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Functional assessment of pediatric pain patients: Psychometric properties of the Functional Disability Inventory

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Abstract

The Functional Disability Inventory (FDI; Walker LS, Greene JW. The functional disability inventory: measuring a neglected dimension of child health status. J Pediatr Psychol 1991;16:39–58) assesses activity limitations in children and adolescents with a variety of pediatric conditions. This study evaluated the psychometric properties of the FDI in pediatric pain patients. Participants included 596 patients with chronic abdominal pain, ages 8–17, and a subset of their parents ($n = 151$) who completed the FDI and measures of pain, limitations in school activities, and somatic and depressive symptoms at a clinic visit. Test–retest reliability was high at 2 weeks (child report, .74; parent-report, .64) and moderate at 3 months (child report, .48; parent report, .39). Internal consistency reliability was excellent, ranging from .86 to .91. Validity was supported by significant correlations of child- and parent-report FDI scores with measures of school-related disability, pain, and somatic symptoms. Study results add to a growing body of empirical literature supporting the reliability and validity of the FDI for functional assessment of pediatric patients with chronic pain.

Keywords: Functional Disability Inventory; Pain; Validity; Reliability; Functional impairment; Children

1. Introduction

Chronic or recurrent pain is estimated to affect more than 25% of children and adolescents (Perquin et al., 2000). Functional assessment is an important component of the evaluation and treatment of pediatric pain (Walker and Greene, 1991; Palermo et al., 2004).

The Functional Disability Inventory (FDI) was developed by Walker and Greene (1991) to assess illness-related activity limitations in children and adolescents with a variety of pediatric conditions. It has been used frequently in the functional assessment of pediatric pain, including both acute pain (Gidron et al., 1995; Barnum et al., 1998) and chronic pain such as headaches (e.g., Palermo and Kiska, 2005), fibromyalgia (e.g., Kashikar-Zuck et al., 2002), complex regional pain syndrome (e.g., Eccleston et al., 2004), juvenile rheumatoid arthritis (e.g., Reid et al., 2005), sickle cell disease (e.g., Peterson and Palermo, 2004), recurrent abdominal pain (e.g., Robins et al., 2002; Walker et al., 2005), irritable bowel syndrome (e.g., Walker et al., 1998; Claar et al., 1999), and inflammatory bowel disease (e.g., Tojek et al., 2002). The FDI also has served as an outcome measure in treatment intervention studies for pain patients, including a randomized clinical trial of behavioral treatment for abdominal pain (e.g., Robins et al., 2005), an evaluation of cognitive behavioral treatment for chronic pain (Eccleston et al., 2003), and an open-label trial of citalopram for treatment of recurrent abdominal pain (Campo et al., 2004).

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The original development studies for the FDI indicated that it was a reliable and valid instrument for functional assessment of children and adolescents with acute illness (Study 1) and recurrent pain (Study 2) (Walker and Greene, 1991). Discriminant validity of the FDI was demonstrated by its utility in discriminating pain patients from well children. Sensitivity to treatment was established by significant reductions in FDI scores for patients treated for peptic disease in contrast to the moderate stability of FDI scores over a 3-month period in patients with unexplained abdominal pain for which effective treatment has not been identified.

Despite these strengths, development studies for the FDI were limited by small sample sizes that prevented examination of potential differences in psychometric properties of the FDI by child age and gender. Moreover, construct validity of the FDI, although acceptable, may have been underestimated because validity analyses were based on the combined patient and well samples. The purpose of this study was to assess the psychometric properties of the FDI in pediatric patients with chronic abdominal pain. In addition, we sought to provide descriptive statistics on the FDI in these patients to permit comparison with pain patients in other studies. We hypothesized that the FDI would demonstrate good reliability and validity for both child- and parent-reported disability across age and gender. Based on trends observed by Walker and Greene (1991), we also expected that girls and older children would report greater disability than boys and younger children.

