Do Parent Protective Responses Mediate the Relation Between Parent Distress and Child Functional Disability Among Children With Chronic Pain?

Christine B. Sieberg,1,2 PhD, Sara Williams,1,2 PhD, and Laura E. Simons,1,2 PhD

1Division of Pain Medicine, Department of Anesthesiology, Perioperative and Pain Medicine, Children’s Hospital Boston and 2Department of Psychiatry, Harvard Medical School

All correspondence concerning this article should be addressed to Christine B. Sieberg, PhD, Pediatric Pain Rehabilitation Center, Children’s Hospital Boston at Waltham, 9 Hope Avenue, Waltham, MA, 02453, USA. E-mail: christine.sieberg@childrens.harvard.edu

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Objectives To examine whether protective parent responses mediate the relation between parent distress and child functioning. Methods At a pain clinic evaluation, 157 families participated. Parents completed measures of global distress (BSI-18), distress in the context of their child’s pain (BAP-PIQ), and protective responses to their child’s pain. Children completed measures of functional disability and pain. Results BAP-PIQ subscales were significantly associated with child functional disability, whereas BSI subscales were unrelated. Protective parent responses partially mediated the relation between parent distress and child functional disability for depression, anxiety, and catastrophizing. However, parent protective behavior fully mediated the relationship between parent helplessness and child functional disability, indicating that feelings of parent helplessness did not uniquely contribute to child functional disability. Discussion Results suggest that when treating youth with chronic pain, parental distress in the context of children’s pain needs to be addressed.

Key words parent distress; pediatric chronic pain; psychosocial functioning.

Introduction

Chronic pain in children is a serious and widespread public health problem, affecting approximately 15–25% of children (Goodman & McGrath, 1991; Roth-Isigkeit, Thyen, Stoven, Schwarzenberger, & Schmucker, 2005). Childhood chronic pain frequently impacts the entire family. Research examining the role of parent and family factors on outcomes for pediatric pain patients has focused on multiple domains, including aggregation of family pain complaints, parenting style, parental responses to child pain behavior, parent–child interaction, family environment, and overall family communication and functioning (Palermo & Chambers, 2005). While parent factors are widely agreed upon as a significant influence on children’s pain experience and outcomes, research is limited by a lack of clarity in distinguishing among variables as well as determining relations between them (Palermo & Chambers, 2005). Drawing upon two theoretical orientations, the current study seeks to examine the mediating role of parent responses to children’s pain on the relationship between parental distress, both globally and in the context of pediatric pain, and child functioning.

Parent Empathy and Social Learning

The theoretical examination of the role of parental empathy toward a child in pain highlights the important interplay between parental cognitive, emotional, and behavioral factors (Goubert et al., 2005). For example, parents are likely to have their own emotional reaction to having a child in pain. The resulting level of distress, which could be conceptualized as global or specific to children’s pain, relates to subsequent parental responses to their children. In this way, parents’ own emotional and behavioral
responses to children in pain are linked. Extending from the parent to the child, social learning theory provides a model for the way in which parental responses influence children’s outcomes in the context of pediatric pain (Bandura, 1977). Specifically, children learn how to respond to pain through watching parents’ own responses to distress as well as taking cues from parental protective behaviors directed toward them, such as having the child stay home from school when in pain (Connelly et al., 2010). Taken together, these theories provide a foundation for investigating the mechanism by which parent responses to children’s pain potentially explain the relationship between parent distress and children’s experience with pain and related outcomes.

**Parent Distress**

Emotional distress is high among parents of children with chronic pain conditions. Parents of pediatric pain patients demonstrate higher levels of anxiety, depression, and somatization compared to mothers of well children (Walker, Garber, & Greene, 1991) and at clinically significant levels (Campo et al., 2007; Emiroglu, Kurul, Akay, Miral, & Dirik, 2004). Parental distress among parents of pediatric pain patients has been shown to be predictive of poor child outcomes, including functional disability (Logan & Scharff, 2005; Wasserman, Whittington, & Rivara, 1988). Similarly, one study showed that parents of highly functioning pediatric pain patients reported significantly less parental stress, anxiety, and depression whereas parents of adolescents with high levels of pain-related disability reported elevated levels of parental stress, anxiety, and depression (Cohen, Vowles, & Eccleston, 2010). While these findings highlight the link between parent psychological distress and child functioning, they do not take into account how this important parent variable may contribute to this complex relationship, possibly through its influence on parent responses to children’s pain.

