

Brief Report: The Impact of Maternal Posttraumatic Stress Disorder Symptoms and Child Gender on Risk for Persistent Posttraumatic Stress Disorder Symptoms in Child Trauma Victims

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Objective To longitudinally examine the impact of maternal posttraumatic stress disorder symptoms (PTSS) on child adjustment following a child's traumatic injury, focusing on child gender differences. **Methods** Forty-one child traumatic injury victims aged 8–18 years and their biological mothers were interviewed over two follow-ups (6 weeks and 7 months). Children were administered the Clinician-Administered Posttraumatic Stress Disorder (PTSD) Scale for Children and Adolescents (CAPS-CA), whereas mothers completed the CAPS. **Results** Six weeks post trauma, maternal PTSS were significantly related to PTSS in boys but not in girls. However, at 7 months, maternal PTSS were strongly related to child PTSS in both boys and girls. Significant 6-week maternal distress–child gender interactions suggested that maternal PTSS, especially avoidance, predicted greater 7-month PTSS but that this was primarily because of a significant relationship in females. **Conclusions** Maternal distress was found to negatively impact subsequent child adjustment, particularly in females. These results underscore the importance of considering family-centered interventions for child PTSD, especially in girls.

Key words children; maternal posttraumatic stress symptoms; pediatric injury; posttraumatic stress disorder.

Posttraumatic stress disorder (PTSD) in injured children represents a serious public health concern, with reported rates of PTSD because of pediatric injury ranging from 5.4 to 14.6% (Landolt, Vollrath, Ribbi, Gnehm, & Sennhauser, 2003). Many demographic (child's age, gender, and socioeconomic status) and event-related (trauma severity and injury severity) variables have been implicated as risk factors for child PTSD (Fletcher, 1996). However, few studies (Best, Streisand, Catania, & Kazak, 2001; McFarlane, 1987) have examined longer term sequelae of parent and child responses or the relationship between parent and child responses following a child's traumatic event. Rates of maternal PTSD stemming

from a child's trauma range from 24 to 71%, and often, a parent's distress is greater than that of the traumatized child (Landolt et al., 2003). Research examining the relationship between parent and child posttraumatic stress disorder symptoms (PTSS) following a child's trauma has produced equivocal results, with some studies reporting a significant association between parent and child PTSS (e.g., deVries et al., 1999) and others finding no significant relationship (e.g., Stuber, Christakis, Houskamp, & Kazak, 1996). Inconsistent findings may be because of methodological differences between studies. For instance, studies that have examined parent and child dyads, in which both were direct victims of the

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Journal of Pediatric Psychology 32(3) pp. 338–342, 2007

doi:10.1093/jpepsy/jsl003

Advance Access publication May 22, 2006

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traumatic event, have found a strong relationship between parent and child PTSS (e.g., deVries et al., 1999). Similarly, studies in which parents report on both theirs and their child's symptoms find higher correlations than studies in which the child reports his or her own symptoms (Smith, Perrin, Yule, & Rabe-Hesketh, 2001).

Despite differential findings concerning concordance of parental/child symptom reporting, research has consistently found that parental distress following a traumatic event has a negative impact on child adjustment (McFarlane, 1987). Most commonly, researchers have examined the impact of overall parental PTSS on child PTSS (Smith et al., 2001) without examining whether specific parental PTSD symptoms (e.g., re-experiencing, avoidance, or hyperarousal) are associated with greater risk for prolonged child PTSS. Specific parental PTSD symptoms may differentially predict persistent symptoms in the child trauma victim, as oftentimes a child's ability to address or avoid traumatic reminders is dependent on parental behavior. For example, parental avoidance may not allow the child to confront and resolve their own anxieties, which can result in maintenance of their current psychological symptoms (McFarlane, 1987).

This study represents a preliminary examination of the relationships between parent and child responses to the child's traumatic injury in a sample comprised of relatively equal numbers of boys and girls. The aims of this study were (a) to examine the incidence and relationship between mother and child PTSS 6 weeks and 7 months following a child's traumatic injury and (b) to explore the impact of overall maternal PTSS as well as specific PTSD symptom clusters on child PTSS levels with a focus on examining potential child gender differences.

