SELF-INFLICTED AND OTHER-INFLICTED INTENTIONAL BURNS VERSUS UNINTENTIONAL BURNS: A COMPARISON STUDY

Melissa B. Ranucci, M.S.

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APPROVED:

Charles A. Guarnaccia, Co-Major Professor
Steven R. Krebaum, Co-Major Professor
Amy Murrell, Committee Member
Randall Cox, Committee Member
Radha Holavanahalli, Committee Member
Kenneth Sewell, Program Coordinator
Linda L. Marshall, Chair of the Department of Psychology
Sandra L. Terrell, Dean of the Robert B. Toulouse School of Graduate Studies

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Burn injuries are associated with significant mortality and morbidity. Intentional burn injuries are not well understood, and warrant study to improve adjustment and outcomes. The present study examined group differences between intentional and unintentional burn injuries, comparing individuals with self-inflicted (SIB; *n*=109) and other-inflicted (OIB; *n*=109) burns to an unintentional burn (UB) group. Compared to UB, those with intentional (SIB, OIB) burn injuries were more likely to be young, female, unmarried, unemployed, abuse substances, and have positive alcohol/drug screens at hospital admission. Individuals with intentional burns report more psychological distress, lower quality of life in some areas, and lower life satisfaction. When SIB and OIB were examined individually, OIB were more likely to be African American compared to SIB and UB. OIB also had more anxiety and paranoia than UB. SIB was more likely than OIB and UB to have had medical problems or psychiatric disorders and treatment prior to the burn injury. Those with SIB were 3 times more likely than UB to die in the hospital even after controlling for age, severity of burn, and inhalation injuries. Moreover, the SIB group had high rates of suicidal ideation at discharge and follow-up. Treatment implications for burn treatment providers were discussed.

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CHAPTER 1

INTRODUCTION

Overview and Epidemiology of Burn Injury

Severe burns are often life-altering injuries that pose high demands on hospital staff and resources, burn patients, and their families. Individuals who have sustained burn injuries must quickly adjust to their injuries in order to endure painful, but necessary medical procedures and reintegrate into the community, often with disfiguring burns. Approximately two million people sustain burn injuries each year, of who 100,000 require acute hospitalization and approximately 5,000 die (Herndon, 1996). Recovering from a severe burn (e.g., total body surface area (TBSA) burn > 25%) often takes years and impacts burn survivors physically, emotionally, socially, financially, and occupationally.

Major burn injuries often warrant hospitalization and a substantial portion are severe and catastrophic. In the United States, an individual is burned every 30 minutes and someone dies from a burn injury every 135 minutes (Karter, 2005). The average hospital stay is 9 days with 3 days in the intensive care unit (Miller, Bessey, Schurr, Brownig, Jeng, Caruso et al., 2006). Burn injuries are costly for the American people given that 31% of individuals who are hospitalized for burn injuries nationally have no insurance, are underinsured, or are listed as “self-pay” and 25% are insured through government programs with the cost averaging $52,000 per patient (Miller et al., 2006); thus, burn injuries account for $3,640,000,000 of yearly hospital charges, half of which tax payers will likely have to cover. Some evidence suggests that burn patients with psychiatric comorbidity have longer hospital stays (Van der Does, Hinderink, Vloemans, & Spinhoven, 1997) and thus accrue more expensive hospital bills. Unfortunately, this same population is less likely to be insured, which places an even greater burden on tax payers.

Understanding psychiatric risk factors for burn injuries and the way in which psychiatric comorbidity affects recovery and adjustment may improve care for burn patients and decrease the monetary cost burden on society.

The National Burn Repository study found the following important results (Miller et al., 2006):

- Nationally, 62% of burn survivors sustain burns that are less than 10% total body surface area (TBSA), which at first glance suggests that they are more minor burns; however, 68% of the total full thickness burns reported nationally fall below 10% TBSA.
- Twenty-one percent of burn injuries fall in the 10-19% TBSA range, 7% in the 20-29% TBSA range, and 10% in the greater than 30% TBSA range.
- Mortality rates of those hospitalized with burn injuries are approximately 5% and are greater in those with inhalation injury, older age, and larger burns.

