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Health care utilization for pain in children and adolescents: a prospective study of laboratory and non-laboratory predictors of care-seeking

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Abstract

Background—Few studies have focused on identifying predictors of medical consultation for pain in healthy children and adolescents.

Objective—This investigation sought to identify parent and child laboratory and non-laboratory predictors of pediatric healthcare utilization for pain problems.

Study group—Participants were 210 healthy children and adolescents (102 girls), aged 8–17 years who took part in a laboratory pain session.

Methods—Three months after the laboratory session, participants were contacted by telephone to ascertain whether they had experienced pain and whether they had seen a healthcare professional for pain. Zero-order correlations among sociodemographics, child laboratory pain responses, parent physical/mental health status and medical consultation for pain were conducted to identify relevant correlates of pediatric healthcare utilization; these correlates were subjected to multivariate analyses.

Results—Bivariate analyses indicated that higher anticipated pain and bother for the cold pressor task, as well as poorer parent physical health status, were associated with pediatric medical consultation for pain, but only among girls. Sequential logistic regression analyses controlling for child age indicated that only parent physical health status, not the laboratory indicators, significantly predicted healthcare consultation for pain among girls. No parent or child correlates of care-seeking for pain emerged for boys.

Conclusion—The findings suggest that parents' perceived physical health plays a role in determining whether medical care is sought for pain complaints in healthy girls. These results suggest that interventions to assist parents in managing their own physical health problems may lead to reductions in medical consultation for girls' pain.

Keywords

pediatric health care; parent health status; parent-child relationship; experimental pain; acute pain

INTRODUCTION

Various factors have been found to influence health care utilization (HCU) for children and adolescents with chronic or recurrent pain. These include parent characteristics such as elevated psychological distress (1) and child characteristics such as increased pain severity and frequency, younger age, female sex, and lower socioeconomic status (2,3). However, predictors of healthcare utilization for pain problems among healthy children and adolescents are less well understood.

In previous prospective research focusing on a healthy cohort of youth, we examined the relationship between laboratory pain reactivity as assessed by responses to the cold pressor task (CPT) and subsequent school nurse visits over a two-year period. Although laboratory pain responses were not related to nurse visits, female sex was associated with more frequent nurse visits (4). In additional work with this cohort, we found that among girls, higher self-reported pain symptom scores predicted more total nurse visits and more visits for complaints with documented physical findings, whereas these associations were not evident among boys (5). Nevertheless, for both boys and girls, higher pain scores predicted more nurse visits for complaints *without* documented physical findings.

This prior research was unusual in that it was conducted at a school with an “open policy” for nurse visits (i.e., pupils may seek care without teacher or parent permission). Typically however, decisions to seek pediatric healthcare are initiated by parents. A recent review of factors underlying general pediatric HCU (6) highlighted the link between maternal psychopathology and greater HCU for children (7–9); although negative findings have also been reported (10–13). Among children with recurrent abdominal pain, higher levels of maternal worry and fear about the child’s abdominal symptoms (14), and maternal psychological distress (1) have been linked with greater pediatric HCU.

Few studies however, have examined the role of parent physical health in influencing pediatric HCU. This deficit is surprising as it is reasonable to believe that parent’s own perceived levels of physical health limitations and/or disability would be an influential factor in decisions to seek healthcare for their child. Earlier studies in the general pediatric population have found a robust relationship between maternal patterns of HCU and utilization patterns for their children (7,12,15,16) but the direct influence of parent physical health status on pediatric HCU was not tested. In two rare studies, Levy et al found that children of parents with irritable bowel syndrome (IBS) had significantly more medical visits than did children of non-IBS controls (17,18). Comparable work examining the role of parent physical health status on pediatric HCU for pain in healthy samples has not been conducted.

This study aimed to extend our prior research by examining sociodemographic, parental, and child laboratory and non-laboratory predictors of pediatric HCU for pain in a large cohort of healthy children and adolescents during the 3 month period after they completed a laboratory pain session. We wished to test the role of parents’ own perceived physical and mental health status as well as their children’s responses to the cold pressor task in determining HCU specifically for pain among these children. We hypothesized that heightened child laboratory pain responsivity and female sex would predict more medical consultations for pain. We also hypothesized that poorer parent mental and physical health would predict more child medical visits for pain.

