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Parent–Teen Interactions as Predictors of Depressive Symptoms in Adolescents with Headache

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Abstract

This study investigated parent–adolescent conflict, family functioning, and adolescent autonomy as predictors of depressive symptoms in adolescents with primary headache. Frequent headaches during adolescence can have a negative impact on activity levels and psychological functioning. Depression is particularly prevalent in adolescents with headache but little research has examined the role of parent–teen interactions in predicting depressive symptoms. Thirty adolescents diagnosed with migraine or chronic daily headache completed self-report measures of pain intensity, parent–adolescent conflict, family functioning, and depression. Adolescents and their parents also participated in three videotaped interaction tasks, scored by independent raters to assess adolescent autonomy. Regression models revealed that pain intensity, parent–adolescent conflict, and autonomy predicted depressive symptoms. Higher levels of conflict, poorer family functioning and lower levels of autonomy were associated with more depressive symptoms. This study highlights the association between parent–teen interactions and psychological functioning in adolescents with primary headache. Implications for intervention are discussed.

Keywords

Headache; Adolescence; Depression; Autonomy; Conflict

According to recent estimates, 18.9% of youth experience headache over a 3-month period, making it the most common chronic pain condition diagnosed in children and adolescents (Perquin et al., 2000). Headache has a significant impact on children's physical and socioemotional functioning and it is associated with increased rates of internalizing symptoms and higher rates of functional disability (Carlsson, Larsson, & Mark, 1996; Fichtel & Larsson, 2002a; Powers, Patton, Hommel, & Hershey, 2004). Children with headaches have elevated levels of depressive symptoms compared to healthy populations (Mazzone, Vitiello, Incorpora, & Mazzone, 2006; Powers & Andrasik, 2005; Powers, Gilman, & Hershey, 2006). In one epidemiological study of children with a psychiatric diagnosis, 21% had frequent headaches. Adolescent females showed the highest levels of comorbidity between depression and headaches with 75% of girls with depression reporting daily or weekly headaches (Egger, Angold, & Costello, 1998).

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The co-occurrence of depressive symptoms in children with recurrent headache is problematic because comorbidity is associated with future pain and disability. In children and adolescents with migraines, depressive symptoms were associated with increased headache-related symptomatology 8 years later (Guidetti et al., 1998). Depression can also impact reports of pain, with children with higher levels of depressive symptoms showing greater errors in pain recall (van den Brink, Bandell-Hoekstra, & Abu-Saad, 2001). Research suggests that the relationship between pain and depression is bidirectional. Psychological symptoms can serve to magnify the focus on bodily sensations such as pain, and both pain and impaired functioning can lead to increased depressive symptoms (Bair, Robinson, Katon, & Kroenke, 2003).

Pain frequency and intensity, and individual factors such as coping strategies (Kashikar-Zuck, Goldschneider, Powers, Vaught, & Hershey, 2001) have been associated with levels of depressive symptoms in children with headache. Recently researchers have argued that in addition to individual factors, it is important to examine the relationship between family-level variables and the physical and psychosocial functioning of children and adolescents with chronic pain (Palermo & Chambers, 2005). Previous studies have shown more family problems in children with primary headache compared to healthy children (Anttila et al., 2004), and that frequent quarreling within families increased the occurrence of weekly and monthly head pain (Kroner-Herwig, Morris, & Heinrich, 2007). Family environments with greater conflict and higher levels of enmeshment have also been associated with increased headache-related disability (Logan & Scharff, 2005).

The mechanisms by which family relationships become more problematic in youth with headaches are unknown. Because the prevalence of headaches in children increases with age (Egger et al., 1998) it is possible that changes are associated with pubertal development, with hormonal changes and transformations in social relationships with parents and peers likely playing a role. During adolescence these relational changes are associated with increased autonomy from parents, including more independent decision-making, and greater responsibility for self-care tasks (Holmbeck, 1996). Changes in autonomy have been linked to increased parent–adolescent conflict and health status in both healthy (Sillars, Koerner, & Fitzpatrick, 2005) and chronic illness populations. In studies of adolescents with type 1 diabetes, discrepancies in decision-making autonomy were associated with increased parent–adolescent conflict and poorer treatment adherence (Lewandowski & Drotar, 2007; Miller & Drotar, 2003). In adolescents with primary headache, lower levels of autonomy were significantly related to increased levels of functional disability (Palermo, Putnam, Armstrong, & Daily, 2007).

