Integrating Psychological Screening Into Medical Care for Youth With Abdominal Pain

Natoshia R. Cunningham, PhD,a,b Erin Moorman, BA,a Courtney M. Brown, MD, MS,b,c,d Daniel Mallon, MD,b,e
Pavan K. Chundi, MS,c Constance A. Mara, PhD,a,b Scott Pentlu, MD,b,e Anne M. Lynch-Jordan, PhD,a,b
Dana M.H. Dykes, MD,b,e Julie Elfers, BN,a Michael K. Farrell, MD,b,e

BACKGROUND: Pediatric functional abdominal pain disorders are common, costly, and disabling. Clinical anxiety is highly prevalent and is associated with increased pain and functional disability. Thus, a psychological screening process is recommended but is infrequently used in current practice.

METHODS: A screening process for patient-reported anxiety (Screen for Child Anxiety and Related Disorders), functional disability (Functional Disability Inventory), and pain levels was implemented in a large gastroenterology division within a major medical center. Quality improvement methods and traditional analytic approaches were used to test the feasibility and outcomes of routine screening in patients ages 8 to 18 with abdominal pain.

RESULTS: Screening rates increased from <1% to >80%. A total of 1291 patients who reported having abdominal pain completed the screening during the first 6 months. Clinically significant anxiety (43.1%), at least moderate disability (45%), and elevated pain (61.5%) were common in children with abdominal pain. The presence of clinically significant anxiety corresponded with higher pain and pain-related disability. Twenty-one percent of youth had clinical elevations in all 3 areas. In such instances, medical providers received an automated prompt to tailor care, including to consider a psychological referral. After the project implementation, psychological referral rates increased from 8.3 per 1000 patients to 15.2 per 1000 patients.

CONCLUSIONS: Systematic screening for anxiety, pain, and pain-related disability as a routine part of medical care can be reliably implemented with clinically meaningful results. Future directions include examining the role of anxiety over the long-term and reducing clinician burden.

Functional abdominal pain disorders (FAPDs) are among the most common medical diagnoses of childhood, affecting 13% of youth1,2 and accounting for 50% of visits to pediatric gastroenterologists.3,4 FAPDs are associated with significant functional disability, including school avoidance, peer difficulties, and psychological problems. For 30% to 40% of affected youth, symptoms persist into adulthood,5,6 incurring substantial medical costs.7 Anxiety disorders affect 42% to 85% of youth with FAPD8–11 and are associated with increased and persistent pain and disability11–14 and a poorer treatment response.15 Although psychological screening as part of routine medical care is recommended by the American Academy of Pediatrics...
Academy of Pediatrics, it is infrequently undertaken. Youth with FAPD are not systematically identified or managed in current care practices. Integrating psychological screening into clinical practice may help identify youth with FAPD who are at risk for poorest outcomes. Different levels of care may be indicated depending on numbers and types of risk factors (anxiety, pain, disability) present. Successful implementation of a tailored care approach depends on a systematic screening and triaging process.

For this project, our goal was to determine the feasibility of implementing routine psychological screening in a large, multipractice gastroenterology division within a major pediatric medical center. Our aims were to (1) evaluate the presence of anxiety, pain, and functional disability in patients presenting with abdominal pain; (2) replicate past research that revealed an association between anxiety, pain, and disability in a large clinical population; (3) create a systematic approach to managing youth with FAPD on the basis of risk status; and (4) quantify the number of psychological referrals generated after routine screening. Provider acceptance of the process was also assessed.

**METHODS**

**Context**

This project was undertaken in a large urban medical center in the Midwest. The Division of Gastroenterology, Hepatology, and Nutrition encompasses 24 providers who see youth with FAPD and serves >8000 new pediatric patients annually. Gastroenterology providers work across 6 locations within a 25-mile radius to the main hospital and use the EPIC electronic medical record (EMR). Our institutional review board approved this work as part of standard clinical practice.

**Intervention**

An interdisciplinary team consisting of a clinical psychologist, 5 physicians (primary care and gastroenterology specialists), a nurse, a quality improvement (QI) consultant, and a project coordinator began meeting in June 2015. The team actively consulted with registrar (employees responsible for checking in patients for their medical visits) management and staff members throughout that time. A QI framework was used to establish a smart aim, a measurable and time-bound goal: to increase psychological screening for anxiety, functional disability, and pain for youth with FAPD from <1% to 80% over 6 months (Fig 1). Next, the team identified 4 key drivers, factors essential to the successful implementation of screening. For each key driver, a number of interventions were tested by using plan-do-study-act cycles (PDSAs), an iterative problem-solving model commonly used in QI work.

