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Functional Gastrointestinal Disorders in African American Children in Primary Care

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Abstract

Objective—To determine the prevalence of functional gastrointestinal disorders (FGIDs) in a primary care setting and to assess the usefulness of pediatric Rome criteria.

Methods—The Questionnaire on Pediatric Gastrointestinal Symptoms (QPGS) assessing the pediatric Rome criteria was administered to 243 school-age children visiting a general pediatric clinic for annual school physicals. Pearson χ^2 statistics were used to determine the association of various demographic factors with FGIDs.

Results—All children were African American, 47.7% were girls, and the mean ± standard deviation age of the group was 10.7 ± 3.9 years. QPGS detected 52 children (21.4%) with FGID. Diagnoses included aerophagia (6), abdominal migraine (1), cyclic vomiting syndrome (2), functional dyspepsia (2), functional abdominal pain syndrome (1), functional constipation (39) and functional fecal retention (1). Thorough clinical evaluation identified 47 (19.3%) children with FGIDs. Five of the children (2.1%) identified as having FGID on QPGS were felt not to have FGID by the examining physician. Children with FGIDs were not different from healthy children in age, insurance, parent's education, employment or number of children in the family. FGIDs were more common in girls (29/47 girls, $P = 0.028$). Children with FGIDs tended to live in single-parent households and miss school more often than children without FGIDs ($P = 0.08$).

Conclusions—Functional gastrointestinal disorders are common among African American children and adolescents in a primary care setting and predominantly affect girls. Symptom-based criteria are useful in the diagnosis of pediatric FGIDs.

Keywords

irritable bowel syndrome; constipation; cyclic vomiting syndrome; functional abdominal pain; abdominal migraine

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INTRODUCTION

In 1958, Apley and Naish (1) described recurrent abdominal pain (RAP) in 10% of British schoolchildren as 3 or more episodes of abdominal pain, severe enough to affect daily activities, occurring over a period of at least 3 months. Five decades later, RAP is still a challenging pediatric problem. In most children with RAP, underlying structural, infectious, inflammatory or biochemical etiology is absent (2–4). If an organic cause is not found, pain is considered functional.

Symptom-based criteria, known as the Rome criteria, are available for adult patients with functional gastrointestinal complaints to allow a positive diagnosis of functional gastrointestinal disorders (FGIDs) if warning signs for other diseases are not present (5). Since the Rome criteria were developed in 1988, they have increased the diagnostic specificity for FGIDs, stimulated research to better understand the disorders and reduced the number of tests performed to exclude other diseases (6). Children with RAP have signs and symptoms similar to those of adults with FGIDs such as irritable bowel syndrome (IBS) (7,8), suggesting that symptom-based criteria may also be applied to children. Although Apley and Naish's criteria (1) for RAP have been widely used, many researchers have deviated from the original definition (9). In 1999, an international working group of pediatric gastroenterologists met in Rome to create a consensus for the symptom-based diagnosis of 13 pediatric FGIDs (10). The goals were to standardize the definitions for FGIDs, to encourage research in the physiology and therapy for FGIDs, to create a common language for clinical and bench research and to provide clinicians with a better approach to diagnosis and treatment of these conditions.

The exact prevalence of RAP is unknown, but chronic abdominal pain accounts for 2% to 4% of all pediatric office visits in the United States (11). Three European studies reported a 10% to 16% prevalence of RAP (1,4,12). In a community-based study from the United States, some abdominal pain was reported in 75% of middle and high school students. In this study, 13% to 17% of children reported weekly abdominal pain, 21% reported abdominal pain severe enough to affect daily activities and 6% to 14% reported IBS-type symptoms (13). In a recent Italian study, a large group of children 0 to 12 years old were screened using a detailed questionnaire based on the pediatric Rome criteria (PRC), and only 2% met the criteria for FGIDs (14). We are not aware of a community-based study from the United States that analyzes the prevalence of FGIDs as defined by the PRC.

In this study, we examined the prevalence of FGIDs among African American children and adolescents in a primary care setting using both medical evaluation and a comprehensive questionnaire.

