Complementary and Alternative Medicine Use in Pediatric Functional Abdominal Pain Disorders at a Large Academic Center

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Objective To describe the use of complementary and alternative medicine (CAM) in pediatric functional abdominal pain disorders at a large Midwestern pediatric gastroenterology center.

Study design A survey of patients attending a follow-up visit for functional abdominal pain disorders was completed. Data were collected on demographics, quality of life, use of conventional therapies, patient's opinions, and perception of provider's knowledge of CAM.

Results Of 100 respondents (mean age, 13.3 ± 3.5 years), 47 (60% female) had irritable bowel syndrome, 29 (83% female) had functional dyspepsia, 18 (67% female) had functional abdominal pain, and 6 (83% female) had abdominal migraine (Rome III criteria). Ninety-six percent reported using at least 1 CAM modality. Dietary changes were undertaken by 69%. Multivitamins and probiotics were the most common supplements used by 48% and 33% of respondents, respectively. One-quarter had seen a psychologist. Children with self-reported severe disease were more likely to use exercise ($P < .05$); those with active symptoms ($P < .01$) or in a high-income group ($P < .05$) were more likely to make dietary changes; and those without private insurance ($P < .05$), or who felt poorly informed regarding CAM ($P < .05$), were more likely to use vitamins and supplements. Seventy-seven percent of patients described their quality of life as very good or excellent.

Conclusions The use of CAM in children with functional abdominal pain disorders is common, with a majority reporting a high quality of life. Our study underscores the importance of asking about CAM use and patient/family knowledge of these treatments. *(J Pediatr 2020;227:53-9)*.

Functional gastrointestinal disorders (FGIDs) are a group of common chronic disorders without an organic underlying mechanism to explain the patient's symptoms.[1-6] In the absence of biological markers, FGIDs are defined according to symptom-based criteria. The Rome IV pediatric criteria divide FGIDs into 3 categorical diagnostic groups based on the main driving symptom.[7] The group characterized by the predominance of abdominal pain, functional abdominal pain disorders (FAPDs), includes functional dyspepsia, irritable bowel syndrome (IBS), abdominal migraine, and functional abdominal pain-not otherwise specified.[7]

It is recognized that various early life events as well as biological and psychosocial factors play a role in the pathophysiology of FAPDs. Gut inflammation, anxiety, or depressive symptoms can precede or follow the onset of FAPDs.[8,9] Environmental, school, and seasonal stressors have all been linked to an increasing incidence of FAPDs as well. Many children also report food intolerances triggering their symptoms. Because of the complexity of the mechanisms underlying these disorders, the suboptimal outcomes of pharmacologic therapies and the high impact on physical, psychological, and social functioning, the approach to treatment of FAPDs is oftentimes multidisciplinary and includes complementary and alternative medicine (CAM).[10]

The National Institutes of Health's National Center for Complementary and Integrative Health, defines complementary medicine as an approach that combines the use of nonmainstream therapy as a complement to a conventional therapy, whereas alternative medicine is when a nonmainstream therapy is used in place of a conventional therapy.[11] A report from the National Institutes of Health estimates that 12% of children use CAM to treat various conditions, most commonly musculoskeletal complaints.[12] Some examples of CAM cited in the report include homeopathy, chiropractic manipulation, acupuncture, hypnosis, meditation, and the use of dietary supplements. Given the increased public interest in CAM, we aimed to describe the use of CAM in patients with FAPDs at a large Midwestern pediatric gastroenterology (GI) center. We also aimed to uncover associations between patient and family factors with the use of CAM, determine how familiar patients are with CAM, and better understand the role the pediatric GI provider plays in the patient's use of CAM.

