]. Such a pattern was not evident in the present study sample, as no correlation between severity of disease and age of onset was observed. This manuscript shows that pediatric IBD differs from adult IBD in classification, disease location, and severity. The observed differences emphasize the importance of customized treatments, in line with disease onset age, and appropriately delivering pediatric patients the appropriate level of care to manage their more extensive disease burden. These findings highlight the need for continued research on such pathophysiological mechanisms of these differences, which may facilitate better-focused targeted therapies and better long-term outcomes for pediatric IBD patients.

Study limitations

We acknowledged the limitations of this study, including small sample size and single-center setting. Nevertheless, the results of the present study can overcome the knowledge gap and provide valuable

insights into the variability of clinical presentations of IBD across different age groups in Iraqi patients, offering a representative perspective from a low-income country.

Conclusion

This study emphasizes the major clinical contrasts between pediatric and adult-onset inflammatory bowel disease, especially regarding symptom length and distribution. Pediatric patients had a higher propensity for rapid development of symptoms and substantial weight loss, which may indicate IBD in children may be more aggressive, and therefore children may have a greater need for early and aggressive treatment.

Conflict of interests

The authors declared no conflict of interest.

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Data sharing statement

Supplementary data can be shared with the corresponding author upon reasonable request.

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