Children’s Appraisal and Coping with Pain: Relation to Maternal Ratings of Worry and Restriction in Family Activities

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Objective To examine the relation of children’s pain severity, perceived pain threat, and passive coping to maternal worry and family activities. Methods We assessed pain severity, perceived threat (conceptualized as beliefs about pain seriousness and coping ability), and coping strategies in 130 patients with chronic abdominal pain. Mothers rated the impact of the child’s health on maternal worry and family activities. Results Controlling for pain severity, higher pain threat was associated with maternal reports of greater worry and limitations in family activities due to the child’s health. Children’s use of passive-coping strategies was not related to maternal worry or family activity limitations. Conclusions Health care providers should assess patients’ pain beliefs, correct misperceptions about pain seriousness, and help increase patients’ perceived efficacy in coping with pain.

Key words abdominal pain; children; coping; family; pain beliefs; worry.

The entire family shares in the stress of a child’s chronic health condition and must adapt to demands imposed by the illness (Barbarin, 1990; Quittner & DiGirolamo, 1998). Recent studies of chronic pain patients emphasize that these demands may influence the well-being of individual family members (e.g., Sharp & Nicholas, 2000) as well as the activities and daily routines of the family as a unit (e.g., Hunfeld et al., 2001). However, the presence of a child with chronic illness does not affect all families equally (Drotar, 1992). For example, studies have found inconsistent relations between child disease parameters and maternal adjustment (for a review, see Wallander & Varni, 1998), suggesting that we must look beyond characteristics of the condition itself to explain variation in family adaptation.

In an effort to identify factors associated with family adaptation to a child’s chronic pain condition, this study investigated pain severity, perceived pain threat, and coping strategies in children with chronic or episodic abdominal pain. Most of the pediatric patients evaluated for abdominal pain of more than 3 months’ duration meet the diagnostic criteria for a functional gastrointestinal disorder not associated with organic disease (e.g., irritable bowel syndrome, nonulcer dyspepsia; Walker et al., 2004). Compared to children with infrequent abdominal pain, patients with chronic abdominal pain report higher levels of somatization symptoms, emotional distress, and functional disability (e.g., Garber, Zeman, & Walker, 1990; Walker, Garber, & Greene, 1993) suggesting that the presence of a child with chronic pain may be associated with considerable family disruption. Indeed, a recent study of children with abdominal pain and other types of medically unexplained pain found that pain severity was related to more restrictions in the social life of the children’s mothers (Hunfeld et al., 2001).

Studies of children with chronic pain have demonstrated that children who perceive greater pain threat and use more passive pain-coping strategies have higher levels of pain severity, disability, and health service utilization (e.g., Gil, Williams, Thompson, & Kinney, 1991; Thomsen et al., 2002; Walker, Smith, Garber, & Claar, in press; Walker, Smith, Garber, & Van Slyke, 1997). It is not known, however, whether children’s appraisal of greater threat and more frequent use of passive strategies for coping with pain are associated with greater family
disruption. It is possible that variations in children's adaptation to pain contribute to the inconsistent relation between pediatric chronic pain and family adaptation observed in prior research. For example, a child's pain condition may be more strongly associated with maternal worry and family disruption when children appraise their pain as highly threatening and cope passively than when children perceive less threat and use more active or accommodative strategies for coping with pain.

Our approach to children's pain appraisal is grounded in Lazarus and Folkman's (1984) formulation of stress appraisal and coping. According to this formulation, primary appraisal refers to the individual's evaluation of the personal relevance of a situation, especially whether it is perceived as benign or as a threat that has the potential for significant personal harm. Secondary appraisal deals with the individual's perceived ability to cope with the stressor and includes two major forms: problem-focused coping potential (PFCP)—the perceived ability to alter the circumstances to make them more desirable (in this case to alleviate pain) and emotion-focused coping potential (EFCP)—the perceived ability to accept and adjust to the circumstances, even if they cannot be improved (in this case to accept and adjust to pain). Lazarus and Folkman (1984) emphasize that the consideration of both forms of appraisal is critical, as different combinations of primary and secondary appraisals shape the degree of stress experienced by the individual (Lazarus & Launier, 1978). Thus, we predicted that family disruption would be magnified to the extent that children perceived their abdominal pain as threatening and evaluated themselves as unable to cope with it.