CAM	Complementary and alternative medicine
FAPD	Pediatric functional abdominal pain disorder
FGID	Functional gastrointestinal disorder
GI	Gastroenterology
IBS	Irritable bowel syndrome

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Methods

Between late 2016 and mid-2019, the schedules of the pediatric GI clinic of Nationwide Children's Hospital were reviewed for eligible patients. Children 4-18 years old attending a follow-up clinic visit with Rome III diagnoses of FAPDs were considered for the study and invited to participate with their parent(s) at the time of consultation.[13] A study explanation form was provided to participants. Children of families that provided consent and who themselves assented to participate were included in the study. Participants completed a questionnaire at the time of the visit following the design of prior published studies.[14,15] Children of non-English-speaking families and children with overlap between FAPDs and inflammatory bowel or celiac disease were excluded.[15] The study was approved by the Nationwide Children's Hospital Research Institute Institutional Review Board (IRB15-00257) and was deemed to be of minimal risk.

Measures and Procedures

The survey included questions on demographics (age, sex, race/ethnicity), highest parental education level, family income, and type of insurance. Information on time from diagnosis and perceived quality of life were obtained. All patient's treatments were reviewed. To account for the possibility of medications given by physicians outside our practice, families were asked to provide information on previously prescribed conventional therapies. Specific generic names were included on the survey to facilitate recall when applicable (prokinetics, including metoclopramide, domperidone, and erythromycin; proton pump inhibitors, including omeprazole, esomeprazole, lansoprazole, and pantoprazole; antispasmodics, including hyoscyamine and dicyclomine; and H-2 blockers, including famotidine and ranitidine). The survey also included questions pertaining to health and well-being, opinions on CAM, and participant perception of their GI provider's knowledge of CAM. Broad categories of CAM listed in the instrument included exercise, vitamins and dietary supplements, dietary changes, stress management, and alternative professional care. We aimed to describe the use of CAM in pediatrics FAPDs at our center.

Statistical Analyses

Descriptive statistics were calculated, and mean ± SD, median (25th and 75th percentiles), or total number and percentage for reported for each variables. Data were graphed, visually inspected, and also tested for normality by use of the Shapiro-Wilk test. ANOVA or the Kruskal-Wallis test was used to compare the FAPD groups. For the comparisons on CAM therapies, a 2-sample *t* test or the Mann-Whitney *U* test was used for the continuous variables and the χ^2 or Fisher exact tests were used for the categorical variables, as appropriate. Significance level was set at an α of ≤0.05. The data were analyzed using Statistical Analysis Software, version 9.4 (SAS Institute Inc, Cary, North Carolina). All surveys, including those partially completed, were included in the analysis.

Results

Demographics

Data for 100 of the 121 patients (83%) who were invited and agreed to participate are included (Table I). Patients were a mean of 13.3 ± 3.5 years old (range, 4-18 years); 70% were female and 88% were white. Some patients did not answer all the questions in the survey, but all respondents were included in the analyses. There were no differences in demographics among the 4 diagnosis groups.

Conventional Therapies

At the time of the study, all patients had been on at least 1 conventional (allopathic) medication. The most commonly used conventional medicines were polyethylene glycol (49%) followed by antispasmodics and proton pump inhibitors (40% each). No patients in the sample had ever used colonic secretagogues. Participants reported side effects with every conventional therapy (1%-11%). The medications that had the highest rate of side effects were polyethylene glycol (11% of all participants) and antidepressants (9% of all participants) (Table II).

CAM

A summary of CAM therapies reported by the respondents is provided in Table III. Almost every patient reported using some form of CAM. Only 4 patients did not use any form of CAM.

Exercise. Forty-nine percent of patients reported practicing exercise to improve their symptoms. Running (34%) and swimming (24%) were the most common exercise modalities. More than one-half of the patients with functional dyspepsia and IBS used some form of exercise. No patients reported practicing tai chi. Respondents who rated the severity of their disorder as severe were more likely to exercise than those whose rated their severity as mild or moderate ($P = .043$). Patients also independently reported the practice of martial arts, tumbling, weight lifting, Zumba, bicycling, gym workouts, powerlifting, and participation on sports teams.

