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Screening for Psychosocial and Family Risk in Pediatric Gastrointestinal Disorders

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Abstract

Objectives—Screening for psychosocial comorbidity is recommended for pediatric patients presenting at an initial gastroenterology (GI) outpatient consultation. We developed and evaluated the psychometric properties of the GI Screener to address the need for a screening tool specific to pediatric GI patients.

Methods—128 patients (8–18 years old, 63% female) and 126 parents completed age-specific versions of the GI Screener and 3 validated psychosocial comparison instruments (The Behavioral Assessment System for Children, The Functional Disability Inventory, The General Functioning scale of the Family Assessment Device) at their initial GI consultation. (30%) of families repeated the measures two weeks later. We identified GI Screener content domains and retained items using exploratory factor analysis. We evaluated internal consistency, construct validity, cross-informant reliability, and test-retest reliability of the trimmed measures.

Results—Exploratory factor analysis identified two factors in both the parent and child scales: Symptom Impact and Emotional Functioning. Internal consistency estimates for the trimmed scales were good (Cronbach's alpha >0.75) for both Child and Parent scales. We found that the GI

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No conflicts of interest exist.

Author's Roles

1. Carin Cunningham, Ph.D Principal Investigator for the study. Co-wrote the initial grant with Tonya Palermo, Ph.D. Participated in study tasks throughout the duration of the project. Involved in the overseeing of the writing of this article and the coordination of the contributing authors.
2. Elise Cho, BS was responsible for consenting patients, scoring questionnaires, recording data, writing and editing part of the paper.
3. Michele Shaffer, Ph.D was the lead statistician, providing statistical oversight for the study. She co-wrote the results section and she reviewed and edited all sections of the paper.
4. Miranda Bradford, MS was responsible for running the statistical analyses for the study. She co-wrote with Michele Shaffer the results section which she also edited.
5. Tonya Palermo, Ph.D mentored Carin Cunningham and Elise Cho BS throughout the study's duration. She chose the psychological instruments to be used for construct validity, reviewed statistical analyses and edited the paper.

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Screener for both patient and parents had good construct validity. Cross-informant reliability between Parent and Child scales at baseline had an estimated correlation of 0.56, while intra class correlation coefficients between baseline and 2-week scores showed high test-retest reliability (>0.7).

Conclusions—The GI Screener is a brief, valid and reliable measure that can aid in identifying families who are at high risk for psychosocial comorbidity facilitating the targeted delivery of psychosocial intervention and efficient use of health care resources.

Introduction

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A brief, targeted psychosocial screening tool has the potential to quickly identify to the pediatric gastroenterologist, patients and families who would benefit from early psychosocial intervention, eliminating, in some cases, the need to do expensive and time consuming medical evaluations. Although there are many validated measures of general psychological functioning (e.g., The Child Behavior Checklist (CBCL) (1), the Behavior and Assessment System (BASC) (2), The Child Depression Inventory (CDI) (3) and the Multidimensional Anxiety Scale for children (MASC) (4), there is currently no brief targeted screening instrument that can be applied in a busy clinic setting to assess psychosocial risk specific to the issues experienced by pediatric gastrointestinal (GI) patients and to measure the impact of these symptoms.

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While psychosocial stressors exist among many pediatric subspecialty patients, there are unique documented behavioral and psychological comorbidity and specific impact of GI symptoms (e.g., pain, fecal incontinence) that are important to assess in GI patients. Hommel et al. (5) examined the prevalence of psychosocial symptoms in pediatric patients presenting with GI symptoms at a new outpatient gastroenterology visit in comparison to a healthy control group. Results indicated that pediatric GI patients are at increased risk for psychosocial dysfunction in comparison to their healthy peers. The need for a screening tool to assess potential psychosocial comorbidity in patients presenting with GI symptoms has been identified by a number of researchers (5–7), and is recommended as a first step in an assessment process in patients with pediatric GI disorders (5–6). Identifying patients and families at high risk allows the targeted delivery of psychosocial intervention and may increase efficient use of health care resources (8)

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This study aimed to develop and validate a screening tool that could aid in identifying children presenting at a new outpatient GI visit who might be at risk for psychosocial issues and for whom more in depth evaluation is indicated. Recognizing the increasing importance of patient-reported outcomes (PROs) which integrate the patient's perspective and the critical perspectives of parents into the assessment and treatment of patients (9–10), we developed child and parent report versions of the screening tools.