**Measures**

The team selected patient-reported screening measures validated for use in pediatric chronic pain that have been used in pediatric FAPD. These measures, which are publicly available and have established clinical cut-offs, were normed for children between the ages of 8 and 18 with the developmental capability to understand questions and accurately respond. A combination of clinical elevations in all 3 areas (anxiety, pain, and disability) predicts long-term functional disability in youth with FAPD compared with children with 1 or no elevations. Together, these measures (detailed below) take between 5 and 10 minutes to complete.

The Screen for Child Anxiety Related Disorders (SCARED) —Child Report was selected to measure anxiety symptoms over the past 3 months. Items were based on Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition diagnoses, and the measure was constructed by using item and
factor analyses. The SCARED is recommended for use by the American Academy of Pediatrics. It has been validated for use in pediatric chronic pain and has been previously used in pediatric FAPD. It consists of 41 items (3-point Likert scale) summed to yield a total score (range: 0–82). A score of ≥ 25 is used to indicate clinically significant anxiety. The measure is available at the following Web site: http://peditricbipolar.pitt.edu/sites/default/files/SCAREDChildVersion_1.19.18.pdf.

The Functional Disability Inventory (FDI)–Child Version measures pain-related disability in the past several days. After reviewing items in which functional disability in adults was assessed, pediatric items were generated to represent broad domains of physical and psychosocial functioning with evidence of construct, concurrent, and predictive validity. The FDI has been validated in pediatric chronic pain and used in pediatric FAPD. It consists of 15 items (5-point Likert scale) summed to yield a total score (range: 0–60), with established clinical cutoffs for minimal (0–12), moderate (13–29), and severe (30+) disability. The measure is available at the following Web site: http://www.commonsdataelements.ninds.nih.gov.

The numeric rating scale was used to measure pain intensity. Patients rated their average pain in the past week on a scale of 0 to 10. On the basis of previous research, an average pain rating of ≥ 4 out of 10 is used to indicate clinically significant (moderate) pain levels.

### Patient Selection

FAPD incorporates a heterogeneous set of conditions and is often a diagnosis of exclusion, which leads to challenges in identifying patients for psychological screening early in the process of evaluation for abdominal pain. A broad algorithm was used to best capture all patients of potential interest (ie, youth with a likely diagnosis of FAPD). Thus, all new and follow-up visits to gastroenterology clinics were included for screening. Because of variability in how providers document and diagnose FAPD, exclusionary criteria were predominantly used to flag eligible participants for screening (Table 1). Exclusionary criteria included the presence of medical conditions with an identifiable organic cause and the presence of developmental delays (because measures were normalized for typically developing youth). Patients who qualified were automatically flagged at the time of check-in and queried via tablet about whether abdominal pain or discomfort was part of their presenting complaint. Of note, all patients completed the screening regardless of their response. For this project, patients who endorsed “yes” to this question were the sample of focus because this response was considered characteristic of a potential FAPD case. Although this is an imperfect method for identifying FAPD, this approach was effective for screening most of the patients with FAPD because many patients do not have a formal diagnosis at the time of their check-in (when screening occurs).

### Implementation of Screening Within a Single Pilot Clinic

Preliminary testing of the screening process was conducted for ~1 year (August 3, 2015, to October 28, 2016) in a single clinic. Screenings were first administered via paper and pencil by clinical staff. Next, the team developed a Web-based assessment process that was conducted on a tablet but was not linked to the EMR. The pilot testing allowed the team to refine the process, develop implementation recommendations, and plan for clinic deviations (high-volume clinic days and staffing changes). PDSAs were used to maximize screening rates while minimizing interruptions to clinic flow.

### Scaling Up Screening Implementation

The screening procedure was implemented across 6 clinic locations (Fig 2). A Web-based data capture that linked data entered on the tablet directly into the patient EMR was developed. Support from the institution’s information technology department was obtained to automate the screening process.
Several training presentations were given, and job aides were e-mailed to providers to explain the screening process and how the information could be used clinically. Key components of screening included patient eligibility (automatically flagged at time of check-in), a tablet that was immediately provided, and automated scoring with preidentified cutoffs embedded into the EMR. For patients with clinical elevations in all 3 domains, prompts were generated to allow providers to auto-populate scores within the progress notes, provide psychoeducational material during the clinic visit (see https://steppedcare.research.cchmc.org), and consider a referral to a psychologist.