Burn risk, treatment, and adjustment have been well-studied. Unfortunately, little is known about intentional burn injuries. Existing published research largely examines burn patients as a homogeneous group with little attention paid to intentionality of burn injuries, which may impact adjustment and outcome. In the following sections, risk factors, burn injury medical complications, and psychological adjustment in those with burn injuries will be reviewed. Then the literature review will narrow to review the few studies that investigate those with intentional burn injuries. Self-inflicted and other-inflicted intentional burn injuries will be reviewed with regard to prevalence, risk factors, burn complications, and psychological adjustment.

Risk Factors for Burn Injury

Given the prevalence, severity, mortality rates, resulting disability status, and cost of burn injuries, it is important to understand who is at risk for such injuries. According to the American Burn Association National Burn Repository Advisory Committee (Miller et al., 2006), 70% of burn patients are men; thus, men appear to be at greater risk for burn injuries. Compared to women, perhaps men have more hazardous occupations and may tend toward more dangerous recreational activities, which may account for the gender discrepancy.

In order to better understand psychiatric risk factors for burn injuries, several researchers identified psychological and behavioral correlates of burn injuries. Pre-burn psychopathology has been indicated to be a risk factor burn injury (Kolman, 1983). Although most studies are limited to self-report measures, Fauerbach, Lawrence, Haythornthwaite, McGuire, and Munster (1996) used a diagnostic structured interview (SCID-NP) to retrospectively assess pre-burn psychiatric disorders in 98 adult patients with burn injuries and found that alcohol use (41%) and mood disorders (31%) were the most prevalent psychiatric diagnoses in their sample. Greater prevalence of substance use disorders in men may account for the finding that more men than women are at risk for burn injuries (DSM-IV, 1994). Williams and Griffiths (1991) also found evidence for one or more psychiatric diagnoses, including alcohol abuse, in nearly 38% of their sample of 55 burn patients. Furthermore, Fauerbach, Lawrence, Haythornthwaite, Richter, McGuire, Schmidt et al. (1997) compared the prevalence of pre-burn psychiatric disorders to psychiatric disorders in the National Comorbidity Study (NCS) nationally representative probability sample and found that compared to the community sample, individuals with burn injuries have greater prevalence of pre-burn lifetime mood disorders (19% vs. 31%) and substance use disorders (24% vs. 41%), with surprisingly lower prevalence of pre-burn anxiety

disorders (25% vs. 10%). Perhaps those with lower anxiety are less vigilant of their surroundings or are greater risk-takers than those with high anxiety, thus placing them at risk for burn injuries. Fauerbach (1997) found that greater pre-burn psychiatric comorbidity at the time of the burn predicted post-burn unemployment. When considering the implications of these results, is important to note that only one fourth of available burn patients consented to each of the aforementioned studies; thus, these results may not fully characterize pre-burn psychological functioning.

Two substantial reviews have been conducted on psychological factors relevant to burn injuries. The first was conducted by Patterson, Everett, Bombardier, Questad, Lee, and Marvin (1993) and the second by Van Loey and Van Son (2003). Patterson et al. reviewed several older studies and suggested that psychiatric disorders, substance abuse problems, homelessness, abusive relationships, and suicide attempts are important premorbid characteristics to examine in order to better understand risk factors for burn. Patterson et al. argue that although several patterns appear throughout analysis of descriptive and retrospective studies of psychological risk factors for burn injuries, these studies do not delineate the characteristics of and reasons why eligible individuals chose not to participate or dropped out of the study. Furthermore, Patterson et al. highlight problems related to retrospective reviews, such as lack of standardized measures, difficult comparisons between studies, and lack of comparisons between burn and non-burn patients.

Van Loey and Van Son (2003) conclude their review with a summary of risk factors, not for burn injuries, but for poor psychological adjustment in patients with burn injuries. Pre-burn psychiatric diagnosis appears to be associated with post-burn psychopathology (Van Loey & Van Son, 2003). Female gender, baseline symptoms of PTSD, high neuroticism, and low extraversion

were associated with development of PTSD and/or depression (Van Loey & Van Son, 2003). In contrast, other researchers point out that pre-burn depression did not predict post-burn depression (Williams and Griffiths, 1991). Perhaps those who are female, have pre-burn psychopathology, PTSD symptoms, or high neuroticism have poorer coping skills, such as a tendency toward avoidance (e.g., passivity, denial) that affects the development of psychopathology post-burn.