In healthy samples, significant relationships have been found between autonomy and depression. In a longitudinal study of a non-clinical sample of adolescents, behavior undermining autonomy was associated with increased depressive symptoms 1-year later (Allen et al., 2006). Conversely, adolescents who reported greater decision-making autonomy had lower levels of depressive symptoms (Smetana, Campione-Barr, & Daddis, 2004). In this study we sought to extend research on parent–teen interactions, including parental granting of autonomy and comorbid depression to adolescents with primary headache. This study expands previous research by assessing autonomy using independent videotaped parent–teen interactions rather than relying on self-report. Rater-coded autonomy avoids the subjectivity of self-report measures of autonomy commonly used in previous research of children with chronic pain and other chronic health conditions (Lewandowski & Drotar, 2007; Palermo et al., 2007).

In the current study, we tested the relationship among pain intensity, parent–adolescent conflict, family functioning, rater-report of adolescent autonomy, and depressive symptoms.

It was hypothesized that after controlling for pain intensity, greater conflict, poorer family functioning, and less age-appropriate autonomy would be associated with higher levels of depressive symptoms in adolescents.

Method

Participants

Participants included 30 adolescents, aged 11–16 years (M = 13.5, SD = 1.5, 63.3% female) receiving treatment through a pediatric neurology clinic at an urban children's hospital and their parents. IRB approval was obtained prior to subject recruitment. Eligibility to participate in this study required: (1) age of 11–16; (2) a neurologist-based diagnosis of migraine or tension-type headache; (3) three or more headaches per month over the previous 3-month period; and (4) an absence of any serious comorbid chronic condition (e.g., cancer). Headache diagnoses were made by the treating neurologist using ICHD-II criteria (International Headache Society, 2004). Of the 78 eligible families contacted for participation in the study, 64% were reached by phone. There were no significant differences on age, gender or headache diagnoses between those who could and could not be contacted. Of the 64 participants who were contacted, 70% agreed to participate in the study. Five families were removed from the final sample due to incomplete data or poor videotape quality. Fifty-three percent of participants in the final sample had a primary diagnosis of chronic daily headaches, and 47% were diagnosed with migraine (with or without aura) headaches. Sixteen adolescents (53.3%) were taking prophylactic medication for headache. Families were predominantly Caucasian (n = 25, 83.3%) and middle class, with a median annual income range of $50,000–$59,000. Mean pain intensity was high according to both parent 7.14 (1.58) and adolescent 7.10 (1.74) report indicating clinically significant levels of pain.

Procedure

Following informed consent from caregivers and adolescents, survey packets were mailed to families, completed at home, and then mailed back to the researchers in pre-stamped envelopes. Each family received nominal monetary compensation for their participation. All survey instruments completed by adolescents were developed and validated for youth over 10 years of age.

After receiving survey packets from families, a home visit was scheduled during which a videotaped interaction took place using three tasks. Researchers instructed participants to spend 6 min on each task and they left the room while the interactions took place. The first interaction was a control task designed to elicit conversation between parents and teens and to help them feel comfortable with the videotape-interaction process. During this control task, parents and teens were instructed to "plan a vacation with unlimited funds." The other two interactions, the 'headache' and 'common issue' tasks, were counterbalanced to control for order effects. On the 'common issue' task parents and adolescents were asked to discuss the topic of highest intensity conflict (e.g., how the adolescent spends their free time) that the adolescents and their parents endorsed on the Issues Checklist (Robin & Foster, 1989). For the 'headache' task, parents and teens were instructed to choose and discuss from a list of 21 items the headache-related topic that was most frequently discussed at home (e.g. school attendance, housework or chores, sports). These tasks were modeled after dyadic interactions used in previous adolescent research (Dura & Beck, 1988; Siqueland, Kendall, & Steinberg, 1996). The videotaped observations were coded by trained raters using the Age-Appropriate Independence and Responsibility-Taking subscale of the Autonomy and Intimacy Rating System (AIRS) (Maharaj, Rodin, Connolly, Olmsted, & Daneman, 2001).