In addition to children's appraisals of pain, their strategies for coping with pain may play a role in maternal worry and family disruption. In both child and adult pain patients, passive coping has been associated with relatively poor outcomes, including decreased physical activity and increased psychological distress (e.g., Brown, Nicassio, & Wallston, 1989; Gil et al., 1991; Smith, Wallston, Dwyer, & Dowdy, 1997; Thomsen et al., 2002; Walker et al., in press). Because children's passive coping involves giving up and disengaging from their usual activities, it may be associated with maternal worry and interruption of family routines.

In this study, we hypothesized that the relation of children's abdominal pain severity to maternal worry and disruption of family activities would be stronger for families in which children perceived their condition as more serious and evaluated themselves as more able to cope with pain, that is, when they made appraisals of high pain threat. Conversely, we hypothesized that the relation of pain severity to maternal worry and family disruption would be weaker for families in which children perceived their condition as less serious and evaluated themselves as more able to cope with pain, that is, when they made appraisals of low pain threat. Regarding children's coping with pain, we predicted that the relation of pain severity to maternal worry and family disruption would be stronger to the extent that children used more passive strategies for coping with pain.

In assessing family variables, we focused on changes that the mother attributed directly to the child's health. Mothers often have primary responsibility for caregiving and therefore may be especially vulnerable to worry and disruptions in personal activities when their children are ill (e.g., Hunfeld et al., 2001; Quittner, DiGirolamo, Michel, & Eigen, 1992). The family as a unit also may experience alterations in daily routines due to caretaking responsibilities and the unpredictability of the child's illness (e.g., Quittner, Opipari, Regoli, Jacobsen, & Eigen, 1992). Thus, we examined mothers' reports of worry and limitations in personal and family activities that they attributed to their child's health.

**Methods**

**Sample**

Participants were 130 consecutive new patients, ages 8–15 years ($M = 10.88$ years, $SD = 2.19$), who were referred to a pediatric gastroenterology clinic for the evaluation of abdominal pain, and their mothers. All patients had been seen by their primary care provider and referred for further evaluation. Patients were eligible if they had experienced chronic or episodic abdominal pain for 3 months or longer. Exclusionary criteria included a known chronic health condition, physical handicap, or mental retardation. Of the 229 patient families screened for eligibility, 57 (26%) failed to meet eligibility criteria, 18 (8%) declined, and 24 (10%) did not complete study measures, leaving a total sample of 130 patients and mothers. The sample was primarily Caucasian (95%) and female (57%). On the nine-point Hollingshead (1975) index of parental occupation, parents in these families had a mean occupational score of 5.3.

**Procedure**

This study was approved by the institutional review board of the study site. Clinic staff identified mothers of children scheduled for the evaluation of abdominal pain and contacted them several days before their initial
Abdominal pain and associated gastrointestinal symptoms were assessed by combining four items of the Abdominal Pain Index (API; Walker & Greene, 1989) with four items from the Children's Somatization Inventory (CSI; Garber, Walker, & Zeman, 1991) that assess gastrointestinal symptoms. The API assesses the frequency, duration, and intensity of abdominal pain episodes in the past 2 weeks. Participants were asked to rate the frequency of abdominal pain during this period on a six-point scale ranging from “not at all” to “every day.” The usual daily frequency of abdominal pain episodes was rated on a six-point scale ranging from “none” to “constant during the day.” The usual duration of pain episodes was rated on a nine-point scale from “none” to “all day.” The usual intensity of abdominal pain was rated on an 11-point scale ranging from “no pain” to “the most pain possible.” Items from the CSI included “stomach aches,” “nausea or upset stomach,” “bloating (gassy),” and “food making you sick.” Children rated the extent to which they had been bothered by each symptom in the previous 2 weeks on a five-point scale ranging from “not at all” to “a whole lot.” Responses to the eight items were standardized and averaged to yield an index of pain severity. Alpha reliability for this index was .81.

