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Original Article

Int J Clin Pediatr. 2018;7(4):47-50

Bowel Movement Patterns and Constipation Prevalence in School Children of South Jordan

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Abstract

Background: Pediatric constipation is a common problem worldwide. Diet is one of the major determinants of bowel movement patterns, including the presence of constipation. Little is known about bowel movement pattern in Jordanian children. Parents might not recognize constipation in school children, which could lead to delayed treatment and increase rate of complication. This study aimed to investigate bowel motion pattern and constipation prevalence in Jordanian children using self-reporting.

Methods: Six schools in Alkarak governorate were selected randomly. Students of grades 6 - 8 were asked to fill the Arabic version of Questionnaire on Pediatric Gastrointestinal Symptoms-Rome III (QPGS-RIII) questionnaire. Children were diagnosed with constipation if two or more criteria on the QPGS-RIII were met. Fisher's exact test was used to analyze categorical data, while Student's *t*-test was used for continuous data.

Results: Of 429 questionnaires administered, 413 (96.3%) were completed (males: 50.8%; mean age: 12.7 years old (range: 11 - 16 years old)). A statistically significant sex difference in the presence of hard, bulky bowel movements and fecal incontinence was observed (P = 0.000, 0.041 and 0.002, respectively). In our cohort, 110 (26.6%) children met Rome III criteria for constipation, which was not statistically significant by sex (59 (28.1%) versus 51 (25.1%), male versus female participants, respectively; P = 0.491).

Conclusion: Most Jordanian school children reported a daily soft bowel movement without pain or retention. Constipation affects approximately 25% of Jordanian school children between 11 and 16 years old.

Keywords: Diet; Gastrointestinal symptoms; Pediatric; Bowel habits

Manuscript submitted September 23, 2018, accepted October 8, 2018

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doi: https://doi.org/10.14740/ijcp318

Introduction

Pediatric constipation is a common problem worldwide [1-4]. Previous studies have shown that mean bowel frequency is reduced significantly in children with a positive family history (i.e. parents and/or siblings) of constipation [5]. Adults with constipation consider constipation in their children to be a familial issue and will not report symptoms unless asked, which leads to delayed diagnosis. Failure to recognize constipation in school children may lead to delayed treatment and has been associated with complications (e.g. fecal incontinence) and poorer long-term outcomes (e.g. persistence of symptoms and continuous need for laxatives) [6].

Normal bowel movement patterns vary across individuals. Bowel movement patterns refer to the frequency, consistency and size of passed stool [7]. Bowel movements become less frequent with age, and patterns stabilize by 4 years of age [5]. Environmental factors, including diet, social background and parental behavior, as well as genetics, are believed to influence bowel movement patterns [5]. A physician needs to understand the normal bowel movement pattern of a patient in order to diagnose whether gastrointestinal symptoms deviate from normal.

Diet is one of the major determinants of bowel movement patterns [8]. South Asian children consume rice-based diets with higher fiber content than diets of Western children, who consume less fiber and have more frequent bowel movements [8]. The diet of Jordanian children is a mixture of Eastern and Western diets. There are no studies on the impact of the Jordanian diet on pediatric constipation. Furthermore, data from either Eastern or Western countries may not be generalizable due to unmatched conditions that affect bowel movement patterns. Therefore, in this project, we aimed to study bowel movement patterns and prevalence of constipation among Jordanian school children.

Materials and Methods

A cross-sectional school-based study was conducted in Alkarak Governorate of Jordan, between October 2012 and April 2013. Participating schools were randomly selected from the whole geographical area. The research team contacted the schools in advance, to obtain the mandatory permissions. Six schools participated. In each school, classes from academic years (grades) 6 - 8 were selected. All students attending the class on the day of the survey were included. Children who refused to partici-

Table 1. Patients' Characteristics

Male, n (%)	210 (50.8)
Female, n (%)	203 (49.2)
Age, mean (range in years)	12.7 (11 - 16)

pate were excluded.