METHODS

Participants

Participants were 244 non-clinical children and adolescents (124 girls; 50.8%) (mean age: 12.7 years; $SD = 3.0$, range = 8 – 18) who took part in a laboratory study on puberty and pain responses. The wide age range of the current sample was intended to include youth representing all stages of puberty. Parents of the child participants completed questionnaires about their own and their child's pain and health status at the time of the laboratory session. Details regarding the measures are given below; only those measures relevant to the current investigation are included herein. Of the 244 youth who participated in the laboratory study, 225 (92.2%) completed a brief telephone survey (described below) to assess whether they experienced pain at least once a month and whether they visited a healthcare professional for the pain in the 3 month period following the laboratory session. Of 225 participants who completed the telephone survey, 12 participants were excluded either because the "parent" measures were completed by a relative other than the parent or relationship data were missing; 3 additional participants were excluded due to missing data. The final sample consisted of 210 youth (102 girls; 48.6%) and their parents; additional demographic information for the final sample is displayed in Table 1.

Participants were recruited via mass mailing, posted advertisements, and classroom presentations. Potential participants were initially screened by telephone to determine study eligibility. Youth were included if, by parent-report, they did not have an acute or chronic illness, i.e., heart condition or arthritis, recent surgery on, or an injury to any limb, history of frostbite, history of fainting spells, or developmental delay. A trained research assistant asked parents whether their child met any of the following exclusionary criteria: (1) acute or chronic illness (as defined above); (2) developmental delay or significant anatomic impairment that would preclude understanding of study procedures (e.g., developmental age of <8 years), or participation in pain induction procedures (e.g., arm immersion in cold water); or (3) daily use of opioid medication. After verbal consent was obtained from a parent, informed parent consent and child assent forms were mailed for review and signature. The university Institutional Review Board (IRB) approved all study procedures.

Procedure

The procedure for the laboratory pain study has previously been described in detail (19). In brief, at the laboratory session, child participants and the accompanying parent were escorted to separate rooms and there was no contact between them until after the session was completed. Parents completed questionnaires either at home prior to the session or at the laboratory on the day of the session. Children completed questionnaires administered by an experimenter and were then exposed to three laboratory pain tasks (pressure, heat, and cold pressor) presented in counterbalanced order. Only data from the cold pressor task (CPT) is reported herein (see description below); details and results of the other laboratory pain tasks are reported elsewhere (19). Before the start of each pain task, participants were informed that they would experience moderate sensation, which may eventually be perceived as pain; they were instructed to continue with the trial for as long as they could, withdrawing if it became too uncomfortable and/or painful. Participants received a \$30 video store gift certificate and a T-shirt for their participation.

Cold Pressor Task—A 38 cm wide, 71 cm long, and 35 cm deep ice chest fitted with a plastic mesh screen to separate crushed ice from a plastic mesh armrest was used. A pump circulated the water maintaining the temperature at 10° C. Participants placed the non-dominant hand in the water for as long as they could with an uninformed three-minute ceiling.

Measures

Sociodemographic characteristics—Sociodemographic characteristics were assessed at the time of the laboratory session using a survey developed for the purposes of this study. This measure was completed by parents; it assessed the child's age, sex, race/ethnicity, and the highest level of education attained by the mother.

Anticipated Laboratory Pain Intensity and Pain Bother—Prior to undergoing the CPT, children were asked to rate how much they anticipated the task would hurt and how much they anticipated the task would bother them. For these ratings, children used a vertical sliding visual analog scale (VAS) anchored with 0 at the bottom indicating the least amount and 10 at the top indicating the greatest amount. Children were asked, "How painful do you think the task will be?" and "How much do you think the task will bother you?" The scale also had color cues, graded from white at the bottom to dark red at the top, as well as a neutral face at the bottom and a negative facial expression at the top.