Measures

Sociodemographics—Caregivers completed a questionnaire to provide the child's age, ethnicity, gender, family income level, parent education background, and parent marital and work status.

Pain Intensity—Adolescents were asked about their headache pain intensity over the last 4 weeks. Participants rated the average or usual level of pain intensity on an 11-point Numerical Rating Scale with response options ranging from (0) *no pain* to (10) *worst pain possible*.

Parent–Adolescent Conflict—The Issues Checklist (Robin & Foster, 1989) was administered to adolescents to assess parent–adolescent conflict. The 44-item measure asks adolescents to rate whether or not a particular topic has been a source of conflict during the previous 4 weeks and a summary score is calculated. Sample items include doing homework, cursing, what the teenager eats, and helping out around the house. Higher scores on the measure reflect higher levels of parent–adolescent conflict. Reliability and validity of the measure has been demonstrated (Robin & Foster, 1989). In the current sample the internal consistency was good (α = .87).

Family Functioning—The McMaster Family Assessment Device (FAD) (Miller, Epstein, Bishop, & Keitner, 1985) was used to assess family interactions and the family environment. Adolescents completed this 60-item self-report measure that assesses 7 dimensions of family functioning: problem solving, communication, roles, affective responsiveness, affective involvement, behavioral control, and general functioning (Epstein, Baldwin, & Bishop, 1983). Items are rated on a 4-point Likert scale, with lower scores indicating better functioning. Established cutoff scores are available to divide families into those with healthy family functioning and those with unhealthy family functioning. The reliability and validity of this measure has been well documented (Miller et al., 1985). The FAD has been used in previous studies to assess family functioning in children with headaches (Anttila et al., 2004).

Autonomy—Adolescent autonomy was assessed via videotaped interactions using the Age-Appropriate Independence and Responsibility-Taking subscale of the Autonomy and Intimacy Rating System (AIRS) (Maharaj et al., 2001), a macroanalytic coding system that evaluates the parent's and teen's verbal and nonverbal communication patterns. Scores are derived on each subscale based on criteria related to the interaction as a whole. Scores on the Age-Appropriate Independence and Responsibility-Taking subscale reflect the ways in which autonomy and intimacy are negotiated in the parent–teen conversation. Two independent raters watched each videotaped interaction and used criteria on this subscale to rate adolescent demonstration of independence and responsibility—using a 7-point Likert-type scale ranging from No Independence/Responsibility-Taking (0) to Consistent Age-Appropriate Responsibility-Taking (6). The reliability and validity of the measure has previously been established (Maharaj et al., 2001). For reliability purposes, 47% of videotaped interactions were coded by a second trained rater. Acceptable levels of inter-rater reliability were demonstrated with intraclass correlation co-efficients (.84).

Depressive Symptoms—Adolescents completed the Revised Child Anxiety and Depression Scale (RCADS) (Chorpita, Yim, Moffitt, Umemoto, & Francis, 2000), a self-report measure using DSM-IV criteria for major depressive disorder and six anxiety disorders. The subscale for major depressive disorder (MDD) was used in data analysis to assess adolescents' levels of depressive symptoms. Good internal consistency has been demonstrated in healthy and clinical samples (α = 0.76 and α = 0.87 for MDD, respectively)

(Chorpita, Moffitt, & Gray, 2005). The current sample also demonstrated good internal consistency (α = 0.83). Adequate 1 week test–retest reliability and validity of the RCADS has been reported (Chorpita et al., 2000).