Vitamin and Dietary Supplements. Seventy-one percent of respondents reported using supplements or vitamins, the highest rate of use of any CAM category. Those with either public insurance or no insurance were more likely to use vitamins and/or dietary supplements compared with respondents that had private insurance ($P = .042$). No patients reported using omega-6 fatty acids or licorice. Multivitamins (48%), probiotics (33%), and vitamin D (20%) were the most frequently used supplements.

Dietary Changes. Sixty-nine percent of patients used at least 1 dietary change to manage their condition including 74% of those with IBS. Almost one-half (47%) of those with IBS limited or eliminated lactose. A gluten-free diet was the next most commonly used diet (10%). Likewise, 8% of

Table I. Respondent characteristics

Characteristics	Functional dyspepsia	IBS	Abdominal migraine	Functional abdominal pain	Total
No. of patients	29	47	6	18	100 (100)
Mean age (years)	14.6 ± 2.9	13.5 ± 3.5	12 ± 3.6	11 ± 3.7	13.3 ± 3.5
Age (years), median [25th%, 75th%]	16.0 [12.5, 17.0]	14.0 [11.0, 16.0]	13 [8, 15]	10 [10, 13]	–
Sex female	25 (86)	28 (60)	5 (83)	12 (67)	70 (70)
Race					
Asian	1 (3)	1 (2)	0 (0)	0 (0)	2 (2)
African American/Black	1 (3)	3 (6)	0 (0)	1 (6)	5 (5)
White	25 (86)	40 (85)	6 (100)	17 (94)	88 (88)
Other/multiple	0 (0)	2 (4)	0 (0)	0 (0)	2 (2)
Declined to answer	2 (7)	1 (2)	0 (0)	0 (0)	3 (3)
Highest parental education level					
High school or less	12 (41)	12 (25)	1 (17)	4 (22)	29 (29)
Some college	7 (24)	8 (17)	1 (17)	8 (44)	24 (24)
College	5 (17)	14 (30)	2 (33)	4 (22)	25 (25)
Postgraduate	4 (14)	11 (23)	2 (33)	2 (11)	19 (19)
Declined to answer	1 (3)	2 (4)	0 (0)	0 (0)	3 (3)
Estimate household annual income (USD)					
0-19 999	5 (17)	5 (11)	0 (0)	2 (11)	12 (12)
20 000-49 999	5 (17)	7 (15)	0 (0)	8 (44)	20 (20)
50 000-99 999	9 (31)	13 (28)	0 (0)	2 (11)	24 (24)
>100 000	9 (31)	16 (34)	3 (50)	5 (28)	33 (33)
Declined to answer	1 (3)	6 (13)	3 (50)	1 (6)	11 (11)
Medical insurance					
Public or self-pay	10 (34)	17 (36)	1 (17)	9 (50)	37 (37)
Private	18 (62)	29 (62)	5 (83)	9 (50)	61 (61)
Declined to answer	1 (3)	1 (2)	0 (0)	0 (0)	2 (2)
Quality of life					
Excellent	15 (52)	17 (36)	4 (67)	7 (39)	43 (43)
Very good	8 (28)	15 (32)	1 (17)	10 (56)	34 (34)
Good	3 (10)	11 (23)	1 (17)	1 (6)	16 (16)
Fair	1 (3)	3 (6)	0 (0)	0 (0)	4 (4)
Poor	1 (3)	0 (0)	0 (0)	0 (0)	1 (1)
Declined to answer	1 (3)	1 (2)	0 (0)	0 (0)	2 (2)
Other chronic medical conditions	7 (24)	18 (38)	3 (50)	8 (44)	36 (36)
Patient reported disease severity					
Quiescent or mild	10 (34)	20 (42)	4 (67)	11 (61)	45 (45)
Moderate	16 (55)	19 (40)	2 (33)	4 (22)	41 (41)
Severe	2 (7)	5 (11)	0 (0)	3 (17)	10 (10)
Declined to answer	1 (3)	3 (6)	0 (0)	0 (0)	4 (4)
Disease duration (months)	10 ± 12.1	18 ± 26.3	24.7 ± 26.7	13.2 ± 10.5	15.2 ± 20.8
Disease duration 25th%, Median, 75th% (months)	6.2 (3.3, 11.6)	9.0 (9.0, 16.4)	17.9 [3.3, 38.5]	10.0 [5.6, 16.4]	–

