Identifying the Variables Impacting Post-Burn Psychological Adjustment: A Meta-Analysis

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Objective  The purpose of this study was to identify and evaluate variables that have the greatest impact on psychological adjustment after burn injury among children, adolescents, and young adults. Methods  Meta-analytical procedures were utilized to determine the strength of association indices of identified impact variables. Only 13 articles were utilized due to the scarcity of and statistical limitations of the research. Results  The body location variable (.26) had the greatest mean strength of association in relation to psychological adjustment. The burn injury variable (.21) had the second greatest mean strength of association. Finally, both the parental adjustment variable and the child premorbid psychological functioning variable (.15) had the third greatest mean strength of association. Conclusions  A major implication of this research is that the impact variables identified will be useful in targeting burn patients who are at risk for psychological adjustment problems.

Key words  burn adjustment; pediatric burn.

Approximately 1 million children in the United States sustain burn injuries each year (American Academy of Pediatrics, 2000). While some burn injuries can be acute life-threatening events, they can also share similar characteristics to chronic illness and may result in serious long-term physical and psychological morbidity (McLoughlin & McGuire, 1990; Patterson et al., 1993; Tarnowski, Rasnake, Gavaghan-Jones, & Smith, 1991). Thus, it is important to determine who is at risk of developing poor psychological adjustment after burn injury.

Although it appears that there is concern for the psychological adjustment and quality of life of child, adolescent, and young adult burn survivors, there is limited literature in this area (Landolt, Grubenmann, & Meuli, 2002; Tarnowski et al., 1991). The research available generally focuses on the prevalence of psychological maladjustment rather than on identifying the variables that impact psychological adjustment.

Psychological Reactions to Burn Injury

To obtain a comprehensive understanding of the impact of burn injury on the psychological adjustment of children, adolescents, and young adults, a critical review of the literature was conducted which revealed contradictory findings regarding the prevalence of post-burn psychological maladjustment within this population. Some outcome studies of pediatric burn survivors indicate that child burn survivors adjust well (Blakeney, Meyer, Le Doux, & Herndon, 1995; Stoddard, Norman, Murphy, & Beardslee, 1989a; Stoddard, Norman, & Murphy, 1989). However, other studies generally suggest that 20–50% of samples of pediatric burn patients experience psychological maladjustment such as symptoms of depression and anxiety (e.g. Stoddard et al., 1989; Tarnowski et al., 1991; Stoddard, Norman, & Murphy, 1989). Furthermore, Meyer, Blakeney, Le Doux and Herndon (1995) found that although children who are burned may not suffer serious psychological adjustment problems, they may be deficient in adaptive behaviors necessary for positive psychological adjustment.

One of the reasons there are contradictory findings in the literature regarding prevalence rates of post-burn psychological maladjustment may be the variations in time elapsed after the burn across studies. This is important because many of the outcome studies that report little-to-no
psychological morbidity may have been conducted after symptoms were resolved or before symptoms surfaced and/or were recognized. Blakeney, Meyer et al.’s (1998) study acknowledges the importance of time in psychological adaptation. Similarly, La Greca, Silverman, Vernberg, and Prinstein (1996) found that in school-aged children traumatized by Hurricane Andrew, posttraumatic stress symptoms decreased and changed over time.

Psychological Adjustment Categories

Although there is some indication in the literature of positive psychological adjustment after burn injury, this appears trivial in comparison to the breadth of research supporting the high prevalence of poor adjustment. This gives reason to explore the various psychological reactions to burn injury. For the purpose of this study, poor psychological adjustment was defined as the presence of post-burn psychological symptoms, other manifestations of emotional or behavioral adjustment (i.e., coping style and decreased life satisfaction), and/or DSM diagnoses as determined by individual studies included in this meta-analysis. In the interest of being clear and concise, psychological reactions were clustered into three categories (depression, anxiety and other psychological reactions) and will be discussed in this section.

Depression

Many studies have found that of the negative psychological outcomes, depression is a common childhood psychological reaction to burn injury (Patterson et al., 1993; Stoddard, 1982b; Stoddard, Stroud, & Murphy, 1992). The most problematic of the depressive reactions for children who have been burned include suicidal ideation, self-rejection, aggressiveness, irritability, and withdrawal (Campbell, 1976; Carvajal, 1990; El Hamaoui, 2002; Stoddard & O’Connell, 1983). Furthermore, Stoddard (1982b) reported that anger, grief, and guilt were also identified among pediatric burn patients.