**Parent Responses to Child Pain**

Research on parent responses to children’s pain also has highlighted parent behaviors as a significantly influential factor on children’s pain and functional outcomes. There is substantial evidence to suggest that maladaptive parent responses to children’s pain, such as reassurance, solicitous, and protective parenting behaviors, increase children’s susceptibility to adverse outcomes in both clinical pain populations (Chambers, 2003; Claar, Simons, & Logan, 2008; Simons, Claar, & Logan, 2008) as well as for experimentally induced pain (Chambers, Craig, & Bennett, 2002; Walker, et al., 2006). Studies of acute pain have demonstrated that children require more restraints and express high levels of fear when parents provide reassurance during immunizations (Blount, Bunke, Cohen, & Forbes, 2001; Manimala, Blount, & Cohen, 2000; von Baeyer, 1997). Interestingly, one study found a relation between parenting responses and parental distress, such that parents who were trained to reassure their children during an immunization procedure were more distressed after the procedure was completed (Manimala et al., 2000). Studies of chronic pain have specifically linked parental protective responses to high levels of children’s functional disability (Langer, Romano, Levy, Walker, & Whitehead, 2009).

**Parent Distress and Responses to Child Pain**

While it has been established that both parent distress and responses to children’s pain exert significant influences on children’s pain and functional outcomes, few studies have specifically addressed how these parental variables may work together. Recently, one study examining the link between parental cognitions, distress, and responses to pediatric pain demonstrated that parent distress mediated the relation between parental catastrophizing about children’s pain and parental protective responses (Caes, Vervoort, Eccleston, Vandenhende, & Goubert, 2011). Another study investigating both parent and child factors found that parental responses, stress, and catastrophizing exerted an indirect influence on children’s function through children’s, not parents’, responses to pain (Vowles, Cohen, McCracken, & Eccleston, 2010). Additionally, a recent study found that parents’ emotional state, classified as positive or negative affect, was not associated with parent protective responses to having a child with Juvenile Idiopathic Arthritis (Connelly et al., 2010). With some research supporting the influence of parent distress on protective behavioral responses (Caes et al., 2011) and other findings not substantiating the relationship of distress influencing parent behavior (Connelly et al., 2010) or directly influencing children’s functioning (Vowles et al., 2010), this investigation set out to examine the potential mediating role of protective parent responses to children’s pain on the relationship between parent distress (measured globally and within the context of child pain) and child functional disability. Specifically, drawing on parent empathy theory, parent distress would be linked to parental behaviors, such that with greater parental distress, there would be greater protective responses to children’s pain (Goubert et al., 2005). Social learning theory would predict that children would then be influenced by parental distress to the degree that it motivated parents’ protective parental behaviors toward the child.
First, we examined the relationships between global parent psychiatric functioning variables (i.e., somatization, depression, anxiety) and variables related to parent psychological distress in response to having a child with pain (i.e., depression, anxiety, catastrophizing, helplessness) and how these parent distress variables relate to child functional disability. We hypothesized that both global and pain-specific parent distress would be associated with greater child functional disability. We also examined the extent to which parent protectiveness mediated the relationship between parent distress and child functional disability (Figure 1). We hypothesized that parent protectiveness would mediate the relations between both global parent psychological distress and pain-specific parent distress and child functional disability.

Method

Participants

All patients, aged 8–17 years, who underwent a multidisciplinary pain evaluation at a tertiary pain clinic in a large, urban northeast pediatric hospital between September 2009 and August 2010 were invited to participate. Of the 181 patients approached, 159 agreed to participate and 157 had sufficient data for inclusion. The total sample of 157 patients were primarily Caucasian (92%) and female (87%), reflective of the population of children seen in this tertiary care clinic setting. The mean age was 13.7 years (SD = 2.43). Primary pain diagnoses included musculoskeletal (33%), neuropathic (36%), headache (3%; including migraine, tension-type headache, combined and daily chronic headache), back/neck pain (10%), chronic abdominal pain (10%), gynecological/genitourinary (5%), and other pain (e.g., chest, ear, bladder) (3%). At the time of the evaluation, patients’ average pain rating, based on a 0–10 points numeric rating scale, was greater than 5 (M = 5.80, SD = 1.94) and mean duration of pain was greater than 2 years, M = 25.92 months (SD = 13.79).

Family socioeconomic status (SES) based on the four-factor index of social status (Hollingshead, 1975) ranged from 22 (semi-skilled workers) to 66 (business owner, professional), with a mean of 45.5 (SD = 12.9). Over half the mothers (55%) and fathers (53%) had a college degree or above. The majority of parents (82%) were married. The majority of respondents (94%) were mothers.