Threat Perception
Patients completed the Pain Beliefs Questionnaire (PBQ; Van Slyke, 2001; Walker et al., in press) regarding their abdominal pain. Following the theoretical work of Lazarus and Folkman (1984), the PBQ measures children’s perceptions of abdominal pain threat by combining scores from three conceptually derived subscales assessing primary and secondary appraisals. Primary appraisal is assessed with a PBQ subscale of 20 items referring to patients’ perceptions of the seriousness of their condition (e.g., “My stomach aches mean I have a serious illness”). Items are rated on a five-point scale ranging from “not at all true” to “very true” and are summed to yield a total score. High scores indicate primary appraisal of the condition as more serious. Eight items assessing the characteristics of abdominal pain episodes (e.g., “My stomach aches hurt worse than anything”) were excluded because of conceptual overlap with items in the index of abdominal pain severity. Alpha reliability for the remaining 12 items in this subscale was .74.

Secondary appraisal refers to perceived efficacy for coping with a stressor. The PFCP scale of the PBQ consists of six items referring to children’s perceived ability to ameliorate their pain (e.g., “When I have a bad stomach ache, there are ways I can get it to stop”). The EFCP scale consists of six items referring to children’s perceived ability to live with an unremitting pain condition (e.g., “I know I can handle it no matter how bad my stomach hurts”). Items are rated on a five-point scale ranging from “not at all true” to “very true” and are summed to yield total scale scores. High scores indicate the perception of low coping potential. Alpha reliability coefficients were .82 and .75 for the problem-focused and emotion-focused subscales, respectively. Each subscale was significantly correlated with the primary appraisal subscale, \( r(129) = .43 \) for problem-focused and \( r(129) = .50 \) for emotion-focused, all \( p < .001 \), and with each other \( r(129) = .65, p < .001 \).

The three subscale scores were standardized and averaged to create a threat perception index that reflects the combination of perceived seriousness of the condition and perceived efficacy for coping with pain. Thus, children with high perceived threat appraised their condition as serious and perceived themselves as having limited ability to cope with their pain. Alpha reliability for this summary index was .87.

Passive Pain Coping
Pain-coping strategies were assessed by child report on the Pain Response Inventory (PRI; Walker et al., 1997). The stem for each item on the PRI is “When you have a bad stomach ache, how often do you...,” followed by a statement describing a response to pain. The PRI comprises three conceptually derived subscales supported by confirmatory factor analysis: passive coping, active coping, and accommodative coping. Passive-coping efforts include self-isolation, restriction of activities, and assuming the worst (e.g., “think to yourself that it’s never going to stop”). Active-coping strategies include various types of problem solving to alleviate the pain (e.g., “try to do something to make it go away”). Accommodative-coping strategies include efforts to adapt to the pain, such as positive reappraisal (e.g., “tell yourself that it isn’t that big a deal”). Response choices for each item range from “never” to “always.” The PRI has demonstrated adequate construct validity and test-retest reliability, and the subscales have demonstrated satisfactory internal consistency. Moreover, its factor...
structure was replicated in cross-validation samples of children in fourth grade and in fifth through eighth grades, supporting its reliability in younger and older children (Walker et al., 1997). Alpha reliabilities for the subscales in this study were .90 for passive coping, .85 for active coping, and .87 for accommodative coping.