2. Methods

2.1. Participants

Participants were consecutive new patients who were referred to the Pediatric Gastroenterology Clinic at Vanderbilt University Medical Center for evaluation of abdominal pain. All patients had undergone one or more prior medical evaluations by their primary care provider and were referred to the Pediatric Gastroenterology Clinic for subspeciality medical investigation. Patients were eligible for research participation if, by parental report, they had abdominal pain of at least 3 months' duration and no chronic health condition, physical handicap, or mental retardation. Approval from the Vanderbilt University Institutional Review Board was obtained prior to conducting this study.

Prior to their clinic visit, parents of children scheduled for evaluation of abdominal pain were informed of the study by telephone. Those who expressed interest were screened for eligibility and invited to arrive early if they wished to participate in the study. Of the 947 patient families contacted, 252 (27%) did not meet eligibility criteria and 99 (10%) declined, leaving 596 participants in the final sample. Informed consent and assent were obtained at the clinic by research staff, and questionnaires were completed prior to the medical evaluation. An interviewer read the questionnaire items to children in a private room, and they selected answers from a response sheet. Parents completed their questionnaires in the clinic waiting room. Children and their parents also completed additional questionnaires by telephone 3 months after the baseline clinic assessment.

A subset of patients ($n = 154$) and their parents also participated in a weeklong daily diary assessment (see Walker et al., 2001 for a description of the Daily Diary Interview) that included completion of questionnaires by telephone 2 weeks after the baseline clinic assessment as well as a 3-month follow-up assessment. All patients referred to the Pediatric Gastroenterology Clinic at Vanderbilt University Medical Center for evaluation of abdominal pain between September 1996 and April 1999 who had pain of at least 3 months' duration and no chronic health condition, physical handicap, or mental retardation were eligible for participation in the daily diary assessment. Of the 229 patient families contacted, 57 (25%) did not meet eligibility criteria and 18 (8%) declined, leaving 154 participants.

At the time of study participation, the average duration of abdominal pain for the total sample was greater than 1 year and ranged from 3 months to a lifetime occurrence. Patients ranged in age from 8 to 17 years ($M = 11.59$, $SD = 2.45$) and 61% were female. The subset of patients who participated in the daily diary assessment ranged in age from 8 to 15 years ($M = 10.77$, $SD = 2.11$) and 57% were female. The total sample was predominantly Caucasian (92%), reflecting the ethnic composition of the clinic. The majority of patients' parents (91%) had completed a high school education; 22% were college graduates. Family socioeconomic status (SES) based on the four-factor index of social status (Hollingshead, 1975) ranged from 19 (unskilled laborers) to 64 (major business owner; professional), with a mean of 42.17 ($SD = 9.74$).

2.2. Measures

2.2.1. Functional Disability Inventory

The Functional Disability Inventory (FDI) (Walker and Greene, 1991) assesses children's self-reported difficulty in physical and psychosocial functioning due to their physical health. The instrument consists of 15 items concerning perceptions of activity limitations during the past 2 weeks; total scores are computed by summing the ratings for each item. Parents participating in the daily diary assessment completed a parallel parent-report form of the FDI, in which they rated the extent of their children's disability during the past 2 weeks. Higher scores indicate greater disability.

2.2.2. Abdominal Pain Index

The Abdominal Pain Index (API) (Walker et al., 1997) includes 5 items assessing the frequency, duration, and intensity of abdominal pain episodes experienced during the previous 2 weeks. Pain frequency is rated on a 6-point scale ranging from not at all (0) to every day (5). Typical pain frequency also is rated on a 6-point scale (none, once a day, two or three times a day, four or five times a day, six or more times a day, and constant during the day). Typical pain duration is rated on a

9-point scale (none, a few minutes, about half an hour, about an hour, between 1 and 2 h, 3 or 4 h, 5 or 6 h, most of the day, and all day). Finally, typical pain intensity and maximum pain intensity are rated on a 11-point scale ranging from no pain (0) to the most pain possible (10). Responses to the five pain items are standardized and summed to compute an index of abdominal pain. Parents completed a parallel parent-report form of the API, in which they rated their children's pain along the same dimensions.

