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Biopsychosocial Factors Associated with Parenting Stress in Pediatric Sickle Cell Disease

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Abstract

Caregivers of children with sickle cell disease (SCD) experience significant physical and emotional hardship with their child's disease management. Little is known about the potential contributors to parenting stress in pediatric SCD. The present study aimed to identify child and caregiver biopsychosocial factors associated with disease-related parenting stress in pediatric SCD. Participants included 74 caregiver-youth dyads. Parenting stress was associated with increased child pain frequency, more missed school days, and increased healthcare utilization, and inversely correlated with caregiver mental health and social-emotional functioning. Parenting stress also partially explained the relationship between child pain frequency and healthcare utilization after controlling for parent depression and anxiety. Parenting stress may play a unique and critical role in pediatric SCD and underscore the impact parenting stress may have on youth in medical and academic settings. Further research is warranted to determine risk factors and appropriate interventions for parenting stress to improve comprehensive patient care.

BACKGROUND

Sickle cell disease (SCD) affects millions of individuals worldwide and impacts approximately 1 in 400 African Americans in the United States (Hassell, 2010). Pain is a prevalent feature of SCD and can be both acute vaso-occlusive episodes and chronic in nature (Dampier et al., 2017; Field et al., 2019), which places a significant burden on

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patients and their families to prevent and manage pain (Oliver-Carpenter, Barach, Crosby, Valenzuela, & Mitchell, 2011). With appropriate training and supervision, most acute pain can be successfully managed at home (Dampier, Ely, Brodecki, & O'Neal, 2002; Noronha, Sadreameli, & Strouse, 2016); however, severe pain episodes are the leading cause for emergency department visits among individuals with SCD (Yusuf, Atrash, Grosse, Parker, & Grant, 2010). Most hospital visits for SCD pain are not preventable (Nimmer, Hoffmann, Dasgupta, Panepinto, & Brousseau, 2015), and home management presents a myriad of challenges for families (Ievers-Landis et al., 2001). The existing, albeit scant literature consistently suggests that caregivers of children with SCD experience significant physical and emotional hardship with their child's disease management (Barakat, Patterson, Tarazi, & Ely, 2007; Kuerten et al., 2020).

Caregivers of children with SCD spend a significant portion of time on technical and crisis care activities (Moskowitz et al., 2007), and they perceive helping their children cope with pain as difficult and emotionally upsetting (Ievers-Landis et al., 2001). In addition to minimizing pain episodes, caregivers are tasked with managing their child's academic, social, and emotional challenges associated with SCD (Ievers-Landis et al., 2001). Approximately one-third of children and adolescents with SCD miss at least 20 days of school per year, and over 40% report disease-related difficulties with school participation (Peterson, Palermo, Swift, Beebe, & Drotar, 2005; Schwartz, Radcliffe, & Barakat, 2009).

Children's transition to adolescence is often a source of distress for parents as they balance supervision and support with the child's increasing autonomy and independence (Melnyk, Feinstein, Moldenhouer, & Small, 2001). Parents have reported that SCD has a negative impact on parents' own friendships, employment, school, participation in activities, relationships, and interactions with their other children (Mitchell et al., 2007). A recent study found that caregivers of youth with SCD experience daytime fatigue, anxiety, impaired concentration, difficulty scheduling time for social activities, and difficulty managing daily activities such as household tasks (Kuerten et al., 2020).

Drawing from the broader pediatric chronic illness literature, there are several known contributors to increased parenting stress, such as severity of child's illness, parent mental health, parent sex, parent marital status, and social support (Pinquart, 2018). Palermo, Valrie, and Karson (2014) proposed a developmental framework in which family-level variables (e.g., family functioning, environment, life cycle stage) and parent-level variables (e.g., emotions, behaviors, parent medical history) have a bidirectional relationship with children's chronic pain experiences and responses. Additionally, those family and parent variables were proposed to have a bidirectional relationship with one another, indirectly influencing the child's pain experience (Palermo, Valrie, & Karlson, 2014). Less is known about the potential contributors to parenting stress in pediatric SCD specifically.