Study of the Interventions

Feasibility

Data were gathered to assess the feasibility, acceptability, and impact of the screening process. The primary outcome measure was the percentage of eligible patients who were screened. Secondary outcome measures included total scores from each of the screening measures, referral rates to psychological services, and provider feedback about the screening process.

Data Collection and Analysis

Data from a single patient visit were obtained. A control chart was used to track the percent of patients who were screened (Fig 3). This is a common method for presenting and analyzing process data over time to drive improvement.34 The control chart helps to differentiate common cause variation (unknown, random) from special cause variation (attributable to a specific reason). A special cause variation in the process was determined by using the following rules:

1. A point outside either the lower or upper control limits;
2. 2 out of 3 consecutive points near a control limit;
3. 9 consecutive points above or below the centerline (mean); and
4. 6 consecutive points increasing or decreasing.

Sample means and frequencies were obtained for the total scores of the screening measures. Independent samples t tests were conducted to confirm the relationship between anxiety, pain, and pain-related disability. Referral rates to psychological services were examined by conducting a chart review and comparing rates of referral before and after the screening implementation. Provider feedback regarding the screening process was collected.

RESULTS

Pilot Clinic Screening Rates

During the testing in the pilot clinic, 277 patients were identified via chart review as meeting criteria for screening. Of those patients, 83% (n = 230) were screened (Fig 3). The monthly screening rates fluctuated from 0% to 97.8%.

Large Scale Implementation

Demographic Factors

The mean age was 13.34 years (SD = 2.97). A majority of the sample were women (58%). The sample was categorized as non-Hispanic white (87.6%), African American (6.0%), Asian American (0.5%), and Hispanic (3.0%) or unknown (2.9%). The most common diagnoses were abdominal pain (54.1%), constipation (28.1%), vomiting or nausea (17.2%), and gastroesophageal reflux disease without esophagitis (8.7%).

Screening Rates

A total of 6744 children (with and without abdominal pain) were eligible for screening. Of those
children, 5221 (77.4%) completed the screening measures during the course of the project (October 11, 2016, to April 30, 2017). A total of 1369 children indicated that abdominal pain was part of their presenting complaint during the active phase of the project. Of these children, 1291 (94%) completed all of the screening questionnaires (Fig 3). A high screening rate was maintained after the formal completion of this project.

Screening Data Outcomes

The mean SCARED score for the sample was 24.3 (SD = 15.3). A total of 43.1% of children met the clinical cutoff for the SCARED. The mean FDI score for the sample was 13.7 (SD = 11.3). A total of 45% of children reported moderate (34.2%) or severe (10.8%) functional disability, and 61.5% reported moderate pain levels (≥4 out of 10) in the past week. A total of 21.1% of the sample reported clinical elevations in all 3 screening areas (ie, in such cases, providers received automated prompts as described in Methods). Independent samples t tests revealed that patients with clinical anxiety based on the SCARED had significantly higher FDI scores (mean = 16.29) compared with those without clinical anxiety (mean = 11.54; t_{1609} = −8.47; P < .001). Additionally, patients with clinical anxiety had higher pain levels (mean = 4.63) compared with patients without clinical anxiety (mean = 3.72; t_{1607} = −7.50; P < .001).

Psychological Referrals

Baseline levels of psychological referrals (made via gastroenterology provider judgement) were derived from a review of data from September 2015 to March 2016, in which an average of 8.3 per 1000 patients per month received a referral to outpatient psychological services. After the integration of the psychological screening measures into EPIC, psychological referral rates during the same period (September 2016 to March 2017) doubled to 15.2 per 1000 patients per month.

In the group of individuals who were screened, 11.9% received referrals to psychological services. Of those individuals with clinical elevations in all 3 areas, 34% received a psychological referral, suggesting a threefold increase in referral rates when gastroenterology providers received an automated prompt to consider making a referral.

Provider Acceptance of Psychological Screening

In total, 75% (18 out of 24) of gastroenterology providers who routinely see youth with FAPD completed the survey (Table 2). Generally, providers rated the process positively. Providers reported that screening revealed important information that would not have otherwise been known during the visit, helped frame the conversation with the patient, and offered a systematic approach to care. Barriers associated with screening included time, consistency, and limited access to resources.