Age was normally distributed; disease duration was not normally distributed.
Values are mean ± SD or number (%) unless otherwise noted.

patients had tried a low ermentable oligo-, di-, mono-saccharides and polyols (FODMAPs) diet to treat their symptoms. Other dietary interventions included the avoidance of oily/fatty foods (15%), spicy foods (6%), soda (2%), and soy (1%). Children with mild, moderate, or severe symptoms were more likely to use dietary interventions as compared with those who reported quiescent symptoms at the time of the study ($P = .005$). Children of families with an annual income of $100 000 or more were more likely to report dietary changes than other income groups ($P = .0197$).

Stress Management. Sixty-four percent of participants attempted stress management through prayer (36%) and music (35%), the 2 most commonly used methods. More than one-half of the patients in each diagnostic group used at least 1 stress management technique.

Professional Care. Forty-six percent of respondents saw alternative care providers outside of their primary care provider and pediatric gastroenterologist. Children with IBS (57%) were more likely to do such as compared with children with other diagnoses. The most commonly reported alternative professional care was consultation with a counselor (30%) or psychologist (25%). No respondents reported visiting an herbalist or a naturopathic physician.

Interest and Attitude Toward CAM and the Physician

Two-thirds of respondents were satisfied with their current overall treatment and only 3% were dissatisfied. Only 13% considered CAM a primary therapy for their disorder, with 32% of respondents considering it a secondary therapy; 43% of respondents did not consider the therapies they used to be complementary or alternative. One-third of participants felt insufficiently informed regarding CAM with an additional 48% feeling neutral in their knowledge of CAM. Those who felt neutral or insufficiently informed about CAM were more likely to use vitamins and/or dietary

Table II. Prior conventional therapies

Medications	Functional dyspepsia (n = 29)	IBS (n = 47)	Abdominal migraine (n = 6)	Functional abdominal pain (n = 18)	Total (n = 100)
Polyethylene glycol	9 (31)	27 (57)	2 (33)	11 (61)	49 (49)
Antispasmodics	9 (31)	18 (38)	2 (33)	11 (61)	40 (40)
Proton pump inhibitors	15 (52)	16 (34)	1 (17)	8 (44)	40 (40)
Antidepressants	11 (38)	12 (26)	0 (0)	4 (22)	27 (27)
Cyproheptadine	13 (45)	4 (9)	4 (67)	6 (33)	27 (27)
Ondansetron	7 (24)	3 (6)	3 (50)	5 (28)	18 (18)
H-2 receptor antagonists	5 (17)	5 (11)	2 (33)	5 (28)	17 (17)
Milk of magnesia	1 (3)	11 (23)	0 (0)	2 (11)	14 (14)
Enemas	1 (3)	8 (17)	0 (0)	4 (22)	13 (13)
Simethicone	1 (3)	6 (13)	0 (0)	2 (11)	9 (9)
Lactulose	1 (3)	4 (9)	1 (17)	1 (6)	7 (7)
Prokinetics	4 (14)	2 (4)	0 (0)	0 (0)	6 (6)
Bisacodyl	0 (0)	4 (9)	0 (0)	1 (6)	5 (5)
Mineral oil	0 (0)	3 (6)	0 (0)	1 (6)	4 (4)
Senna	1 (3)	2 (4)	0 (0)	0 (0)	3 (3)

Values are number (%).

supplements than those who felt sufficiently informed ($P = .041$). Participants who viewed their doctor's influence on whether to use CAM as negative or neutral were also more likely to use vitamin or dietary supplements as compared with those who viewed their providers as having a positive view of CAM ($P = .0401$). However, those who viewed their doctor's influence on whether to use CAM as positive or neutral had a higher likelihood of using stress management modalities to treat their symptoms, which approached statistical significance ($P = .051$). More than one-half (52%) of families viewed their pediatric GI provider as being very or quite a bit knowledgeable on CAM for their condition (Table IV).