2.2.3. Faces Pain Scale

A subset of children also rated their usual level of abdominal pain at the baseline assessment using the Faces Pain Scale (FACES) (Bieri et al., 1990). The FACES contains 7 hand-drawn faces that gradually increase in pain expression from neutral to higher levels of pain. The faces are rated on a 7-point scale ranging from 0 to 6. The FACES has been found to have good reliability and validity (Bieri et al., 1990). The FACES is designed as a child-report measure and was not administered to parents. The FACES was administered to all children who completed their baseline assessment in 2001 or later.

2.2.4. Children's Depression Inventory

Depressive symptoms were assessed with the Children's Depression Inventory (CDI) (Kovacs and Beck, 1977; Kovacs, 1981). The CDI contains 27 self-report items representing depressive symptoms. Each item is rated on a 3-point scale and summed to obtain a total score. Higher scores indicate higher levels of depressive symptoms. The CDI has been found to have adequate reliability and validity (Saylor et al., 1984). Parents completed a parallel form, in which they rated the extent of their children's depressive symptoms.

2.2.5. Children's Somatization Inventory

The Children's Somatization Inventory (CSI) (Garber et al., 1991; Walker et al., 1991) assesses the severity of nonspecific somatic symptoms (e.g., "headaches", "dizziness") that often are reported by children with RAP and need not have organic disease etiology (Walker et al., 1991). Respondents rate the extent to which they have experienced each of 35 symptoms during the last 2 weeks using a 5-point scale ranging from "not at all" (0) to "a whole lot" (4). Higher scores indicate higher levels of somatic symptoms. The CSI has been found to have adequate reliability and validity (Walker et al., 1991). Parents also completed a parallel parent-report form of the CSI, in which they rated the extent of their children's somatic symptoms.

2.2.6. School disability

The subset of children who completed the daily diary interview ($n = 154$) were asked about school-related disability as part of the daily diary assessment (Walker et al., 2001). During each of the five daily diary interviews, children were asked, "How difficult was it for you to do things at school because you did not feel well?" Responses were rated on a 5-point Likert scale from "not at all" to "a whole lot" and were summed across the five days to create a total score. Higher scores indicate greater disability. The school-related disability item was not administered to parents.

3. Results

3.1. Descriptive data

Pearson correlations indicated a low but statistically significant correlation of child-report FDI scores with child age, $r = .10$, $p < .05$, and family SES, $r = .10$, $p < .05$, but parent-report FDI scores were not significantly associated with child age, $r = .14$, $p =$ n.s., or family SES, $r = -.004$, $p =$ n.s. Table 1 shows the mean, median, standard deviation, and range for the child-report FDI for boys ($n = 233$), girls ($n = 363$), and for the total sample ($n = 596$). Statistics for the parent-report FDI are also given in Table 1. Child-report FDI scores were significantly higher for girls ($M = 12.80$, $SD = 10.49$) than for boys ($M = 8.84$, $SD = 8.20$), $t(594) = 4.89$, $p < .001$, but parent-report FDI scores did not differ significantly by child gender.

Table 2 presents descriptive statistics for individual FDI items by child- and parent-report. With few exceptions, responses to each item ranged across the 0–4 response scale. Five items had the highest mean difficulty ratings by both child- and parent-report: being at school all day, doing the activities in gym class (or playing sports), running the length of a football field, eating regular meals, and getting to sleep at night and staying asleep.

3.2. Reliability

3.2.1. Internal consistency

Alpha reliability coefficients were high on the child-report FDI for girls ($\alpha = .91$) and boys ($\alpha = .86$) and on the parent-report FDI for parents of girls ($\alpha = .94$) and boys ($\alpha = .90$). We also examined the mean item-total correlations by child gender: for the child-report and parent-report FDI for girls, $r = .40$ and .51, respectively; for the child-report and parent-report FDI for boys, $r = .30$ and .35, respectively.