Measures

Parent Report

The Brief Symptom Inventory-18 (BSI; Derogatis, 2000) was used to measure global parent distress. The BSI consists of 18 self-report items assessing adult physical and emotional symptoms. It includes a three symptom dimensions: somatization, depression, and anxiety. T-scores were used in this study. Higher scores indicate higher levels of somatization, depression, and anxiety. Internal consistencies in this sample were 0.82 for somatization, 0.85 for depression, 0.87 for anxiety, and 0.93 for Global Distress.

The Bath Adolescent Pain-Parent Impact Questionnaire (BAP-PIQ; Jordan, Eccleston, McCracken, Connell, & Clinch, 2008) was used to measure parent distress in the context of children’s pain. The BAP-PIQ is a 64-item multidimensional self-report inventory with multiple scales to assess changes in parents’ functioning and behavior associated with parenting an adolescent with chronic pain. Subscales examined in this study were depression, anxiety, catastrophizing, and helplessness. Higher scores indicate higher levels of distress. The stem for each item is, “In the last 2 weeks living with my child in pain I have...” (e.g., “felt sad”; “not been able to get my mind off my worries”; “thought my child’s pain would get worse”; “thought that I had failed my child”). Internal consistencies in this sample were 0.83 for depression, 0.91 for anxiety, 0.74 for catastrophizing, and 0.84 for helplessness.

The Adult Responses to Children’s Symptoms (ARCS; Van Slyke & Walker, 2006) assesses parents’ responses to their children’s pain in three subscales: parent protective-ness, minimization of pain, and encouraging and monitoring. For the present study, the protective responses subscale of this measure was used. The stem for each item is, “When your child has pain, how often do you...?” Responses are rated on a 5-point scale ranging from “never” (0) to “always” (4), and subscale scores are computed by calculating the mean ratings for items on each subscale. Higher scores indicate higher levels of parent protective responses. Examples include: “bring your child special treats or little gifts,” and “let your
child stay home from school.” The internal consistency for the protectiveness scale in this sample was 0.84.

Child report
The Functional Disability Inventory (FDI; Walker et al., 1991) is a 15-item self-report measure assessing children’s perceived difficulty in physical and psychosocial functioning that is due to physical health. Children rate the degree to which they had any trouble completing activities in the past 2 weeks on a 5-point scale ranging from “No Trouble” to “Impossible.” Items are summed for a total score and higher scores represent higher levels of children’s perceived functional disability. The internal consistency for this measure in this sample was 0.91.

Finally, as part of the semi-structured interview with the clinical psychologist, children were asked to provide their typical/usual daily average pain rating on a standard 11-point numeric rating scale (von Baeyer et al., 2009).

Procedure
Study measures were collected in the context of the child’s multidisciplinary pain evaluation with a set of measures that is part of the standard clinical assessment battery and a portion of measures separately completed as part of a larger IRB-approved research protocol. The first portion of study questionnaires, including demographic forms, ARCS, and FDI, was mailed to families prior to the child’s evaluation as part of the standard clinical assessment. Parents and children were asked to complete those questionnaires independently and return them on the date of their appointment to aid in the clinical evaluation. If parents or children had not completed these questionnaires upon arrival to their appointment, they were asked to do so prior to the start of the evaluation. Pain ratings were obtained during the clinical psychologist interview. The second portion of study questionnaires, including the BAP-PIQ and BSI, was obtained through the IRB-approved research protocol assessing attitudes toward chronic pain in children and their parents. Parents and children were approached by a research assistant prior to their evaluation with consent/assent obtained for the use of data from the clinical assessment battery in addition to study measures.

Data Analyses
All analyses were carried out using SPSS version 17.0. We conducted descriptive statistics to test assumptions of normality in order to proceed with statistical analyses and examined the frequency of elevated psychological distress among parents per the BSI. Bivariate correlations for all variables of interest were examined with nonsignificant bivariate relations not included in subsequent regression equations in order to conduct a parsimonious number of mediation analyses. Based on these results, a series of hierarchical multiple regression analyses were conducted to examine the extent to which parent protective responses mediated the relations between parent distress and child functional disability (FDI). Bootstrapping as outlined by Preacher and Hayes (2008) was done to test the indirect effects for each mediation model.

Results
Descriptive Analyses
Table 1 presents the means, standard deviations, and bivariate correlations for all variables. Regarding parents’ clinically significant psychiatric distress, as measured by the BSI (T-score ≥ 60), 21% of parents reported elevated levels of depressive symptoms, 7% reported elevated anxiety, and 31% of parents reported elevated somatic symptoms. In regards to global severity of psychological distress, 30% of parents reported clinically significant scores.