Anxiety

Anxiety is another common psychological reaction to burn injury among children, adolescents, and young adults (Clarke & Martin, 1978; Patterson et al., 1993; Stoddard, 1982b). Knudson-Cooper (1982b), Stoddard, Chedekel, and Remensnyder (1984), as well as Stoddard (1982b) found that anxiety was a major complaint among pediatric burn patients. It appears that a large portion of research in the area of pediatric burn-related anxiety focuses on participants who met the diagnostic and statistical manual of mental disorder’s (DSM) criteria for posttraumatic stress disorder (PTSD). PTSD and symptoms of PTSD have been observed as being prevalent among burn survivors (i.e., Bryant, 1996; El Hamaoui, 2002; Patterson et al., 1993). La Greca et al. (1996) suggest that symptoms of PTSD were a common reaction to trauma such as physical burn.

Other Psychological Reactions

In addition to anxiety and depression, there are several other psychological reactions discussed in the literature to a lesser extent. A broad spectrum of transient and long-term psychological issues will be addressed within this category. Children, adolescents, and young adults who have been burned may experience body image issues and academic difficulties (Carvajal, 1990; Clarke & Martin, 1978; Stoddard, 1982a). Sleep disturbances are also found to be common among burn victims (Meyer & Blakeney, 1995). In addition, Bryant (1996), El Hamaoui (2002), Herndon et al. (1986), and Rusch (1998) reported that there is an occurrence of somatic complaints in pediatric burn patients. Finally, burn injury has been found to impact social, educational, and occupational functioning as well as medical compliance (Ilechukwu, 2002; Stoddard, 1982b; Stoddard et al., 1991).

Variables Impacting Post-Burn Adjustment

A review of the literature indicates that there are several adjustment variables that may exacerbate or cause psychological maladjustment in child, adolescent, and young adult burn patients. For the purposes of this study, only variables that have been historically deemed most important in the psychological adjustment to burn injury were identified and evaluated (i.e., Tarnowski et al., 1991). These variables will be referred to as impact variables. The impact variables evaluated in this study were labeled social support, body location, burn injury, visible scarring, child premorbid psychological functioning, parental adjustment, demographics, age, and total body surface area (TBSA) (cf. Yu & Dimsdale, 1999; Landolt et al., 2002; LeDoux, Meyer, Blakeney, & Herndon, 1998; Rusch, 1998; Tarnowski et al., 1991; Tyack & Zivani, 2003).

Social Support Variable

Social support is defined by the care, support, and acceptance of others (Giljohann, 1979; Landolt et al., 2002; Sheridan, 2000; Williams, Reeves, Cox, & Call, 2004). For the purpose of this study, social support encompassed the quality of relationships, interactions, and social situations among the burn survivors and their
family and peers. Support provided by family and peers appears to play a significant role in youth adjustment after burn injury (Blakeney, Portman, & Rutan, 1990; LeDoux et al., 1998; Perry, Difede, Musngi, Frances, & Jacobson, 1992; Rusch, 1998; Vernberg et al., 1996). It also plays an important role in helping children cope with stressors (i.e., Compas & Epping, 1993). One reason this may be true is that strong social support influences the burn survivors’ self-esteem and may act as a buffer against the trauma of the burn (Bowden et al., 1980; Davidson Bowden, & Feller, 1981).

Direct family support and family relationships were found to impact psychological adjustment after burn injury (Beard, Herndon, & Desai, 1989; Blakeney et al., 1988; Knudson-Cooper, 1984). In addition, it has been suggested that children’s recovery to other traumas has been mediated by both parental support and family conflict (Faust & Furdella, 2004; La Greca, 2004). However, positive adjustment after traumatic injury such as burn injury is not dependent on family support alone; peer support plays an important role as well (Luther & Price, 1981; Prinstein & La Greca, 2004). To summarize, the literature suggests that the more positive support available to a child who has experienced a trauma such as burn, the less likely that child will have psychological adjustment problems.

