

Clinical Characteristics of Pediatric Constipation in South Jordan

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Purpose: Constipation is a common pediatric problem worldwide. This study aims to describe the clinical characteristics of pediatric constipation in south Jordan according to gender and age group.

Methods: All patients with constipation managed at our pediatric gastroenterology service between September 2009 and December 2012 were included. Hospital charts were reviewed. Demographic data, clinical characteristics, and final diagnosis were recorded. Data were analyzed according to gender and the following age groups: infants, pre-school, school age, and adolescents.

Results: During the study period, 126 patients were enrolled. The number (percentage) of patients according to age were the following infants: 43 (34.1%), pre-school: 55 (43.7%), school age: 25 (19.8%), and adolescents: 3 (2.4%). Males made up 54.8% of the study population. There were no statistical gender differences in any age group. The most common symptom in all age groups was dry, hard stool. Infrequent defecation was found in almost one-half of the patients. Fecal incontinence was more common in school-aged children compared to pre-school-aged children and adolescents. Abdominal pain was seen in almost 40% of the constipated children. Abdominal pain was more prevalent in girls and older children. Fecal mass in the rectum was the most common physical finding, with constipated boys exhibiting higher rates. Functional constipation was the most common etiology.

Conclusion: Clinical characteristics of constipation in children vary according to age group and gender. Older children had less frequent bowel motions, a longer duration of symptoms, and a higher prevalence of long-standing constipation complications (fecal incontinence and abdominal pain).

Key Words: Constipation, Infant, Preschool, School age, Adolescent

INTRODUCTION

Constipation is a common problem in children. The worldwide prevalence varies between 0.7% and 29.6% [1]. Constipation is the reason for 3% to 5% of

physician visits by children [2] and accounts for almost one-fourth of pediatric gastroenterology consults [3]. Constipation has a significant impact on the use and cost of medical services [4]. Childhood constipation is a family issue that negatively affects

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children's physical, social, emotional, and school functioning [5].

As normal bowel habits differ with age [6], features of constipation are expected to differ between age groups. Prevalence and symptoms of constipation are often different in very young children than in older children. For example; constipation prevalence is not the same through childhood. It peaks at the age of toilet training [7]. A longer duration of constipation before diagnosis has been associated with complications (e.g., fecal incontinence) and poorer long-term outcome (persistent of symptoms and continuous need for laxatives) [7].

The clinical profile of childhood constipation has been well described in developed countries [7-10]; however, new reports indicate that the problem of constipation is not limited to developed countries. A community-based survey from Sri Lanka using Rome III criteria reported that constipation affects 10.6% of children 10-16 years old [5]. Another report from Iran reported that childhood constipation is the cause of 15.6% of pediatric gastroenterology clinic visits [4].

In Jordan, the prevalence of pediatric constipation is unknown. Although no epidemiological studies have been performed to accurately identify the true size of the problem, we believe that constipation is not uncommon in our society. Since the establishment of a pediatric gastroenterology clinic in south Jordan, constipation was noted as the most common cause for consultation. Because no studies have been published on constipation in children from Jordan, we performed a retrospective analysis to evaluate the etiology and clinical characteristics of patients with constipation according to age group and gender.

MATERIALS AND METHODS

Consecutive children with constipation (organic and non-organic) who presented to the Pediatric Gastroenterology Clinic at Alkarak Teaching Hospital, Alkarak, Jordan between September 2009 and December 2012 were included in the study. The study was approved by Mu`tah Faculty of Medicine Ethics

Committee (20144).

Exclusion criteria were patients with constipation for less than 2 weeks and those with insufficient data.

At their first visit in our clinic, the patient's detailed history was documented either by the patient if appropriate and/or by the patient's caregiver.

Constipation was diagnosed when a delay or difficulty in defecation was present for 2 or more weeks that was sufficient to cause significant distress to the patient [11].