PATIENTS AND METHODS

Subjects

Parents of 243 school-age children (range, 4–17 years) who consecutively visited a community clinic in Little Rock, AR, for annual school physicals between April 1999 and March 2000 were asked to answer the Questionnaire on Pediatric Gastrointestinal Symptoms (QPGS) and family demographics form. None of the children had any primary gastrointestinal or other complaints at the time of the visit. All parents who were asked to answer the questionnaire agreed to participate in the study. One of the authors (A.U.), a pediatric gastro-enterologist working in a primary care setting, explained the study to the children and their parents, obtained informed consent and was available to answer questions.

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QPGS for Parents of Children and Adolescents (4–17 years)–Form A

The questionnaire was developed by Walker et al (15) to assess the symptom criteria of the PRC. The questionnaire elicits data from parents concerning their child's vomiting (frequency, duration, interim symptoms, age of onset and effect on daily activities), abdominal pain (location, frequency, duration, severity, age of onset, impact on daily activities, associated change in bowel habit, abdominal distention, nausea, vomiting, migraine-type symptoms, relationship to meals and response to medications), bowel movements (frequency, consistency, size, association with soiling, urgency, straining, pain, incomplete evacuation, stool withholding behavior and effect on daily activities), and abdominal distention (frequency, duration, severity, age of onset, diurnal variation, association with abdominal pain, belching or flatus and air swallowing). To make a diagnosis of functional dyspepsia, functional abdominal pain (FAP), IBS, aerophagia, functional constipation, functional fecal retention (FFR) or functional nonretentive soiling, a total symptom duration of at least 12 weeks (not necessarily consecutive) within the 12 preceding months is required (10). The diagnosis of cyclic vomiting syndrome (CVS) or abdominal migraine is not dependent on the duration of symptoms but rather on the presence and frequency of typical episodes. QPGS also contains questions about ethnicity, medical and surgical history, current medications, allergies and number of missed school days.

Family Demographics Form

This questionnaire was used to determine the socioeconomic status of the household. It collected data on age, sex, ethnicity, number of children in the household, number of parents and/or caregivers, parental employment (none, full-time or part-time) and number of school years completed by parents.

Analysis

The QPGS was scored to identify patients with symptoms consistent with FGIDs as defined by PRC (10). The QPGS results were then compared with the clinical diagnoses. Descriptive statistics were calculated using Statistical Package for Social Sciences version 11.5 for Windows (Chicago, IL). Pearson χ^2 statistics were calculated to determine the associations between demographic factors and FGIDs. The values are reported as mean ± standard deviation (SD).

RESULTS

Study Subjects

Parents of 243 school-age children agreed to participate. Demographic characteristics of the children are shown in Table 1. All children were of African American origin. The mean age of the children was 10.7 ± 3.9 years, with 52.3% boys and 47.7% girls. Forty-nine percent of children were living with a single parent; 51% with both parents. There were 2 or more children in 65.8% of households. The majority of parents caring for the child (84.8%) had at least a high school diploma, and 82.3% were employed. About two thirds were insured by Medicaid, one third had private insurance or HMO and less than 5% were self-pay.

Children with Functional Gastrointestinal Disorders

Fifty-two children (21.4%) met symptom-based criteria for FGIDs as defined by the PRC (nonretentive soiling, 1; aerophagia, 12; abdominal migraine, 1; CVS, 2; functional dyspepsia, 2; FFR, 1; FAP, 1; functional constipation, 39). A thorough clinical evaluation by 1 author (A.U.) confirmed FGIDs in 47 of the 52 children identified by the PRC (19.3% of the total sample). Confirmed diagnoses included 6 aerophagia, 1 abdominal migraine, 2 CVS, 2 functional dyspepsia, 1 FFR, 1 FAP and 39 functional constipation. One patient had

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functional dyspepsia and functional constipation; another patient had both functional constipation and aerophagia. A 5-year-old boy had 4 diagnoses—aerophagia, CVS, functional constipation and FFR. Six children whose symptoms on the QPGS were consistent with a diagnosis of aerophagia were swallowing air intentionally to induce belching. These children were boys, and 5 of them were competing with a sibling to see who could belch the loudest. Abdominal distention was not present if aerophagia was detected by the QPGS and not confirmed by the clinical evaluation. The QPGS identified nonretentive soiling in a child who was not wiping well. Age and sex distribution of patients with confirmed FGIDs is shown in Table 2.