**Burn Injury Variable**

There were several burn injury-related variables that were found in the literature to be significantly related to post-burn psychological adjustment (Baker et al., 1996; Yu & Dimsdale, 1999; Rusch, 1998). However, there is a paucity of research available for each individual burn injury-related impact variable. Thus, because of the lack of qualitative and quantitative research to warrant individual impact variables, the burn injury variable was comprised of several different burn injury-related variables. In this study, the burn injury variable is comprised of treatment environment, length of hospital stay, medical complications, burn severity, patient compliance, and pain.

This section will provide a brief description of the six components of the burn injury impact variable. The first component that will be discussed is medical non-compliance. Although it may be a behavioral outcome after burn injury, it may also lead to poorer physical functioning which, in turn, may result in poorer psychological adjustment and quality of life over time (Sheffield et al., 1988). In particular, it has been found to be a problematic occurrence among children who have been burned (Tarnowski, 1995). For example, the literature suggests lack of activity during hospitalization has a negative impact on physical and emotional functioning (Patterson & Ptacek, 1997). The second component, burn severity, has been found to be related to post-burn psychological maladjustment (Bowden, Feller, Tholen, Davidson, & James, 1980). The third component, pain, whether caused by the actual injury or medical procedures, may impact psychological outcome (Patterson & Ptacek, 1997; Ptacek, Patterson, Montgomery, & Heimbach, 1995). The fourth component, the environment for which the burn patient is treated (e.g., Intensive Care Unit) also has been found to overstimulate or under-stimulate burn patients, which may lead to difficulties with psychological adjustment (Steiner & Clark, 1977). Finally, lengths of hospital stay and medical setbacks have been associated with depressive symptoms (Andreason et al., 1972; Choiniere, Melzack, Røndeau, Girard, & Paquin, 1989; Hamburg, Hamburg, & deGoza, 1953).

**Total Body Surface Area Variable**

Total body surface area (TBSA) is the percentage of total body surface area affected by the burn. Many studies have identified a relationship between TBSA and psychological adjustment (De Wet, Cywes, & Davies, 1979; Smith, Barclay, Quesada, Sedowofia, & Thompson, 1997). In addition, Stoddard, Norman et al. (1989) found that there were significantly more psychological diagnoses among participants who had greater than 30% TBSA burned than those who did not. However, Byrne et al.’s (1986) study found that children who had a larger TBSA did not differ in psychological adjustment problems when compared to children with less TBSA burned. Based on the breadth of literature regarding TBSA’s impact on psychological adjustment, TBSA was further evaluated in this study (i.e. De Wet, Cywes & Davies et al., 1979; Smith, Barclay, Quesada, Sedowofia, & Thompson, 1997).

**Premorbid Psychological Functioning Variable**

Premorbid psychological functioning was found in the literature to be related to post-burn psychological adjustment among children, adolescents, and young adults. It should be noted that for the purpose of this study, premorbid psychological functioning included psychopathology, psychological symptoms, and coping styles that were present prior to burn injury. It has been reported that the risk for post-burn psychological adjustment problems is elevated in children with a preburn psychiatric history (Clarke & Martin, 1978; Fauerbach et al., 1997; LeDoux et al., 1998; Seligman, Carroll, & MacMillan, 1972). Coping styles of the youth who have experienced burn injury have been found to be related to poor adjustment and quality of life (Browne et al., 1985; Sheffield et al., 1988). Literature
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on stress and medical disorders suggest that patients who have premorbid psychological vulnerability show poorer use of adaptive coping strategies after their burn injury (Vitaliano, Maiuro, Bolton, & Armsden, 1987). In addition, La Greca, Silverman, and Wasserstein (1998) found that premorbid emotional and behavioral functioning contributed to posttraumatic stress reactions after disasters such as hurricanes. In conclusion, researchers appear to agree that premorbid psychological functioning impacts post-burn psychological adjustment (Clarke & Martin, 1978; Fauerbach, Lawrence, Schmidt, Munster, & Costa, 2000; Giljohann, 1979; Moore et al., 1993; Patterson & Ford, 2000; Rusch, 1998; Seligman et al., 1972; Stoddard, Norman et al., 1989; Tyack & Zivani, 2003).