The patients' complete case records were reviewed in detail. Data collected included age, duration of constipation, symptoms and signs such as bowel motion frequency, bowel motion consistency, pain with defecation, stool withholding behavior, presence of blood with bowel motion, fecal incontinence, and the presence of fecal impaction or an abdominal mass. Clinical evaluation (history and physical examination) of all patients was done by the same physician (the author). Digital rectal examination was deferred in cases of active anal fissures and parent or patient refusal. Laboratory and radiological investigations were performed according to the patient's presentation. Celiac disease was diagnosed if the patient had positive celiac serology and a small intestinal biopsy consistent with celiac disease. Hirschsprung's disease was confirmed only after rectal biopsy. Allergy to cow's milk protein was considered if elimination of cow's milk formula resulted in improvement of symptoms and if recurrence of symptoms was seen after reintroduction of cow's milk by oral challenge or accidental ingestion. Neurological disorders were diagnosed with appropriate investigations with pediatric neurology input.

For data analysis and comparison, we categorized the patients according to gender and age: infants (0 to 23.9 months), preschool (24.0 to 71.9 months), school age (72.0 to 120 months), and adolescents (121-229 months).

Functional constipation was defined according to Rome II criteria as at least 2 weeks of scybalous, pebble-like, or hard stools for most stools, or firm stools two or fewer times per week, in the absence of struc-

tural, endocrine, or metabolic disease [12].

Stool avoidance behavior (withholding) was considered if the child showed specific stereotypic behavior at the time of defecation. Infants tended to assume an unusual posture that was characterized by extending the body and straightening their legs and buttocks, leading to contraction of the anal and gluteal muscles. Some infants hide so that no one will see his/her withholding behavior. Fecal incontinence, also known as encopresis or soiling, refers to the repetitive, involuntary, inappropriate passage of stool by a child after attaining complete bowel control [13]. Children who attained control before 24 months were not considered.

The SPSS Statistics 17.0 (SPSS Inc., Chicago, IL, USA) was used. Results were expressed as the means with ranges. Categorical data were tested using Fisher’s exact test, and continuous data were tested using the t-test. *p*-values <0.05 were considered significant.

RESULTS

During the study period, our clinic saw 528 patients, of whom 137 had constipation, comprising 25.9% of our consults. One hundred twenty-six patients were included in the analysis after exclusion of 11 patients.

Patient’s distribution by age, sex, duration of constipation and treatment exposure

Of the one hundred twenty-six patients, 69 patients (54.8%) were male. They dominated all age groups except for school-age children. No statistically significant gender differences were seen in any age groups. Preschool children (n=55, 43.7%) were the most commonly affected age group, followed by infants (n=43, 34.1%), school-age children (n=25, 19.8%), and adolescents (n=3, 2.4%).

The average duration of constipation prior to consultation significantly increased with age (5.25, 10, 21, and 66 months for infants, preschool, school age, and adolescents, respectively; Table 1).

Clinical characteristics of bowel motions and associated symptoms

Regarding bowel motion characteristics, hard and dry stool was the most common symptom seen in all age groups, affecting more than 90% of constipated children. On the other hand, infrequent bowel motion (<3 bowel motions per week) was seen in almost half of our patients. The prevalence of infrequent defecation showed a non-significant increase as children got older (66.7%, 56.0%, 54.5%, and 44.2% in adolescents, school age, pre-school, and infants, respectively).

Fecal incontinence was most commonly seen in school-age children (72.0%) and was significantly different compared to preschool children (*p*<0.001). Although fecal incontinence was more prevalent in

Table 1. Patient’s Distribution by Age, Sex, Duration of Constipation and Treatment Exposure

	Infants (0-23.9 months)	Preschool (24.0-71.9 months)	School age (72-120 months)	Adolescent (121-229 months)	Total	<i>p</i> -value
Patient	43 (34.1)	55 (43.7)	25 (19.8)	3 (2.4)	126 (100)	-
Male	26 (60.5)	30 (54.5)	10 (40)	3 (100)	69 (54.8)	-
Naïve treatment	20 (46.5)	18 (32.7)	12 (48)	2 (66.7)	52 (41.3)	NS
Average duration of constipation prior to consultation (mo)	5.25 (1-18)	10 (1-43)	21 (1-42)	66 (6-126)	14.9 (1-126)	<i>p</i> -value significant between all age groups*

Values are presented as number (%) or number (range).

NS: not significant between all age groups.

**p*-value between infants and preschool (*p*=0.010), infants and school age (*p*=0.0001), infants and adolescent (*p*<0.0001), preschool and school age (*p*=0.006), preschool and adolescents (*p*<0.0001), and school age and adolescents (*p*=0.015).

boys than girls (33.3 vs. 22.8%), the difference was not statistically significant ($p=0.196$).