Data on bowel movement characteristics were gathered using the using the Arabic self-reported Questionnaire on Pediatric Gastrointestinal Symptoms-Rome III Version (QPGS-RIII). The original questionnaire was translated and validated into Arabic language in cooperation with the Rome Foundation. Rome foundation granted the researchers the permission to use the questionnaires.

On the day of the survey, questionnaires were distributed in the classrooms; students were asked to consider themselves in exam; research team was available to explain the process and answer any inquiries; no time limit was given to fill the questionnaires; and confidentiality and privacy were insured.

No demographic information was collected except age, grade and gender.

Children were considered constipated if they met QPGS-RIII criteria for constipation [9], which includes at least two of the following: 1) two or fewer defecations per week; 2) at least one episode of fecal incontinence per week; 3) a history of retentive posturing or excessive volitional stool retention; 4) a history of painful or hard bowel movements; 5) the presence of large fecal mass in the rectum; or 6) a history of large-diameter stools that may obstruct the toilet.

Statistical analysis

SPSS Statistical Package Version 17 (IBM, Armonk, NY, USA) was used. Results are expressed as numbers and percentages. Fisher's exact test was used to analyze categorical data, while Student's *t*-test was used for continuous data. $P < 0.05$ was considered significant.

This study was granted ethical approval by the Ethics Committee of Medical School, Mutah University. The data collected were anonymous with no identifiers and kept confidential.

Results

A total of 429 questionnaires were distributed. Of 413 (96.3%) completed questionnaires, 50.8% were completed by male participants. The mean age of participants was 12.7 years (range: 11 - 16 years) (Table 1). A total of 252 (61%) participants reported having at least one bowel movement per day, whereas 123 (29.8%) reported having two or less bowel movements per week. In addition, 69 (16.7%) described their bowel movement as hard or very hard, 85 (20.6%) reported painful defecation, 115 (27.8%) reported stool retention at least once per week, 69 (16.7%) reported fecal incontinence at least once per week and 84 (20.3%) reported bulky stool. Male participants reported hard bulky bowel movements and incontinence more frequently than female participants, which was statistically significant ($P = 0.000$, 0.041 and 0.002, respectively). Details of bowel movement characteristics stratified by sex are reported in Table 2.

In our cohort, 110 (26.6%) children met Rome III criteria for constipation. There was no significant sex difference in constipation (59 (28.1%) versus 51 (25.1%), male versus female participants, respectively; $P = 0.491$).

Discussion

The present study evaluated the bowel movement patterns of Jordanian school children between the ages of 11 and 16 years old. Most Jordanian school children reported a daily soft bowel movement without pain or retention. Constipation affects approximately 25% of Jordanian school children between 11 and 16 years old.

In our cohort, 290 (70.2%) participants reported having a bowel movement three or more times per week, which was less frequent than children from South Asia [8, 10, 11].

This finding may be due to differences in diet; while the South Asian diet is high in fiber, the westernization of the Jordanian diet limits fiber intake.

Previous studies did not find significant sex differences in bowel frequency [5, 8, 10]. In contrast, our study revealed that female Jordanian school children report a statistically significant higher frequency of bowel movements (two to three times per day) than male children ($P = 0.002$). However, our findings may reflect over- or under-reporting by responders rather than a true sex difference.

In our study, large-diameter stools, withholding posture, and harder stools were more common in male participants, which are consistent with previous reports from Sri Lanka and the USA [8, 12]. Compared to Sri Lankan children, male participants in our cohort also reported pain with defecation more frequently than female participants [8]. A previous study from Italy reported a positive association between decreased defecation frequency and presence of hard stools and painful defecation [5], which is consistent with our findings.

Parents do not always recognize constipation in school children. Failure of parents and doctors to recognize constipation can lead to chronic symptoms, development of complications and high rates of treatment failure. Fecal incontinence is known to be related to prolonged untreated constipation [13]. In our cohort, encopresis was reported more often by male than female participants, which is consistent with previous studies [14, 15].