Short-Form 12 (SF-12) (20)—The SF-12 was completed by parents at the time of the laboratory session. The SF-12 is a widely used and well-validated measure of health status in adults. It yields two psychometrically-based summary scores: a physical health summary score and a mental health summary score. These scales are transformed to have a mean of 50 and a standard deviation of 10 in the general United States (US) population. Scores above and below 50 are therefore above and below the average, respectively, in the general US population. Higher scores indicate better health status.

Pain and healthcare utilization for pain—Pain and healthcare utilization for pain were assessed using a survey developed for the purposes of this study. Three months after the laboratory session a research assistant telephoned each child and asked whether he or she had experienced any of the following pain problems at least once a month in the past 3 months (yes/no): headaches, stomachaches/belly pain, pain in the arms or legs, chest pain, menstrual period cramps, jaw/mouth pain, back pain, other pelvic pain, other pain. Children who reported experiencing pain were asked whether they had seen a healthcare professional (e.g., doctor, dentist) for the pain in the prior 3 months (yes/no).

RESULTS

Statistical Analysis

Bivariate analyses were conducted to initially examine the relationships among the study variables prior to multivariate modeling. To test for sex differences, independent *t*-tests and chi-square tests for continuous and categorical data respectively were conducted. Chi-square tests were conducted to examine differences based on maternal educational level (high school diploma or less, some college, college degree, post-graduate degree) and child race/ethnicity (Caucasian vs. non-Caucasian). Pearson product moment correlation coefficients were generated to characterize the association between age and the study measures. Zero-order correlations among the study measures were also examined to identify relevant correlates of HCU for pain for the multivariate analyses. An uncorrected α level of .05 (two-tailed) was used to evaluate these bivariate results (corrections to the α level were applied to the confirmatory analyses—see below).

For the confirmatory multivariate analyses, sequential logistic regression was used to test the association between the significant correlates identified in the bivariate analyses and the likelihood of visiting a healthcare professional for pain. Information regarding the specific variables entered into the regression models is discussed below. A Bonferroni correction for the two main classes of data (child and parent measures) was used to reduce the likelihood

of Type 1 error. Therefore, a corrected α level of .025 (two-tailed) was used to evaluate the confirmatory results.

Bivariate Results

Table 1 displays descriptive data for girls, boys and the total sample. As shown in the Table, boys and girls did not differ in the likelihood of reporting pain, the mean number of pain problems, or the likelihood of visiting a healthcare professional for pain. Child age, child race/ethnicity, mother educational level, and parent SF-12 physical and emotional health summary scores were comparable for boys and girls (see Table 1). Parents' physical and emotional summary scores were within the normative range. Youth who reported pain did not differ from those who did not report pain based on child age, mother education, or child race/ethnicity. Youth who visited a healthcare professional for pain did not differ from those who did not based on mother education or child race/ethnicity. However, age was significantly correlated with healthcare utilization for pain ($r = .18, p < .05$), indicating that older age was associated with an increased likelihood of care-seeking.

Table 2 shows the types of pain problems reported by boys, girls, and the total sample. As displayed in the Table, the most common pain problem was headaches, followed (in order) by stomachaches, pain in arms/legs, back pain, jaw/mouth pain, other pain, chest pain, and other pelvic pain. In addition, approximately a quarter of girls reported menstrual pain. Excluding menstrual pain, there were no sex differences in the prevalence of any particular pain problem.

Although there were no significant differences between boys and girls in the presence or type of pain problem or in the likelihood of visiting a healthcare professional for pain, prior work has indicated substantial sex differences in adolescent's laboratory pain responses (19). Therefore, additional analyses were conducted separately for boys and girls. Partial correlations controlling for age indicated that for girls, anticipated pain ($r = .29, p < .01$) and anticipated bother ($r = .24, p < .05$) for the CPT were significantly positively correlated with visiting a healthcare professional for pain. Thus, greater anticipated laboratory pain and bother among girls were associated with an increased likelihood of healthcare utilization. In addition, parent physical health summary scores was inversely correlated with the child visiting a healthcare professional for pain ($r = -.31, p < .01$), indicating that poorer parent physical health status was associated with an increased likelihood of care-seeking for girls. For boys however, no significant correlates of HCU emerged in the bivariate analyses.