Discussion

We found that the duration of symptoms of FAPDs did not predict whether someone was more or less likely to use any particular modality of CAM. Almost all patients (96%) used at least 1 form of CAM as outlined in our survey. Still, 43% of respondents did not consider these therapies to be CAM modalities as we broadly defined them in this study. This finding underscores the importance for a practitioner to be specific in questioning when trying to ascertain whether a patient is using CAM, because patients and families may have an incomplete understanding of these treatments. The rate of CAM use in our study is notably greater than the 38% use found in a multicenter Dutch study.[16] This finding is likely due to the broad and inclusive nature of the CAM therapies we listed as compared with other studies with a more narrow definition.[15,16]

The concept of a patient's incomplete understanding regarding the use of CAM is further substantiated by the fact that 81% of respondents felt neutral or insufficiently

Table III. CAM use by category

Categories	Functional dyspepsia	IBS	Abdominal migraine	Functional abdominal pain	Total
No. of patients	29	47	6	18	100 (100)
Exercise	16 (55)	24 (51)	2 (33)	7 (39)	49 (49)
Running	11 (38)	15 (32)	2 (33)	6 (33)	34 (34)
Swimming	7 (24)	13 (28)	1 (17)	5 (28)	26 (26)
Yoga	2 (7)	2 (4)	1 (17)	0 (0)	5 (5)
Other	5 (17)	9 (19)	0 (0)	1 (6)	15 (15)
Vitamins and dietary supplements*	18 (62)	33 (70)	4 (67)	16 (89)	71 (71)
Multivitamins	13 (45)	20 (43)	3 (50)	12 (67)	48 (48)
Probiotics	7 (24)	19 (40)	0 (0)	7 (39)	33 (33)
Vitamin D	8 (28)	10 (21)	2 (33)	3 (17)	23 (23)
Fiber	4 (14)	10 (21)	0 (0)	6 (33)	20 (20)
Peppermint	4 (14)	9 (19)	0 (0)	4 (22)	17 (17)
Calcium	3 (10)	8 (17)	1 (17)	1 (6)	13 (13)
Ginger	6 (21)	5 (11)	0 (0)	0 (0)	11 (11)
Fish oil or omega-3 fatty acids	2 (7)	3 (6)	0 (0)	0 (0)	5 (5)
STW5 (Iberogast)	2 (7)	2 (4)	0 (0)	1 (6)	5 (5)
Turmeric or curcumin	3 (10)	2 (4)	0 (0)	0 (0)	5 (5)
Dietary changes	20 (69)	35 (74)	2 (33)	12 (67)	69 (69)
Avoiding certain foods (eg, greasy foods)	16 (55)	33 (70)	2 (33)	10 (56)	61 (61)
Avoidance of lactose	11 (38)	22 (47)	2 (33)	8 (44)	43 (43)
Special diets (eg, gluten free)	6 (21)	11 (23)	1 (17)	4 (22)	22 (22)
Stress management†	20 (69)	30 (64)	3 (50)	11 (61)	64 (64)
Prayer	8 (28)	17 (36)	3 (50)	8 (44)	36 (36)
Music	16 (55)	14 (30)	2 (33)	3 (17)	35 (35)
Aromatherapy	6 (21)	5 (11)	0 (0)	3 (17)	14 (14)
Guided imagery or visualization	4 (14)	6 (13)	0 (0)	2 (11)	12 (12)
Massage	2 (7)	6 (13)	0 (0)	1 (6)	9 (9)
Meditation	2 (7)	5 (11)	0 (0)	2 (11)	9 (9)
Support group	1 (3)	4 (9)	0 (0)	2 (11)	7 (7)
Biofeedback	1 (3)	4 (9)	0 (0)	0 (0)	5 (5)
Spiritual healing	2 (7)	3 (6)	0 (0)	0 (0)	5 (5)
Professional care‡	10 (34)	27 (57)	2 (33)	7 (39)	46 (46)
Counselor	7 (24)	17 (36)	1 (17)	5 (28)	30 (30)
Psychologist	7 (24)	15 (32)	0 (0)	3 (17)	25 (25)
Acupuncture	3 (10)	7 (15)	0 (0)	0 (0)	10 (10)
Physical therapy	2 (7)	5 (11)	0 (0)	2 (11)	9 (9)
Chiropractor	2 (7)	2 (4)	1 (17)	0 (0)	5 (5)
Massage therapist	1 (3)	4 (9)	0 (0)	0 (0)	5 (5)