Examining the bivariate correlations between parent psychiatric functioning as measured by the BSI and child functional disability, no bivariate correlations between parent psychiatric functioning and child functioning were significant. In contrast, when examining parent distress in the context of their child’s pain, as measured by the BAP-PIQ, each dimensions of parent distress was significantly correlated with child functional disability; specifically parent depression, anxiety, catastrophizing, and helplessness.

In order to examine potential covariates, child gender, age, and average pain rating were examined. Functional disability did not significantly differ across gender and was not associated with child age. Children’s average pain rating was associated with functional disability ($r = .39$, $p < .001$); and was therefore added as a covariate to subsequent regression analyses.

Overview of Regression Analyses
A series of hierarchical multiple regression analyses were conducted to examine the extent to which parent protective responses mediated the relations between parent pain-specific distress variables (BAP-PIQ) and child functional disability (FDI; see Table II). We did not examine global parent distress (BSI) further as it was unrelated to our outcome of interest, functional disability. Child functional disability served as the dependent variable in each equation. In the initial step of
each regression equation, pain as a covariate was inputted. In the next step, one of the pain-specific parent distress variables (i.e., depression, anxiety, catastrophizing, and helplessness) was entered. In the final step, the hypothesized mediator, parent protectiveness, was entered in each equation. Bootstrap resampling methods (Preacher & Hayes, 2008; Shrout & Bolger, 2002) were conducted for each mediation analysis to assess the indirect effect of the independent variable (parent distress) on the dependent variable (child functional disability) via the mediator (parent protective responses) when controlling for average pain rating.

Does Parent Protectiveness Mediate the Relation Between Parent Depressive Symptoms and Child Functional Disability?
The direct effect of parent depressive symptoms on child functional disability decreased from $\beta = .30, p < .01$ to $\beta = .23, p = .01$ after the mediator, parent protectiveness, was entered into the regression equation. The Bootstrap test of the magnitude of this decrease was significant indicating that protectiveness partially mediated the relation between parent anxiety symptoms and child functional disability ($\beta = .18, 95\%$ CI 0.02–0.39).

Does Parent Protectiveness Mediate the Relation Between Parent Anxiety Symptoms and Child Functional Disability?
The direct effect of parent anxiety symptoms on child functional disability decreased from $\beta = .29, p < .01$ to $\beta = .21, p < .05$ after the mediator, parent protectiveness, was entered into the regression equation. The Bootstrap test of the magnitude of this decrease was significant indicating that protectiveness partially mediated the relation between parent anxiety symptoms and child functional disability ($\beta = .18, 95\%$ CI 0.04–0.42).

Discussion
Many parents of children with chronic pain have high levels of distress (Campo et al., 2007; Emiroglu et al., 2004; Walker et al., 1991) and respond protectively to
their children when they are in pain (Connelly et al., 2010). Also, parent distress and protectiveness have both been associated with poor outcomes in children with chronic pain (Chambers, 2003; Claar et al., 2008; Levy et al., 2004; Logan & Scharff, 2005; Simons et al., 2008). This investigation sought to add to the growing literature examining important parental variables that exert their effect on child outcomes. Specifically, the current study sought to examine if parent protective responses to children’s pain mediates the relationship between parent distress and child functional disability. This hypothesis was partially supported.

Several interesting findings emerged that serve to further delineate the complex relations between parent and child behaviors in the context of pediatric chronic pain. Regarding parents’ global psychological functioning, it is noteworthy that one-fifth to nearly one-third of parents in this sample indicated clinical levels of distress. Specifically, 30% of parents reported clinically significant global psychological distress, which is similar to previously reported levels of global distress among parents of pediatric pain patients at 31% (Eccleston, Crombez, Scotford, Clinch, & Connell, 2004). Although many parents in the current sample reported high levels of global distress and all of the global distress subscales were significantly correlated with the pain-specific parent distress subscales, none of these global distress variables correlated with child functional disability. This is consistent with previous findings in which reports of global maternal depressive symptoms did not significantly predict functional impairments in adolescents with Juvenile Fibromyalgia Syndrome, despite reporting significantly greater depressive symptoms when compared with peer mothers (Kashikar-Zuck et al., 2008). Additionally, Eccleston et al. (2004) found a lack of association between global parent anxiety and depressive symptoms and child functional disability among adolescents with diverse chronic pain conditions. While Logan and Scharff (2005) found that maternal psychological distress was predictive of child functional disability, their sample was different than the

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| Note. Parent protective behavior as a mediator between parent distress and child functional disability. *p < 0.05, **p < 0.01.
present sample in that participants were recruited from both primary care and a variety of specialty clinics, not just pain management. Although it is unclear that this would account for the difference, the mean scores on measures of parental distress were within the normative range in their sample, which differs from the present sample.