**Visible Scaring Variable**
A common outcome for survivors of severe burn injury is visible scaring, which may often result in negative physical and emotional consequences (Sawyer, Minde, & Zucker, 1982; Williams et al., 2004). The visible scaring variable relates to the burn victim’s body image, which is believed to alternately affect psychological well-being. Body image is a component of the self-concept formed from both sensory and social experiences (Orr, Reznikoff, & Smith, 1989; Pruzinski, 2004; Shakespeare, 1998). Relationships between such experiences (e.g., appearance-related teasing) and psychological adjustment have been found in the literature [Yu & Dimsdale, 1999; Campbell, 1976; Gilbert & Thompson, 2002 (as cited in Gilbert & Miles); Giljohann, 1979; Jesse, Strickland, Leeper, & Wales, 1992; Sawyer et al., 1982; Zeitlin, 1997]. Specifically, it has been postulated that when children who are burned are faced with changes in their body image, they are likely to become anxious and/or depressed (Stoddard, 1982a). For the purpose of this study, only visible scarring was considered. Visible scaring was defined as any burn injury that is visible and has been defined in terms of location, severity, degree, or TBSA.

**Location of Burn Variable**
The location of burn impact variable in this study was defined as the area of the body which the burn occurred. Authors such as Clarke and Martin (1978) found that the location of the burn played a role in psychological adjustment. However, they were unable to determine why location of burn impacted psychological adjustment.

**Demographic Variable**
The trauma conceptual model proposes that demographic variables predict psychological maladjustment over time in children exposed to natural disasters; thus it was explored in this study (Green, 1991; Green et al., 1994; La Greca et al., 1996; Pynoose & Nader, 1988). The demographic variable comprised socioeconomic status (SES), race, and gender. Although age is a demographic variable, it was separated into its own category because of the multitude of studies that focused on it. The three components of the demographic variable will be discussed here. First, SES plays an important role in psychological adjustment and the development of adaptive behaviors after burn injury (Clarke & Martin, 1978; Meyer et al., 1995). Second, race has also been shown to impact post-burn psychological adjustment (Campbell, La Clave, & Brack, 1987). For example, African-American children were reportedly more depressed than Caucasian children. Third, gender has been found in the literature to impact post-burn adjustment. For example, being male has been found to be significantly related to better self-esteem and body image after burn injury (Orr et al., 1989).

**Age Variable**
The literature varied on how age impacted psychological adjustment to burn injury. Several studies suggest that age at the time of the burn was related to post-burn psychological adjustment (Landolt, Grubenmann, & Martin, 2002; Sawyer et al., 1982; Tyack & Zivani, 2003). However, Abdullah et al. (1994) found no significant correlation between age at time of injury and psychological outcome. Contradictory findings give reason to evaluate this variable further.

**Parental Adjustment Variable**
Parents’ psychological state has been found to be predictive of psychological adjustment in children, adolescents, and young adults who have experienced a trauma such as burn (Beard et al., 1989; Browne et al., 1985; Goodman & Gotlib, 2002; Moore et al., 1993; Tyack & Zivani, 2003; Wasserstein & La Greca, 1998). However, there is limited research regarding the impact of parental psychological adjustment on child post-burn psychological adjustment. For the purpose of this study, the parental impact variable will be defined as the parent’s psychological state and ability to utilize adaptive coping strategies after their child was burned.

**Purpose**
The scarcity of empirical research and contradictory findings among previous studies make it difficult to determine which of the aforementioned variables have the greatest strength of association on post-burn adjustment.
Thus, the purpose of this study was to identify variables that impact post-burn adjustment and to determine the strength of association of the following identified impact variable categories: body location, burn injury, parental adjustment, premorbid psychological functioning, visible scaring, demographics, social support, age, and TBSA.

Method

Literature Search Procedure

An extensive literature search was conducted in an attempt to find studies within the area of child, adolescent, and young adult burn. The literature reviewed included studies beginning from 1970, when research of the psychological effects of pediatric burn was initially published, through 2005. Three methods were used to locate potentially relevant studies: (a) manual search of journals, (b) review of references from identified studies, and (c) internet resources such as PsychINFO and PsychLit. Within these sources, keywords such as “pediatric burn, pediatric trauma, and psychological outcome of burn” were used.

Criteria for Review

To be included in this review, studies had to meet the following criteria: (a) burn injuries were present within the sample studied, (b) burn injury was defined as any burn sustained via flame, thermal, radiation, electrical, or chemical source, (c) studies contained data on variables which impacted psychological adjustment after burn injury, (d) study samples had to contain information about one or more of the identified impact variables, (e) sample participants had to attain injuries that were severe enough to require medical attention, (f) samples included children, adolescents, and young adults who ranged from age 1 month to 23 years, (g) the studies included quantifiable empirical data necessary to compute the strength of association indices between impact variables and psychological adjustment outcomes, and (h) samples presented with specific DSM diagnoses (e.g., PTSD, major depressive disorder, and panic disorder), psychological symptoms, or other manifestations of emotional/behavioral distress (e.g., academic problems and coping issues).