To distinguish between patients who reported similar levels of passive-coping strategies but varying levels of total coping efforts, researchers computed a passive-coping index by using the relative scoring method outlined by Vitaliano et al. (1987). The mean score of the passive-coping subscale was divided by the sum of the mean scores of the passive, active, and accommodative coping subscales. Thus, a high score on the passive coping index reflects a higher proportion of passive coping relative to other types of coping.

Maternal Worry and Family Activities
Mothers completed the Child Health Questionnaire—Parent Form 50 (CHQ-PF50; Landgraf, Abetz, & Ware, 1996), which assesses children’s health-related quality of life. The CHQ-PF50 was empirically derived from the full-length CHQ-PF98 (Landgraf et al., 1996). The CHQ is a measure of children’s health and quality of life comprising 14 conceptually derived health constructs. It was normed on a large national sample and has demonstrated adequate reliability and validity in both clinical and nonclinical samples (Landgraf et al., 1996). This study focused on the three subscale scores measuring mothers’ perceptions of how their child’s health affected their family. The parental impact–emotional subscale includes three items assessing the amount of “worry and concern” experienced in the past 4 weeks by the mother in relation to the child’s physical health, emotional well-being or behavior, and attention or learning abilities. Degree of worry is rated on a five-point response scale ranging from “none at all” to “a lot.” Alpha reliability for this scale was .75. The family activities subscale includes six items assessing the frequency of disruption in family activities in the past 4 weeks due to the child’s well-being (e.g., “how often has your child’s health or behavior interrupted various everyday family activities [eating meals, watching TV]?”). Each item is rated on a five-point scale that ranges from “very often” to “never.” Alpha reliability for this scale was .81. The parental impact–time subscale includes three items assessing the degree of limitations in time for personal activities and needs experienced by the mother in the past 4 weeks due to the child’s well-being (e.g., “were you LIMITED in the amount of time YOU had for your own needs because of your child’s physical health?”). Items are rated on a four-point scale ranging from “yes, limited a lot” to “no, not limited.” Alpha reliability for this scale was .79. On all three CHQ scales, high scores reflect better quality of life.

Results
Preliminary Data Screening and Analyses
Conversion of variables into z-scores revealed no potential outliers, and histograms indicated no problems with data distribution. Two mothers had missing items on the CHQ; therefore, some analyses were based on 128 participants. Table I presents the bivariate correlation matrix for the variables. As expected, children’s ratings of higher pain severity and higher threat were associated with significantly lower scores for all maternal and family variables, reflecting maternal ratings of more worry and family activity disruption due to their child’s well-being. Scores on the passive coping index were significantly correlated with limitations in family activities but were not associated with maternal worry or limitations in activities.

Regression Analyses
Overview of Regression Analyses
Hierarchical multiple regression analyses were conducted to examine the extent to which children’s threat perception and passive coping moderated the relation of pain severity to maternal worry, family activities, and mothers’ time for personal activities. Separate analyses were conducted for each outcome variable, and moderation was tested by using multiple regression techniques described by Baron and Kenny (1986). Abdominal pain severity was
entered into the first step of each equation, followed by a moderator variable (threat perception or passive coping) in the second step. Finally, the two-way interaction between pain severity and a moderator variable (perceived threat or passive coping) was entered into the equation in the third step. Before calculating interaction terms, scores were mean centered (means subtracted) to reduce problems with multicollinearity (Aiken & West, 1991).

Maternal Worry
Children's reports of greater pain severity were significantly related to maternal ratings of worry, $\beta = -.21$, $R^2 = .04$, $F(1, 128) = 5.67, p < .02$. Controlling for pain severity, children's perceived threat significantly predicted maternal worry, $\beta = -.20$, $\Delta R^2 = .03$, $F(2, 127) = 5.19, p < .01$, with higher threat associated with greater worry. The interaction between pain severity and perceived threat was not significantly related to maternal worry. In a separate analysis, passive coping did not have a significant direct or indirect relation to maternal worry.