Multivariate Results

Table 3 shows the results of the sequential logistic regression analysis, which was conducted only in girls. Based on the results of the bivariate analyses, age was entered in Step 1, followed by anticipatory pain for the CPT, anticipatory bother for the CPT, and parent physical health summary scores in Step 2. Six outliers with studentized residuals in excess of two standard deviations were identified and excluded. There was a good model fit (discrimination among groups) ($\chi^2(8) = 10.69; p = .22$; Log likelihood = 25.19); the overall model explained 29% of the variance in group membership (Cox & Snell R^2). As shown in the Table, after controlling for age in Step 1, inclusion of the laboratory measures and parent physical health summary scores in Step 2 reliably improved model fit. However, only parent physical health summary scores emerged as a significant predictor of care-seeking for pain in girls after controlling for age. The significant odds ratio (OR) in Table 3 indicates that a 1 unit decrease in parent physical health summary scores increased the likelihood of visiting a healthcare professional by 0.80 units. For age, the significant OR in Table 3 indicates that a 1 unit increase in age increased the likelihood of healthcare utilization for pain by 2.90 units among girls.

Although maternal education was not correlated with care-seeking in the bivariate analyses, we wished to examine whether parent physical health summary scores predicted HCU in girls independent of socioeconomic status (SES), particularly because additional analyses indicated that parent physical health summary scores were correlated with mother education in girls ($r = .21, p < .04$). Therefore, the analysis was repeated with mother education entered in Step 1 (together with child age) and the identical variables for the confirmatory analyses noted above in Step 2. For mother education, high school diploma or less was the reference category. The results were identical to the confirmatory results reported above. The OR for parent physical health status was 0.79 (vs. 0.80 in the original confirmatory analyses). As expected based on the bivariate results, mother education was not significantly associated with HCU for pain in girls.

DISCUSSION

The current findings extend our prior efforts at identifying sociodemographic, parental, and child predictors of medical consultation for pain in healthy children and adolescents (4,5). Multivariate analyses indicated that for girls only, parent's physical health status was a key predictor of HCU for adolescent's pain. Poorer parent health status was associated with an increased likelihood of girls visiting a health care professional for pain during a roughly 3 month period following a laboratory pain session. For every 1 unit decrease in parent physical health status, the likelihood of girls visiting a provider for pain increased by 0.80 units (see Table 3). This effect held even after controlling for mothers' educational level. Parents' mental health status was not associated with pediatric care-seeking for pain. Girls' laboratory pain responses were not predictive of HCU for pain after accounting for parent physical health status, although bivariate analyses indicated that girls' anticipated pain and bother for the cold pressor task were significantly correlated with utilization. Among boys, however, no parent or child correlates of HCU emerged. Approximately half of the current sample of youth ($n = 120$; 62 girls) completed a measure of physical and mental health status [The Children's Health Questionnaire or CHQ (21)] comparable to that completed by the parent. Additional analyses found no relationship between children's own perceived physical or mental health status and medical consultation for pain in this subset of participants.

Our findings are in accord with those of Levy and colleagues who reported that children of parents with IBS had more clinic visits for both gastrointestinal (GI) and non-GI symptoms compared to controls (17,18). Yet, our results diverge somewhat from Levy et al's in that the observed relationship between parent physical health status and medical consultation for children's pain was evident only for girls. In contrast to Levy et al, we did not select a parent population with a chronic illness and it is possible that boys and girls alike are impacted when parents experience chronic health conditions. Unlike Levy et al, we only assessed utilization specifically for pain complaints; our results may have differed had we assessed HCU for a broader range of symptoms. In contrast to previous reports indicating a link between maternal psychological distress and child HCU [see review by Moran & O'Hara (6)], we did not find an association between parent mental health status and pediatric HCU for pain. Nevertheless, it should be noted that other investigators have also failed to find such a relationship (10–13). As discussed by Moran & O'Hara (6), these conflicting results may be due to variation in the assessment of maternal psychopathology and/or pediatric HCU.