Plan for Statistical Analyses

Summary statistics were used to describe the demographic characteristics of the sample. Means and standard deviations were used for continuous data, and categorical items were described using frequency statistics. T-tests and chi-square analyses were conducted to determine whether there were any significant effects of age, gender, race or income on adolescent autonomy, parent–adolescent conflict, family functioning, or depressive symptoms. Pearson product correlations were used to assess the relationship between demographic characteristics, depressive symptoms, autonomy, family functioning and conflict variables. A hierarchical multiple regression analysis was conducted to test for the multivariate relationship of parent–adolescent conflict, family functioning and observed adolescent autonomy in predicting depressive symptoms. Specifically, pain intensity was entered on the first step to control for effects of pain. Family variables (parent–adolescent conflict and family functioning) were entered on the second step. And last, observed adolescent autonomy was entered on the final step to examine the additional contribution of variance in predicting depressive symptoms after controlling for pain intensity and family variables. Data analyses were conducted using the Statistical Package for the Social Sciences (SPSS 15.0). Significance levels were set at $p < .05$.

Results

Descriptive Data

Participants reported moderate to high levels of pain intensity ($M = 7.10$, $SD = 1.74$) and moderate levels of depressive symptoms (T-score; $M = 61.41$, $SD = 16.43$) (see Table 1). Previous research has demonstrated that T-scores of ≥11 can be used as a clinical indicator of children “at-risk” for depression (Chorpita et al., 2005); 48.3% of adolescents in this sample met that criteria. The mean levels of observed adolescent autonomy on the ‘headache’ and ‘common issues’ tasks were 3.70 (1.34) and 3.97 (1.42), respectively, indicating teens exhibited low to moderate amounts of age-appropriate striving for independence and responsibility-seeking behavior. Because the correlation between scores of adolescent autonomy on the ‘headache’ and ‘common issues’ was strong ($r = .55$, $p < .01$), ratings on these two tasks were combined to form a summary score of autonomy for adolescents.

Depressive symptoms were significantly correlated with adolescent autonomy ($r = -.49$, $p < .01$) and family functioning ($r = .53$, $p < .01$), with more depressive symptoms associated with lower levels of autonomy and poorer family functioning. Adolescent autonomy was associated with family functioning with higher levels of autonomy associated with better family functioning ($r = -.37$, $p < .05$). Neither age, gender, nor pain intensity were associated with autonomy, conflict, depressive symptoms or family functioning (Table 2).

Regression Analysis Examining Predictors of Depressive Symptoms

A hierarchical multiple regression was used to test the hypothesis that after controlling for pain intensity, the parent–adolescent conflict, family functioning, and adolescent autonomy variables would predict depressive symptoms. Pain intensity was entered on the first step of the regression model to control for its effects. Conflict and family functioning were entered together on the second step because prior research has shown associations between these family interaction variables in chronic pain populations. Finally, adolescent autonomy was

entered alone on the third step of the regression model to determine its individual association with depressive symptoms.

As hypothesized, results indicated that when controlling for pain intensity, the parent–adolescent conflict ($\beta = -.31$, $p < .05$), family functioning ($\beta = .40$, $p < .05$), and adolescent autonomy ($\beta = -.39$, $p < .05$) variables predicted depressive symptoms. Greater conflict, poorer family functioning and less age-appropriate autonomy were associated with higher levels of depression. Together, parent–adolescent conflict and family functioning accounted for 37.6% of the variance in adolescents' depressive symptoms with adolescent autonomy accounting for an additional 12.1%. In total, controlling for pain intensity, the model of parent–adolescent conflict, family functioning and adolescent autonomy accounted for 50.5% of the variance in predicting depressive symptoms (see Table 3).

Discussion

Results from the current study expand existing knowledge on the association between parent–teen interactions and depressive symptoms in adolescents with primary headache. Findings demonstrated a significant relationship between depressive symptoms and autonomy, parent–adolescent conflict and family functioning. Lower levels of autonomy, higher conflict and poorer family functioning were associated with higher levels of depression. These findings support previous research with healthy populations that has demonstrated lower levels of adolescent autonomy were associated with increased depressive symptoms (Allen et al., 2006; Millikan, Wamboldt, & Bihun, 2002). These findings also extend research indicating that family conflict in adolescents with headache was associated with increased pain and headache-related disability (Kroner-Herwig, Heinrich, & Morris, 2007).