3.2.2. Test–retest reliability

Table 3 depicts the test–retest reliability of the child- and parent-report FDI for the total sample and by child

Table 1
Descriptive statistics for baseline child- and parent-report FDI

Sample	*N*	Mean	Median	*SD*	Range
Child-report					
Total	596	11.25	8.00	9.84	0–53
Girls	363	12.80	10.00	10.49	0–53
Boys	233	8.84	6.00	8.20	0–46
Parent-report					
Total	151	10.56	6.00	10.16	0–47
Girls	86	11.02	6.50	10.97	0–47
Boys	65	9.94	6.00	9.01	1–36

Table 2
Descriptive statistics for baseline child- and parent-report FDI individual items

		Child report			Parent report		
		Mean	*SD*	Range	Mean	*SD*	Range
	FDI item						
1.	Walking to the bathroom	.20	.52	0–3	.15	.43	0–2
2.	Walking up stairs	.37	.74	0–4	.29	.65	0–3
3.	Doing something with a friend (for example, playing a game).	.63	.95	0–4	.59	.95	0–4
4.	Doing chores at home	.53	.91	0–4	.61	.90	0–3
5.	Eating regular meals	.99	1.21	0–4	1.25	1.16	0–4
6.	Being up all day without a nap or rest	.86	1.16	0–4	.59	1.02	0–4
7.	Riding the school bus or traveling in the car	.70	.98	0–4	.44	.77	0–3
8.	Being at school all day	1.08	1.16	0–4	1.25	1.19	0–4
9.	Doing the activities in gym class (or playing sports)	1.12	1.23	0–4	1.08	1.18	0–4
10.	Reading or doing homework	.55	.91	0–4	.63	.99	0–3
11.	Watching TV	.22	.61	0–4	.21	.59	0–3
12.	Walking the length of a football field	.73	1.11	0–4	.63	1.10	0–4
13.	Running the length of a football field	1.44	1.32	0–4	1.06	1.33	0–4
14.	Going shopping	.59	.98	0–4	.58	1.01	0–4
15.	Getting to sleep at night and staying asleep	1.24	1.26	0–4	1.23	1.15	0–4

gender. Two-week test–retest reliability coefficients were high for both child- ($r = .74$) and parent-report FDI ($r = .64$). We examined gender differences in reliability and found that 2-week test–retest reliability coefficients were significantly higher for girls ($r = .80$) than for boys ($r = .56$), $z = 2.77$, $p < .01$. There were no significant gender differences by parent-report for girls ($r = .67$) and boys ($r = .60$), $z = .70$, $p =$ n.s. Three-month test–retest reliability coefficients were moderate for child- ($r = .48$) and parent-report FDI ($r = .39$). By child-report, 3-month test–retest reliability coefficients were significantly higher for girls ($r = .51$) than for boys ($r = .35$), $z = 1.96$, $p < .05$; however, there were no significant gender differences by parent-report for girls ($r = .34$) and boys ($r = .49$), $z = 1.05$, $p =$ n.s.

3.3. Validity

The validity of the FDI was assessed by examining: (1) the concordance between child- and parent-report scores on the FDI and (2) the correlation of the FDI with measures of similar or related constructs.

Table 3
Test–retest reliabilities for child-report and parent-report baseline FDI with FDI scores at 2-week and 3-month assessments

	Two-week FDI	Three-month FDI
Child-report		
Total	.74*** ($n = 151$)	.48*** ($n = 416$)
Girls	.80*** ($n = 86$)	.51*** ($n = 245$)
Boys	.56*** ($n = 65$)	.35*** ($n = 171$)
Parent-report		
Total	.64*** ($n = 151$)	.39*** ($n = 142$)
Girls	.67*** ($n = 86$)	.34** ($n = 81$)
Boys	.60*** ($n = 65$)	.49*** ($n = 61$)

** $p < .01$.
*** $p < .001$.

3.3.1. Concordance between child-report and parent-report FDI

For girls, the correlation between child- and parent-report forms of the FDI was significant at baseline ($r = .31$, $p < .01$) and at the 2-week ($r = .36$, $p < .001$) and 3-month assessments ($r = .26$, $p < .05$). A similar pattern of results emerged for boys at baseline ($r = .32$, $p < .01$), at 2 weeks ($r = .55$, $p < .001$), and at 3 months ($r = .29$, $p < .05$).