Reliability of the GI Screener was evaluated by estimating internal consistency and test-retest reliability as well as cross-informant reliability between child and parent. Validity was assessed by investigating the factor structure using exploratory factor analysis and estimating construct validity by examining relationships between factor scores and validated measures of related constructs (e.g., internalizing problems, family functioning, and

functional disability). We hypothesized that the GI Screener would demonstrate preliminary reliability and validity.

Methods

Methods are included in the Supplemental Digital Content.

Results

Description of sample

128 patients (36% age 8–11, 64% 12–18) and 126 caregivers completed the Psychosocial GI Screener, including 125 child-caregiver dyads (Table 1) at an initial visit in the GI clinic. The majority of participants were female (63% patients, 92% caregivers) and of non-Hispanic White race (85%). The sample included only one grandparent caregiver; the rest were parents. Half of caregivers had completed college, over half (64%) worked full or part-time, and half (49%) reported annual household income $\leq$ \$70,000.

Exploratory factor analysis

Preliminary scree plots run before the factor analysis scale refinement process suggested that with a minimum eigenvalue of one, the number of latent factors could be up to three for the Child scale and up to five for the Parent scale (Supplemental Digital Content Figure 2). In the end, we found that factor analysis identified two latent factors for both screeners, although the factor contents differed somewhat between Parent and Child screeners. Fourteen items out of 30 were retained in the trimmed Child scale and 12 out of 30 items were retained in the trimmed Parent scale (Supplemental Digital Content Table 1). Factor 1 (Child Symptom Impact) in the child scale related to the impact of GI symptoms (9 items) and factor 2 (Child Emotional Functioning) related to social and emotional functioning (5 items). Factor 1 (Parent Symptom Impact) in the parent scale related to impact of GI symptoms on functioning (6 items), and factor 2 (Parent Emotional Functioning) related to the emotional functioning for both parent and child (6 items).

Reliability

Internal consistency estimates for individual items and total scales at baseline are shown in Supplemental Digital Content Table 1. Consistency estimates were good for both Child and Parent scales. Overall alpha was 0.79 for the trimmed Child scale (lower 95% CI: 0.75) and 0.76 for the trimmed Parent scale (lower 95% CI: 0.70), while alpha estimates for individual items were similarly high and quite uniform (Child range 0.76–0.80, Parent range 0.73–0.75).

21 patients and 28 caregivers returned a second GI Screener at the two-week follow-up, while 11 patients and 8 caregivers did not complete the two-week follow-up. This small sample size limited our power to run test-retest reliability analyses. Intraclass correlation coefficients (ICC) are shown in Supplemental Digital Content Table 1. ICC estimates for the total scale were 0.82 (95% CI: 0.61–0.93) for the Child scale and 0.72 (95% CI: 0.47–0.86) for the Parent scale. ICC estimates for the symptom impact subscale and emotional

functioning subscale were 0.87 and 0.72, respectively, for the Child scale, 0.63 and 0.66 for the Parent scale. ICC estimates for individual items ranged between 0 and 0.75 for Parent items and between 0.30 and 0.90 for Child items. This variability is confirmed by Bland-Altman plots of individual items (not shown) which reveal systematic variation for certain items.

Cross-informant reliability as estimated by the Pearson correlation coefficient between Parent and Child trimmed scales at baseline was 0.56 (95% CI: 0.43–0.67), which is in the range of observed cross-informant reliabilities reported for pediatric behavioral and emotional problems (1).

Construct Validity

Correlations of the Child and Parent GI Screener subscales and total scores with other psychometric measures are presented in Table 2. Convergent validity of the Child GI Screener was supported by moderate correlations with the BASC-2 Internalizing Problems and Emotional Symptoms Index Composites ($r=0.44$ to 0.58), and the Parent GI Screener subscale and total scores showed similar correlations with the BASC-2 Internalizing Problems Composite ($r=0.39$ to 0.51). In addition, the Child and Parent GI Screener Symptom Impact and total scores had moderate correlations with the Functional Disability Inventory total score ($r=0.52$ to 0.65). Discriminant validity was supported by lower correlations of the Child and Parent GI Screener subscales and total scores with the Family Assessment Device General Family Functioning score ($r=-0.16$ to 0.31). In addition, the Child and Parent GI Screener Emotional Functioning scores had low correlations with the Functional Disability Inventory total score ($r=0.21$ and 0.23 , respectively), and the Parent GI Screener Symptom Impact and total scores had lower correlations with the BASC-2 Behavioral Symptoms Index Composite ($r=0.13$ and 0.32 , respectively).