The present results are also consistent with our own earlier work indicating no association between the pain responses of youth to the cold pressor task and subsequent visits to a school nurse (4,5). The prior research was conducted in a school with an "open system" for nurse visits, meaning that youth were able to self-initiate care without permission from

teachers or parents. In the current study, we did find significant bivariate correlations between anticipated pain and bother for the cold pressor task and HCU for pain among girls. However, in multivariate analyses, the contribution of the laboratory indicators to healthcare use was overshadowed by that of parent physical health. Taken together, our work suggests that laboratory pain indicators show only weak associations with pediatric HCU for pain. The current results are also consistent with our previous research indicating significant sex differences in the relationship between children's pain symptom scores and nurse visits in the aforementioned open system, in which girls generally demonstrated stronger relationships between pain symptoms and care-seeking (5). As noted above, in the current study we did not find any significant relationships between parent or child characteristics and HCU for pain among boys suggesting that additional work is needed to identify relevant predictors of utilization in this population.

Levy et al (18) have proposed that the mechanism responsible for the effect of parent health status on children's symptom reporting and subsequent medical consultation may be modeling, defined as the observation of and imitation of another's behavior. Levy and colleagues suggest that youth may be modeling their parents' illness behaviors, i.e., the ways in which people perceive, evaluate and react to somatic sensations that might indicate disease, and as measured by symptom reports, disability days, and medical visits. For example, youth may be modeling their parent's behavior by engaging in a high level of symptom reporting, which in turn may lead parents to initiate care-seeking. Moreover, parent's own perceptions (of the child's as well as their own symptoms) may influence decisions about whether to take the child to a healthcare provider by lowering the threshold for parents to seek care. Our results suggest that girls may be particularly vulnerable to the influence of parent's perceived health status and by extension, parents' illness behaviors. Retrospective studies have found that females are more likely than males to report relationships between a positive family history of pain and their own poor general health (22) and pain complaints (23). Our own recent work also indicates that perceptions of maternal pain among healthy children and adolescents are more consistently related to girls' pain than to boys' pain (24). Most of the parents in our sample were mothers (85%) and this may partially account for the sex difference in the association between parent health status and child HCU for pain. Mothers are most likely to be the primary decision-makers in seeking healthcare for children, and there may be more overlap between mothers' and daughters' symptoms than between mothers' and sons'. Relatedly, girls may have been more willing than boys to complain of pain to their mothers, although it should be noted that the mean number of visits did not differ between boys and girls (see Table 1). These possibilities are speculative and require further testing.

Several limitations to the current investigation should be mentioned. We relied on youth self-reported medical visits for pain rather than automated utilization data. However, given the paucity of research in this area, our work identifies salient characteristics that may be investigated in future work utilizing automated data. Also, we did not look specifically at role of parents' own pain in pediatric care-seeking as the SF-12 only generates summary mental and physical health scales. Although bodily pain is one aspect of the physical health summary score, the SF-12 scoring system does not allow examination of individual subscales. Another limitation is that we did not collect data on health insurance status. However, when additional analyses were conducted including mother education, a reasonable proxy for SES our overall results were the same. The current sample was highly educated (nearly 60 % had college degree or higher) and therefore the influence of SES may have been attenuated due to restricted range. Relatedly, in light of the sample's high SES, the current findings may not generalize to other less affluent populations. Only about half the youth sample completed the CHQ and so we were not able to examine the role of child physical and mental health status in the total sample. It is possible that the failure to find a

link between child physical or mental health and HCU for pain in the subsample that completed the CHQ may have been due to low power.

In sum, this prospective study demonstrates that child and parent variables together influence decisions to seek care for adolescent's pain. Among healthy girls, older age and poorer parent physical health status were predictive of greater HCU for pain. Our findings suggest that girls may be particularly sensitive to parent modeling of illness behaviors; and given that the majority of parents were mothers, that girls may be particularly sensitive to *maternal* modeling of illness behaviors. The clinical implications of this study include the possible value of interventions to assist parents in managing their own physical health symptoms to reduce adolescent's medical consultation for pain. In the general pediatric population, child health accounts for only about one-sixth of the variance in pediatric HCU [see review by Janicke et al (25)]. Our findings suggest that parent physical health explains at least part of the remaining variance, although only for girls. Future efforts should continue to identify the most relevant predictors for pain-related pediatric HCU, especially for boys.