In fact, the majority of research on SCD-related parenting stress to date focuses on its prevalence and impact on the child, suggesting that higher parenting stress is associated with poorer child outcomes such as higher pain intensity, poorer psychological functioning, and more hospital admissions for pain (Barakat, Patterson, Daniel, & Dampier, 2008; Barakat, Patterson, Weinberger, et al., 2007). In one study, disease-related parenting stress was found

to mediate the relationship between child pain frequency and health-related quality of life (Barakat et al., 2008). Few studies have examined caregiver or family level factors that may influence SCD-related parenting stress. In SCD populations, financial hardship and lower family income have been associated with increased parenting stress and poorer caregiver functioning (Barakat, Patterson, Tarazi, et al., 2007; Kuerten et al., 2020). Caregiver mental health and adjustment have also been linked to increased disease-related parenting stress in SCD (Thompson, Gil, Burbach, Keith, & Kinney, 1993). A more comprehensive understanding of the factors influencing parenting stress in SCD is needed to optimize assessment and inform development of targeted parenting interventions that can enhance child functioning and disease management.

The primary aim of the present study was to identify child and caregiver biopsychosocial factors associated with disease-related parenting stress in pediatric SCD. We predicted that child and caregiver demographic risk factors (e.g., older age, lower income, single marital status), disease-related child clinical risk factors (e.g., disease severity, presence of disease-modifying treatments, higher pain frequency), greater healthcare utilization, and poorer caregiver physical and mental health would be associated with increased parenting stress. The secondary aim was to examine parenting stress as a mediator in the relationship between child pain frequency and healthcare utilization.

METHOD

Recruitment

Participants were children and adolescents with SCD and their caregivers, recruited from outpatient comprehensive SCD clinics at a tertiary care children's hospital. Youth were eligible if they had SCD, were aged 8 to 21 years, and were English-speaking (due to self-report measures being in English). Exclusion criteria included having comorbid acute or chronic pain conditions unrelated to SCD and having previously established diagnoses of cognitive or developmental disabilities. Caregivers were included if they were the child's parent, legal guardian, or served as the primary or supporting caregiver (e.g., grandparent) in the home and had English fluency.

Study procedures

Study procedures were approved by the hospital's institutional review board, and participants provided written informed consent and assent. Participants recruited by phone completed verbal consent and assent. Youth and parents completed web-based measures during a routine outpatient sickle cell clinic visit at the hospital or at home. Participants were provided the option to take home packets of paper-pencil questionnaires if time prohibited their participation in clinic or internet access was not available in the home.

Measures

Demographics and background information—Background and demographic information (e.g., youth and caregiver age, race, sex, annual family income, caregiver marital status, child SCD genotype, SCD treatment type [hydroxyurea, chronic transfusions], school days missed in the past academic year) was obtained from parents

via self-report. Child's SCD genotype was collapsed into two groups (HbSS/HbSβ^0, HbSC/HbSβ^+/Other) based on similarity of disease characteristics and clinical presentation. Healthcare utilization data (i.e., number of inpatient admissions in the 12-months prior to and 12-months following study enrollment) were obtained via medical chart review.

Child Pain Frequency—Youth self-reported the number of days they experienced pain in the past month (0–31 days) and for how long they have experienced pain at that frequency on a 5-point Likert-type scale (1=only this month to 5 = over 1 year). Items were adapted from prior research and have demonstrated high interclass correlations with parent-report of pain frequency and duration (Sil, Cohen, & Dampier, 2016). Pain frequency group was categorized as episodic or chronic. Chronic pain was defined based on published diagnostic criteria as pain frequency of ≥ 15 days per month with duration ≥ 6 months (Dampier et al., 2017). Youth who did not meet the definition of chronic pain were categorized as having episodic pain.