Discussion

This study demonstrated that the GI Screener is a reliable and valid measure that has the potential to fill the need for a brief, targeted psychosocial screening instrument within an outpatient GI clinic. It is inexpensive, simple to score and its short length would not interrupt the flow of a busy outpatient clinic. Most significantly, it will add to the identification of psychosocial issues that are impacting GI symptoms and contribute to integrated care for patients with GI conditions and their families.

GI disorders commonly occur in children and adolescents. Estimates of between 4% and 25% of school-age children complain of recurrent abdominal pain (RAP) of sufficient severity to interfere with daily activities (12). Fecal incontinence affects approximately 2.8 % of 4-year-old and 1.5 % of 7–8-year-old children (13), and IBD affects 71 of 100,000 youth in the United States (14–15). In addition to managing the physical demands of pediatric GI disorders, these disorders can have a far-reaching impact on a child's physical and emotional well-being (16–17). Children and adolescents are faced with the demands of normal development at the same time that they are dealing with illness-related issues. Psychological development of independence, such as self-care, social relationships with peers, and the dynamics within the family may be affected. Feelings of helplessness,

increased dependency, and self-consciousness may occur, as well as high rates of school absences. GI disorders are associated with significant morbidity and use of healthcare resources (18–19).

Psychosocial comorbidity has been documented among pediatric patients with GI symptoms, and the presence of psychosocial dysfunction can have a significant effect on the outcome of GI disorders (20). Szigethy et al. (21) found that pediatric inflammatory bowel disease (IBD) is associated with high rates of depression. Youth with IBD reported significantly worse social functioning than healthy children, but similar functioning compared with children with other chronic illnesses (22). Rates of clinically significant social difficulty for patients with pediatric IBD ranged from 2% to 22% in two studies (23–24). Psychosocial comorbidity has been documented in functional gastrointestinal disorders (FGID) in children (25–26). Using structured diagnostic interviews four studies have found the prevalence of anxiety disorders in children with functional abdominal pain (FAP) to be between 42% and 85% (26–29). Similarly, von Gontard et al. (6) reported a rate of comorbid clinical behavior disorders in children with fecal incontinence ranged from 30% to 50%. Equit et al. (30) examined the prevalence rates of elimination disorders and anxious/depressed symptoms of a representative sample of young children and found that children with fecal incontinence have the highest rate of anxious/depressed symptoms.

Early psychosocial assessment to identify psychosocial functioning and the impact of GI symptoms on pediatric patients in the context of an initial outpatient clinic visit is recognized (5,7). Available psychosocial assessment instruments in youth include both broadband measures and measures identifying a specific psychological symptom such as depression or anxiety. Broadband measures such as the Child Behavior Checklist (CBCL; (1) and the Behavior and Assessment System (BASC) (2) assess a wide range of behaviors and functioning. Because of their length and need for computer scoring, they are not practical in the context of a busy outpatient GI clinic. The Child Depression Inventory (CDI) (3) and the Multidimensional Anxiety Scale for children (MASC) (4) measure one symptom. In addition neither the broadband measures nor the psychological symptoms questionnaires identify the impact of specific GI symptoms.

Assessment instruments exist that measure the impact of specific GI symptoms such as abdominal pain (Child Report: Abdominal Pain Index (API), 31); functional disability (The Functional Disability Inventory, 11); disease activity (The Questionnaire on Gastrointestinal Symptoms in Children and Adolescents (QPGS, 10) ; and health-related quality of life (The IMPACT III Health Related Quality of Life (HRQOL) Questionnaire, 32). The PedsQL GI Module (10) is also available to measure baseline GI-specific quality of life and could be used to assess changes in health status over time. These scales contribute to research and clinical practice by measuring changes on a broad spectrum of GI symptoms over time. However, they are not screening tools and are not focused on identification of psychosocial needs.

Our initial results have shown that the GI screener is a brief, simple screening tool that can aid in identifying psychosocial concerns of pediatric and adolescent patients using information from patient and parent-proxy self-reports at a new outpatient GI visit. The

simplicity of use, its low cost and the immediate usability of the information are positive factors for its use in clinical settings. However, further studies are needed to implement the GI Screener in clinical setting to understand feasibility and impact of its introduction. Although our validation sample included children from subspecialty care, the GI Screener may also be useful in the primary care or other general practice setting and this is an important future direction. Identifying families at high risk has the potential to facilitate the targeted delivery of psychosocial intervention.

Limitations of this study include the relatively small sample size, and the lack of information on families who chose not to participate. Future research is needed to determine if the GI Screener differentiates between a GI population and a healthy control group. Extensions to other populations may also be possible including children with neurodevelopmental disorders who also have a high rate of GI conditions. Further studies using this screener in other sites would also provide additional and important validation data.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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What is Known?