DISCUSSION

This project supports the use of a screening process to identify youth with FAPD who may be at the greatest risk for adverse outcomes. Screening was reliably administered across providers within the gastroenterology division of a major academic medical center. Children with FAPD who are at the greatest risk for persistent functional disability (ie, those with clinical elevations in all 3 risk areas) are now being immediately identified and managed as part of routine care. High rates of anxiety were observed (43%). Consistent with previous research, there was a significant relationship between clinical anxiety

FIGURE 3

This control chart displays the percentage of eligible participants who completed the screening measures. The chart includes annotations to document select PDSAs. The number of eligible patients each month is included on the x-axis in parentheses. The total number of participants completing pilot screening measures is 250. The total number of participants completing screening measures in division-wide implementation is 1291. * (±3 SD).
and elevated rates of pain and functional disability.

Medical providers identified a number of benefits of using a standardized psychological screening process. Many reported that screening identified problems (clinical anxiety) that the provider may have otherwise missed during a routine visit. Providers also felt that the psychological screening helped frame their clinical conversations with the patients and families, which is a theme that has emerged in previous research.35

Overall, referral rates to psychological care increased, particularly for the at-risk group, with clinical elevations in all 3 domains. Our project also revealed some of the challenges in facilitating psychological care for patients with FAPD. Even in patients with all 3 risk factors, the decision to refer to psychological providers remains an individualized process driven by clinical judgement. Many factors, including provider practice patterns and other considerations (eg. patient and family interest, provider availability, distance to care, and insurance coverage) guide these decisions.

Referrals were tracked by providers’ electronic orders to our institution’s clinical psychology division. There was no easy method to capture referrals to community providers and/or differentiate psychological treatment needs. Future efforts may include tracking if providers are systematically having conversations about psychological needs of patients and what proportion of patients with sustained risk factors eventually complete psychological care.

Overcoming challenges that are involved in facilitating appropriate psychological care is worthwhile, considering the growing evidence for the benefits of psychological assessment and therapy for the management of pediatric FAPD.36 Efforts to improve access to experienced psychological providers may further improve outcomes, too. Telehealth and online multimedia

### TABLE 2 Provider Acceptance

<table>
<thead>
<tr>
<th>Question</th>
<th>Response</th>
</tr>
</thead>
<tbody>
<tr>
<td>How important do you think it is to ask patients about anxiety? (range: 0–10)</td>
<td>Mean: 8; range: 4–10</td>
</tr>
<tr>
<td>How important do you think it is to ask patients about functional disability? (range: 0–10)</td>
<td>Mean: 8.7; range: 6–10</td>
</tr>
<tr>
<td>How often do you think providers should ask patients about anxiety or worries as it relates to pain?</td>
<td>At each visit: 18 (100%); monthly: 0; every 3 mo: 0; every 6 mo: 0; annually: 0; never: 0</td>
</tr>
<tr>
<td>How often do you feel patients should answer questions about how much their pain disables them?</td>
<td>At each visit: 16 (89%); monthly: 0; every 3 mo: 1 (6%); every 6 mo: 1 (6%); annually: 0; never: 0</td>
</tr>
<tr>
<td>On average, how often (%) does the screening data reveal information about anxiety and functional disability that you would not have otherwise known?</td>
<td>Mean: 31 (anxiety), 37 (functional disability)</td>
</tr>
<tr>
<td>How often do you use the screening information to guide your conversation with the patient?</td>
<td>Never: 1 (6%); rarely: 8 (44%); sometimes: 1 (6%); often: 6 (33%); always: 2 (11%)</td>
</tr>
<tr>
<td>How often do you use the provider alert when you receive a prompt?</td>
<td>Never: 0 (0%); rarely: 7 (39%); sometimes: 8 (44%); often: 3 (17%); always: 0 (0%)</td>
</tr>
</tbody>
</table>
| If you do not use the suggested referral, what keeps you from doing so? (check all that apply) | Include scores: 7 (39%); use referrals: 15 (83%); provide education materials: 3 (17%); talk to families about results: 8 (44%)
| How do you use the screening information? (check all that apply) | [Helps with] highlighting the relationship between abdominal pain and anxiety or stress. High scores may come as a surprise and help to give evidence that anxiety is present and affecting pain |
| Can you describe some positive aspects of screening? | [Screening] frames the discussion on how much symptoms are affecting a child’s life. I point to the FDI score as something our treatment is meant to improve |
| Can you describe any barriers or challenges associated with screening? | The measures are universal, and the screening results hopefully reduces stigma. (The) more systematic approach ensures that every patient is complete the screening |