Methods

Procedures

The human subjects review boards of Akron Children's Hospital and Kent State University approved the following procedures. Child trauma victims between the ages of 8 and 18 years and their mothers were recruited from the emergency department (ED). Given that mothers typically report greater levels of distress than fathers following a child's trauma (Landolt et al., 2003) and that mother and child distress scores have been more strongly correlated than father and child self-report scores (Stuber et al., 1996), we specifically recruited biological mother-child dyads.

Six weeks and seven months following the child's trauma, a master's level clinical psychology student

interviewed the children and their mothers separately in their homes. Children were administered the Clinician-Administered PTSD Scale for Children and Adolescents (CAPS-CA; Nader et al., 1996), whereas mothers were administered the CAPS (Blake et al., 1995) with the child's trauma as the index event.

Participants

Of the 65 families approached, 61 agreed to participate (94% acceptance rate). Participants consisted of 33 boys (age = 13.35 years, $SD = 2.81$) and 28 girls (age = 13.29, $SD = 3.35$) and their mothers. The final sample was primarily Caucasian (92%; African American 8%). Many of the traumatic events were motor vehicle accidents ($n = 41$). Eighty-two percent of the original sample was retained at the 6-week follow-up with 67% ($n = 41$) returning for the 7-month time point. There were no differences in demographics between participants who did and did not complete the follow-ups (all $ps > .33$), and participants who did not complete the 7-month follow-up did not differ from those who did on 6-week child or adult PTSS (all $ps > .60$).

Measures

Child injury severity was assessed with the Injury Severity Scale (ISS; Baker, O'Neil, Haddon, & Long, 1974). Objective injury data were collected from the participants' charts and used to compute ISS scores. ISS scores range from 0 to 75, with scores less than 10 suggesting a minor injury, 10–15 indicating serious injury, and >25 suggesting severe injuries.

Child PTSD symptoms were assessed using the CAPS-CA (Nader et al., 1996). Symptoms were recorded as present if the child received a minimum score of 1 for frequency and 2 for intensity. According to diagnostic and statistical manual of mental disorders-IV (DSM-IV) criteria, diagnostic levels of PTSD were met if at least one re-experiencing symptom (criterion B), three avoidance symptoms (criterion C), and two arousal symptoms (criterion D) were present. Subthreshold criteria were met if the participant endorsed at least one symptom out of each symptom cluster and reported distress or impairment in important areas of functioning (criterion F; Stein, Walker, Hazen, & Forde, 1997). Prior research has demonstrated that subthreshold PTSD is often associated with clinically significant levels of impairment (Carlier & Gersons, 1995), underscoring the importance of identifying victims who may not meet full diagnostic criteria but report subthreshold levels of symptoms. Given the low prevalence of PTSD in our current sample, many of analyses were conducted on

continuous measures of PTSD (CAPS-CA total scores). Cronbach's alpha for the CAPS-CA was .90.

Mothers were administered the CAPS (Blake et al., 1995) to assess the presence of PTSS stemming from their child's traumatic injury. The CAPS is a structured interview that provides both a continuous measure of PTSD severity and a categorical diagnosis based on DSM-IV criteria. Cronbach's alpha for this study was .91.

Results

Participant age, race, parental education, and Injury Severity Scale (ISS) scores were not related to child PTSS at either follow-up (all $ps > .15$). Girls reported significantly higher levels of PTSS than boys at 6 weeks [26.2 ± 18.3 vs. 17.4 ± 10.9 , respectively; $F(1, 49) = 4.26, p \leq .05$] but did not significantly differ from boys at 7 months [14.4 ± 14.5 vs. 10.1 ± 8.25 , respectively; $F(1, 40) = 1.43, p = .24$]. Family income was significantly related to 7-month child PTSS ($r = -.48, p \leq .01$). Within-gender analyses also revealed that, in boys, age was significantly correlated with 7-month PTSS ($r = -.47, p \leq .05$), so age and income were used as covariates in relevant analyses.