Some of the risk factors for sustaining burn injuries listed above are demographic factors (e.g., gender) that are innate and may be better conceptualized as complicating or protective factors. One might speculate that other risk factors (e.g., unemployment, homelessness, abusive relationships, pre-burn psychiatric diagnoses) may act as stressors that further complicate the adjustment to a disfiguring burn injury, an additional major life stressor. Individuals who are unemployed and/or homeless may not have their most basic needs met (e.g., safety, food, shelter) and thus unemployment and homelessness may exacerbate resource deficits that understandably complicate the adjustment to burn injuries.

One might also speculate that the presence of psychiatric diagnoses in burn patients may make it inherently more difficult to cope effectively because individuals with psychiatric diagnoses may tend to appraise stressors and internal events associated with stressors as unmanageable or intolerable. It may be that individuals who have deficits in their available resources related to basic human needs (i.e., stressors such as shelter, food, safety) or have a psychiatric diagnosis have more difficulty coping effectively and thus are at greater risk for exposure to dangerous situations, such as fires.

Burn Injury Medical Complications

Many burn injuries result in co-occurring medical problems or complications such as

high risk of infection, contractures, amputations, and decubitus ulcers from long-term hospital stays. Those with burn injuries are at high risk of infection secondary to loss of protective skin. Contractures are structural changes in muscles, tendons, or ligaments that occur because of limited range of motion in joints from the burn injury and left untreated result in chronic limited range of motion. Amputations result from decreased blood flow to a particular area of the body, typically an extremity, which may cause necrotic tissue, risk of infection, and/or nonfunctioning muscle tissue in limbs. Delayed extremity amputations are associated with increased mortality, compared to amputations conducted earlier in hospital stays (Yowler, Mozingo, Ryan, & Pruitt, 1998). Decubitus ulcers are pressure sores that often result from extended stays in hospital beds. Both amputations and decubitus ulcers increase the risk of infection. These are just some of the co-occurring medical issues that likely complicate adjustment for those recovering from burn injuries.

Patients with burn injuries in medical hospitals and as outpatients often undergo painful procedures (Fauerbach, Lawrence, Haythornthwaite, & Richter, 2002) such as skin grafts to facilitate healing of wounds too large to regenerate skin, debridement to remove necrotic tissue and reduce the risk of infection, and dressing changes. Van Loey and Van Son (2003) conducted an extensive review of the literature and suggest that anxiety related to pain is a major concern for individuals who have sustained burn injuries. Kiecolt-Glaser and Williams (1987) found that when physical therapists rated individuals high on pain behavior, these ratings were significantly correlated with anxiety and depressive symptoms, suggesting a link between pain experienced during not only painful medical procedures, but painful rehabilitative sessions. Compared to those with lower pain scores, those with higher pain scores (even after controlling for size of burn, length of hospital stay, and pre-burn psychiatric diagnoses) report significantly poorer

adjustment (Ptacek, Patterson, Montgomery, & Heimbaum, 1995). Hospitalized patients with burn injuries reported that the medical and rehabilitative procedures produce far greater pain than the wounds themselves (Perry, Heidrich, & Ramos, 1981). In fact, patients with burn injuries frequently rate their pain as "excruciating" (Perry et al., 1981). Thus; previous research highlights the importance of pain management during treatment and interventions are needed to assist with pain tolerance in the burn population (Haythornthwaite, Lawrence & Fauerbach, 2001).

Psychological Adjustment to Burn Injury

There is reason to believe those recovering from burn injuries face numerous challenges to adjustment. One might speculate that during early phases of recovery after burn injury, patients may have limited resources to expend on the cognitive and emotional issues associated with burn injuries. It has been proposed that following a burn, individuals may enter into a sequence of stages of adjustment, as follows: (1) survival anxiety, (2) problems with pain, (3) search for meaning, (4) investment in recuperation, (5) acceptance of losses, (6) investment in rehabilitation, and (7) reintegration of identity (Watkins, Cook, May & Ehleben, 1988). Little consensus exists in the literature on adjustment stages, but it is clear that patients are presented with various obstacles to full recovery.