One child with FAP was under evaluation for behavioral problems and was taking an osmotic laxative. Two patients with dyspepsia were evaluated with an upper gastrointestinal endoscopy. One had *Helicobacter pylori* gastritis. The other's endoscopic findings were normal. The child with *H. pylori* gastritis was treated with omeprazole, amoxicillin and clarithromycin for 10 days. The other child with dyspepsia was given an antiacid medication. In the child with abdominal migraine, episodes were associated with menstrual periods, and the family history was positive for migraine headaches. Children with CVS and abdominal migraine were not treated because their symptoms were infrequent and not consistently interfering with daily activities. Only 5 (12.8%) of 39 children with functional constipation had discussed their defecation problems with their pediatrician in the past. These patients were advised to increase the amount of fiber in their diet and return to their pediatricians if they continued having problems.

Sociodemographic Characteristics

Children with FGIDs were not different from healthy children in age, insurance, parental education, parental employment, or number of children in the family (Table 3). There was a trend for children with FGIDs to live in single-parent households (78.7% single parent vs 22.3% both parents, $P = 0.08$) and to miss school more often (12.8% in children with FGIDs vs 5.6% in children without FGIDs, $P = 0.08$) (Table 3). FGIDs were more common in girls than in boys (61.7% vs 38.3%, $P = 0.028$).

Children with Gastrointestinal Symptoms of Less Than 12 Weeks' Duration

Forty-one children complained of abdominal pain, dyspepsia, mild abdominal distention, belching or flatulence of less than the 12 weeks' duration and therefore did not reach the time required by the PRC for FGID diagnosis. None of these children missed school or other daily activities. In 12 patients, abdominal pain accompanied functional constipation or aerophagia. One adolescent with dyspepsia of short duration was diagnosed with pregnancy. One child with periumbilical abdominal pain that did not meet the criteria for IBS was diagnosed with lactose intolerance by breath hydrogen test.

DISCUSSION

In this community-based study, the QPGS and clinical evaluation found that 19.3% of children receiving routine health maintenance had FGIDs. Among children with FGIDs, functional constipation was the most common diagnosis, but only 12.8% of these subjects had sought medical attention for their symptoms. In our study, all children were of African American origin, making this one of the largest reported African American cohorts. We do not know if the prevalence of FGIDs is different in this ethnic group compared with that in others. One community-based study from the United States reported no ethnic differences in children with IBS, but African American patients comprised less than 10% of their cohort (13).

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In our study, IBS was not diagnosed, and FAP was found in only 1 child. If all children were screened using Apley and Naish's criteria (1), only 4 (2 functional dyspepsia, 1 FAP and 1 abdominal migraine) (1.6%) would meet the criteria for RAP. Although the exact prevalence of RAP in the United States is not known, 1.6% is 6-fold lower than the figure previously reported (1,16). The reason for the low prevalence of IBS and FAP in our African American subjects is not known. On the other hand, application of Rome criteria enabled us to recognize FGIDs that would otherwise have been missed by the Apley and Naish criteria.

Constipation is the chief complaint in 3% of pediatric outpatient visits and 10% to 25% of pediatric gastro-enterology visits (16,17). In our study, 16% of the children met the symptom-based criteria for functional constipation. The majority of these patients had not complained to their pediatrician, suggesting that constipation is underreported or not perceived as a problem in this group.

In our study, the QPGS and clinical evaluation detected a high incidence of aerophagia, a condition considered relatively rare in neurologically normal children. Aerophagia is usually described in children with behavioral disorders or mental retardation, and it is treated with behavioral intervention (18–20). The etiology and the prevalence of aerophagia in neurologically normal children are unknown, and further studies are needed. We would recommend abdominal distension as a mandatory criterion for the diagnosis of pediatric aerophagia. Abdominal distension was absent in all children incorrectly identified as having aerophagia by symptom report on the QPGS.

The prevalence of CVS and abdominal migraine (0.8% and 0.4%, respectively) in our cohort was slightly lower than the prevalence reported in the literature. In the United Kingdom and Australia, CVS has been described in 1.9% to 2.3% (21,22) and abdominal migraine in 0.7% to 4.1% (23,24) of children.