Pediatric Inventory for Parents (PIP)—The PIP is a 42-item instrument designed to measure stress in parents whose child has a chronic illness (Streisand, Braniecki, Tercyak, & Kazak, 2001). Parents rated difficult events (e.g., "Difficulty sleeping," "Watching my child have trouble eating," "Feeling helpless over my child's condition") on a 5-point Likert-type scale. For each item, parents rated the frequency (1=Never, 2=Rarely, 3=Sometimes, 4=Often, 5=Very often) and difficulty (1=Not at all, 2=A little, 3=Somewhat, 4=Very much, 5=Extremely) which yield separate frequency ("PIP Frequency") and difficulty ("PIP Difficulty") scores for the overall measure. PIP Frequency and Difficulty scale scores can range from 42 to 210, with higher scores indicating greater levels of parenting stress. The PIP has been utilized in various disease populations, including parents of children with chronic pain conditions and SCD (Logan, Radcliffe, & Smith-Whitley, 2002). Psychometric data for the PIP are strong, with high coefficient alphas for the total scores (PIP Frequency = .95, PIP Difficulty = .96) (Streisand et al., 2001).

Center for Epidemiological study – Depression Scale Revised (CESD-R-10)—The CESD-R 10 is a 10-item self-report questionnaire used to screen for symptoms of depression in the general population (Radloff, 1977; Van Dam & Earleywine, 2011). Parents indicated the frequency of each item during the past week (Rarely or none of the time = less than 1 day to All of the time = 5–7 days). Scores were converted to a 4-point Likert-type scale (0 to 3), with two items reverse scored. Greater total scores are indicative of more depressive symptoms. The CESD-R has demonstrated good psychometric properties, including high internal consistency (Cronbach α = .92) (Van Dam & Earleywine, 2011).

Generalized Anxiety Disorder Scale (GAD-7)—The GAD-7 is a 7-item instrument designed to screen for symptoms of anxiety (Spitzer, Kroenke, Williams, & Löwe, 2006). Parents indicated the frequency of each symptom during the past two weeks (0 = Not at all to 3 = Nearly every day). Total raw scores range from 0 to 21, with greater scores indicating more anxiety. The GAD-7 has strong internal consistency (Cronbach α = .92) and good test-retest reliability (intraclass correlation = 0.83) (Spitzer et al., 2006).

36-Item Short Form Health Survey (SF-36)—The SF-36 is a self-report instrument designed to assess overall quality of life in the general adult population (Ware & Sherbourne, 1992). Parents rated their general health currently and perceived change in health compared to one year ago. The measure yields subscales for eight health domains: Physical Functioning, Physical Role Functioning, Emotional Role Functioning, Vitality, Emotional Functioning, Social Functioning, Bodily Pain, and General Health. Scores were recoded to values between 0 and 100, with higher scores reflecting a more favorable health status. Physical Component Summary and Mental Component Summary scores were also computed to represent parent physical and mental health (Taft, Karlsson, & Sullivan, 2001). Reliability coefficients for the SF-36 domains ranged from 0.78 for the General Health domain to 0.93 for the Physical Functioning domain (McHorney, Ware Jr, Lu, & Sherbourne, 1994).

Statistical analyses

Preliminary analyses included descriptive statistics of the sample's demographics and self-report measure scores. Regression analyses were conducted to examine associations between parent physical health, parent depression, parent anxiety, youth healthcare utilization, and parenting stress. One-way analyses of variance (ANOVAs) were conducted to examine between-group differences in parenting stress scores as a function of youth's disease genotype, youth's treatment type, annual family income, and pain frequency group. Based on these preliminary analyses, two hierarchical multiple regression analyses were then conducted to examine the relative contribution of child and parent physical and psychological health variables for parenting stress frequency and difficulty, separately. Finally, mediation analyses were conducted using Hayes' PROCESS Model 4 (Hayes, 2012) to examine parenting stress as a mediator in the relationship between child pain frequency and healthcare utilization in the following year. Two mediation models were constructed in which child pain frequency was linked directly with healthcare utilization, and indirectly through parenting stress frequency or parenting stress difficulty, taking into account significant covariates. Bootstrapping with 5,000 samples was analyzed to produce a bias-corrected 95% confidence interval (CI). Confidence intervals that did not contain 0 indicated significant mediation. Significance was determined by the overall model for the indirect effect. All analyses were conducted in SPSS 26.0 for Windows, and the criterion for statistical significance was $p < .05$.