In this sample, only one child and one mother (not related to each other) met full criteria for PTSD at 6 weeks post trauma, whereas at 7 months, one child met full PTSD criteria while no mothers met full criteria. However, at the 6-week follow-up, 30% of the children and 19% of the mothers met subthreshold criteria for PTSD and 12% of children and 1% of mothers continued to meet subthreshold at 7 months post trauma. Given the low prevalence of diagnostic levels of PTSD in our current sample, subsequent analyses focus on the continuous measure of PTSD symptoms (PTSS).

Mother and child PTSS were significantly correlated at each follow-up (6-week follow-up: $r = .33, p \leq .01$; 7-month follow-up: $r = .55, p \leq .01$). Separate gender analyses indicated that mother and child PTSS were significantly correlated at 6 weeks post trauma for boys ($r = .43; p \leq .05$) but not for girls ($r = .25; p = .22$). At 7 months post trauma, mother and child overall PTSS were significantly correlated for boys ($r = .44; p \leq .05$) and girls ($r = .63; p \leq .01$). After excluding those dyads in which the mothers were direct victims along with their child (e.g., motor vehicle accidents (MVAs) where the mother was also in the car; $N = 9$), the correlations between mother and child 6-week PTSS became nonsignificant ($r = .23, p = .17$ for total sample, $r = .32, p = .17$ for boys, $r = .15, p = .55$ for girls). However, excluding mothers who were direct victims of the trauma did not alter the significance of the correlations for 7-month mother and child PTSS.

Hierarchical linear regressions were computed to examine the extent to which 6-week maternal responses to the child's trauma and child's gender interacted to predict persistent PTSS in the child. Income, age, and 6-week child PTSS were entered on the first step, the main effects of gender and 6-week maternal PTSS were entered on the second step, and the interaction of gender and 6-week maternal PTSS was entered on the third step. After accounting for the variance contributed by covariates and main effects, the interaction between maternal PTSS and gender significantly predicted subsequent child PTSS ($\Delta R^2 = .07, p \leq .05$; Table I). Inspection of the interaction suggested that, as maternal PTSS increased, girls' PTSS were more impacted than boys' PTSS. However, the decomposition of this interaction revealed nonsignificant slopes for both the male and the female lines (Fig. 1). After excluding those mothers who were also direct victims of the trauma, the interaction of child gender and maternal PTSS again accounted for a significant percentage of the variance in 7-month child PTSS ($\Delta R^2 = .13, p \leq .01$). Decomposition of the interaction revealed findings similar to that of the entire sample, but in this case, the slope of the line for females was significant ($p \leq .05$), suggesting that as maternal PTSS increased, PTSS in female children also increased.

Additional regression analyses were conducted to determine whether the significant predictive relationships between the interaction of maternal PTSS and child gender and subsequent child PTSS were driven by any particular PTSD symptom cluster. Income, child age, and 6-week child PTSS were entered on the first step, the main effect of 6-week maternal PTSS subscale score (either re-experiencing, hyperarousal, or avoidance) and child gender on the second step, and the interaction term between the specific 6-week maternal PTSS subscale score and child gender on the final step. The interaction of acute maternal avoidance and child gender accounted for a significant percentage of the variance in 7-month child PTSS ($\Delta R^2 = .08, p \leq .05$), with the interaction suggesting that females were more negatively impacted by maternal avoidance than males.

Table I. Summary of Hierarchical Regression Analysis for Variables Predicting 7-month Child PTSS

Step number	Variables	B	SEB	β	ΔR^2
1	Age, income, 6-week child PTSS	.40	.10	.55	.50***
2	Gender, 6-week parent PTSS	.01	.13	.01	.02
3	Gender x 6-week parent PTSS	.52	.23	.41	.07*

PTSS, posttraumatic stress disorder symptoms.

* $p \leq .05$. ** $p \leq .01$. *** $p \leq .001$.