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References

1. Levy RL, Langer SL, Walker LS, Feld LD, Whitehead WE. Relationship between the decision to take a child to the clinic for abdominal pain and maternal psychological distress. *Arch Pediatr Adolesc Med.* 2006; 160:961–5. [PubMed: 16953020]
2. Perquin CW, Hazebroek-Kampschreur AA, Hunfeld JA, van Suijlekom-Smit LW, Passchier J, van der Wouden JC. Chronic pain among children and adolescents: physician consultation and medication use. *Clin J Pain.* 2000; 16:229–35. [PubMed: 11014396]
3. Perquin CW, et al. Insights in the use of health care services in chronic benign pain in childhood and adolescence. *Pain.* 2001; 94:205–13. [PubMed: 11690734]
4. Tsao JC, Glover DA, Bursch B, Ifekwunigwe M, Zeltzer LK. Laboratory pain reactivity and gender: relationship to school nurse visits and school absences. *J Dev Behav Pediatr.* 2002; 23:217–24. [PubMed: 12177567]
5. Tsao JC, Zeltzer LK. Sex differences in pain-related symptoms and self-initiated school nurse visits among pre-adolescents. *J Pain Symptom Manage.* 2003; 25:472–80. [PubMed: 12727046]
6. Moran TE, O'Hara MW. Maternal psychosocial predictors of pediatric health care use: use of the common sense model of health and illness behaviors to extend beyond the usual suspects. *Clin Eff Nurs.* 2006; 9:e171–e80. [PubMed: 18379647]
7. Riley AW, et al. Determinants of children's health care use: an investigation of psychosocial factors. *Med Care.* 1993; 31:767–83. [PubMed: 8366679]
8. Tessler R, Mechanic D. Factors affecting children's use of physician services in a prepaid group practice. *Med Care.* 1978; 16:33–46. [PubMed: 621975]
9. Woodward CA, et al. Ontario child health study: patterns of ambulatory medical care utilization and their correlates. *Pediatrics.* 1988; 82:425–34. [PubMed: 3405678]
10. Horwitz SM, Morgenstern H, Berkman LF. The impact of social stressors and social networks on pediatric medical care use. *Med Care.* 1985; 23:946–59. [PubMed: 4021580]
11. Kelleher K, Starfield B. Health care use by children receiving mental health services. *Pediatrics.* 1990; 85:114–8. [PubMed: 2296478]
12. Ward A, Pratt C. Psychosocial influences on the use of health care by children. *Aust N Z J Public Health.* 1996; 20:309–16. [PubMed: 8768423]
13. Watson JM, Kemper KJ. Maternal factors and child's health care use. *Soc Sci Med.* 1995; 40:623–8. [PubMed: 7747197]

14. Venepalli NK, Van Tilburg MA, Whitehead WE. Recurrent abdominal pain: what determines medical consulting behavior? *Dig Dis Sci*. 2006; 51:192–201. [PubMed: 16416235]
15. Newacheck PW, Halfon N. The association between mother's and children's use of physician services. *Med Care*. 1986; 24:30–8. [PubMed: 3945128]
16. Starfield B, et al. Utilization and morbidity: random or tandem? *Pediatrics*. 1985; 75:241–7. [PubMed: 3969323]
17. Levy RL, Whitehead WE, Von Korff MR, Feld AD. Intergenerational transmission of gastrointestinal illness behavior. *Am J Gastroenterol*. 2000; 95:451–6. [PubMed: 10685749]
18. Levy RL, et al. Increased somatic complaints and health-care utilization in children: effects of parent IBS status and parent response to gastrointestinal symptoms. *Am J Gastroenterol*. 2004; 99:2442–51. [PubMed: 15571594]
19. Lu Q, Zeltzer LK, Tsao JC, Kim SC, Turk N, Naliboff BD. Heart rate mediation of sex differences in pain tolerance in children. *Pain*. 2005; 118:185–93. [PubMed: 16213093]
20. Ware J Jr, Kosinski M, Keller SD. A 12-Item short-form health survey: construction of scales and preliminary tests of reliability and validity. *Med Care*. 1996; 34:220–33. [PubMed: 8628042]
21. Landgraf, JM.; Abetz, L.; Ware, JE, Jr. *Child Health Questionnaire (CHQ): A User's Manual*. Boston, MA: HealthAct; 1999.
22. Fillingim RB, Edwards RR, Powell T. Sex-dependent effects of reported familial pain history on recent pain complaints and experimental pain responses. *Pain*. 2000; 86:87–94. [PubMed: 10779665]
23. Edwards PW, Zeichner A, Kuczmierczyk AR, Boczkowski J. Familial pain models: the relationship between family history of pain and current pain experience. *Pain*. 1985; 21:379–84. [PubMed: 4000687]
24. Evans S, Tsao JC, Zelter LK. Relationship of child perceptions of maternal pain to children's laboratory and non-laboratory pain. *Pain Res Manag*. 2008; 13:211–8. [PubMed: 18592057]
25. Janicke DM, Finney JW, Riley AW. Children's health care use: a prospective investigation of factors related to care-seeking. *Med Care*. 2001; 39:990–1001. [PubMed: 11502956]