RESULTS

Participants

A total of 124 eligible participants were approached for the study, 93 child-parent dyads consented, and 83 initiated study procedures. Three families had more than 50% missing data on necessary parent-reported measures and were dropped from analyses. Six families had a second caregiver complete an additional battery of parent measures, which were also excluded from analyses due to the low frequency of completion. The final sample consisted of 74 caregiver-youth dyads. Youth were primarily African American (90.5%), with ages ranging from 9 to 20 years old (14.20 ± 2.47). The majority of patients had HbSS (75.7%) and were prescribed hydroxyurea as a disease-modifying treatment (81.1%).

Detailed sample demographics are summarized in Table I. Mean scores for parenting stress and parent quality of life for the present sample are summarized in Table II.

Parenting stress differences across child biopsychosocial variables

Parenting stress frequency and difficulty scores did not statistically vary as a function of child's age, SCD genotype (HbSS/HbSβ^0 vs. HbSC/HbSβ^+/Other), treatment type (i.e., prescribed hydroxyurea or receiving chronic transfusions), or annual family income (all p's > .05). However, parenting stress frequency (F[1,70] = 25.60, p < .001) and difficulty (F[1,68] = 10.91, p < .01) were significantly higher among parents of youth with chronic pain than parents of youth with episodic pain. Additionally, more missed school days were significantly associated with higher parenting stress frequency (f^2 = .076 t = 2.31, p = .024), but not parenting stress difficulty (f^2 = .055.; t = 1.93, p = .058). Mean parenting stress scores for child demographic/pain variables are summarized in Table III.

Regarding inpatient admissions, parenting stress frequency (f^2 = .193; t = 3.73, p < .001) and difficulty (f^2 = .082; t = 2.40, p = .019) were significantly correlated with number of admissions in the previous year as well in the following year (frequency: f^2 = .263; t = 4.35, p < .001; difficulty: f^2 = .167; t = 3.42, p = .001).

Parenting stress across parent biopsychosocial variables

The regression for parent age as a correlate of parenting stress frequency approached significance (f^2 = .056; t = 6.15, p = .054), and parenting stress difficulty was not significant (f^2 = .05; t = −1.83, p = .071). Parent marital status (single, married/partnered, separated/divorced/widowed) was not statistically associated with parenting stress frequency or difficulty (all p's > .05).

Correlation analyses suggest both parenting stress frequency and difficulty were significantly associated with multiple aspects of parent quality of life and emotional functioning, including Physical Role Functioning, Emotional Role Functioning, Vitality, Emotional Functioning, Social Functioning, and Bodily Pain, as well as parent depressive and anxiety symptoms. Parenting stress difficulty, but not frequency, was statistically associated with General Health. Neither parenting stress frequency nor difficulty were significantly associated with Physical Functioning. The SF-36 Mental Component Summary score was significantly correlated with both parenting stress frequency and difficulty. The Physical Component Summary score was not statistically associated with parenting stress frequency or difficulty. Results of regression analyses for quality of life subscales and parenting stress scores are summarized in Table V.

Child and parent predictors of parenting stress

Hierarchical multiple regressions were used to assess the relative contribution of significant child (pain frequency, school days, previous year hospital admissions) and parent (parent depression, anxiety, physical and mental health component summary) biopsychosocial variables in accounting for parenting stress. After accounting for child covariates, parent depression and anxiety remained significant predictors of parenting stress frequency (R squared change = .255, F change [4, 60] = 8.798, p = .025 for depression; p = .006 for

anxiety). For parenting stress difficulty, only parent depression remained significant (R squared change = .321, F change [4, 60] = 9.308, p = .046) but not parent anxiety (p > .05). Parent physical and mental health composite scores were not unique predictors of parenting stress frequency or difficulty (all p's > .05).