Significance of regression model $F(6, 36) = 7.26, p \leq .05$.

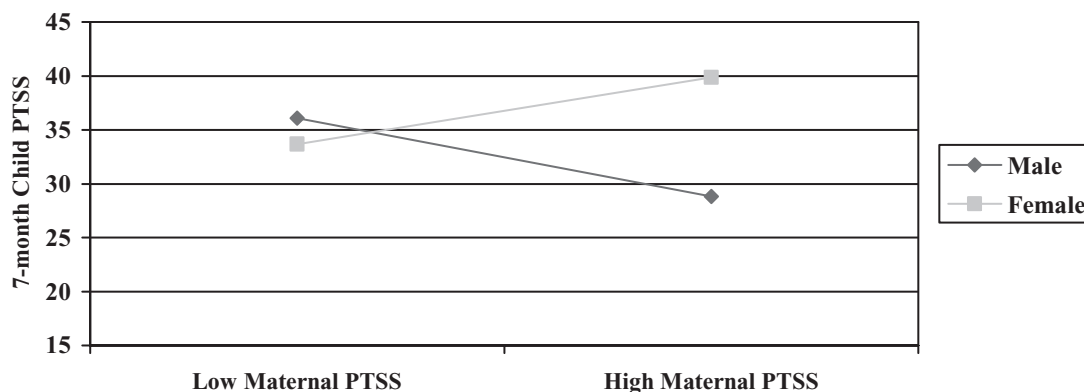


Figure 1. Interaction of 6-week maternal posttraumatic stress disorder symptoms (PTSS) and child gender predicting 7-month child PTSS.

However, the decomposition of this interaction again revealed nonsignificant slopes for the male and female lines. After excluding those mothers who were direct victims, the interaction of child gender and maternal avoidance symptoms continued to significantly predict 7-month child PTSS ($\Delta R^2 = .17, p \leq .01$). The decomposition of this interaction was similar to that obtained with the entire sample. Interactions of maternal re-experiencing and hyperarousal symptoms with child gender were not significant predictors of 7-month child PTSS (re-experiencing: $\Delta R^2 = .03, p = .15$; hyperarousal: $\Delta R^2 = .05, p = .07$).

Discussion

Contrary to prior studies that found no significant relationships between acute parental and child PTSS (e.g., Landolt et al., 2003), this study found a significant relationship between 6-week maternal and child PTSS that persisted over time. However, the relationship between mother and child acute PTSS was driven by mothers who were direct victims of the trauma (i.e., were also in the car during the motor vehicle accident).

Female child trauma victims appeared to be more negatively impacted by maternal PTSS than were males. Females may be at greater risk for developing posttraumatic distress than similarly traumatized males because of differences in biological risk factors (DeBellis et al., 1999) and differences in coping styles between boys and girls (Matud, 2004). Parental distress may exacerbate these predisposing vulnerabilities making girls more susceptible to PTSS. Maternal avoidance was found to have the greatest impact on child adjustment, specifically that of female children. Maternal avoidance combined with the tendency to internalize distress in girls (Nolen-Hoeksema, 1994) may be particularly detrimental with respect to persistent PTSD symptoms in girl trauma victims.

This study is limited by a relatively small sample size of moderately injured trauma victims. Additionally, given the low rates of PTSD in this sample, PTSD was assessed as a continuous variable. Therefore, these findings may not generalize to more severely traumatized individuals. Despite these limitations, the results of this study underscore the importance of assessing maternal distress following a child's trauma and of considering child reactions to trauma in a family-focused manner. Interventions directed toward familial responses may hold promise, especially in female trauma victims. Interventions targeting parental avoidance and normalizing the tendency to avoid distressing traumatic thoughts or reminders (Kazak et al., 2004) may be of particular benefit, given these findings.

Acknowledgments

The preparation of this article was supported, in part, by National Institutes of Mental Health grants R34 MH 71201 and R34 MH73014. Funding for this study was provided by a grant from the Ohio Board of Regents.

Received October 23, 2005; revision received February 22, 2006, accepted April 27, 2006

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