Withholding behavior was much more common in younger age groups (infants and preschool) compared to older groups. Except for adolescents who

did not report urinary problems, urinary complaints were more prevalent in older children (20.0%, 10.9%, and 2.3% of school age, preschool, and infants, respectively).

The prevalence of abdominal pain increased with

Table 2. Clinical Characteristics of Bowel Motions and Associated Symptoms

	Infants (n=43)	Preschool (n=55)	School age (n=25)	Adolescent (n=3)	Total (n=126)	p-value
<3 evacuations per week	19 (44.2)	30 (54.5)	14 (56.0)	2 (66.7)	56 (51.6)	NS
Blood with stool	16 (37.2)	15 (27.3)	6 (24.0)	0 (0.0)	37 (29.4)	NS
Hardened, dried painful bowel motion	41 (95.3)	50 (90.1)	23 (92.0)	3 (100.0)	117 (92.9)	NS
Fecal incontinence	-	16 (29.1)	18 (72.0)	2 (66.7)	36 (28.6)	0.001 (between preschool and school age)*
Withholding behavior	19 (44.2)	28 (50.9)	1 (4.0)	0 (0.0)	48 (38.1)	0.008 (between infants and school age and 0.0001 between preschool and school age) [†]
Urinary complaints	1 (2.3)	6 (10.9)	5 (20.0)	0 (0.0)	12 (9.5)	0.016 (between infants and school age) [‡]
Abdominal pain	7 (16.3)	22 (40.0)	17 (68.0)	2 (66.7)	50 (39.7)	0.012 (between infants and preschool, 0.0001 between infants and school age and 0.039 between infants and adolescents, 0.023 between preschool and school age) [§]

Values are presented as number (%).

NS: not statistically significant between all age groups.

*p-value between preschool and adolescents ($p=0.176$), and school age and adolescents ($p=0.849$). [†]p-value between infants and preschool ($p=0.510$), infants and adolescents ($p=0.139$), preschool and adolescents ($p=0.091$) and school age and adolescents. [‡]p-value between infants and preschool ($p=0.115$), infants and adolescents ($p=0.792$), preschool and school age ($p=0.277$), preschool and adolescents ($p=0.548$) and school age and adolescents ($p=0.401$). [§]p-value preschool and adolescents ($p=0.364$), and school age and adolescents ($p=0.964$).

Table 3. Physical Findings in Patients with Constipation

	Infants	Preschool	School age	Adolescent	Total	p-value
Abdominal distention	17 (39.5)	21 (38.2)	13 (52.0)	0 (0)	51 (40.5)	NS
Abdominal mass	3 (7.0)	7 (12.7)	4 (16.0)	0 (0)	14 (11.1)	NS
Fecalmass in the rectum	22 (51.1)	30 (54.5)	8 (32.0)	3 (100)	63 (50)	0.031 (between school children and adolescents, rest NS)
Abnormal perianal exam (tag-infection-fissure)	22 (51.1)	20 (36.4)	1 (4.0)	0 (0)	43 (34.1)	0.0002 (between infants and school children and 0.003 between preschool and school children)*
Functional constipation	29 (67.4)	52 (94.5)	20 (80.0)	2 (66.7)	103 (81.7)	NS

Values are presented as number (%).

NS: not statistically significant between all age groups.

*p-value between infants and preschool ($p=0.148$), infants and adolescent ($p=0.094$), preschool and adolescents ($p=0.206$), and school age and adolescents ($p=0.727$).

age (16.3%, 40.0%, 68.0%, and 66.7% in infants, preschool, school age and adolescents respectively; Table 2). Although abdominal pain, urinary complaints, and blood in stool were reported more frequently by girls than boys, only abdominal pain was significantly different ($p=0.021$).

Physical findings in patients with constipation

On physical examination, a fecal rectal mass was found in half of our patients. Boys were affected more often ($p=0.010$). An abnormal perianal exam was associated with younger age groups and was found in 51.1%, 36.4%, and 4.0% of infants, preschool, and school-age children, respectively (infants compared to school-age children, $p=0.0002$, preschool compared to school-age children, $p=0.003$; Table 3).

Functional (non-organic) constipation was the most common diagnosis and was seen most commonly in preschool children (94.5%). The percentages were 80.0%, 67.4%, and 66.7% in school-age children, infants, and adolescents, respectively. Surgical etiologies were the leading causes for organic constipation, followed by celiac disease and allergy to cow's milk protein.