Mediation analyses

A mediation analysis was tested consisting of the direct and indirect associations among child pain frequency, parenting stress, and healthcare utilization in the following 12-months. There was a significant direct effect between child pain frequency and healthcare utilization in the following 12-months (b = 2.11, t = 2.81, p < .01). After controlling for parent depression and anxiety, results indicated that parenting stress frequency, $\alpha\beta$ = 1.08, 95% CI = [.10, 2.45], and parenting stress difficulty, $\alpha\beta$ = .56, 95% CI [.03, 1.40], were significant mediators of child pain frequency on healthcare utilization.

DISCUSSION

Caregivers play an integral role in managing their child's SCD and supporting transition to self-management. Given the significant burden pain and disease management can have on caregivers, understanding the role of parenting stress in SCD is critical. To date, few studies have examined the biopsychosocial factors that influence parenting stress in SCD. This study replicates and extends the pediatric SCD literature by exploring child and parent biopsychosocial variables that may exacerbate disease-related parenting stress for caregivers of children with SCD.

As expected, parenting stress was associated with increased child pain frequency, more missed school days, and increased healthcare utilization (i.e., number of inpatient admissions). These findings are consistent with and expand upon the results of previous studies that found increased parenting stress was associated with increased child disease severity and increased healthcare utilization, presumably related to additional SCD complications that likely require more disease management (Barakat et al., 2008; Barakat, Patterson, Weinberger, et al., 2007; Bioku et al., 2020; Pinquart, 2018). Although pain frequency and SCD complications tend to increase over the course of development (Shapiro et al., 1995), child's age, SCD genotype, treatment type, and annual family income were not meaningful contributors to parenting stress. This suggests that parenting stress within the context of higher child pain frequency may be further complicated by other factors, such as family density (Caccavale, Weaver, Chen, Streisand, & Holmes, 2015), caregivers' level of perceived support (Pinquart, 2018), or overall psychosocial risk (Karlson et al., 2012), that warrant further study.

Also congruent with existing literature (Kuerten et al., 2020; Thompson et al., 1993), parenting stress was inversely correlated with caregiver mental health and social-emotional functioning. This further suggests that the caregiver's personal experience and coping in relation to their child's chronic illness plays a salient role in disease-related parenting stress. A few specific aspects of caregiver physical health were significantly correlated with parenting stress, suggesting that poorer physical health may also be associated with increased parenting stress in SCD. Physical health may be negatively impacted by caregiver

medical conditions that were not directly assessed in this study. Future studies should consider alternate methods of measuring caregiver physical and mental health beyond self-report in order to further elucidate this relationship.

Both parenting stress frequency and difficulty partially explained the relationship between child pain frequency and healthcare utilization after controlling for parent depression and anxiety. This suggests that the parenting stress related to managing child pain at home may partially drive the connection between pain frequency and healthcare utilization. It is possible that as caregivers and children both engage in pain management strategies at home without meaningful relief, the reciprocal influence of increased child's pain and increased parenting stress contributes to greater healthcare use. In combination with the non-significant associations between parenting stress and child demographic variables, these findings also suggest that increased parenting stress is perhaps more likely associated with the child's functional impairment requiring caregiver involvement (i.e., pain management, school absence, hospitalization) than with static demographic variables or clinical characteristics as has been demonstrated in the chronic illness literature more broadly (Cousino & Hazen, 2013).

The present study should be considered within the context of its limitations and future directions. Although our sample was diverse in terms of youth age, sex, caregiver marital status, and annual family income, a larger sample size may have captured greater variability of SCD genotypes, disease-modifying treatments, and observed parenting stress scores to enhance generalizability to the SCD population. Our caregiver sample also primarily consisted of mothers and only families who presented to clinic. The cross-sectional study of parenting stress limits the ability to examine potential changes over time, and future studies should consider a longitudinal approach. Future studies may also consider the development and evaluation of measures to rigorously assess SCD-related pain frequency to further differentiate chronic SCD pain. Despite these limitations, this study highlights the need to assess parenting stress as an integral component of comprehensive SCD care to help optimize both parent and child functioning and SCD self-management.

