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## Mother's Mental Health, Mother-Child Relationship, and Family Functioning 3 months after a Preschooler's Head Injury

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### Abstract

**Objective**—Investigate mothers' mental health, mother-child relationship, and family functioning 3 months after preschool children's head trauma and hospital discharge.

**Design**—Prospective survey.

**Setting**—7 hospitals; families' homes.

**Participants**—Eighty mothers of children (ages 3–6) with head trauma.

**Measures**—Perceived injury severity, Mental Health Inventory (MHI), Parental Stressor Scale: PICU 24–48 hours after admission; MHI, Parenting Stress Index, FACES II, Multidimensional Scale of Perceived Social Support 3 months post-discharge.

**Results**—Injury severity had negative effects on mothers' mental health at 3 months after discharge, but not on the mother-child relationship and the family's functioning. Mothers' baseline mental health and ongoing support had positive effects on mother-child relationship and family adaptability.

**Conclusions**—Mothers with greater stress and poorer mental health during their child's hospitalization may be at risk for negative mother-child and family outcomes. Interventions that decrease parents' stress during hospitalization and promote ongoing social support after discharge may diminish this risk.

### Keywords

head injury; family functioning; parent mental health; preschool children

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An estimated 475,000 children under the age of 14 years experience traumatic brain injuries (TBIs) each year in the United States, leaving many with residual impairments – including seizures, speech and gait problems, hearing or vision changes, and memory or attention problems<sup>1–3</sup>. Young children are more likely to experience diffuse, rather than focal, brain injury which may interrupt cerebral development in areas important for information processing activities, executive skills and behavioral functions<sup>4,5</sup>. Hooper and colleagues<sup>6</sup> found that primary caregivers reported neurological, neurocognitive, behavioral and school problems in children and adolescents, even following a mild TBI. These residual effects of TBI present challenges for parents and families, as they adjust to a “new” child after the injury<sup>7</sup>. Mothers, who are most often the primary caregivers<sup>8</sup> and likely also to be employed, may have the most difficulty coping with the child's injury and residual problems that require adjustments to the family's usual way of functioning. Poor family functioning increases the risk of poor

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outcome<sup>9</sup>, especially for children with more severe TBI. Research is limited on factors affecting the mother's mental health, mother-child relationship, and family functioning after a preschool child's head injury. The purpose of this study was to investigate the effects of perceived and objective injury severity, family structure, mothers' mental health and reactions at 24–48 hours after the preschool child's hospital admission for head injury (T1), and ongoing social support on: mothers' mental health, the mother-child relationship, and family functioning at 3 months post-discharge (T2).

Based on McCubbin and McCubbin's Resiliency Model of Family Stress, Adjustment, and Adaptation<sup>10</sup>, this study hypothesizes that characteristics of the situation, characteristics of the family, perception of the event (injury), and resistance resources will affect family outcomes (mothers' mental health, the mother-child relationship, family functioning). Characteristics of the event – the severity of the child's head injury, the acuity of the child's condition (critical vs. acute), parent reactions to the event (degree of stress) – are expected to affect family outcomes. Being in a two-parent family and having fewer children (characteristics of the family) are expected to have positive effects on family outcomes. Resistance resources are factors that help the family to defend against stress – in this study, social support and baseline mothers' mental health – and are expected to have positive effects on family outcomes.

## Parent Mental Health

In a study of preschool children hospitalized with head injury, Youngblut and Brooten<sup>11</sup> found better parent mental health 2 weeks after the child's discharge to be related to the mother's greater social support and better baseline mental health (24–48 hours after the child's hospital admission). Mothers' greater perceived severity of the child's injury and lower social support were associated with her greater distress in parenting. Better mothers' baseline mental health, social support, and being in a 2-parent family were related to greater family cohesion<sup>11</sup>. Hawley and colleagues<sup>8</sup> found that 16–18.5% of parents of children with head injury (ages 6–20 years) had poor mental health at recruitment and 12 months later, compared to none of the parents in the control group. Among parents with severely head-injured children, the proportion with poor mental health increased from 18% at recruitment to 35% one year later. Length of time since injury varied from 6 months to 5 years at recruitment. Wade et al.<sup>12</sup> found that, at 12 months post-injury, parents of children with severe TBI reported more clinically severe psychological symptoms than parents of children with moderate TBI.