Coding Procedure

Over 100 studies were reviewed, and two coding procedures were utilized in order to delineate which of these studies were most appropriate to include in the meta-analysis, given the age and statistical parameters of this study. The first procedure consisted of coding studies according to age group: pediatric and mixed age groups. The pediatric code was assigned to studies that contained burn victims who ranged from age 1 month to 23 years. The mixed pediatric code was applied to the studies with samples comprised of children, adolescents, young adults, and adults. The mixed studies were utilized because of the limited number of studies with participants under 23 years of age.

The second coding procedure categorized studies with respect to their statistical contribution to this study. Articles were coded as (a) containing variables that had statistically significant findings, (b) containing variables that did not have statistically significant findings, and (c) containing descriptive and qualitative data.

Data Analysis

This meta-analysis involved a two-stage procedure. Only studies that utilized univariate and multivariate statistics [i.e., multiple regressions, conical correlations, t-tests, chi-square, analysis of variance (ANOVA), and analysis of covariance (ANCOVA)] and that had significant findings were included in the meta-analysis. In stage 1, studies that provided values (i.e., t, F, chi-square, r, standard deviation, mean, and degrees of freedom) for identified impact variables (e.g., age) were converted to strength of association indices (i.e., $r^2$, $\eta^2$, Crammer’s V, and $\phi$ coefficient) using a statistical program written by Alfred Sellers, PhD (2004) (see Table I). In stage 2, impact variables from each individual study were delegated into nine impact variable categories: body location, burn injury, parental, premorbid psychological functioning, visible scaring, demographics, social support, age, and TBSA. The mean strength of association for each of the nine variable categories was then calculated (see Table II).

Results

In Table I, the strongest associations between individual impact variables and psychological adjustment were concerns regarding scarring, avoidant coping style, age at burn, mother’s adjustment, and burn size (log % BSA). In Table II, the body location variable category had the greatest mean strength of association and accounted for .26 of the psychological adjustment. The burn injury variable category (.21) had the second greatest mean strength of association of the impact variable categories. The parental variable and the child premorbid psychological functioning variable had the third greatest mean strength of association (.15) among all the impact variable categories. The visible scaring variable and the demographic variable had the fourth greatest strength of association (.09) indices. Finally, social support (.07), age (.05), and TBSA (.01) had the lowest strength of association indices among all nine impact variable categories.
### Table I. Strength of Association Indices of Impact Variables in Selected Pediatric Burn Studies