Values are number (%).
*Fewer than 5% of respondents used chamomile, flax seed/flax oil, or aloe.
†Fewer than 5% of respondents used hypnosis.
‡Fewer than 5% of respondents used occupational therapy, osteopathy, healing/therapeutic touch, or Qi Gong/Reiki.

informed regarding CAM in our study. The fact that just over one-half (52%) of participants saw their provider as being "very much" or "quite a bit" knowledgeable about CAM provides an opportunity to discuss during the consultation the small body of evidence for this type of treatments in children. Among a few examples of clinical trials for nonpharmacologic interventions conducted in children with FAPDs are the 2001 double-blind study that showed that the use of enteric-coated peppermint oil decreased pain in three-quarters of the participants with IBS.[17] A review on the use of herbs and spices in FAPDs also found some support for the use of peppermint in children with weaker evidence for

Table IV. CAM interest, influence, and knowledge

	Functional dyspepsia	IBS	Abdominal migraine	Functional abdominal pain	Total
No. of patients	29	47	6	18	100 (100)
How satisfied are with your (child's) current overall treatment?					
Satisfied	22 (76)	32 (68)	3 (50)	9 (50)	66 (66)
Neutral	5 (17)	12 (26)	2 (33)	8 (44)	27 (27)
Dissatisfied	0 (0)	1 (2)	1 (17)	1 (6)	3 (3)
Declined to answer	2 (7)	2 (4)	0 (0)	0 (0)	4 (4)
Classify your (child's) use of CAM					
Primary form of therapy he/she looks to for symptom relief	7 (24)	4 (9)	0 (0)	2 (11)	13 (13)
Secondary or complementary to other prescribed medications	6 (21)	17 (36)	2 (33)	7 (39)	32 (32)
Replacement for previously failed treatments	1 (3)	1 (2)	0 (0)	0 (0)	2 (2)
Last-resort effort for symptoms relief/cure	0 (0)	1 (2)	0 (0)	0 (0)	1 (1)
Do not use CAM	11 (38)	19 (40)	4 (67)	9 (50)	43 (43)
Declined to answer	4 (14)	5 (11)	0 (0)	0 (0)	9 (9)
How interested are you in learning more about CAM?					
Very interested	6 (21)	8 (17)	1 (17)	2 (11)	17 (17)
Quite a bit	7 (24)	9 (19)	1 (17)	6 (33)	23 (23)
Somewhat	4 (14)	11 (23)	1 (17)	3 (17)	19 (19)
A little bit	2 (7)	6 (13)	1 (17)	4 (22)	13 (12)
Not at all	7 (24)	10 (21)	2 (33)	2 (11)	21 (21)
Declined to answer	3 (10)	3 (6)	0 (0)	1 (6)	7 (7)
How informed do you feel about CAM?					
Sufficiently informed	4 (14)	4 (9)	0 (0)	0 (0)	8 (8)
Neutral	14 (48)	21 (45)	3 (50)	10 (56)	48 (48)
Insufficiently informed	6 (21)	16 (34)	3 (50)	8 (44)	33 (33)
Declined to answer	5 (17)	6 (13)	0 (0)	0 (0)	11 (11)
How would you rate your doctor's influence on your decision to use or not use CAM?					
Positive influence	7 (24)	13 (28)	3 (50)	2 (11)	25 (25)
Neutral	15 (52)	25 (53)	2 (33)	14 (78)	56 (56)
Negative influence	0 (0)	0 (0)	0 (0)	1 (6)	1 (1)
Declined to answer	7 (24)	9 (19)	1 (17)	1 (6)	18 (18)
How knowledgeable about CAM do you perceive your (child's) Pediatric GI provider to be?					
Very much	7 (24)	12 (26)	1 (17)	4 (22)	24 (24)
Quite a bit	9 (31)	11 (23)	3 (50)	5 (28)	28 (28)
Somewhat	4 (14)	9 (19)	0 (0)	3 (17)	16 (16)
A little bit	0 (0)	0 (0)	0 (0)	1 (6)	1 (1)
Not at all	2 (7)	1 (2)	0 (0)	1 (6)	4 (4)
Declined to answer	7 (24)	14 (30)	2 (33)	4 (22)	27 (27)