Domain 1: framing the conversation
Theme: role of anxiety
Theme: general treatment

Domain 2: systematic approach to care

Domain 3: limited access to resources

Access to mental health providers based on third party payer: I don’t feel like I have the resources to offer “tailored care” to patients
educational and training tools, such as one developed specifically for youth abdominal pain and co-occurring anxiety, may increase access to care and reduce the face-to-face time needed with a psychologist. Another promising option may be the integration of a psychological provider into medical clinics as part of routine care, and such models in pediatric and adult care settings have been employed. However, even at our own medical center, integration of psychological care into medical treatment of abdominal pain remains the exception rather than a rule. Given these barriers, we have included a detailed guide that providers may use to help their patients access appropriate psychological care (Supplemental Table 3). Additionally, it would be valuable to adapt and test similar screening processes in other settings, such as primary care practices or even in school settings in which youth may first present with abdominal pain. In these settings, a similar approach may also optimize care for patients with other conditions, such as headache or musculoskeletal pain.

Time constraints, screening consistency (eg, some patients were not screened), and access to resources were the biggest barriers to feasibility and acceptability. Other barriers may be present, but not all providers who were queried participated in the survey (potentially because of time constraints). To address these concerns, it may be beneficial to shorten the process by using briefer measures (such as the Patient-Reported Outcomes Measurement Information System [PROMIS] anxiety measure). To do so effectively, it will be critical to first establish clinically meaningful cutoffs. Further refinement of the target population for screening may also be beneficial. For example, distributing tablets to a more homogeneous patient population (eg, all gastroenterology clinic patients) may simplify the process and result in more reliable screening and comprehensive care for gastroenterology patients with other conditions. This remains challenging in light of condition-specific assessment and treatment protocols in place at larger institutions depending on the patient population (youth with inflammatory bowel disease receive a separate screening at our institution).

Overall, this psychological screening process has the potential to improve the quality of care for pediatric patients with FAPD and may be broadly applicable to the assessment and treatment of other pediatric medical conditions. Continued efforts toward systematically integrating psychological screening methods to enhance medical care will advance the field and improve the quality of care of patients who are impacted by FAPD.

ABBREVIATIONS

EMR: electronic medical record
FAPD: functional abdominal pain disorder
FDI: Functional Disability Inventory
PDSA: plan-do-study-act cycle
QI: quality improvement
SCARED: Screen for Child Anxiety Related Disorders

REFERENCES


Integrating Psychological Screening Into Medical Care for Youth With Abdominal Pain
Natoshia R. Cunningham, Erin Moorman, Courtney M. Brown, Daniel Mallon, Pavan K. Chundi, Constance A. Mara, Scott Pentiu, Anne M. Lynch-Jordan, Dana M.H. Dykes, Julie Elfers and Michael K. Farrell

Pediatrics 2018;142; DOI: 10.1542/peds.2017-2876 originally published online July 25, 2018;

Updated Information & Services including high resolution figures, can be found at:
http://pediatrics.aappublications.org/content/142/2/e20172876

References This article cites 41 articles, 4 of which you can access for free at:
http://pediatrics.aappublications.org/content/142/2/e20172876#BIBL

Subspecialty Collections This article, along with others on similar topics, appears in the following collection(s):
Administration/Practice Management
http://www.aappublications.org/cgi/collection/administration:practice_management_sub
Quality Improvement
http://www.aappublications.org/cgi/collection/quality_improvement_sub
Gastroenterology
http://www.aappublications.org/cgi/collection/gastroenterology_sub
Abdominal Pain
http://www.aappublications.org/cgi/collection/abdominal_pain_sub

Permissions & Licensing Information about reproducing this article in parts (figures, tables) or in its entirety can be found online at:
http://www.aappublications.org/site/misc/Permissions.xhtml

Reprints Information about ordering reprints can be found online:
http://www.aappublications.org/site/misc/reprints.xhtml
Integrating Psychological Screening Into Medical Care for Youth With Abdominal Pain


*Pediatrics* 2018;142; DOI: 10.1542/peds.2017-2876 originally published online July 25, 2018;

The online version of this article, along with updated information and services, is located on the World Wide Web at:

http://pediatrics.aappublications.org/content/142/2/e20172876

Data Supplement at:

http://pediatrics.aappublications.org/content/suppl/2018/07/18/peds.2017-2876.DCSupplemental