We identified dyspepsia in 2 children. One patient had *H. pylori* gastritis by esophago-gastro-duodenoscopy; in the other patient, esophago-gastro-duodenoscopy was normal. The prevalence of functional dyspepsia in children is not known, but 62% of children referred to pediatric gastroenterology clinics with dyspeptic symptoms do not have an organic disorder (2).

In our study, children with FGIDs were not different from other children in age, insurance, parental education and employment or number of children in the family. FGIDs were more common in children from single-parent households; however, the difference was not statistically significant. A higher risk for RAP has been reported in children living in single-parent households (25,26). Psychological factors due to family problems or school stress are known to be associated with RAP (1,27,28). The role of family structure on pediatric FGIDs needs to be further investigated.

We also found a trend for children with FGIDs to miss more school than healthy children. Functional disability, school absence and clinic visits have been reported as common in children with RAP (29,30). Adults with IBS represent a significant burden to society through increased health care demands and missed work (31). We suspect that FGIDs who feel sick enough to miss school and activities create a similar socioeconomic burden, but it has not been adequately investigated.

In our study, FGIDs were more prevalent in girls. In adults, the incidence of FGIDs is higher in women (32), but a sex difference has not been reported in pediatric studies (1,13). In adults, a history of sexual and physical abuse is particularly common in women with FGIDs (33). We have not investigated the abuse history in our population. The role of sexual and physical abuse in pediatric FGIDs will need to be studied.

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In summary, FGIDs are common among African American children and adolescents in a primary care setting and primarily affect girls. Functional constipation accounted for the majority of FGIDs in this sample, and no cases of IBS were identified. Children with FGIDs had a tendency to live in single-parent households and missed school more often than children without FGIDs. We suggest that the PRC be further improved by making abdominal distension a mandatory criterion, excluding voluntary belching for aerophagia and excluding poor anal hygiene for nonretentive soiling. Further studies will be needed to understand the usefulness of symptom-based criteria to comfortably exclude organic disorders.

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TABLE 1

Demographic data on 243 African American children

Sex	
Male	127 (52.3)
Female	116 (47.7)
Age	10.7 ± 3.9*
Parents living in household	
Both parents	124 (51)
Single parent	119 (49)
No. of children living in household	
2 or less	83 (34.2)
More than 2	160 (65.8)
Parent education	
Less than 12 years	37 (15.2)
12 or more years	206 (84.8)
Parent employment	
Unemployed	43 (17.7)
Employed	200 (82.3)
Insurance	
Medicaid	161 (66.3)
Private insurance	70 (28.8)
Self-pay	12 (4.9)

Percentages are in parentheses.

*Mean ± SD.

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TABLE 2

Number of FGID diagnoses by age group*

	Age (years)			
Diagnosis	**4–6**	**7–9**	**10–12**	**13–17**
Aerophagia	2M, 1F	1F	2M	
Functional dyspepsia		1M	1F	
Abdominal migraine				1F
CVS	1M, 1F			
Constipation	2M, 5F	3F	9M, 7F	4M, 9F
FFR	1M			
FAP	1F			

M = male, F = female, CVS = cyclic vomiting syndrome, FFR = functional fecal retention, FAP = functional abdominal pain.

*FGID diagnoses are based on QPGS and clinical evaluation; a total of 52 diagnoses were made in 47 children.

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TABLE 3

Sociodemographic characteristics of healthy children vs children with FGIDs

		Sex*		Parent structure*		Parent employment*		Parent education (years)*		School missed*		No. of siblings*	
	Age (year)	M	F	Single	Both	Yes	No	<12	≥12	Yes	No	<2	≥2
FGID children (n = 47)	10.4 ± 3.8	38.3	61.7†	78.7‡	21.3	78.7	21.3	12.7	87.3	12.7‡	87.3	42.5	57.5
Healthy children (n = 196)	10.8 ± 4	56.1	43.9	65.8	34.2	83.1	16.9	15.8	84.2	5.6	94.4	32.1	67.9

M = male, F = female.

*Results are given as percentages.

†$P = 0.028$, FGIDs vs healthy children.

‡$P = 0.08$, FGIDs vs healthy children.