Values are number (%).

the use of STW5 (Iberogast).[18] Additionally, a 2017 Dutch study showed home-based hypnotherapy was noninferior to individual provider-based hypnotherapy in children with IBS or another FAPD.[19]

Our study suggests that the physician should also systematically assess the patient's perception of therapeutic success and quality of life. Despite the relatively frequent disappointment of the physician in relation to patient's outcome found in the literature, only 3% of our participants were dissatisfied with their current treatment.[20,21] Similarly, we found that the vast majority (77%) of patients had a favorable self-reported quality of life rating and that only 10% rated their symptoms as severe. These quality of life data contrast prior studies in children with FAPDs that have shown diminished health-related quality of life scores as compared with healthy controls.[22] However, our study was not designed to specifically examine quality of life, which may account for this discrepancy.

Regarding specific therapies, vitamins and dietary supplements were the most commonly used class of CAM (71% of participants). They were also the class most likely to be used by those who felt the least informed about CAM and those with public insurance or no insurance. Alternative professional care (eg, therapists and counselors) was the least used modality, despite the fact that there is support for the use of cognitive behavioral therapy or hypnotherapy in the medical literature for the treatment of FAPDs.[23] Difficulty accessing such specialized care presumably plays a role in the underuse of this evidence-based therapy.[24] Likewise, a lack of familiarity, lack of insurance benefit, and one's preconceived notions about such all may play a role in its infrequent use as well. The fact that these evidence-based therapies are among the least frequently used would be an important area for future investigation. Notably, the rates of use of yoga, meditation, and chiropractic care in our study are similar to those found in a 2018 national data brief which looked at CAM use in the US for a wide range of pediatric conditions.[25] The number of individuals citing exercise as a means of managing symptoms was surprising (49%) and we are not sure why it is so high. We wonder if this reflects a desire of the respondent to appear healthy and active.

In our study, dietary changes were most often used by those in the highest income group and children with IBS. A large proportion (74%) of children with IBS modified their diet. These data are in line with a previous study that found that 62.5% of children with IBS reported at least 1 food intolerance and that avoidance of foods causing intolerance was common among this group of children.[26] Although the use of a low FODMAP diet has previously been shown to be helpful in IBS in childhood, only 8% of our respondents had tried such.[27] Notably, only 10% of all patients had trialed a gluten-free diet, the same percentage as was found in a study on CAM in inflammatory bowel disease at our institution.[15] The proportion of children that has tried this type of exclusion diet is similar to the proportion of adults that report gluten sensitivity in the absence of celiac disease in other countries such as the Netherlands (6.2%) and Argentina (7.6%).[28,29]

The decision for a patient or family to use CAM may result from an evidence-based discussion with a medical provider but at other times is made without the physician's awareness. One-quarter of respondents indicated that their doctor had a positive influence on their choice to use CAM. Beyond provider influence, prior studies have also shown accessibility to care, insurance coverage, social influences, lifestyle, and philosophical or religious preferences can all influence the selection of therapeutics in pediatric and adult FGIDs.[30,31] Experience with prior medications and accompanying side effects may also influence the decision to use CAM. In our study, antidepressants and polyethylene glycol had the highest rates of participant report side effects (9% and 11%, respectively). These side effect rates are lower than those reported in an adult IBS study in which the majority of respondents were women (88%). In the study, 63% reported a side effect with antidepressant medication use and 58% reported a side effect with laxative use.[32] The difference in side effect rate is likely due, in part, to the fact that the adult study's expressed purpose was to examine side effects in a self-selected IBS cohort whereas in ours, side effects of conventional therapies were a minor focus.