Table 1

Demographic and descriptive data for girls, boys, and the total sample

	Girls (N = 102)	Boys (N = 108)	Total Sample (N = 210)
Child mean age in years (SD)	12.4 (2.8)	12.2 (2.8)	12.3 (2.8)
Child race/ethnicity [Caucasian – n (%)]	42 (41.2%)	48 (44.4%)	90 (42.9%)
Mother education - n (%)			
High school diploma or less	11 (10.8%)	16 (14.8%)	27 (12.9%)
Some college	33 (32.4%)	25 (23.1%)	58 (27.6%)
College degree	28 (27.5%)	32 (29.6%)	60 (28.6%)
Post-graduate degree	30 (29.4%)	35 (32.4%)	65 (31.0%)
Child-reported pain problem in past 3 months - n (%)	83 (81.4%)	81 (75.0%)	164 (78.1%)
Child-reported mean number of pain problems (SD)	1.8 (1.5)	1.6 (1.4)	1.7 (1.4)
Child-reported visit to HCP for pain – n (%)	14 (13.7%)	13 (12.0%)	27 (12.9%)
Mother completed study measures – n (%)	86 (84.3%)	92 (85.2%)	178 (84.8%)
Mean parent SF-12 physical health summary scores (SD)	51.7 (9.3)	52.5 (8.4)	52.1 (8.8)
Mean parent SF-12 emotional health summary scores (SD)	52.1 (7.5)	51.8 (8.0)	51.9 (7.7)

Note: HCP = Health care professional; SF-12 = Short-Form 12.

Table 2

Pain problems reported by girls, boys, and the total sample

	Girls (N = 102)		Boys (N = 108)		Total Sample (N = 210)	
	n	%	n	%	n	%
Headaches	37	36.3	46	42.6	83	39.5
Stomachaches	35	34.3	38	35.2	73	34.8
Pain in arms/legs	32	31.4	29	26.9	61	29.0
Chest pain	6	5.9	13	12.0	19	9.0
Menstrual period cramps	26	25.5	-	-	26	12.4
Jaw/Mouth pain	13	12.7	13	12.0	26	12.4
Back pain	21	20.6	16	14.8	37	17.6
Other pelvic pain	5	4.9	3	2.8	8	3.8
Other pain	13	12.7	10	9.3	23	11.0

Note: Frequencies of child-reported pain problems experienced at least once a month in the 3 months following the laboratory session.

Sequential Logistic Regression of Child Laboratory Pain and Parent Physical Health Summary Measures on Child Healthcare utilization for Pain

Table 3

Step	Predictor Variable	β	Significance	Odds Ratio	95% CI	χ^2 to remove	df
1	Age	1.06	.02*	2.90	1.17 – 7.16	4.74	1
2	CPT Anticipated Pain	0.38	.21	1.46	0.81 – 2.62		
	CPT Anticipated Bother	-0.15	.62	0.86	0.47 – 1.57		
	Parent Physical Health Summary Scores	-0.23	.01**	0.80	0.67 – 0.95	26.18**	4

Note: CPT = Cold pressor task; CI = confidence interval,

* significant at $p < .025$,

** significant at $p \leq .01$.