Findings from this study demonstrate that family-level factors can have a significant impact on the emotional functioning of adolescents with primary headache. Given that this relationship is significant even when controlling for pain intensity indicates that many factors other than pain are associated with depressive symptoms in this population. These results extend previous research in youth with headaches that has identified individual factors (e.g., pain frequency, coping strategies) as predictors of depression (Kashikar-Zuck et al., 2001).

Determining that family-level factors can predict depressive symptoms is important given the high prevalence of comorbid depressive symptoms in this population. These results suggest that family-level interventions, particularly those aimed at increasing age-appropriate autonomous behavior and improving parent-child relationships may be important to include in treatment. Many current psychological interventions for children and adolescents with chronic pain incorporate a parent-training or parent education component, (Eccleston, Malleson, Clinch, Connell, & Sourbut, 2003; Robins, Smith, Glutting, & Bishop, 2005) with these programs focused on operant or behavioral strategies. Incorporating strategies that are focused on improving parent–teen interactions or facilitating age-appropriate autonomy may improve the effectiveness of these treatment programs, specifically programs aimed at adolescents with comorbid pain and depressive symptoms.

It is not known whether adolescents' depressive symptoms precede problematic family relationships or whether family problems lead to depressive symptoms, however it is likely that in most cases the relationship is bidirectional. Poor family relationships not only impact teens' emotional functioning but depressive symptoms can negatively impact the family environment leading to greater conflict and hostility (Jackson & Lurie, 2006). The association between autonomy and depressive symptoms is also likely to be bidirectional.

While restricted autonomy may lead to higher levels of depression, parents may restrict the independence of their depressed adolescents due to concerns regarding their emotional status. Future studies examining changes in parent–adolescent relationships over time are needed to tease out these complex relationships. Specifically studies following children during the transition to adolescence can be used to identify risk factors for the development of difficulties with autonomy or poor family functioning. Findings can assist in the development of targeted interventions that can potentially reduce the occurrence of comorbid depressive symptoms in adolescents with primary headache.

The measurement of autonomy using independent rater-report is a particular strength of this study. The majority of previous studies examining autonomy have relied on self-report which lack objectivity or standardized rating scales. Moreover videotaping families in the home captures family dynamics in a more naturalistic setting, providing more accurate information on how parents and children interact in their home environment.

Several limitations need to be taken into account when interpreting the results. First, the sample used in the study was small and relatively homogenous. Future studies need to examine the relationship between these family-level factors and depressive symptoms using a more racially diverse sample. Moreover, the majority of parents who participated in the study were mothers. It is possible that adolescents' interactions with their fathers may be different, potentially impacting the level of parent–teen conflict in adolescents' reports. In addition, adolescents in this study were recruited from a clinic setting. Treatment-seeking families report higher levels of pain symptoms and more disruptions in functioning compared to healthy families and the generalizability of our findings to those who do not seek treatment for headaches is unknown. Specifically, adolescents in the sample reported moderate to high levels of depressive symptoms. Based on population norms it is likely that non treatment-seeking participants would have fewer comorbid depressive symptoms, potentially weakening the association between family-level variables and depression. The participants in the study also knew that the interactions were being video-taped which may have impacted the results. While this effect was likely minimal, this study will have to be replicated using an alternate assessment method to determine if associations between autonomy and depressive symptoms remain significant. Finally, the study is limited by the assessment of adolescent autonomy using a measure that fails to take into account the interdependence of the parent–adolescent interaction patterns. Applying Cook and Kenny's (2005) Actor–Partner Interdependence Model to the present study, one sees that an individual's emotions, thoughts, and behaviors impact the emotions, thoughts, and behavior of their partner. Because these variables are related, the observations being coded should not be examined exclusively as individual units, but also as nested within the dyad relationship. Due to sample size, this type of analysis could not be utilized in the current study and it will be an important direction for future research.