<table>
<thead>
<tr>
<th>Author and year</th>
<th>N</th>
<th>Adjustment measure(s)</th>
<th>Impact variable(s)</th>
<th>Strength of association index</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tyack and Zivani (2003)</td>
<td>68</td>
<td>Vineland adaptive behavior measure (Function outcome)</td>
<td>Demographics, injury, premorbid functioning, parent variable</td>
<td>$r^2 = .30$, $r^2 = .05$, $r^2 = .21$, $r^2 = .17$</td>
</tr>
<tr>
<td>El Hamaoui et al. (2002)</td>
<td>60</td>
<td>Hamilton rating scales for depression and anxiety</td>
<td>Age of child</td>
<td>$r^2 = .31$</td>
</tr>
<tr>
<td>Kent, King, and Cochrane (2002)</td>
<td>40</td>
<td>CBCL total</td>
<td>Time since burn</td>
<td>$r^2 = .01$</td>
</tr>
<tr>
<td></td>
<td></td>
<td>CBCL internalizing</td>
<td>CBCL externalizing</td>
<td>$r^2 = .02$, $r^2 = .03$, $r^2 = .04$</td>
</tr>
<tr>
<td></td>
<td></td>
<td>HADS anxiety</td>
<td>HADS depression</td>
<td>$r^2 = .04$</td>
</tr>
<tr>
<td>Smith et al. (1997)</td>
<td>35</td>
<td>Stress response (i.e., depression) Hormone</td>
<td>Burn size (log % BSA)</td>
<td>$r^2 = .50$, $r^2 = .30$, $r^2 = .26$, $r^2 = .51$, $r^2 = .38$, $r^2 = .18$, $r^2 = .12$, $r^2 = .39$</td>
</tr>
<tr>
<td>Bryant (1996)</td>
<td>35</td>
<td>Watson PTSD Scale</td>
<td>Concern over scarring, Avoidant coping style</td>
<td>$r^2 = .41$</td>
</tr>
<tr>
<td>Baker et al (1996)</td>
<td>250</td>
<td>BSHS Scores</td>
<td>Degree of burn</td>
<td>$r^2 = .28$, $r^2 = .24$, $r^2 = .26$</td>
</tr>
<tr>
<td>Mason and Hiller (1993)</td>
<td>57</td>
<td>General health questionnaire child</td>
<td>Mother's adjustment</td>
<td>$\Phi^2 = .30$</td>
</tr>
<tr>
<td>Orr et al. (1989)</td>
<td>121</td>
<td>Semantic differential</td>
<td>Age, TBSA, Perceived social support (family), Perceived social support (friends)</td>
<td>$r^2 = .01$, $r^2 = .01$, $r^2 = .01$, $r^2 = .13$</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Body image 1 (strength)</td>
<td>Perceived social support (family)</td>
<td>$r^2 = .01$</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Body image 2 (animation)</td>
<td>Perceived social support (friends)</td>
<td>$r^2 = .13$</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Body image 3 (social anxiety and animation)</td>
<td>Age, TBSA, Perceived social support (family), Perceived social support (friends)</td>
<td>$r^2 = .00$, $r^2 = .02$, $r^2 = .03$, $r^2 = .08$</td>
</tr>
<tr>
<td></td>
<td></td>
<td>The Rosenberg Self-Esteem Scale</td>
<td>Perceived social support (friends)</td>
<td>$r^2 = .04$</td>
</tr>
<tr>
<td></td>
<td></td>
<td>BDI</td>
<td>Perceived social support (friends), Age</td>
<td>$r^2 = .16$, $r^2 = .01$</td>
</tr>
</tbody>
</table>
A major implication of this study is that the impact variables identified and evaluated will be useful in targeting child, adolescent, and young adult burn patients who are at risk for psychological adjustment problems. This emphasizes the importance of utilizing brief psychological screening measures with patients who have been identified as having one or more impact variables. The body location variable had the greatest mean strength of association in impacting post-burn adjustment. Perhaps this was because pain and functionality were also affected by body location. Nover (1973), Stoddard (1982b), and Stoddard and O'Connell (1983) were among the few who addressed pain and functionality as independent factors in terms of psychological adjustment. Their studies found that exposure to physical pain and experiencing limited physical functionality increased the likelihood of psychological maladjustment. Keeping this in mind, healthcare professionals may need to increase use of interdisciplinary interventions since pain and functionality are likely linked to psychological adjustment as in pediatric sickle cell disease research (Lutz, Barakat, Smith-Whitley, & Ohene-Frempong, 2004). Because pain and functionality were not controlled for, or separated in the previous literature, they may have elevated the body location variable's strength of association index. Hence, it would be important for future research to evaluate moderating and mediating variables such as these.

The burn injury variable had the second greatest mean strength of association. This finding contradicted Blakeney and Creson's (2002) article that suggests injury-related variables such as the presence of amputations and the depth of the burn did not predict psychological outcome. The present study's findings regarding the burn injury variable may be attributed to the fact that several burn injury-related variables were placed into one impact variable category, which may have superficially elevated its mean strength of association. It would be important to separate and individually examine variables included in this category in future research.

Table II. Mean Strength of Association of Impact Variables

<table>
<thead>
<tr>
<th>Impact variables</th>
<th>Mean strength of association</th>
</tr>
</thead>
<tbody>
<tr>
<td>Body location</td>
<td>.26</td>
</tr>
<tr>
<td>Burn injury</td>
<td>.21</td>
</tr>
<tr>
<td>Parental</td>
<td>.15</td>
</tr>
<tr>
<td>Premorbid psychological functioning</td>
<td>.15</td>
</tr>
<tr>
<td>Visible scarring</td>
<td>.09</td>
</tr>
<tr>
<td>Demographic</td>
<td>.09</td>
</tr>
<tr>
<td>Social support</td>
<td>.07</td>
</tr>
<tr>
<td>Age</td>
<td>.05</td>
</tr>
<tr>
<td>Total Body Surface Area</td>
<td>.01</td>
</tr>
</tbody>
</table>

Discussion

A major implication of this study is that the impact variables identified and evaluated will be useful in targeting child, adolescent, and young adult burn patients who are at risk for psychological adjustment problems. This emphasizes the importance of utilizing brief psychological screening measures with patients who have been identified as having one or more impact variables.