It is less understood why global and pain-specific parent distress variables are closely linked to one another without the logical link to child outcomes. It may be that pain-specific parent distress is a more proximal variable related to child pain-related functioning, whereas global parent distress may be a more distal construct. Given the preponderance of parents who report clinically significant global psychological distress, parent mental health screening and inquiry to understand the complexities of parent distress are warranted.

Even with nonsignificant global distress findings, multiple dimensions of parent psychological distress in the context of parenting a child with chronic pain were associated with child functional disability. These findings suggest that parent psychological distress in the context of child pain not only provides important information regarding parent psychological functioning, but also associated with and likely influences child outcomes. Current directions in research and clinical work call for additional focus on parents of children with chronic pain conditions (Palermo & Eccleston, 2009). When working with families in the clinic setting, it may be beneficial to administer measures that examine both global distress and distress specific to the context of parenting a child with chronic pain to not only screen for parent mental health issues, but also to identify what degree parent pain-related distress could be impacting child functioning.

Parent protectiveness mediated the relationship between pain-specific parent distress and child functional disability. Specifically, parent protectiveness partially mediated the relationship between parent depression, anxiety, and catastrophizing and child functional disability and fully mediated the relationship between parent helplessness and child functional disability. These findings indicate that protective responses to child pain can explain the relationship between parent distress and child functional disability to some extent, but that parent distress also continues to contribute uniquely to child functional disability. This study supports previous findings that have found that parent distress influences protective behavioral responses (Caes et al., 2011) and extends those findings to emphasize the important role of both of these constructs for understanding child outcomes. Children’s functional outcomes are therefore likely influenced both by children’s observation of a parent in distress and the effect of the protective behaviors that parents place on them that are also motivated by that distress.

There are multiple implications from these findings for both future research and intervention in this pediatric pain population. Future research may be wise to assess parent distress in the context of children’s pain and parent behavioral responses to children’s pain in order to capture these unique dimensions of parent factors that contribute to children’s outcomes. Additionally, it may be worthy to explore the role of parents own pain experiences and pain history as well as parent modeling of pain and disability on child pain outcomes, as there is significant evidence to support their importance (Connelly et al., 2010; Kashikar-Zuck et al., 2008). Intervention with parents of children with chronic pain should consider assessing and targeting parent distress around parenting a child with chronic pain in addition to working on adaptive parenting responses to children’s pain behavior in order to address both of these factors that affect children’s symptoms and functional outcomes. Several innovative interventions have recently been developed specifically targeting parent behavior and distress (e.g., Hicks, von Baeyer, & McGrath, 2006; Levy et al., 2010). Interventions such as these are important examples of the successful translation of research on parent factors that influence children’s outcomes into clinical practice for children with chronic pain disorders.

The results of this study must be viewed in light of its limitations. First, the parents in this sample were almost all mothers, limiting our ability to examine the unique influence that the psychological distress and protective responses of fathers may have on child outcomes. This limitation is reflective of the majority of pediatric research with an effort to recruit fathers for research in this much needed area, particularly given recent findings that demonstrate differences in catastrophizing between mothers and fathers (Hechler et al., 2011). Second, longitudinal studies are needed to further understand the relationship between parent variables and pediatric outcomes. In this cross-sectional investigation, it was only possible to examine associations between parent and child behaviors concurrently; longitudinal studies would be able to investigate potential causal relations between parent and child behaviors which would further aid our understanding of these complex associations. Additionally, while parent distress and parent protectiveness are important to explain child outcomes, other variables should be identified to add to the models examining the impact of parent factors on pediatric pain outcomes. Future research should continue to explore parent and family variables
(e.g., sibling functioning, family environment) that may improve the prediction of child symptoms and functioning. Additionally, the measure of protectiveness used in this study (i.e., ARCS) might not be adequately capturing the full range of protective or solicitous pain responses parents might engage in. For example, additional clinically important behaviors (e.g., not letting a child participate in or discouraging normal physical activities) are not included on the scale. Future research should also include these other dimensions of protective responses and the impact such responses may have on child pain outcomes.

The present study underscores the importance of including parents and families in the assessment and treatment of pediatric chronic pain. Particularly, the findings from this study indicate that targeting parents’ psychological functioning, particularly in the context of their children’s pain, and protective behavior in response to children’s pain may be important in the treatment of functional disability in children and adolescents with chronic pain.

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