We also examined concordance between child- and parent-report FDI by child age (8–11 years, $n = 307$; 12–17 years, $n = 289$). For younger children, the correlation between child- and parent-report FDI was significant at baseline ($r = .21$, $p < .05$), at 2 weeks ($r = .40$, $p < .001$), and at 3 months ($r = .23$, $p < .05$). The correlations between child- and parent-report FDI scores for older children also were significant and somewhat stronger (at baseline, $r = .50$, $p < .001$; at 2 weeks, $r = .42$, $p < .01$; at 3 months, $r = .40$, $p < .01$).

3.3.2. Relation of the FDI to related constructs

Table 4 presents the Pearson correlations at baseline for the child- and parent-report FDI with child-reported pain, somatic symptoms, and depressive symptoms for the total sample and by child gender. Correlations of the child-report and parent-report FDI with child-reported pain were significant for both boys and girls. In addition, correlations between the child-report FDI and CSI somatic symptoms were significant for boys and girls. Parent-report FDI was significantly correlated with CSI scores for girls but not boys. Finally, the child-report FDI, but not the parent-report FDI, was significantly correlated with children's depressive symptoms on the CDI for both boys and girls.

Table 4
Pearson correlations between baseline child- and parent-report FDI with child-reported pain and somatic and depressive symptoms

	Child-report			
	Abdominal pain (API)	Typical pain (FACES)	Somatic symptoms (CSI)	Depressive symptoms (CDI)
Child-report FDI				
Total	.33*** ($n = 587$)	.35*** ($n = 423$)	.59*** ($n = 596$)	.52*** ($n = 591$)
Girls	.34*** ($n = 356$)	.34*** ($n = 266$)	.62*** ($n = 363$)	.56*** ($n = 361$)
Boys	.24*** ($n = 231$)	.33*** ($n = 157$)	.47*** ($n = 233$)	.38*** ($n = 230$)
Parent-report FDI				
Total	.37*** ($n = 145$)	–	.28*** ($n = 151$)	.12 ($n = 151$)
Parents of girls	.32** ($n = 82$)	–	.32** ($n = 86$)	.10 ($n = 86$)
Parents of boys	.46*** ($n = 63$)	–	.20 ($n = 65$)	.15 ($n = 65$)

Note. The FACES pain scale was administered to a subset of children at the baseline clinic assessment whose parents did not complete the parent-report FDI at baseline.
** $p < .01$.
*** $p < .001$.

3.3.3. Predictive validity

Table 5 shows the Pearson correlations, for the total sample and by child gender, between the child-report FDI and various outcomes 2 weeks and 3 months following baseline. For both boys and girls, results indicated that the FDI was a strong predictor of pain, school-related disability, and somatic and depressive symptoms at the 2-week assessment. The FDI also was a significant predictor of pain, somatic symptoms, and depressive symptoms at the 3-month assessment for the total sample.

Table 6 shows the Pearson correlations between the parent-report FDI at baseline and child-report outcomes for the total sample and categorized by gender. The baseline parent-report FDI was significantly correlated with child-reported abdominal pain at the 2-week but not the 3-month assessment. For girls, the baseline parent-report FDI was a significant predictor of somatic symptoms at 2 weeks but not at 3 months. In contrast, for boys the parent-report FDI was a significant predictor of somatic symptoms at 3 months but not at 2 weeks. Finally, the parent-report FDI was a significant predictor of depressive symptoms at the 2-week and 3-month assessments for boys but not for girls.