- Psychosocial screening for pediatric patients at an initial gastroenterology (GI) appointment is recommended
- Integrated medical and psychological care is recommended evidence-based treatment for GI symptoms and disorders such as functional abdominal pain, fecal incontinence, and rumination

What is New?

- There is currently no screening instrument for identifying psychosocial risk in pediatric GI patients at an initial consultation
- The GI Screener is a brief, targeted, valid and reliable measure, easy to use and score within the context of a busy GI clinic visit
- Identifying families at high risk for psychosocial comorbidity is an efficient use of health care resources

Table 1

Sample characteristics (N = 254, 125 child-caregiver dyads)

Child or teen responses (% , n)	50%	128
Child (age 8–11)	36%	46/128
Teen (age 12–18)	64%	82/128
Non-White race (% , n / # responses)	15%	37/244
Hispanic or Latino ethnic background (% , n / # responses)	15%	35/241
Female gender (% , n / # responses)	63%	81/128
Child age at baseline in years (mean (sd), # responses)	13 (3)	128
Caregiver relationship to child: mother or stepmother (% , n / # responses)	92%	110/120
Caregiver marital status (% , n / # responses)		
Married, partnered or widowed	80%	97/122
Divorced or separated	13%	16/122
Never married	7%	9/122
Number of people in household (% , n / # responses)		
2	2%	2/126
3	20%	25/126
4	40%	51/126
5 or more	38%	48/126
Number of children in household (% , n / # responses)		
1	19%	24/126
2	49%	62/126
3 or more	32%	40/126
Age of youngest child (mean (sd), # responses)	10 (4)	125
Age of oldest child (mean (sd), # responses)	15 (3)	125
Employment status of caregiver responder (% , n / # responses)		
Full-time	41%	51/123
Part-time	23%	28/123
Not-working	36%	44/123
Employment status of caregiver's spouse/partner (% , n / # responses)		
Full-time	84%	87/104
Part-time	9%	9/104
Not-working	8%	8/104
Highest grade completed by caregiver responder (% , n / # responses)		
High school or less	21%	27/126
Vocational school/Some college	28%	35/126
College	33%	41/126
Graduate/Professional school	18%	23/126
Highest grade completed by caregiver's spouse/partner (% , n / # responses)		
High school or less	31%	32/104
Vocational school/Some college	21%	22/104
College	30%	31/104

Graduate/Professional school	18%	19/104
Household total annual income (% , n / # responses)		
Less than \$30,000	15%	19/124
\$30,000–\$49,999	23%	28/124
\$50,000–69,999	13%	16/124
\$70,000–\$100,000	17%	21/124
More than \$100,000	32%	40/124

Correlations of Child and Parent GI Screeners with other psychometric measures to assess construct validity

Table 2

Pearson correlation coefficient (95% confidence interval); n	Behavioral Assessment System for Children - Second Edition Composites				Functional Disability Inventory Overall/Total Score	Family Assessment Device General Family Functioning
	Internalizing Problems	Emotional Symptoms Index	Personal Adjustment			
Child GI Screener						
Symptom Impact Score (rescaled 0–100)	0.47 (0.32,0.60); 122	0.44 (0.28,0.57); 123	–0.32 (–0.47,–0.15); 122		0.52 (0.38,0.64); 119	0.15 (–0.03,0.32); 119
Emotional Functioning Score (rescaled 0–100)	0.44 (0.28,0.57); 122	0.45 (0.30,0.58); 123	–0.58 (–0.69,–0.45); 122		0.21 (0.03,0.38); 119	0.31 (0.14,0.46); 119
Total Score (rescaled 0–100)	0.58 (0.44,0.68); 122	0.56 (0.42,0.67); 123	–0.52 (–0.64,–0.38); 122		0.53 (0.38,0.64); 119	0.26 (0.08,0.42); 119
Parent GI Screener						
Symptom Impact Score (rescaled 0–100)	0.39 (0.23,0.53); 120	0.13 (–0.05,0.30); 120			0.65 (0.53,0.74); 118	0.00 (–0.18,0.18); 120
Emotional Functioning Score (rescaled 0–100)	0.44 (0.29,0.58); 120	0.42 (0.26,0.55); 120			0.23 (0.05,0.39); 118	–0.16 (–0.33,0.02); 120
Total Score (rescaled 0–100)	0.51 (0.36,0.63); 120	0.32 (0.15,0.47); 120			0.55 (0.41,0.67); 118	–0.08 (–0.26,0.10); 120