DISCUSSION

We have conducted the first retrospective study to evaluate the prevalence of constipation among children treated in a pediatric gastroenterology clinic in south Jordan. Patients were categorized into four pediatric age groups: infants, preschool, school-age children, and adolescents. Our study showed that older children had less frequent bowel motions, a longer duration of symptoms, and a higher prevalence of long-standing constipation complications (fecal incontinence and abdominal pain). Preschool children were the most commonly affected age group. We believe that the low number of adolescents does not reflect a low prevalence rate in this age group, but a referral bias, as our clinic treats children 13 years old and younger.

Fewer than three bowel motions per week is a commonly used definition of constipation and was

reported by only half of our patients. Using only this definition will lead to under-diagnosis of constipation [9]. Hard, dry stool and painful defecation appear to be more sensitive indicators. More than 90% of constipated children in all age groups described their bowel motions as dry, hard, and painful. This is consistent with the work of Loening-Baucke [10], who concluded that using stool consistency and painful bowel motion to define constipation is more sensitive than using symptom duration or frequency of bowel motions.

Traditionally, successful toilet training and bowel control are linked to good motherhood. Fecal incontinence has a significant influence on children and their families. Retentive fecal incontinence (associated with constipation) has been reported in up to 85% of constipated children [13]. In our study, school-age children exhibited the highest rate (72%) of fecal incontinence, which was significantly different compared to preschool children ($p=0.006$).

Males have higher rates of incontinence compared to females [14]. Although the rate of fecal incontinence in boys was not significantly different from that in girls (33.3% in boys vs. 22.8% in girls; $p=0.196$), this may reflect under-reporting rather than a different epidemiology.

Stool withholding is usually misinterpreted as straining, which aims to prevent anal relaxation rather than pushing the stool down. Rasquin et al. [15] reported these retentive behaviors in up to 60% of children with functional constipation. On the other hand, a study from India reported withholding in 27% of patients [16]. In our cohort, the rate was 38.1%. Younger age groups (infants and preschool) showed a significantly higher prevalence rate compared with older children (school age).

The urinary system is anatomically adjacent to the gut and shares neurological control. Rectal pathology leads to urinary symptoms through mechanical compression of the stool mass over the bladder in addition to a voiding dysfunction caused by pelvic floor muscle spasms. Constipation may cause urinary tract infections, enuresis, and vesico-uretric reflux due to uninhibited bladder contraction [17,18].

Urinary symptoms were seen in 9.5% of patients in our cohort, a rate that is consistent with previous studies [11]. Urinary morbidities were seen more often in school-age children compared to infants ($p=0.016$).

Abdominal pain was reported in about one-third of constipated children [19]. In our cohort, almost 40% of our patients had abdominal pain, and the prevalence rate increased with age ($p=0.012$ infants vs. preschool; 0.0001 infants vs. school age; 0.039 infants vs. adolescents). The lower rate in younger age groups may reflect under-reporting by a third party rather than a lower rate. Girls reported a higher prevalence of abdominal pain (50.9% vs. 30.4%; $p=0.021$). This may reflect a hyperalgesic state as in irritable bowel disease-constipation predominant in which females are predominantly affected [20].

On physical exam, a fecal mass in the rectum was the most common finding in all age groups. Adolescents showed the highest rate (100%) and may reflect the long-standing constipation in this age group. On the other hand, younger age groups showed a higher prevalence of an abnormal perianal exam. This area seems to be more vulnerable in this age group.

Regarding the underlying cause of constipation, functional constipation was the most common cause of chronic constipation. The lower rates of functional constipation in our cohort compared to reported rates [21] may reflect a referral bias (prolonged non-responding cases) rather than a different epidemiology in our population.

The results of this study are limited by the retrospective nature of the study. The small number of adolescents in this cohort also limits the generalization of our results to this pediatric population. The underlying cause of constipation and its effect on clinical features was not considered in our study, which is another limitation to our results.

To the best of our knowledge, this is the first study describing the clinical profile of childhood constipation in Jordanian children according to age group and gender. The clinical characteristics differed according to age group and gender. These dif-

ferences need to be considered when treating constipated children. Further studies in our population to define the epidemiology, management, and outcome are needed.

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