4. Discussion

Examination of the psychometric properties of the FDI demonstrated that it is a reliable and valid measure of functional limitations for children and adolescents with chronic abdominal pain. As expected for a chronic pain condition, test–retest reliability was high at 2 weeks (.74 for child-report; .64 for parent-report) and moderate at 3 months (.48 for child-report; .39 for parent-report). Internal consistency reliability also was excel-

Table 5
Baseline child-report FDI predicting child-reported pain, school-related disability, and somatic and depressive symptoms at the 2-week and 3-month assessments

	Baseline Functional Disability Inventory		
	Total	Girls	Boys
Abdominal pain			
Two weeks	.40*** ($n = 141$)	.42*** ($n = 84$)	.37** ($n = 57$)
Three months	.15** ($n = 372$)	.12 ($n = 226$)	.15 ($n = 146$)
School disability			
Two weeks	.41*** ($n = 119$)	.40*** ($n = 70$)	.33* ($n = 49$)
Somatic symptoms			
Two weeks	.68*** ($n = 153$)	.71*** ($n = 88$)	.58*** ($n = 65$)
Three months	.49*** ($n = 417$)	.52*** ($n = 246$)	.35*** ($n = 171$)
Depressive symptoms			
Two weeks	.51*** ($n = 149$)	.52*** ($n = 85$)	.37** ($n = 64$)
Three months	.36*** ($n = 416$)	.38*** ($n = 245$)	.25** ($n = 171$)

Note. School disability was administered only at the 2-week assessment as part of the Daily Diary Interview.
* $p < .05$.
** $p < .01$.
*** $p < .001$.

Table 6
Baseline parent-report FDI predicting child-reported pain, and somatic and depressive symptoms at the 2-week and 3-month assessments

	Baseline functional disability inventory		
	Total parents	Parents of girls	Parents of boys
Abdominal pain			
Two weeks	.29*** ($n = 138$)	.28** ($n = 82$)	.31* ($n = 56$)
Three months	.11 ($n = 102$)	.09 ($n = 62$)	.14 ($n = 40$)
Somatic symptoms			
Two weeks	.21** ($n = 150$)	.25* ($n = 86$)	.09 ($n = 64$)
Three months	.16 ($n = 142$)	.09 ($n = 81$)	.30* ($n = 61$)
Depressive symptoms			
Two weeks	.16 ($n = 146$)	.10 ($n = 83$)	.31* ($n = 63$)
Three months	.19* ($n = 142$)	.11 ($n = 81$)	.41*** ($n = 61$)

* $p < .05$.
** $p < .01$.
*** $p < .001$.

lent, ranging from .86 to .91 for child- and parent-report versions.

Regarding validity, FDI scores were significantly correlated with school-related disability reported in a diary study following baseline assessment. Moreover, both child-report and parent-report FDI scores were significantly correlated with measures of children's abdominal pain and other somatic symptoms. These results echo those of prior studies demonstrating a significant correlation of FDI scores with pain and somatic symptoms in pediatric pain patients (Walker et al., 1998; Claar et al., 1999; Kashikar-Zuck et al., 2001, 2002; Eccleston et al., 2004; Peterson and Palermo, 2004; Reid et al., 2005). Finally, the correlation between child-report and parent-report FDI scores was significant at baseline and at the 2-week and 3-month assessments. This cross-informant concordance was significant both for children (ages 8–11 years) and for adolescents (ages 12–17 years), indicating that the FDI is appropriate across a broad age range of pediatric patients. Correlations were in the moderate range, as has been found in other examinations of parent–child concordance regarding symptoms and disability (e.g., Garber et al., 1998). Children in this study tended to report slightly higher levels of disability than did their parents. Given that some of the FDI items refer to disability experienced in academic or social arenas that parents may not directly observe, perhaps parents underestimate the extent of children's disability in these areas. Children's higher ratings of disability also could be due to the fact that the FDI asks for ratings of *perceived* difficulty that children themselves may be better able to evaluate than their parents.