Research on parents' reactions that compares pediatric intensive care unit (PICU) and general care unit (GCU) groups is very limited. In one study<sup>13</sup>, top concerns and stressors soon after a preschool child's hospital admission for head trauma were very similar for parents with a child in the PICU and parents with a child in the GCU; however, parents in the PICU group rated more aspects of the child's hospitalization as highly stressful. Compared to mothers in the GCU group, mothers in the PICU group were more concerned about their child's future (survival, physical or mental impairment) and more stressed by the child's appearance, sights and sounds of the unit, and procedures done to their child<sup>13</sup>. In addition, research finds that greater objective illness severity, parent's perception of greater severity of the child's illness, and more negative parent reaction to the critical illness are associated with lower parent mental health after a child's hospitalization in a PICU<sup>14</sup>.

## Parent-Child Relationship

Hawley and colleagues<sup>8</sup> found that parents of children with TBI, regardless of severity, consistently reported more total parenting stress ( $\geq 90^{\text{th}}$  percentile on the Parenting Stress Index [PSI]) than controls, 46.5% vs. 3.4% at recruitment and 37% vs 9.6% one year later. The same was true for the PSI's three subscales: parenting distress, parent-child dysfunctional relationship, and child perceived as difficult. At both time points, the proportion of parents

scoring above the 90<sup>th</sup> percentile (on the total scale and the three subscales) in the group with severely head-injured children was greater than those of parents in the groups with mildly and moderately head-injured children. In one qualitative study<sup>7</sup>, mothers of children with a head injury described their relationship with their child as “changed dramatically.” Memory loss, motor disabilities, and cognitive deficits changed the pattern of interaction the mother and child had established prior to injury. Mothers reported feeling guilty and helpless at failing to protect their children and not being able to make their children better.

## Family Functioning

Anderson and colleagues<sup>9</sup> examined family functioning 30 months after TBI in children aged 2 to 6.11 years and found that family function measures, particularly parenting style, remained relatively stable over time. Preinjury family function, as well as functional impairments in the child, influenced effective family functioning in the long term after injury and more severe injury resulted in increased perception of family burden and stress. Stresses affected parents, siblings and family activities equally.

A few studies of family functioning after a school-age child’s TBI have been reported. Poor pre-injury family functioning and parental psychological disorder were the best predictors of poor post-injury family functioning<sup>15–17</sup>. Max and colleagues<sup>18</sup> reported that family functioning 2 years after a school-aged child’s TBI was related to pre-injury family functioning (measured “as soon as possible” after injury), development of a new psychiatric disorder in the child, and pre-injury family life events or stressors. However, in this study and others, pre-injury measures were gathered as much as a month after the child’s injury by asking parents to rate their family’s pre-injury functioning. The stress of the injury event and the amount of elapsed time call into question the parents’ ability to accurately recall the quality of their family’s functioning. Indeed, Youngblut and Brooten<sup>11</sup> found that injury severity affected family functioning as early as 2 weeks following discharge. Also, family structure (single- or 2-parent family, number of children) was not considered in any of the reported studies, ignoring the additional (pre-existing) related demands on the parents.

In summary, while much research has focused on outcomes of children after TBI, it has concentrated mainly on school aged children with little research on preschool children. In addition, in contrast to child function, less research has focused on family functioning, although there is increasing recognition of the interactive effects of the child’s injury severity and family functioning on child outcomes. There is an absence of findings reporting functioning of mothers who serve as the major caretakers for children with TBI. The present study, examining mother’s mental health, mother-child relationship, and family functioning 3 months after a preschooler’s head injury, addresses these gaps in our knowledge. The questions for this study were: 1) Do mother’s mental health, mother-child relationship, and family functioning at 3 months post-hospital discharge differ by severity of head injury or by the child’s condition on hospital admission (critical vs. acute), and 2) Are perceived and objective injury severity, family structure, mothers’ mental health and reactions at 24 – 48 hours after hospital admission (T1), and ongoing social support related to mothers’ mental health, mother-child relationship, and family functioning at 3 months post-discharge (T2). These data were collected as part of a longitudinal study of families with a preschool child with TBI.

## Materials & Method

### Sample

Mothers of preschool children (ages 36 through 83 months) hospitalized after sustaining a head injury were eligible to participate. Inclusion criteria for the child were: hospitalized after sustaining an injury where head trauma was possible, had at least one physical finding

consistent with head trauma (loss of consciousness, a positive CT scan or x-ray, or symptoms of head injury in children), living with the mother before the injury, free from chronic illness other than asthma, and no previous hospitalization. All mothers understood spoken English. Mothers were excluded if the child had severe pre-existing cognitive deficits or was considered brain dead after the injury, if the child's injuries were due to child abuse, or if a parent was hospitalized or died in the injury event.