Family Activities
Children's reports of pain severity were significantly related to maternal ratings of limitations in family activities due to the child's condition, $\beta = -.33$, $R^2 = .11$, $F(1, 126) = 15.41, p < .001$, with greater severity associated with more limitations in activities. Controlling for pain severity, higher perceived threat also was significantly associated with limitations in family activities, $\beta = -.24$, $\Delta R^2 = .05$, $F(2, 125) = 11.51, p < .001$. The interaction between symptom severity and perceived threat was not significant. Passive coping did not have a significant direct or indirect relation to family activities.

Mothers' Activities
Children's ratings of pain severity were positively associated with mothers' reports of limitations in their personal activities due to the child's condition, $\beta = -.19$, $R^2 = .04$, $F(1, 126) = 4.86, p < .03$. However, neither children's perceived threat nor passive coping had significant direct or indirect relations to the mother's time for personal activities. Second, even after controlling for pain severity, children's perceived threat explained significant additional variance in maternal worry and family activity limitations. Thus, regardless of the severity of their abdominal symptoms, when children viewed their pain condition as serious and evaluated their coping potential as low, mothers reported more worry about their children's health and were more likely to attribute restrictions in family activities and personal time to children's health. These findings suggest that both the severity of children's pain and children's beliefs about their pain are independently related to family adaptation. After controlling for pain severity, children's passive coping was not related to maternal worry or limitations in family activities; thus, maternal worry and family activities may be more closely linked to children's perceptions of threat than to the nature of their coping strategies.

Recent approaches to pain management emphasize that, rather than aiming to eliminate pain, it may be more effective to help patients accept and learn to live effectively with their pain (e.g., Dahl, Wilson, & Nilsson, 2004; McCracken, 1998), in other words, to reduce perceived threat. To the extent that interventions can reduce children's perceptions of high threat, mothers may experience some relief from worry and family activity restriction associated with the child's pain. In related research on a cognitive-behavioral pain treatment program, changes in patients' pain-related beliefs were associated with decreases in physical disability as rated by family members (Jensen, Turner, & Romano, 2001), demonstrating that changes in pain beliefs may influence patient pain behavior in ways that make it less disruptive for their families.

Although the CHQ used in this study is worded to reflect maternal perceptions of causality (e.g., "how much worry or concern did your child's physical health cause you?"), the study design was cross-sectional and does not answer questions about the direction of influence between variables. It is possible that children's perceptions of pain threat are communicated to their families and cause family members to worry and restrict their activities to care for the child. Alternatively, children's threat perceptions could develop as a reaction to maternal worry and changes in family routines. For example, maternal worry may instill in children the belief that their condition is indeed dangerous (Van Slyke, 2001; Walker, 1999). Maternal worry may increase children's anxiety about their pain condition, and restriction of family activities during pain episodes may draw continued attention to the pain. Both pain fear/anxiety and increased attention to pain may magnify the noxious
quality of pain episodes (Zeltzer, Bush, Chen, & Riveral, 1997). Thus, children and their families may find themselves in a situation in which children’s pain severity, perceived threat, family disruption, and maternal worry interact in an escalating cycle. Longitudinal investigations will be important for understanding these processes.

The modest amount of variance explained by the model suggests that factors other than pain severity and perceived threat influence the degree to which children’s pain is associated with maternal worry and disruption in family activities. This study is further limited by reliance on maternal and child self-report measures. Observational methods and father and sibling report are needed for a fuller understanding of family adaptation to pediatric chronic pain conditions. Finally, future research should extend beyond the tertiary care center to include patients seen in primary care settings.

These limitations notwithstanding, study findings extend the literature on families of pediatric pain patients to include the role of children’s pain threat perceptions. Specifically, they offer support for the relation of children’s pain appraisals to family adaptation. Our identification of the importance of threat perception highlights the need for health care providers to assess patients’ pain beliefs, correct any misperceptions about the seriousness of their pain, and help increase patients’ perceived efficacy in coping with pain.

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