These findings support the validity of the FDI in the functional assessment of pediatric pain patients. It should be noted that the FDI was developed as a brief screening tool and is not intended to assess limitations specific to a particular pediatric condition and does not have subscales reflecting domains of activity. The instrument assesses perceived difficulty in performing a broad range of activities that are relevant to children and adolescents, representing domains similar to those assessed by the Sickness Impact Profile for adults (Bergner et al., 1981), i.e., ambulation, social interaction, recreation, chores, school, sleep, and eating. Respondents are asked to rate the perceived difficulty of performing each activity due to "physical health". Thus, the FDI differs from instruments that ask respondents to evaluate impairment due exclusively to pain (e.g., Palermo et al., 2004) or to a specific health condition (e.g., Creer et al., 1993; Rosier et al., 1994) and instead focuses on respondents' assessments of disability due to their overall physical health. This approach makes the FDI useful in comparisons of disability across pediatric conditions.

As expected based on trends from the original development study (Walker and Greene, 1991), disability scores were significantly higher for girls than for boys on the child-report but not on the parent-report FDI. Similarly, test–retest reliability was higher for girls than for boys on the child-report but not the parent-report FDI. Compared to boys, girls reported higher levels of disability at baseline and at follow-up assessments. Past research has not found significant gender differences on the FDI (e.g., Claar et al., 1999; Tojek et al., 2002; Crombez et al., 2003; Eccleston et al., 2004); however, those studies had limited power to detect potential gender effects due to small sample sizes. Additional research using objective measures of disability, such as school absence, is needed to assess the extent to which gender differences on the FDI might be due to a gender-related reporting bias versus actual differences in daily functioning.

In the present study, there was a weak correlation between child-report FDI and age but not between parent-report FDI and age. Given that the correlation was low ($r = .10$), this age effect is probably not clinically meaningful. Results of other studies examining the association between child age and disability are mixed; some studies found increasing disability with child age in pain patients (e.g., Claar et al., 1999; Crombez et al., 2003; Eccleston et al., 2004), while other studies found no association between age and disability (e.g., Tojek et al., 2002; Peterson and Palermo, 2004).

Results of prospective analyses for this study demonstrated that FDI scores obtained at the medical evaluation significantly predicted children's pain and school-related disability 2 weeks following the medical evaluation. In addition, baseline FDI scores predicted depressive and somatic symptoms at a 3-month follow-up assessment. Thus, initial level of disability may influence the course of symptoms in pediatric pain patients following medical evaluation. These results echo those of past research demonstrating that pain-related disability is a strong predictor of long-term adjustment (e.g., Gureje et al., 2001). Surprisingly, FDI scores obtained at baseline were only weakly associated with pain ratings at the 3-month follow-up; perhaps some patients have successfully learned to cope with their pain and are experiencing fewer health-related activity impairments at the 3-month follow-up despite continued pain.

The present study is limited in that patients' FDI scores were not compared to those of well children. However, the ability of the FDI to distinguish pain patients from well children has been extensively documented in other studies (Walker et al., 1993; Garber et al., 1998; Walker and Heflinger, 1998; Walker et al., 1998). In addition, the study sample, while reflective of the patients seen in our tertiary care clinic, was primarily composed of Caucasian and middle-class patients.

Future studies should examine the psychometric properties of the FDI with a more diverse sample. This study also is limited in that it focused on patients with chronic abdominal pain to the exclusion of other populations of pain patients. However, studies by other research teams support the reliability and validity of the FDI across a broad range of painful pediatric conditions (cf. Kashikar-Zuck et al., 2002; Eccleston et al., 2003, 2004; Reid et al., 2005). Thus, this study adds to a growing body of empirical literature supporting the reliability and validity of the FDI for functional assessment of pediatric patients with chronic pain.

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