As we continue to gain a more comprehensive understanding of how parenting stress is related to child pain and healthcare outcomes, an important next step is to understand the mechanisms driving disease-related parenting stress. Identification of these variables could provide an opportunity to anticipate and address disease-related parenting stress in SCD through parent-focused interventions to ultimately minimize the potentially harmful impact of parenting stress on youth. Our findings indicate that parenting stress may play a unique and critical role in pediatric SCD. The present study highlights the paucity of existing research on disease-related parenting stress within this population and underscores the significant impact parenting stress may have on youth in medical and academic settings. Given the potentially salient function of parenting stress in SCD, further research is warranted to determine parenting stress risk factors and appropriate interventions to improve comprehensive patient care.

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Table I

Sample demographics

Youth			
Child age (M, SD)	14.20, 2.47		
Female sex	41, 55.4%		
Child race (n, %)			
African American	67, 90.5%		
Multi-Racial	2, 2.7%		
Caucasian	1, 1.4%		
Other	2, 2.7%		
Hemoglobin type (n, %)		Hydroxyurea	Chronic transfusions
HbSS	56, 75.7%	50	9
HbSC	10, 13.5%	6	1
HbSβ^{+}	6, 8.1%	2	0
HbSβ^{0}	1, 1.4%	1	1
HbSO – Arab	1, 1.4%	1	0
SCD treatment type (n, %)		60, 81.1%	11, 14.9%
Caregiver			
Caregiver age (M, SD)	41.39, 7.78		
Female sex	69, 93.2%		
Relation to Child			
Biological parent	68, 91.9%		
Legal Guardian	2, 2.7%		
Aunt/Uncle or other relative	2, 2.7%		
Step-parent	1, 1.4%		
Caregiver ethnicity (n, %)			
African American	65, 87.8%		
Multi-Racial	4, 5.4%		
Other	5. 6.8%		
Marital status			
Married/partnered	29, 39.2%		
Single	24, 32.4%		
Separated/divorced	15, 20.3%		
Widowed	2, 2.7		
Annual family income			
≤$20,000	19, 25.7%		
$20,001–50,000	26, 35.1%		
≥$50,001	20, 27.0%		
Missing/Prefer not to answer	9, 12.2%		

Highest grade completed			
High school or GED	10, 13.5%		
Some college or trade	20, 27.0%		
College or trade	26, 35.1%		
Graduate or professional degree	9, 12.2%		
Caregiver SCD (n, %)	15, 20.3%		
HbSS	8, 10.8%		
HbSC	3, 4.1%		
HbSβ^{+}	1, 1.4%		
HbSβ^{0}	1, 1.4%		

Table II

Descriptive Statistics on Caregiver and Youth Psychosocial Variables

	M, SD
PIP	
Frequency of Parenting Stress	99.21, 36.16
Difficulty of Parenting Stress	84.88, 36.70
SF-36	
Physical Functioning	79.91, 26.22
Physical Role Functioning	75.85, 26.68
Emotional Role Functioning	79.85, 26.58
Vitality	60.56, 18.71
Emotional Functioning	66.89, 22.99
Social Functioning	70.27, 28.35
Bodily Pain	67.95, 25.70
General Health	64.96, 22.76
Physical Health Composite	48.22, 10.21
Mental Health Composite	47.51, 10.94
Missed school days	15.97, 19.65
Healthcare utilization	
Hospital admissions in year prior	2.05, 3.30
Hospital admissions in year following	2.50, 3.22
CESD-R-10	8.39, 6.32
GAD-7	4.65, 4.89

Table III

Differences in Parenting Stress Frequency and Difficulty across demographic and clinical characteristics