Eighty mothers with a preschool child (3 – 6 years old) hospitalized with a head injury participated in the study. Half were white; most were high school graduates (81.3%) and married or living with a partner (71.3%). Mothers did not differ across head injury severity groups (Table 1). Most injured children had a least one sibling (87.5%), and 50% were hospitalized initially in the PICU. The most common cause of the head injury was falls, followed by motor vehicle crashes. Most children sustained only the head injury (71.4%). 41.3% ( $n = 33$ ) of the children experienced a loss of consciousness at the scene, and 1 (1.3%) had a period of coma after the injury. Other injuries, sustained by 28.6% of the children, included other fractures ( $n = 17$ ) and injuries to the lung ( $n = 6$ ), liver ( $n = 4$ ), spleen ( $n = 3$ ), kidney ( $n = 2$ ), GI tract ( $n = 3$ ), heart ( $n = 1$ ), and spinal cord ( $n = 1$ ). Children differed across head injury severity groups on two variables. Children with more severe head injuries were more likely to be admitted to the PICU initially and to have longer lengths of hospital stay (Table 1).

### Dependent Measures

**Mother's Mental Health** was measured at 3 months after discharge with the two domains – psychological well-being and psychological distress – of the Mental Health Inventory<sup>19</sup> (MHI). Psychological well-being measures general positive affect and sense of belonging. Psychological distress assesses anxiety, depression, and loss of behavioral/emotional control. Mothers rated each of the 32 items on a 5-point scale based on their experiences over the previous 2 weeks. Higher total scores indicate greater well-being and distress. Internal consistency reliabilities at 3 months post-discharge were strong at .93 (distress) and .89 (well-being).

**Degree of strain in the Mother-Child Relationship** at 3 months after discharge was measured with the 3 subscales (distress in parenting, dysfunctional parent-child relationship, parent perception of the child as difficult) of the Parenting Stress Index<sup>20</sup> (PSI) -Short Form. Mothers rated each of the 36 items on a 5-point Likert scale from 1, “strongly agree” to 5, “strongly disagree.” Construct validity is supported by significant correlations between PSI scores and parental anxiety and by group differences between parents of children with and without disabilities<sup>21</sup>. Internal consistency reliabilities were strong, ranging from .86–.88. Higher scores indicate higher levels of strain or dysfunction in the mother-child relationship.

**Family functioning** at 3 months post-discharge was measured with the two subscales – family cohesion and family adaptability – of the FACES II<sup>22</sup>. Cohesion assesses the nature and quality of the relationships among family members, ranging from disengaged to enmeshed. Adaptability measures the degree to which the family's rules and role structure are stable and predictable, ranging from rigid to chaotic. Mothers rated each of the 15 Cohesion items and the 15 Adaptability items on a 5-point scale from 1 “almost never” to 5 “almost always.” Validity is supported by the scales' ability to distinguish between clinical and nonclinical families<sup>23</sup>. Internal consistency reliabilities in this study were acceptable at .72 for cohesion and .76 for adaptability. Higher total scores indicate greater cohesion and adaptability.

## Independent Measures

**Social Support** was measured with the Multidimensional Scale of Perceived Social Support<sup>24</sup> (MSPSS) at 3 months post-discharge. The MSPSS is a 12-item instrument that gauges amount of support received from friends, family, and significant others. Mothers rated each item on a 7-point Likert scale from 1 “very strongly disagree” to 7 “very strongly agree.” Construct validity is supported by a moderate correlation ( $r = -.35$ ) between MSPSS scores and depression scores for subjects reporting high life stress but no correlation ( $r = .02$ ) for subjects reporting low life stress<sup>24</sup>. Internal consistency for the total scale in this study was strong at .95. Higher total scores represent greater support.

**Baseline Mental Health** was measured with the MHI at 24 – 48 hours after the child’s hospital admission. Mothers were asked to consider the previous 2 weeks when rating the items. Internal consistency reliabilities at baseline were strong at .94 (distress) and .90 (well-being).