Our preliminary findings demonstrating the association between parent–teen interactions and depressive symptoms suggests several areas for future research. Additional studies are needed to examine the relationship between parent–teen interactions, autonomy, and depressive symptoms at multiple time points to determine causality and if the associations remain stable over time. Future studies also need to explore the relationship between parent–teen interactions and other domains of socioemotional functioning including anxiety and psychological adjustment. While depression shares the highest comorbidity with headache, significant levels of anxiety in youth with headache have also been reported (Carlsson et al., 1996; Fichtel & Larsson, 2002b) and the relationship between family variables and anxiety is unknown. Moreover, future studies need to assess how parental stress and psychological functioning are associated with autonomy and family-relationship factors. Parental distress and psychological adjustment have been associated with reports of pain, disability and

socioemotional functioning in their adolescents (Drotar, 1997), and it is important to determine how these factors are related to age appropriate autonomy and their potential impact on parent–teen relationships.

Finally, treatment studies that evaluate parent and family interventions are critically needed. To date, parent treatment strategies included in psychological treatment for youth with chronic pain have focused exclusively on operant strategies (e.g., reinforcing adaptive coping, discouraging maladaptive pain behaviors) (Allen & Shriver, 1998). The potential benefit of parent–child communication strategies in reducing pain or improving functioning in youth with primary headache is an important future direction. Adapting existing treatments like Behavioral Family Systems Therapy (BFST), a multicomponent program that targets barriers to family communication and problem solving (Robin & Foster, 1998) may be an effective intervention for families of adolescents with chronic pain. Studies of adolescents with type 1 diabetes and their parents have shown that 10 sessions of BFST were effective in improving family communication and problem solving, effects that persisted at a 12 month follow-up (Wysocki et al., 2000; Wysocki, Greco, Harris, Bubb, & White, 2001). Success of treatment programs increasing effective communication for adolescents with headache and their parents will likely be an important step toward decreasing functional limitations and depressive symptoms in this population.

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Table 1

Demographic and clinical characteristics of the sample

Characteristic	*n*/*M* (*SD*) %	Range
Age (years)	13.5 (1.57)	11–16
Gender		
Male	11 (36.7%)	
Female	19 (63.3%)	
Headache diagnosis		
Chronic daily headache	16 (53.3%)	
Migraine	14 (46.7%)	
Headache frequency		
<1 time/month	2 (6.7%)	
1–3 times/month	8 (26.7%)	
1 time/week	5 (16.7%)	
2–3 times/week	6 (20.0%)	
3–5 times/week	2 (6.7%)	
Daily	6 (20.0%)	
Missing data	1 (3.3%)	
Taking prophylactic medication		
Yes	16 (53.3%)	
No	14 (46.7%)	

Table 2

Correlations and descriptive data for predictor and outcome variables

	1	2	3	4	5	*M* (*SD*)	Range
1. Depressive symptoms (T-score)	–					61.41 (16.43)	36–105
2. Pain intensity	.12	–				7.10 (1.74)	3–10
3. Parent–adolescent conflict	−.34	.07	–			31.57 (3.86)	26–40
4. Adolescent autonomy	−.49**	−.33	.04	–		9.20 (2.19)	4–12
5. Family functioning	−.53**	.23	−.05	−.37*	–	2.06 (.52)	1.25–3

* $p < .05$,

** $p < .01$

Table 3

Multiple regression effects of parent–adolescent conflict, family functioning, and adolescent autonomy on depressive symptoms

	β	ΔR^2	R^2	t	p
Pain intensity	.09	.008	.008	.47	.65
Pain intensity	−.01			−.04	.97
Parent–adolescent conflict	−.32			−2.01	.06
Family functioning	−.52	.38	.39	3.13	.01
Pain intensity	−.12			−.73	.47
Parent–adolescent conflict	−.31			−2.13	.04
Family functioning	.40			2.49	.02
Adolescent autonomy	−.39	.12	.51	−2.37	.03