	PIP Frequency (M, SD)	F	p	PIP Difficulty (M, SD)	F	p
Youth phenotype		.749	.390		.007	.933
HbSS/HbSβ⁰ (n=57)	101.19, 32.63			84.68, 34.85		
HbSC/HbSβ⁺/Other (n=17)	92.53, 46.66			85.56, 43.82		
Youth treatment type						
Hydroxyurea (n=60)	102.47, 24.07	2.177	.145	85.84, 38.03	.007	.933
No hydroxyurea (n=13)	86.23, 44.13			86.77, 38.03		
Chronic transfusions (n=11)	98.73, 29.67	.001	.977	75.64, 31.18	1.148	.288
No chronic transfusions (n=61)	99.07, 37.47			88.24, 36.55		
Youth pain frequency		25.60	<.001 *		10.91	.002 *
Episodic (n = 41)	83.88, 31.43			73.00, 29.44		
Chronic (n = 31)	121.26, 30.51			100.61, 40.47		
Annual family income		.305	.822		.472	.703
≤$20,000 (n=19)	104.05, 40.07			89.47, 40.59		
$20,001–50,000 (n=26)	100.85, 31.08			87.42, 33.33		
≥$50,001 (n=20)	95.70, 40.27			83.20, 36.83		

* $p<.05$

Table IV

Hierarchical multiple regressions of predictors of parenting stress

		PIP Frequency			PIP Difficulty		
Model		**Beta**	**p**	**R^2 change**	**Beta**	**p**	**R^2 change**
1			<.001**	.310		.010*	.161
	Child pain frequency	.414	.001**		.297	.024*	
	Missed school days	.054	.645		.090	.482	
	Admissions in year prior	.203	.101		.110	.416	
2			<.001**	.255		<.001**	.321
	SF-36 Physical Health Composite	.070	.479		-.047	.662	
	SF-36 Mental Health Composite	.093	.532		-.158	.328	
	Parent depression	.323	.025*		.313	.046*	
	Parent anxiety	.345	.006**		.176	.193	

* $p<.05$

** $p\leq.01$

Table V

Correlations among parent psychosocial functioning

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1. Parent Depression Total Score	1	.622**	−0.174	−.537**	−.365**	−.673**	−.716**	−.661**	−.362**	−.406**	−0.195	−.719**	.476**	.561**
2. Parent Anxiety Total Score		1	−0.145	−.387**	−.393**	−.617**	−.568**	−.559**	−.330**	−.397**	−0.159	−.620**	.552**	.530**
3. SF-36 Physical Functioning			1	.692**	0.141	0.143	0.196	.359**	.550**	.445**	.891**	−0.074	−0.152	−0.156
4. SF-36 Physical Role Functioning				1	.323**	.379**	.357**	.593**	.641**	.535**	.811**	0.223	−.348**	−.383**
5. SF-36 Emotional Role Functioning					1	.292*	.300**	.312**	.294*	0.196	0.068	.554**	−.502**	−.488**
6. SF-36 Vitality						1	.660**	.653**	.436**	.503**	0.222	.731**	−.423**	−.438**
7. SF-36 Emotional Functioning							1	.702**	.395**	.454**	0.094	.884**	−.310**	−.406**
8. SF-36 Social Functioning								1	.626**	.692**	.476**	.720**	−.298**	−.455**
9. SF-36 Bodily Pain								.	1	.540**	.762**	.284*	−.284*	−.381**
10. SF-36 General Health										1	.655**	.394**	−0.214	−.279*
11. SF-36 Physical Health Composite Score										.	1	−0.083	−0.149	−0.186
12. SF-36 Mental Health Composite Score												1	−.403**	−.514**
13. Frequency of Parenting Stress													1	.698**
14. Difficulty of Parenting Stress														1

*$p<.05$

**$p\leq.01$

Table VI

Mediation analyses of the indirect effect of parenting stress on child pain frequency and child healthcare utilization in the following year

IV	M	DV	IV on M (Path a)	M on DV (Path b)	Indirect Effect (a × b)	Direct Effect (Path c')
			Est. (SE)	*Est. (SE)*	*Est. (95% CI)*	*Est. (SE)*
Child pain frequency	Parenting stress frequency	Healthcare utilization in following year	6.3282	.0134	.1015–2.4447	.8038
	Parenting stress difficulty		7.0405	.0127	.0261–1.3974	.7722

Note. IV=independent variable; M=mediator; DV=dependent variable