**Mothers’ stressors** in the hospital were measured at T1 with the Parental Stressors Scale: PICU<sup>25</sup> (PSS: PICU), which asks about seven stressors in the hospital: child’s appearance, sights & sounds of the unit, procedures done to the child, child’s behavioral and emotional responses, professional staff behavior, professional staff communication, and parental role revision. Mothers rate each of the 39 items on a 5-point scale, ranging from 1 “not stressful” to 5 “extremely stressful.” Items not experienced by the mothers receive a “0.” Total scores were calculated by adding the mother’s ratings and dividing by the number of items. Carter and Miles<sup>26</sup> (1989) found that higher PSS: PICU scores are related to higher anxiety scores, supporting the instrument’s validity. Reliability for the total scale in this study was strong at .92. Higher scores indicate greater stress.

**Mothers’ Perceived Injury Severity** was measured at T1 with a single item, “How sick would you say your child is right now?” rated on a scale from 1 “not very sick” to 5 “the most sick possible.” Mothers were asked to base their rating on how serious they thought their child’s injury was.

**Objective Injury Severity** has two indicators: 1) the seriousness of the child’s condition on admission measured by whether the child was initially admitted to the pediatric intensive care unit (PICU) or to the general care unit (GCU), and 2) the Injury Severity Scale (ISS), a measure of anatomical injury derived from the Abbreviated Injury Scale<sup>27</sup> (AIS). Although Glasgow Coma Scale (GCS) scores were collected, a valid score could not be calculated in many cases because of insufficient information in the child’s chart. In addition, since the GCS is a physiologic scale, scores change over time. In contrast, since the child’s AIS score is determined by the severity of the child’s injuries and does not use physiologic variables, the AIS does not change over time. Based on chart information, individual injuries in each of 6 body regions are classified as: 1 (minor), 2 (moderate), 3 (serious), 4 (severe), 5 (critical), and 6 (maximum), using the AIS dictionary with extensive lists of anatomical injuries and delineated coding rules. The highest AIS code in each body region is squared, and the three highest squared codes are summed to create the ISS total, with higher scores indicating more serious injuries. In the current study, AIS head injury categories were: 15 (18.8%) mild, 27 (33.8%) moderate, 15 (18.8%) serious, 17 (21.3%) severe, and 4 (5.0%) critical. Two children’s head injuries could not be classified due to insufficient information in the chart. Total ISS scores ranged from 1 to 50.

## Procedure

Mothers of eligible preschool children were recruited from the general care unit (GCU) and the PICU in 7 tertiary care centers – 4 in northeastern Ohio and 3 in southern Florida. Three are free-standing children’s hospitals. Admission to the PICU vs. GCU was decided by the

admitting physicians and hospital policy. All 7 facilities allow 24-hour visiting for the child's family. Institutional Review Board approvals were obtained from the universities and hospitals. Mothers were approached by a data collector for recruitment into the study at 24 to 48 hours after the child's hospital admission. This time frame provides data as close to the time of admission as possible. In our pilot work, parents approached prior to 24 hours were unable to respond to study instruments. Refusal rate was 5%. Data were collected from the mothers in the hospital after they provided written consent (T1) and in the home at 3 months post-discharge (T2). The 3-month time point was selected because most children's temporary disabilities (due to casts, traction, etc.) have resolved by that time. In the larger study, attrition rate was 20%. Demographic data were collected by interview, and data about the child's condition and hospital stay were obtained from the child's inpatient chart. All other data were gathered with self-administered questionnaires. About 20% of the mothers could not read well enough to complete the questionnaires, so the data collector read the items to these mothers in private.

### Data analysis

Comparisons across injury severity groups were conducted with oneway analysis of variance (ANOVA) (Table 2). Comparisons of the PICU and GCU groups were done with two-sample t-tests. Bivariate correlations were used to examine the associations among the independent and dependent variables (Table 3). Multiple linear regression analysis was used to examine the ability of perceived and objective injury severity, stressors in the hospital, social support, and baseline mental health to explain the mothers' mental health, mother-child relationship and family functioning 3 months after the child's hospital discharge (Table 4). Significance level was set at  $p = .05$ .

## Results

### Differences by severity of head injury

Mothers' mental health, mother-child relationship, and family functioning did not differ across head injury severity groups (mild, moderate, serious, severe/critical, Table 2) or for mothers of critically ill children (PICU admission) compared to mothers of acutely ill children (GCU admission).

### Factors related to mothers' mental health, mother-child relationship, and family functioning

Mothers' greater psychological distress at T2 was related only to their greater baseline psychological distress and lower baseline psychological well-being as tested with bivariate correlations (Table 3). However, when other factors were considered in the multiple regression, mothers greater psychological distress at T2 was related to greater head injury severity as well as greater psychological distress at baseline (Table 4). Bivariate correlations showed mothers' greater psychological well-being at T2 to be related to their greater baseline psychological well-being, lower baseline psychological distress, and lower head injury severity (Table 3). These associations held in the multiple regression, and both greater stress in the hospital and greater number of children in the family had negative effects on well-being (Table 4).

Mothers' greater distress in parenting at 3 months after discharge was related to their baseline mental health, their perception of greater severity of the child's injuries, and greater stress in the hospital as tested with bivariate correlations (Table 3). Only the associations with mothers' baseline mental health and stress in the hospital remained significant in the regression analysis (Table 4). Greater dysfunction in the mother-child relationship was related to greater maternal baseline psychological distress in the bivariate correlations (Table 3); however, in the regression, greater dysfunction was associated with less T2 social support (Table 4). Mother's greater perception of her child as difficult was related to greater maternal stress in the hospital

using bivariate correlations (Table 3), but this association did not remain significant in the regression analysis (Table 4).

Mothers' perceptions of greater family adaptability at 3 months post-discharge were related to their lower baseline psychological distress, greater baseline psychological well-being, and greater social support at 3 months (Table 3). In the regression, greater family adaptability was related to greater T2 social support and maternal stress in the hospital (Table 4). Mothers' perceptions of greater family cohesion were related to mothers' lower baseline psychological distress and being in a two-parent family (Table 3). These associations remained significant in the regression analysis (Table 4).

## Discussion

This study investigated differences in mothers' mental health, mother-child relationship, and family functioning at 3 months after a preschool child's head injury requiring hospitalization, as well as factors related to these outcomes. Severity of head injury alone had few effects on these outcomes. When other factors were controlled, head injury severity was related to mothers' psychological distress and well-being, but not to the mother-child relationship or the family's functioning. Psychological distress at baseline (24–48 hours after hospital admission) negatively affected parenting distress and family cohesion. Mothers' stress at 24–48 hours after their child's hospitalization had a continuing impact on parenting distress and family adaptability at 3 months post-discharge. Concurrent social support ameliorated parenting distress, quality of the mother-child relationship and the family's adaptability. Family structure variables had little effect on study outcomes, but family cohesion was higher in 2-parent families compared to single-parent families, and mothers' psychological well-being declined with increasing number of children.

Consistent with the study's conceptual framework, the greater the severity of the head injury, measured objectively, the greater the psychological distress and the lower the psychological well-being for mothers at 3 months. Wade et al.<sup>12</sup> also found that severity of psychological symptoms reported by parents of school-age children with TBI at 12 months post-injury varied by severity of the child's TBI. Catroppa and Anderson<sup>28</sup> showed that children who sustained a severe TBI generally performed poorest on complex and timed tasks, situations in everyday life where decreased or slowed performance could take a significant toll on the mother's mental health. Indeed, mothers' greater psychological distress and lower psychological well-being at 3 months were related to greater distress in parenting and more difficulty in dealing with the child.

Mothers whose child was admitted to the PICU and mothers whose child was admitted to the GCU did not differ on mental health, mother-child relationship or family functioning at 3 months after discharge. Although contrary to expectations, this finding is consistent with a study<sup>29</sup> that compared groups based on the unit where the child was initially hospitalized (PICU vs. GCU) at 20 months post-discharge. We can only speculate on the reasons behind this finding. The unit of initial hospitalization may not be a sensitive indicator of severity of the child's injuries, since children with less severe injuries could be admitted to the PICU for treatment of airway or hemodynamic stability problems. Perhaps the reassurance afforded by the greater level of care and availability of health care professionals in the PICU outweighs the fear engendered, especially when the child survived. In addition, the time spent on a GCU before discharge, experienced by all children admitted to a PICU and their families, may provide families with the time and resources to cope with their fears from the PICU, diminishing possible longer term differences.



Greater stress reported by mothers soon after their child's injury and hospital admission was related to greater distress in parenting 3 months after hospital discharge, consistent with the study's conceptual framework. Thus, mothers (and probably fathers) may benefit from efforts to decrease their stress during the child's hospitalization. Frequently clarifying the mother's perception of the child's injury and treatment, providing support and teaching at times often experienced as stressful during the hospitalization, and allowing mothers to participate in the care of their injured child when possible are interventions that have been found to decrease maternal stress in the hospital<sup>30,31</sup>.

Greater maternal stress about what is happening to the child soon after hospital admission was related to greater family adaptability 3 months after hospital discharge. Perhaps the mother's greater stress in the hospital triggers or reflects thoughts that the child might die or could have died. Indeed, Youngblut and Jay<sup>32</sup> found that at 24–48 hours after a child's emergency admission to the PICU, almost all parents were concerned that their child might die, even those whose child had already been transferred to the GCU. In their study of mothers reactions soon after their child's admission to the PICU or GCU for head injury, Youngblut, Brooten and Kuluz<sup>13</sup> found that "What could I have done to prevent this?" was one of the mothers' top 3 concerns. Perhaps the fear about the possibility of the child's death or feelings of guilt at not preventing the injury, also described by Guerrier and McKeever<sup>7</sup>, leads to a realization that stricter rules may not protect the child from adversity and to a desire to indulge the child – to be less rigid about the family's rules and roles – consistent with observations made by Green and Solnit<sup>33</sup>.

Family structure was related to two outcomes. Mothers with fewer children reported greater psychological well-being at 3 months. Perhaps this finding represents the effect of the amount of caretaking responsibility that falls to the mother. That is, the injured child's greater care needs may be more harmful for mothers' psychological well-being when these care needs are added to the existing caretaking responsibility necessitated by other children in the family. In addition, negative sibling behavior and/or interactions among siblings may increase in response to the greater amount of maternal attention directed to the injured child's care needs.

Mothers in two-parent families reported greater family cohesion than mothers in single-parent families. Having a second parent in the family may provide respite, financial resources, and support for the mother in dealing with the injured child's behavior and needs. It may also represent a difference in the "family" being evaluated. In single-parent families, there is likely to be only one type of relationship (parent-child) being evaluated. However, in two-parent families, the mother is considering both the parent-child and the couple relationships. Thus, perhaps the couple relationship tempers the mother's perception of her family's cohesion.

Mothers with better mental health at 24 – 48 hours after their child's hospital admission for head trauma also had better mental health, less distress in parenting, and more positive perceptions of family cohesion by 3 months after the child's hospital discharge. This extends our previous findings (11) at 2 weeks after discharge for mothers of preschool children hospitalized with head injury. The better the mother's mental health at the outset, the more psychological and emotional resources she has available to cope with the injury event.

At 3 months following discharge, greater ongoing social support was related to less dysfunction in the mother-child relationship and to greater family adaptability. Social support was also important to family outcomes in our earlier study<sup>11</sup>. This finding suggests that ongoing social support is important for the mother's ability to effectively relate with her injured child and manage the challenges presented by her family, such as the elevated behavior problems often seen after TBI<sup>34</sup>. Since social support may taper off as time since the child's hospital discharge increases, monitoring the availability of social support at follow-up clinic or office visits and

helping mothers to identify additional sources of support may help to decrease the effects of these negative child behaviors.

### Limitations

The study reports outcomes for mothers and mothers' perceptions of their relationship with the injured child and within the family. Although both parents were invited to participate, a large proportion of the fathers declined, prohibiting comparison of mothers and fathers. This also made it impossible to investigate the effects of disparate parental perceptions on the family's functioning. The study's findings suggest that severity of injury has some effects through 3 months; research at later times will provide better information on how long these effects continue. A sample with a greater number of families from racial/ethnic minorities is needed to investigate differences in outcomes for Black, Hispanic, and Asian families.

In summary, severity of the preschool child's head injury was related to the mothers' mental health at 3 months after hospital discharge, but not to the mother-child relationship or the family's functioning. Thus, the additional caretaking challenges these children often present after discharge may take a toll on the mothers' mental health, but there seems to be little carry-over effect on the mother-child relationship or the family system. Whether the preschooler is admitted to the GCU or the PICU appears to have little effect on mother, mother-child, and family outcomes at 3 months post-discharge. However, it is important to assess mothers' level of stress and mental health at the time of the child's admission, especially for those mothers with other children and those with less social support, since they are at greater risk for compromised parent and family functioning at 3 months after discharge.

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Table 1

Demographics of the sample of mothers.

	All Families (n = 78)	Head Injury Severity				Statistic
		Mild M(SD) (n = 15)	Moderate M (SD) (n = 27)	Serious M(SD) (n = 15)	Severe or Critical M(SD) (n = 21)	
Mother's Age	32.3 (7.20)	31.2 (7.23)	31.4 (7.34)	35.5 (8.59)	32.5 (5.47)	F = 1.27
Mother's Race [N(%)]	39 (50.0%)	5 (33.3%)	14 (51.9%)	10 (66.7%)	6 (28.6%)	X <sup>2</sup> = 8.49
	23 (29.5%)	6 (40.0%)	6 (22.2%)	4 (26.7%)	6 (28.6%)	
	15 (19.2%)	3 (20.0%)	6 (22.2%)	1 (6.7%)	5 (23.8%)	
	1 (1.3%)	1 (6.7%)	0 (0%)	0 (0%)	0 (0%)	
	14 (17.7%)	2 (13.3%)	7 (25.9%)	3 (20%)	2 (9.5%)	X <sup>2</sup> = 5.66
	21 (26.6%)	6 (40%)	7 (25.9%)	4 (26.7%)	4 (19%)	
	24 (30.8%)	5 (33.3%)	7 (25.9%)	4 (26.7%)	8 (38.1%)	
	19 (24.4%)	2 (13.3%)	6 (22.2%)	4 (26.7%)	7 (33.3%)	
	56 (71.8%)	7 (46.7%)	21 (77.8%)	12 (80%)	16 (76.2%)	X <sup>2</sup> = 6.29
	18 (23.1%)	7 (46.7%)	5 (18.5%)	3 (20%)	3 (14.3%)	
	9 (12.5%)	2 (13.3%)	2 (7.4%)	3 (20%)	2 (9.5%)	X <sup>2</sup> = 10.79
	26 (36.1%)	7 (46.7%)	8 (29.6%)	4 (26.7%)	4 (19%)	
	15 (20.8%)	3 (20%)	8 (29.6%)	0 (0%)	8 (38.1%)	
	22 (30.6%)	1 (6.7%)	9 (33.3%)	5 (33.3%)	7 (33.3%)	
	17 (31.5%)	2 (13.3%)	6 (22.2%)	2 (13.3%)	4 (19%)	X <sup>2</sup> = 1.60
	17 (31.5%)	3 (20%)	8 (29.6%)	2 (13.3%)	4 (19%)	
	20 (37.0%)	8 (53.3%)	13 (48.1%)	8 (53.3%)	11 (52.4%)	
	58.8 (14.1)	53.5 (11.4)	60.7 (12.3)	56.3 (15.7)	61.7 (16.3)	F = 1.35
	47 (60.3%)	11 (73.3%)	17 (63.0%)	8 (53.3%)	11 (52.4%)	X <sup>2</sup> = 2.0
	31 (39.7%)	4 (26.7%)	10 (37.0%)	7 (46.7%)	10 (47.6%)	
	39 (50%)	3 (20%)	8 (29.6%)	11 (73.3%)	17 (81.0%)	X <sup>2</sup> = 21.2*
	39 (50%)	12 (80%)	19 (70.3%)	4 (26.7%)	4 (19.0%)	F = 4.14*
	3.6 (4.76)	2.8 (5.41)	1.6 (1.05) <sup>a</sup>	5.3 (6.25)	5.6 (5.10) <sup>a</sup>	
	3.2 (4.14)	2.3 (2.31)	1.0 (<.001)	4.2 (5.23)	3.8 (4.35)	F = 1.00
	39 (50.0%)	6 (40.0%)	16 (59.3%)	7 (46.7%)	10 (47.6%)	X <sup>2</sup> = 17.21
	11 (13.8%)	1 (6.7%)	4 (14.8%)	2 (13.3%)	4 (19.0%)	
	15 (18.8%)	6 (40%)	2 (7.4%)	2 (13.3%)	5 (23.8%)	
	5 (6.3%)	1 (6.7%)	3 (11.1%)	1 (6.7%)	0 (0%)	
	5 (6.3%)	0 (0%)	0 (0%)	3 (20.0%)	2 (9.5%)	
	55 (71.4%)	11 (78.6%)	23 (85.2%)	9 (60.0%)	12 (57.1%)	X <sup>2</sup> = 8.31
	9 (11.7%)	1 (7.1%)	1 (3.7%)	3 (20.0%)	4 (19.1%)	
	5 (6.5%)	0 (0%)	2 (7.4%)	1 (6.7%)	2 (9.5%)	
	8 (10.4%)	2 (14.3%)	1 (3.7%)	2 (13.3%)	3 (14.3%)	

\* p < .01

**Table 2**  
Comparison of mothers' mental health, mother-child relationship, and family functioning at 3 months post-discharge across head injury severity groups

T2 Outcome Measures	Head Injury Severity Groups				F	p
	Mild M(SD) (n = 15)	Moderate M(SD) (n = 27)	Serious M(SD) (n = 15)	Severe/Critical M(SD) (n = 22)		
Psychological Distress	37.9 (8.98)	43.2 (13.71)	40.5 (14.07)	48.3 (15.67)	1.72	.17
Psychological Well-being	46.8 (6.58)	46.6 (8.43)	46.9 (7.11)	41.2 (9.65)	2.20	.10
Distress in Parenting	22.3 (5.55)	28.7 (16.33)	20.8 (6.69)	26.1 (8.33)	1.71	.18
Dysfunctional Mother-Child Relationship	24.0 (7.90)	23.6 (7.71)	24.9 (9.43)	28.0 (9.98)	1.05	.38
Child perceived as Difficult	20.8 (5.97)	34.7 (28.44)	23.7 (8.64)	29.3 (7.64)	.71	.56
Family Cohesion	55.2 (5.75)	55.6 (7.43)	58.9 (8.33)	56.8 (7.40)	.85	.47
Family Adaptability	54.7 (6.24)	50.9 (6.38)	54.3 (4.78)	50.4 (7.04)	2.25	.09

\* p < .05

Table 3

Correlations among study variables

	Head ISS	How Sick	# Children	# Parents	Baseline Psych Distress	Baseline Psych Well-being	PSS: PICU total	T2 Social Support	T2 Psych Distress	T2 Psych Well-being	T2 Distress in Parenting	T2 Dysfunctional Parent-Child	T2 Child as Difficult	T2 Family Cohesion
Head ISS	1.0													
How Sick	.26*	1.0												
# Children	.003	-.01	1.0											
# Parents	.21	.13	.01	1.0										
Baseline Psych Distress	.18	.02	.22	-.06	1.0									
Baseline Psych Well-being	-.30**	-.25*	.003	.12	-.58**	1.0								
PSS: PICU total	.19	.20	-.17	.21	.15	-.14	1.0							
T2 Social Support	-.16	-.20	-.15	-.03	-.46**	.38**	-.04	1.0						
T2 Psych Distress	.23	.05	.22	-.10	.41**	-.32**	.20	.18	1.0					
T2 Psych Well-being	-.29*	-.22	-.19	.17	-.30**	.49**	-.25	.27*	-.76**	1.0				
T2 Distress in Parenting	.10	.27*	-.11	-.008	.44**	-.36**	.26*	-.14	.53**	-.**	1.0			
T2 Dysfunctional Parent-Child	-.03	.06	-.07	-.12	.27*	-.16	.05	-.004	.23	-.23	-.59**	1.0		
T2 Child as Difficult	.18	.19	-.06	-.10	.06	-.27	.61**	-.13	.36**	-.**	.50**	.59**	1.0	
T2 Family Cohesion	.08	.07	-.02	.31**	-.35**	.22	.06	.21	-.44**	.38**	-.29*	-.32**	-.14	1.0
T2 Family Adaptability	-.12	-.03	-.19	.15	-.32**	.26	.13	.43	-.38**	.35**	-.26	-.32**	-.18	.62**

\* p < .05

\*\* p < .01

Table 4  
 Regressions for mothers' mental health, mother-child relationship, and family functioning at 3 months post-discharge.

Independent Variables	Mother's Mental Health (T2)		Distress in Parenting		Mother-Child Relationship		Child as Difficult		Family Functioning	
	Psychological Distress	Psychological Well-being	β	β	Mother-Child Relationship	β	β	Cohesion	Adaptability	
Head Injury Severity	.24*	-.26**	.02	.07	.23	-.001	-.04			
How sick right now (T1)?	-.03	-.04	.08	-.10	.12	.17	-.03			
Number of children	.20	-.28**	.08	.05	.08	-.08	-.11			
Number of parents in home (1 vs. 2)	-.19	-.22*	-.24*	-.25	-.17	.38***	.03			
Baseline Mental Health <sup>a</sup>	.41***	.34***	.35***	.10	-.13	-.31*	-.07			
PSS:PICU total score	.17	-.22*	.34**	.08	.19	.004	.34**			
T2 total social support	.04	.05	-.26*	-.40**	-.08	.12	.41***			
F	2.89**	4.65***	4.52***	1.93*	.96	2.73**	2.75**			
Total Adjusted R <sup>2</sup>	.22	.34	.36	.13	<.001	.20	.20			

\* p < .10  
 \*\* p < .05  
 \*\*\* p < .01

<sup>a</sup>The measure of baseline mental health was T1 psychological distress for all dependent variables, except when the dependent variable was T2 psychological well-being. In that regression, T1 psychological well-being was used to indicate baseline mental health.