In our cohort, 20.1% of children reported having fecal incontinence at least once per month, which is a higher percentage than previously reported among school children [14, 15]. If fecal matter streaks in underpants, which might reflect a hygiene issue or poor toilet paper use, are excluded, then the rate of fecal incontinence drops by 50% in our cohort. Although a 10% rate of fecal incontinence is still high, this finding is somewhat consistent with a previous study in Brazilian children (14% versus 19% between non-constipated and consti-

Table 2. Bowel Habits' Features According to Gender in School Children

Feature	Boys, n (%)	Girls, n (%)	P value	Total (%)
Frequency of bowel motion				
2 times a week or less often	70 (33.3)	53 (26.1)	NS	123 (29.8)
3 - 6 times a week	24 (11.4)	14 (6.9)	NS	38 (9.2)
Once a day	65 (31)	70 (34.5)	NS	135 (32.7)
2 - 3 times a day	25 (12)	48 (23.6)	0.002	73 (17.7)
More than 3 times a day	26 (12.3)	18 (8.9)	NS	44 (10.7)
Consistency				
Hard, very hard	51 (24.3)	19 (9.4)	0.0001	70 (16.9)
Not too hard and not too soft	78 (37.1)	95 (46.8)	0.046	173 (41.9)
Very soft or mushy	12 (5.7)	13 (6.4)	NS	25 (6.1)
Watery	24 (11.4)	13 (6.4)	NS	37 (8.9)
It depends (my poops are not always the same)	45 (21.4)	63 (31)	0.027	108 (26.2)
Painful stool				
Yes	45 (21.4)	42 (20.7)	NS	87 (21.1)
Large stool				
Yes	50 (24.9)	34 (16.7)	0.041	84 (20.3)
Stool retention				
Never	107 (51.7)	125 (61.6)	0.031	232 (56.2)
1 - 3 times a month	40 (19)	26 (12.8)	NS	66 (16)
Once a week	26 (12.4)	25 (12.3)	NS	51 (12.3)
Several times a week	25 (11.9)	14 (6.9)	NS	39 (9.4)
Every day	12 (5.7)	13 (6.4)	NS	25 (6.1)
Fecal mass				
Yes	45 (21.4)	13 (6.4)	< 0.000	58 (14)
Fecal incontinence				
Never	128 (61)	153 (75.3)	0.002	281 (68)
Less than once a month	31 (14.8)	18 (8.8)	NS	49 (11.9)
1 - 3 times a month	8 (3.8)	6 (3)	NS	14 (3.4)
Once a week	28 (13.3)	16 (7.9)	NS	44 (10.6)
Several times a week	8 (3.8)	6 (3)	NS	14 (3.4)
Every day	7 (3.3)	4 (2)	NS	11 (2.7)
Constipation as per Rome III criteria	59 (28.1)	51 (25.1)	NS	110 (26.6)

NS: not significant.

pated children, respectively) [16].

In our cohort, 110 (26.6%) participants met the criteria for constipation, which is also consistent with a previous Brazilian study [16]. In that study, a questionnaire inquiring about difficulties during defecation was administered to children between 8 and 10 years of age. The study found that 28% of children were constipated according to the study's definition [16]. Another study from the USA reported that self-reported constipation occurred in an average of 18% of children (range: 7-39%).

Still our study suffers some limitations. Bowel movements are a sensitive issue, which many children feel shy or uncomfortable discussing. Although this study reports valuable data about bowel movements in Jordanian school children, recall bias and under- or over-reporting of symptoms cannot be ignored. This study, although not designed for at first, lacks clinical evaluation of the study subjects.

Factors affecting the bowel movements were not addressed in this study. Further studies are needed to study the socioeconomic and psychological factors that affect bowel movements in this population.

In conclusion, this study provides important data about bowel movement patterns and constipation in Jordanian school children. Most Jordanian school children have a daily soft

bowel movement without pain or retention. Constipation affects approximately 25% of Jordanian school children between the ages of 11 and 16 years old.

Presentation

This work was presented at its abstract form at the ESPGHAN meeting, 2015 at Amsterdam, The Netherlands.

Financial Support

None.

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