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This was consistent with previous research (Blakeney et al., 1990; Blakeney, Robert et al., 1998; Browne et al., 1985; LeDoux et al., 1998; Moore et al., 1993). It is likely both had equal mean strength of association indices because parental psychological functioning has been found to be related to children's psychological development (Power, 2004).

The social support, age, and TBSA impact variables had the lowest strength of association indices (<.09) among all nine impact variables. It was interesting to find that the social support variable had such a low strength of association index, given that one would expect it to be related to the parental variable based on previous research that suggests that parent emotional state may be related to the quality of support parents provide (Power, 2004; Prinzie et al., 2004; Satake, Yamashita, & Yoshida, 2004). For example, even though a child may directly experience the trauma of being burned, the parent also may experience the trauma of witnessing the distress of their child and may not be able to provide emotional support needed by the child to ensure their healthy adjustment. The social support, age, and TBSA impact variables have minimal impact on post-burn psychological adjustment; therefore, they may be least helpful in identifying children, adolescents, and young adults at risk.

There were three major limitations of this study. First, because this study utilized meta-analytic procedures, results were limited by the data provided by the previous studies. Second, it is unknown whether the diversity of adjustment measures and respective outcomes led to the results of this meta-analysis. For example, previous studies have not been able to distinguish between the disorder of depression and depressive symptoms. Third, the present meta-analysis did not account for the impact of moderating and mediating variables. The variability in the strength of association indices may be due to the impact of mediator and moderator variables that were not accounted for across the research. These limitations highlight the need to conduct well-controlled, well-designed studies to further investigate risk factors associated with maladjustment among child, adolescent, and young adult burn survivors.

This study has several implications for future research in the area of pediatric burn. More empirical research is needed to further investigate the potential risk factors associated with this population especially because results may be generalized to other areas of pediatric injury such as spinal cord injury and amputation (Blakeney, Robert et al., 1998). This study draws attention to the importance of utilizing psychological screening measures and promotes the development of measures that are specific to this population. Furthermore, the present findings may serve as a starting point for developing clinical interventions that may increase the likelihood of positive psychological adjustment.

One factor that was not commonly discussed in the pediatric burn literature or this study that may play an integral role in the prediction of post-burn adjustment, based on the conceptual model for predicting children's reactions to natural disasters and accidental injuries, is exposure to the actual trauma (i.e., house fire, car accident, and explosion) (La Greca et al., 1996). Rusch (1998) reported that factors that are predictive of poor post-burn psychological adjustment are threat of death and exposure to shocking images. Perhaps, future research could evaluate exposure to trauma as a predictor variable.

Finally, although there has been advancement in the integration of psychological services in the medical field, there is no evidence of empirically developed interdisciplinary models and interventions addressing the needs of child, adolescent, and young adult burn patients in the literature.

The lack of theoretical models for child, adolescent, and young adult burn survivors may in part be due to the paucity of adequate theory behind the research. Those that may have utilized a theoretical framework to guide their research were likely to have utilized the medical model or stage theory. These models are inadequate for describing the dynamic experiences of a young burn patient and may lead to overemphasis of medically related variables as predictors in recovery (Clark, 1999; Patterson et al., 1993). For example, because there are other factors that may be particular to burn injury such as TBSA, other models (i.e., trauma model) may not be comprehensive and specific enough for this population. Keeping theoretical limitations in mind, this study utilized trauma-related conceptual models such as the Blakeney and Creson (2002) “habilitation” model to explore variables that may impact this population’s post-burn psychological adjustment. Results of this meta-analysis were consistent with La Greca et al.’s (1996) conceptual model that utilizes premorbid psychological functioning and parental factors as predictors of children’s reactions to natural disasters. In conclusion, a pediatric burn model may help healthcare professionals be more effective and efficient in assisting in the psychological recovery of children, adolescents, and young adults.

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References

*References marked with an asterisk indicate studies included in the meta-analysis.


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