Although our study focuses on pediatric patients, there are more studies available regarding adult CAM use in functional disorders.[20,21,31] A 2008 US survey study of more than 1000 individuals residing in Washington state looked at a broad range of FGIDs in adults. Ginger, massage, and yoga were the most commonly used CAM therapies with about one-third of patients having used CAM. This rate of use is lower than in our studies, but our study had a broader definition of CAM. Furthermore, in the adult study, those using CAM were more likely to be female, have a higher education, and have anxiety. There were no sex differences in our study and we did not evaluate for concomitant anxiety. Participants in the adult study spent a median of $200 per year on CAM with a range of $40-$2200.[31] Our study did not examine the economics of CAM therapy, although it does underscore the importance of asking about such CAM use and patient/family knowledge of these treatments, because they are clearly investing time and money into these therapies. Beyond the economic implications, it is also important for providers to discuss these therapies as we know some possess an efficacy evidence base, whereas many others do not.[17-19,23]

We also noted a number of respondents who declined to answer both how they would rate their provider's influence on whether or not to use CAM (18%) and how knowledgeable they felt their provider was regarding use of CAM (27%). These rates are notably higher than other queries where we feel one may be hesitant to provide an answer (eg, household income, satisfaction with treatment). We wonder if these high rates of nonresponse not seen in other items of our questionnaire may reflect a proclivity toward not wanting to offend one's provider with the answer they were to provide.

The limitations of our study include our homogeneous (mostly white) population; only 4% identified as Hispanic/Latino. Also, the patients included in this study saw providers with differing levels of expertise; some respondents were seen by a fellow and/or an attending in a general GI clinic, whereas other patients were seen in a clinic specifically dedicated to FGIDs. As such, a provider's knowledge of, and comfort with, CAM use may influence the patient's opinion of such. Furthermore, we had a limited number of patients with abdominal migraine and we were thus unable to draw any conclusions about this disorder with statistical certainty. Additionally, prior medication use was recall based, not from a chart review, and thus predicated on participants recalling prior therapies and recognizing them on the survey instrument (**Table V**; available at www.jpeds.com). Furthermore, it is not clear from our survey whether the CAM modalities resulted from the family/patient decision or were advised by a provider; the source of such information and advice could introduce bias into the likelihood of such a therapy being successful or not. Also, our questionnaire, although used in prior studies, is not externally validated.[14,15] This is also the case with our quality of life question. Finally, we did not ask about cannabis or related products, although there has been increasing interest in their use to treat FGIDs in children as well as adults.[18,33]

In conclusion, the use of CAM in FAPDs is common at our center. Vitamins and supplements are the most commonly used form of CAM in children with FAPDs. We found that patients and families do not consider their level of understanding of CAM sufficient in most cases. They often look to their pediatric GI provider for expertise and guidance on how to integrate CAM in the treatment of their FAPDs. Recognition of these issues provides an opportunity for improvement of the care of children with FAPDs. Our study provides a framework for future investigation in this area of growing patient and family interest. ■

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Table V. Current and past medications listed on the survey questionnaire to facilitate recall

Medications
Prokinetics (metoclopramide, domperidone, erythromycin)
Proton pump inhibitors (omeprazole, esomeprazole, lansoprazole, pantoprazole)
Antispasmodics (hyoscyamine, dicyclomine)
Simethicone
H-2 blockers (famotidine, ranitidine)
Antidepressants
Cyproheptadine
Lubiprostone
Ondansetron
Polyethylene glycol (Miralax)
Lactulose
Bisacodyl
Senna
Mineral oil
Milk of magnesia
Enemas
Other: