

Child and Family Factors Associated With Posttraumatic Stress Responses Following a Traumatic Medical Event: The Role of Medical Team Support

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Abstract

Objectives This study examined the contribution of pretrauma psychosocial factors (child emotional functioning, family resources, family functioning, and social support) and environmental factors (mother's posttraumatic stress symptoms [PTSSs], medical team support [MTS]) to PTSSs of injured or seriously ill children within a pediatric rehabilitation setting. It was hypothesized that psychosocial variables would be strongly associated with child's PTSS; that mother's PTSS and MTS would mediate the association between psychosocial factors and child's PTSS; that mother's report on child's PTSS would mediate the association between mother's PTSS and child's PTSS.

Methods Participants were 196 children hospitalized following an injury/illness and assessed $M = 47.7$ days postevent. Children completed measures of PTSS, mothers completed measures of their own PTSS, child's PTSS, and pretrauma psychosocial factors. Family's therapist completed a MTS measure. Structural equation modeling was employed to evaluate the study hypotheses.

Results Pretrauma family structure and resources were associated with child's self-reported PTSS; each pretrauma variable and mother's report of child's PTSS was significantly associated. Although mother's PTSS was not directly associated with child's PTSS, this relationship was mediated by mother's report of child's PTSS. MTS mediated the relationship between pretrauma social support and mother's PTSS. **Conclusion** This study further explicates the utility of a biopsychosocial framework in predicting childhood PTSS. Findings confirm the role of pretrauma factors and environmental factors at the peritrauma period in the development of PTSS following a pediatric injury/illness. Mother's PTSS and MTS may be appropriate targets for prevention and early intervention.

Key words: accidents and injuries; chronic illness; parent stress; parenting; posttraumatic stress.

Pediatric illnesses and injuries affect many children, adolescents, and families; ~30 million children are injured each year in the United States alone (Centers for

Disease Control & Prevention, 2014). In Israel, ~202,000 children visit emergency rooms annually (Nir et al., 2017). These traumatic medical events

(TMEs) are associated with impaired physical functioning, emotional distress, and substantial health services utilization (Hilliard et al., 2015). Of particular concern, 16–19% of children and youth with TMEs develop significant posttraumatic stress disorder (PTSD) or elevated levels of posttraumatic stress symptoms (PTSSs; Price et al., 2016). Whether or not a child meets the full diagnostic criteria for PTSD, PTSS might impair day-to-day interpersonal and academic functioning (Kassam-Adams et al., 2013) and is often linked to negative outcomes in children and youth.

The biopsychosocial theoretical model of PTSS following TMEs (Marsac et al., 2014) suggests that biological, psychological, and social factors in the pre and peritrauma periods contribute directly or through interactional relationships to the development and maintenance of PTSS over time. This study wished to examine a mediation model in which the relationship between child's factors and PTSS symptoms is mediated by various factors within the child, the family (e.g., parental PTSS), and the environment (e.g., medical team support [MTS]).

Child's Biological Factors

During the pretrauma period, biological factors such as child's gender and age were found to have small to medium-effect sizes, with female gender and younger age as risk factors for PTSS among various types of traumatic events in general (Trickey et al., 2012), and following accidental trauma specifically (Cox et al., 2008). During the peritrauma period biological markers have the potential to serve as screeners for the development and maintenance of PTSS (Marsac et al., 2014). However, during rehabilitation, due to children's complex medical and functional conditions, they are often highly medicated; addressing biological variables such as heart rate, as indicators of the body's response to stress, is therefore problematic.

Psychological Factors

Child's Psychological Factors

Child's pretrauma emotional functioning serves as a significant predictor for the development of PTSS (Brosbe et al., 2011; Cox et al., 2008; Trickey et al., 2012). Results from longitudinal studies show that pretrauma internalizing difficulties (i.e., depression and anxiety problems; Storr et al., 2007) and disruptions in emotion regulation (i.e., greater rumination, high levels of catastrophizing, and low levels of positive reappraisal) predict PTSS among youth exposed to a traumatic event (Jenness et al., 2016; McLaughlin & Lambert, 2017). Among children following a pediatric traumatic injury specifically, preinjury child behavior problems were predictive of higher PTSS (i.e.,

belonging to the recovery and high-chronic trajectory groups; Le Brocque et al., 2010).

Parental Psychological Factors

A large evidence base suggests that parental acute PTSS increases the risk for, and maintenance of the child's PTSS during the peritrauma period (Brosbe et al., 2011; Landolt et al., 2012). In addition, several studies have shown that following a child's TME, parents with more stress symptoms report higher symptoms in their child, suggesting that they might be more prone to overestimating the child's stress symptoms (Dame et al., 2014; Shemesh et al., 2005). For example, Ostrowski et al. (2011) evaluated 118 children admitted to the hospital for an injury and found that while caregiver's PTSS did not predict child's PTSS, the interaction between child's and parent's PTSS at 2 weeks predicted child's 6-week PTSS. Thus, examining the complex relationship between parent's and child's PTSS is important for understanding short- and long-term outcomes.

Environmental Factors

Family Structure and Resources

There is inconsistency in the literature regarding the relationship between socioeconomic status and PTSS among children and families following TMEs. Whereas some studies showed a low-moderate relationship (Trickey et al., 2012), others found that lower parental income (Delahanty et al., 2005) and lower parental education (Vanderbilt et al., 2009) were associated with stress responses among families.

Family Functioning

Environmental and social pretrauma factors of the family (for instance, substance abuse, marital conflicts, or histories of mental health or legal problems), as well as the family's social support, have been found to impact the family's functioning and determine whether and how symptoms are expressed within the child and the parent (Brosbe et al., 2011; Muscara et al., 2017). The literature on childhood TMEs indicates that family, and parents in particular, are usually the main source of support for their child following a traumatic event (Brown et al., 2018; Price et al., 2016). Attachment theory (Bowlby, 1981; Fonagy & Target, 2013) makes it abundantly clear that the physical presence of parents during hospitalization, and the protection they provide, is not enough to ensure that a child will receive the emotional support needed during confusing and stressful times. Following TMEs, children need their parents' help and support in making sense of their traumatic experience and integrating it into their existing schemas; in general, they need their parents' support for their overall physical and emotional recovery (Cohen, 2009).

Medical Team Support

The support given by the medical team during the acute peritrauma period is a unique and important variable which, to the best of our knowledge, has not received sufficient attention in past research in the field. When a family is coping with a child's TME, the child's health-care providers are an essential part of the child's system of care. Being present in the medical setting allows the medical team to provide support to families as they begin to cope with the traumatic event. In rehabilitation settings, the medical team aims to engage the parents by using a collaborative approach to help explore the family's knowledge and understanding of their child's abilities as a result of the illness/injury, including symptoms, etiology, and impact on behavioral and emotional functioning (Williams et al., 2014). During prolonged hospitalizations, providing support to the family may allow the team to differentiate between symptoms explained by trauma and those associated with the illness/injury. As such, MTS has the potential of increasing parental presence and support as well as the parent's ability to make meaning of the child's experiences and behaviors in the medical setting (Williams et al., 2014). Thus, if the medical teams support the parents and address parental symptoms, the parents themselves may be better able to support their child (Marsac et al., 2014).

Families differ in their willingness and ability to use the medical team's support during hospitalization. Past experiences of social support may be related to the relationship that develops between the family and the medical staff. More specifically, during times of stress, pretrauma history of close relationships can be used as a protective factor facilitating family's engagement and positive relationships with the medical team. Examining the relationship between social support and the use of MTS may help us understand important factors that help families buffer the negative effects of stress and enable recovery and resilience (Cohen, 2004).

This study

This study used an accepted biopsychosocial approach to examine the contribution of selected biological factors (i.e., child's gender, child's age), psychological factors (i.e., child's pre-TME emotional functioning), and environmental factors (i.e., parent's PTSS, family structure and resources, family functioning, social support, MTS) at the pre and peritrauma period, to child's PTSS (Figure 1). The study had three specific goals. *First*, we wished to examine pretrauma factors that contribute to child's and mother's PTSS during the peritrauma period. We hypothesized that child's female gender and younger age would be risk factors for PTSS. Additionally, we hypothesized that children

from families with reduced resources and poorer family functioning, and a child with more pre-TME emotional difficulties, would demonstrate more PTSS as reported by child and by mother. Furthermore, we hypothesized that child's pre-TME emotional difficulties, poorer family functioning, and less social support, would contribute to mother's PTSS. *Second*, we wished to examine the mediational role of mother's PTSS and MTS in the association between pretrauma factors and child's PTSS. Specifically, we hypothesized that mother's PTSS would serve as a mediator between pretrauma factors and child's PTSS, and that MTS during hospitalization would serve as a mediator between pretrauma social support and mother's PTSS. Our *third* goal was to examine the contribution of mother's PTSS to child's PTSS according to both the mother's report and the child's self-report. We hypothesized that mother's PTSS during the peritrauma period would contribute to child's PTSS during peritrauma, and that the mother's report of the child's PTSS would contribute to the child's PTSS. We also hypothesized that the mother's report of the child's PTSS would serve as a mediator between mother's PTSS and the child's PTSS.

Materials and Methods

Participants

Posthospitalization archival clinical data (consisting of questionnaires for the children and their mothers, described in the *Procedure* section) were extracted from the medical records of 196 children (120 males), 7–18 years of age ($M = 12.8$, $SD = 3.1$), who were admitted to the Pediatric Rehabilitation Department between the years 2013–2018 (see Table I for a detailed description of the demographic and injury/illnesses characteristics of study participants).

Participants were eligible for inclusion if they: (a) agreed to fill out the questionnaires; (b) experienced a TME within a 3-month period prior to their hospitalization in the rehabilitation department; and (c) had sufficient mastery of Hebrew to complete the questionnaires. Potential participants were excluded if: (a) their medical conditions or cognitive limitations did not allow for completion of the clinical data; (b) their injuries were due to family violence or suspected child abuse; and (c) the child or parent was subject to legal proceedings related to the injury, the child or parent was the perpetrator of violence related to the injury, or the child or parent declined to complete the questionnaires.

Among the 405 children who were eligible for the study, the reasons for exclusion were: family declined to participate ($N = 104$), the parent or the child did not have sufficient mastery of Hebrew ($N = 41$), the family was intended to be discharged from the

Table I. Demographics and Injury/Illness Characteristics

Variable	N = 196
Child age in years <i>M</i> (<i>SD</i>), range	12.8 (3.1), 7–18
Child gender, male <i>N</i> (%)	120 (61.2)
Child ethnicity <i>N</i> (%)	
Jews	172 (88.2)
Arabs	23 (11.8)
Highest parental education <i>N</i> (%)	
Less than high school education	26 (14.2)
High school education	62 (33.9)
Some college/vocational school	71 (38.8)
Graduated from 4-year college or higher	24 (13.1)
Relationship status <i>N</i> (%)	
Single	8 (4.3)
Married/partnered	76.9 (80.2)
Separated/divorced	28 (15)
Widow	1 (0.5)
Financial status <i>N</i> (%)	
No financial problems	83 (46.6)
Some financial problems	59 (33.1)
Many financial problems	20 (11.2)
Hard to meet basic needs	16 (9)
Child injury/illness type <i>N</i> (%)	
ABI ^a	92 (46.9)
Spinal Cord	16 (8.1)
Burns	5 (2.6)
Developmental after surgery	21 (10.7)
Orthopedic	32 (16.3)
Guillain Barre syndrome	12 (6.2)
Others	18 (9.2)

^aABI = acquired brain injury.

pediatric ward within a short time (<3 weeks), not sufficient for completing the psychosocial protocol when needed (*N* = 64). There were no significant differences in child's gender or age between those who participated in the study and those who were ineligible.

All baseline assessments occurred within 90 days (and at least 30 days from the TME, according to DSM-IV and DSM-V diagnostic criteria; [American Psychiatric Association, 1994, 2013](#); T1; *M* = 47.7 days postinjury, *SD* = 18.3 days postinjury).

Procedure

As part of the admission process in the Pediatric Rehabilitation Department, each family was asked by their psychologist/social worker to complete the questionnaires in order to screen for psychosocial risk and for child's and mother's PTSS. All study procedures were approved by the Institutional Review Board at The Sheba Medical Center.

Measures

Throughout the screening phase, children completed PTSS measures; mothers completed a psychosocial assessment tool (PAT; e.g., family structure and resources, child's pre-TME emotional functioning, family pre-TME functioning, social support), mother's PTSS,

and child's PTSS. Child and injury-related factors were abstracted from medical records.

Pre- and Peri-TME Psychological and Environmental Variables

The PAT2.0 ([Pai et al., 2008](#)) comprises seven subscales; however, for the purpose of this study, only 4 subscales were utilized. We assessed child's pretrauma emotional functioning using the child's problems subscale (eight items), and pretrauma environmental variables were assessed using the family structure and resources subscale (eight items), the social support subscale (eight items), and the family problems subscale (eight items). Subscale total scores were calculated by dividing the number of endorsed high-risk items by the total number of items in each subscale. Adjusted subscale scores ranged from 0 to 1, with higher scores indicating higher psychosocial risk. In a recent study by [Kazak et al. \(2018\)](#) the PAT subscales have shown good internal consistency using the Kuder–Richardson 20 coefficient (child problems $KR20 > 0.80$; family structure/resources, social support, and family problems were adequate, ranging from .59 to .64). The PAT has shown excellent convergent validity with standardized measures of family resources, family functioning, child functioning, and sibling functioning, in a range of pediatric conditions ([McCarthy et al., 2016](#); [Pai et al., 2012](#); [Reader et al., 2020](#); [Sint Nicolaas et al., 2016](#)).

Child's PTSSs

Child's PTSS was evaluated using the Child PTSD Symptom Scale (CPSS; [Foa et al., 2001](#)). The CPSS is a 17-item self-report instrument that can yield an overall PTSS severity score corresponding to the DSM-IV edition of PTSD symptom categories. In our study all 17 items were summed to create a total score, with a higher score indicating greater PTSS severity (0–51). The CPSS has shown excellent internal consistency, test–retest reliability, and convergent validity with structured clinical interview measures of PTSD ([Foa et al., 2001](#); [Nixon et al., 2013](#)). [Rachamim et al. \(2011\)](#) reported high-internal consistency ($\alpha = .91$) and excellent test–retest reliability ($r = .81$) for the total scale in the Hebrew version. In this study, internal reliability was high (Cronbach's $\alpha = .85$). A PTSD risk cutoff score of ≥ 15 was decided based on previous recommendations ([Kassam-Adams et al., 2015](#)).

Child's PTSSs: parent report

Mother's report of her child's level of symptoms was evaluated using the CPSS-parent's report ([Foa et al., 2001](#); for the full description, see the measurement above). In this study, internal reliability was high for mother's report on child's PTSD symptoms

(Cronbach's $\alpha = .92$). Cutoff score of ≥ 15 was applied (Kassam-Adams et al., 2015).

Mother's PTSSs

Mother's PTSS was evaluated using the Posttraumatic Diagnostic Scale (PDS; Foa et al., 1997). The PDS is a widely used 17-item self-report questionnaire for assessing PTSS based on DSM-IV criteria for PTSD (American Psychiatric Association, 1994). All 17 items are summed to create a total score, with a higher score indicating greater PTSS severity (0–51). Psychometric evaluation has demonstrated acceptable to excellent internal consistency, good test–retest reliability, and acceptable convergent and concurrent validity (Foa et al., 1997; Powers et al., 2012). To obtain an indication of whether mothers' reported PTSD symptoms were related specifically to their child's medical event, mothers were asked to complete the questions related to their own PTSD symptoms with respect to their child's medical event, rather than the traumatic event “that bothered them the most,” as in the original version. In this study, internal reliability was high for mother's self-report (Cronbach's $\alpha = .92$). A PTSD risk cutoff score of ≥ 23 was decided based on previous recommendations (Sheeran & Zimmerman, 2002).

Medical Team Support

A MTS measure was created for this study and was derived from the Staff PAT questionnaire (Pai et al., 2008). The Staff PAT questionnaire is a 17-item Likert-type rating scale that provides a parallel assessment of psychosocial risk from the perspective of the patient's medical team. The items correspond to the PAT2.0 and seek to assess whether a particular risk factor is an area of concern for the family (4-point scale ranging from *definitely no* to *definitely yes*). The MTS scale consisted of four items that captured the relationship between the family and the medical team (e.g., “*this family is connected to the medical team and trusts the medical team*”). A sum score of the four items was conducted (0–16). Internal consistency for the Staff PAT in the current sample was Cronbach's $\alpha = .82$.

Statistical Analysis

We first examined bivariate relationships (using Pearson's correlations and chi-square) among key study variables. Bivariate analyses of demographic, injury/illness type, and pretrauma variables with child's and mother's PTSS provided an initial examination of the model. We then used structural equation modeling (SEM) with maximum likelihood parameter estimation (Raykov & Marcoulides, 2006), to explore and test the complex patterns of relationships between the hypothesized pretrauma variables and child's and mother's PTSS.

In accordance with the Marsac et al. (2014, 2017) biopsychosocial model, we specified SEM for PTSS, in which pretrauma variables contributed to peritrauma PTSS, controlling for child's gender, age, parental education, ethnic group, and financial status. We included pretrauma variables as concurrent predictors of child's self-reported PTSS. Then, we separately added MTS, mother's PTSS, and mother's report of child's PTSS, respectively. Finally, in Figure 1, we included all variables in a combined model. In addition, we tested whether mother's report of child's PTSS was a mediator between mother's PTSS and child's PTSS, and whether MTS was a mediator between pretrauma social support and mother's PTSS. In order to examine mother's report of child's PTSS as a mediator, we entered child's PTSS scores into the model as a manifest variable and not as a latent variable (as usually required in multi-method assessment strategies involving data collected from multiple reporters). Next, we examined the model fit and ensured that we did not inaccurately specify the model.

Missing data were managed by SPSS Version 22, using multiple imputation (Enders, 2010). We used Little's missing completely at random test (Little & Rubin, 1987), which did not reach significance, suggesting that the data were missing completely at random. Data analyses were conducted using SPSS Version 22 (for descriptive and bivariate analyses) and AMOS (for SEM analyses). To examine the hypotheses, each type of child's PTSS factor (i.e., mother's report on the child, child's self-report) was first examined in a separate model, followed by a final model including both informants' reports. In the combined models, the residuals of each informant type were allowed to correlate. Overall model fit was evaluated using three indices: the χ^2 statistic, the comparative fit index (CFI), and the root mean square error of approximation (RMSEA). Hypotheses regarding mediation were tested using bootstrapping procedures; confidence intervals (CIs) of indirect effects were calculated using the bias-corrected bootstrap (MacKinnon, 2008).

Results

Bivariate Analyses

Levels of Posttraumatic Symptoms in the Sample

Approximately 27% of the children in our sample self-reported significant levels of PTSS (i.e., > 15) and mothers' reports of their child's PTSS indicated that 38% had significant levels of symptoms (i.e., > 15). Mothers' self-reports of their own level of PTSS revealed that 21% had significant levels of symptoms (i.e., > 23).

Demographics and Injury/Illness Characteristics

Mothers were more likely to have above-clinical cutoff scores if they had less than a high school education

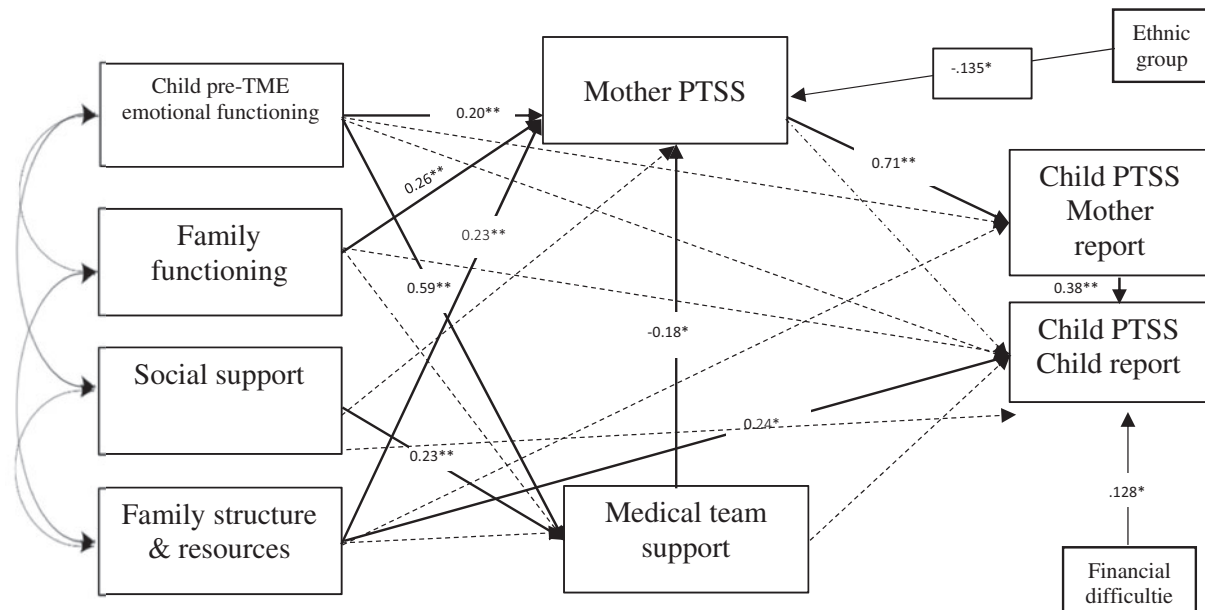


Figure 1. Completed structural equation model including standardized estimates ($N = 196$). Model Fit, $\chi^2(196) = 4.781$, $p = .311$, comparative fit index = 0.998, root mean square error of approximation = 0.032, TLI = 0.973, $\chi^2/df = 1.19$. *** $p < .001$, ** $p < .01$, and * $p < .05$. Not pictured: covariates relationships (i.e., child age, gender, and parental education; none had a direct effect on PTSS).

($\chi^2 = 10.33$, $p < .05$), or had Arab ethnicity ($\chi^2 = 7.62$, $p < .05$). They were more likely to have below the PTSS clinical cutoff scores if they had some college/vocational school education ($\chi^2 = 9.51$, $p < .05$). Children were more likely to have below clinical PTSS cutoff scores if their family had no financial difficulties ($\chi^2 = 7.27$, $p < .05$). Accordingly, parental education, ethnic group, and financial status were retained as a covariates in the tested models (see Table II). Bivariate analyses suggested that family social support was associated with child's age ($r = .170$, $p < .05$), and less social support (higher score) was associated with older age. Child's gender and type of medical event involved were not related to any of the study variables. Accordingly, only child's age was retained as a covariate in the tested models.

Child's self-reported PTSS score positively correlated with child's pre-TME emotional functioning ($r = .20$, $p < .001$), family structure and resources ($r = .32$, $p < .005$), family functioning ($r = .26$, $p < .005$), and mother's PTSS ($r = .33$, $p < .005$). Positive associations were also found between each pretrauma variable and mother's report of child's PTSS. Child's emotional functioning ($r = .30$, $p < .005$), family structure and resources ($r = .30$, $p < .005$), and family functioning ($r = .37$, $p < .005$), were significantly positively correlated with mother's own PTSS score.

Positive associations were found between MTS and all pretrauma variables: child's emotional functioning ($r = .64$, $p < .005$); family structure and resources ($r = .16$, $p < .05$); family functioning ($r = .30$, $p < .005$); and social support ($r = .33$, $p < .005$). MTS was

positively related to mother's report of child's PTSS ($r = .42$, $p < .05$). Furthermore, positive associations were found between child's self-reported PTSS, mother's report of child's PTSS, and mother's report of her own PTSS ($r = .33-.74$, $p < .005$).

Structural Models

The hypothesized model, which included mother's PTSS and MTS as mediators between pretrauma psychosocial factors and child's PTSS fit the data well, $\chi^2(196) = 4.781$, $p = .311$, CFI = 0.998, RMSEA = 0.032, and TLI = 0.973 (see Figure 1 for the complete model). As to our hypotheses, the results were as follows. Family's pretrauma structure and resources, and financial difficulties, were positively associated with child's self-reported PTSS (structure and resources standardized $\beta = .243$, $p < .001$, financial difficulties standardized $\beta = .128$, $p < .05$), with less family resources and more financial difficulties associated with higher levels of PTSS. Family's ethnic group, pretrauma structure and resources, child's pretrauma emotional functioning, and family's pretrauma functioning were positively associated with mother's PTSS (ethnic group standardized $\beta = -.135$, $p < .05$, structure and resources standardized $\beta = .229$, $p < .001$; child's emotional functioning standardized $\beta = .203$, $p < .001$; family's functioning standardized $\beta = .256$, $p < .001$), with Arab ethnicity, less family resources, higher levels of child's emotional problems, and poorer family functioning being associated with higher maternal PTSS. Mother's PTSS mediated the effects of

Table II. Correlations Between Pretrauma Psychosocial Factors, Peritrauma Environmental Factors, and Child's Posttraumatic Stress Factors (N = 196)

Variable	1	2	3	4	5	6	7
1. Child function	1						
2. Family structure and resources	0.08	1					
3. Family function	0.32**	0.27**	1				
4. Social support	0.12	0.28**	0.17*	1			
5. Mother's PTSS	0.30**	0.30**	0.37**	0.13	1		
6. MTS	0.64**	0.16*	0.30**	0.33**	0.13	1	
7. Child's PTS-child's report	0.20**	0.32**	0.26**	0.03	0.33**	0.08	1
8. Child's PTSS-mother's report	0.30**	0.21**	0.30**	0.17*	0.74**	0.19**	0.42**

* $p < .05$ (two-tailed); ** $p < .01$ (two-tailed).

the following: family's pretrauma functioning on mother's report of child's PTSS (bootstrap estimate of the indirect effect was 12.07 $p < .05$, 95% CI [4.12, 21.8]), child's pretrauma emotional functioning on mother's report of child's PTSS (bootstrap estimate of the indirect effect was 11.22 $p < .05$, 95% CI [6.25, 19.33]), and family's pretrauma structure and resources on mother's report of child's PTSS (bootstrap estimate of the indirect effect was 0.16 $p < .05$, 95% CI [0.04, 0.28]). MTS mediated the effect of family's pretrauma social support on mother's PTSS (bootstrapped estimate of the indirect effect was .026, $p < .05$, 95% CI [-12.01, -.83]). Mother's PTSS was not significantly associated with child's self-reported PTSS, a finding that did not support our hypothesis; however, mother's PTSS was strongly associated with mother's report of child's symptoms (mother's PTSS standardized $\beta = .72$, $p < .001$). Mother's report of child's PTSS significantly contributed to child's PTSS. Finally, mother's report of child's PTSS mediated the effect of mother's PTSS on child's PTSS (see Figure 1). Bootstrapped estimate of the indirect effect was .056, $p < .05$, 95% CI [0.12, 0.32].

Discussion

The aim of this study was to expand the current understanding of the development of PTSS following TMEs in children, focusing on the pre and peritrauma periods. This research supports the integration of selected variables from the biopsychosocial theoretical model of PTSS (Marsac et al., 2014), after TMEs, for an understanding of children's PTSS.

In our study, 27% of the children self-reported significant symptoms of PTS. Parents' reports on child's PTSS indicated that 38% of the children and youth had significant symptoms. In addition, parents' self-reports of their own level of PTS symptoms revealed 21% with significant symptoms, and similar rates have been reported for parents following TMEs (Landolt et al., 2012; Price et al., 2016). Our results regarding child's symptoms are in accordance with previous reports suggesting that approximately 30%

of ill and injured children experience significant PTSS (Price et al., 2016). Furthermore, the observed discrepancy in our study between child's self-reports and parents' proxy reports of child's symptoms, has been demonstrated in various trauma populations (Egberts et al., 2018; Shemesh et al., 2005). We elaborate on the possible explanation for such a discrepancy below.

This study extends past work by revealing that among the various psychosocial risk factors that were examined, the family's pretrauma structure and resources had unique, independent relationships with the child's self-reported PTSS. These findings are consistent with earlier findings showing that lower parental income (Delahanty et al., 2005), and lower parental education (Vanderbilt et al., 2009) are associated with higher stress responses among families. It may be that people who grow up in lower-class environments (as may be reflected in a family with fewer resources and an unstable family structure) are objectively characterized by having heightened vigilance to threat (Manstead, 2018). Thus, in light of our findings, family's pretrauma structure and resources are important pre- and peri-TME factors associated with the development of child's PTSS following TMEs.

Child's pretrauma emotional functioning and family's pretrauma functioning did not have an independent relationship with child's self-reported PTSS or with mother's report on child's PTSS. Early studies of traumatic events among children found similar findings (Udwin et al., 2000), whereas a meta-analysis found a significant contribution of child's pretrauma emotional functioning to child's PTSS (Cox et al., 2008; Trickey et al., 2012). These mixed findings might be understood in light of our results indicating that child's pretrauma emotional functioning and family's pretrauma functioning were both strongly associated with mothers' PTSS at the peritrauma period. Similarly, among the psychosocial variables in the aftermath of a serious illness or injury, child's behavioral problems within the family context and parent's mental health factors play a major role in the parent's own stress reactions (Muscara et al., 2017).

With regard to the role of mothers' PTSS in the development of child's PTSS, our findings show that mother's PTSS significantly mediated the relationship between child's pre-existing emotional functioning, family functioning, and family structure and resources, and the mother's report of the child's PTSS. However, as opposed to our hypothesis, mothers' PTSS did not mediate the relationship between the above factors and child's self-reported PTSS. These mixed results may reflect discrepancies in the reports of child's symptoms between different informants (i.e., parent or child). Studies indicate that following a child's TME, parents with more stress symptoms report higher symptoms in their child, suggesting parents' symptoms biasing them to recall more negative information in terms of child problems (Dame et al., 2014; Shemesh et al., 2005). Thus, studies indicate that mother and child views on child traumatic stress reactions differ, and the methods of assessing PTSS might explain the equivocal nature of the findings (Egberts et al., 2018).

Beyond pretrauma factors, this study also examined for the first time the potential mediational role of MTS, in the association between pretrauma risk factors and child's levels of PTSS. We found that mothers who reported higher pretrauma social support tended to require more support from the medical team in the peritrauma period. Such findings are consistent with the biopsychosocial model (Marsac et al., 2014), and can also be viewed in light of evolutionary approaches and attachment theory. These suggest that human beings have a basic need for social connection, and that social disconnection is painful because it runs counter to this fundamental need (Baumeister & Leary, 1995; Bowlby, 1981). Thus, although examining mothers' attachment processes is outside the scope of this study, the current findings may demonstrate that a mother's predisposition towards receiving social support allows her to obtain support from a medical team in times of stress.

Furthermore, mothers who made more use of MTS (as perceived by the medical team) were also the ones presenting higher levels of PTSS. Similar findings were found in a recent study examining the consequences of parental PTSS on service utilization by parents and children following serious illness or injury, where severity of PTSS predicted being in a higher utilization group of physical and psychological services 12 months later (Thompson et al., 2017). These findings may be encouraging, suggesting that individuals with the greatest needs, in terms of PTSS severity, are more likely than others to engage MTS (Thompson et al., 2017). However, as this study was cross-sectional, it is not possible to assess the utility and effectiveness of the support given by the medical team. A prospective analysis of health service utilization in trauma-exposed parents may allow a better understanding.

Our third main goal was to examine the effect of mother's PTSS and mother's report of child's PTSS on child's self-reported PTSS. Although mother's PTSS during the peritrauma period did not contribute directly to child's co-occurring PTSS, mother's report of child's PTSS served as a mediator between mother's PTSS and child's PTSS.

These findings are consistent with earlier studies that found higher concordance between symptoms when parents reported on both their and their child's symptoms (De Young et al., 2014; Landolt et al., 2012) than in studies in which the parent and the child each reported on their own symptoms (Dame et al., 2014; Wise & Delahanty, 2017). These findings highlight the complexity underlying systemic family effects, in which a mother's perceptions of her child's symptoms play a large role in the child's development of PTSS. Recently, the role of parents' cognitive appraisals regarding their child's recovery was reported as a potentially central theme in the development of PTSS in children, perhaps explaining why parents' responses are critical to their children's outcomes (Schilpzand et al., 2018). Parents' reports of their child's PTSS might embody their cognitions regarding the child's recovery, and might relate to the child's PTSS by either directly influencing how a parent helps the child appraise the traumatic experience in conversation, or indirectly by how these cognitions influence a parent's mental health and compromise parenting practices (Schilpzand et al., 2018). However, this association merits further study to better understand how parents' stress symptoms and their report of their child's symptoms can impact the child's recovery.

Study Limitations

This study has several limitations. First, it is cross-sectional, precluding conclusions about causality. In order to examine mechanisms of interfamilial stress responses, prospective studies—which would examine risk and protective factors for PTSS within the child and the parents and would provide valuable insight into the family's response to medical trauma—are needed. In addition, due to the heterogeneity of etiologies, we could not examine the role of illness/injury severity on mother's and child's PTSS. As far as we know, there is no single measure that can compare the severity of illness among all the etiologies presented in this study. In a previous study conducted in our department examining emotional distress among mothers of children with chronic physical disabilities, emotional distress was not related to the child's specific injury etiology (Silberg et al., 2016). In addition, history of prior traumatic experiences is another significant risk factor which was not included in this study and should be included in further studies (Finkelhor et al., 2009).

In this study MTS was evaluated using the medical team's perceptions regarding their relationship with the family throughout rehabilitation. The use of a standardized measure regarding utilization of health care resources during rehabilitation (e.g., meetings with psychologist/social worker), so as to gauge the family's perceptions regarding their relationship with the medical team, is recommended for future research.

This study presented only mother-child PTSS reports. The reason for focusing solely on the role of mothers (rather than fathers) in this study lies in the fact that in most families mothers are still the primary caregivers for children with medical conditions, both at home (Thyen et al., 1999) and during hospitalization (Azevedo et al., 2018). That said, by examining the role of fathers as well, we could gain a broader understanding of within-family systemic influences of PTSS following TMEs, critically important data when adopting a biopsychosocial framework (Egberts et al., 2018).

In addition, it may be that some of the families who did not agree to complete the PTSS questionnaire or to accept the MTS that was offered them were families with high levels of PTSS. We assume that for these families any reminder of the traumatic event might have been threatening and unbearable at the peritrauma phase and avoiding questionnaires or MTS may have constituted an attempt to avoid reminders of the traumatic event (a prominent PTSS in and of itself). In addition, because of the timing of the study (during the transition from DSM-IV to DSM-V), we used a PTSS measure based on DSM-IV criteria which differ slightly from DSM-V criteria. In the revised DSM-V fifth edition, the three clusters are divided into two distinct clusters: avoidance, and persistent negative alterations in cognitions and mood.

Clinical Implications

This study highlights the importance of screening every family who has a member hospitalized after a TME. Driven by a trauma-informed care approach (Marsac et al., 2016), all children and families are viewed as potentially experiencing a traumatic event in the past or as experiencing their current medical care as traumatic. Medical teams working in this context are a significant source of support for the family during this period. Health-care providers who are knowledgeable about medical traumatic stress have the opportunity to minimize the potentially traumatic aspects of medical care and identify children and families with persistent distress (Cutuli et al., 2019).

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