Fauerbach et al. (1997) compared 95 patients admitted for acute burn care to the National Comorbidity Study (NCS) community sample. This community sample was a nationally representative probability sample of adults. Using this comparison group and DSM-III-R criteria, Fauerbach et al. found that at one year follow-up after discharge, individuals with burn injuries had significantly greater 12-month prevalence of anxiety disorders (30% vs. 17%), alcohol use

disorders (17% vs. 10%), and non-alcohol substance use disorders (14% vs. 4%). PTSD diagnosis accounted for increased rates of anxiety disorders from pre-burn to post-burn one-year follow-up, which was also associated with longer hospital stays. PTSD diagnoses at follow-up were also more likely to be found in those with premorbid mood disorders (vs. premorbid anxiety disorders; Fauerbach et al., 1997). Although size of burn, thickness of burn, inhalation injury, and number of surgeries were controlled for, Fauerbach et al. (1997) did not control for age differences in the PTSD vs. no-PTSD groups, which is known to affect recovery times (Van der Does et al., 1997).

Significant numbers of individuals who survived burn injuries exhibit troublesome psychological symptoms up to a year or more after hospital discharge. It may be fair to assume that adjustment to burn injuries may be complicated by co-occurring medical conditions, premorbid psychiatric disorders, and limited social support. Fauerbach et al. (1996) compared groups with a pre-burn psychiatric diagnosis (i.e., substance use disorder, mood disorder, anxiety disorder, and PTSD), pre-burn mood/anxiety disorder only, pre-burn substance use disorder only, and no pre-burn psychiatric diagnosis. They found that participants with a pre-burn psychiatric diagnosis had poorer overall adjustment at discharge compared to those without a pre-burn diagnosis at discharge, but that differences in adjustment were negligible at 4 month and 1 year follow-up (Fauerbach et al., 1996).

Depression following burn injury has been investigated in previous research. Researchers found that demographic factors, such as gender (Miller et al., 2006) and general pre-burn psychopathology are associated with post-burn depression (Ward, Moss, Darko, Betty, Anderson, Kolman et al., 1987). Although some suggest that certain demographic factors are associated with depression, Ward et al. (1987) found that “age, sex, marital status, ethnic origin,

educational level, and economic level" were not associated with post-burn incidence of depression. Additionally, Tedstone, Tarrier, & Faragher (1998) found that pre-burn depression did not account for post-burn depressive symptoms. Ward et al. (1987) also found that severity and location of burn were not associated with post-burn levels of depression (Ward et al., 1987). Further understanding regarding predictors of depression in the general burn population are needed, given that depression levels remain high at one-year or more after discharge (Ward et al., 1987), suggesting that these are not simply transient symptoms that will remit on their own with time.

Anxiety symptoms following burn injuries have been another focus of psychological adjustment research. Some researchers found that anxiety was the most common problem at one year after discharge (Williams & Griffiths, 1991). Posttraumatic stress disorder appears to be particularly prevalent in the burn survivor population. Baur, Hardy, and Van Dorsten (1998) conducted an extensive review of four retrospective, two cross-sectional, nine prospective, and three case studies that investigated posttraumatic stress in children and adults with burns. They found several discrepancies between studies, largely impacted by limitations in methodology (e.g., difficulty recruiting participants, small sample sizes, lack of standardized measures, high attrition rates, liberal use of post-hoc analyses, and limited prospective data); however, several patterns emerged from their critical analysis (Baur et al., 1998). Overall, burn size, facial burns, and amputation did not appear to be associated with later posttraumatic stress symptoms (Baur et al., 1998). In contrast, perception of ability to sufficiently cope, experiential avoidance (e.g., avoidant coping, emotional numbing, substance abuse), perception of poor social support, and high levels of emotional distress were typically associated with post-burn posttraumatic stress symptoms (Baur et al., 1998). For example, Williams and Griffiths (1991) assessed the

prevalence of posttraumatic stress symptoms at one year post-discharge and found that approximately 17% of their sample exhibited avoidance symptoms and 13% exhibited intrusion symptoms. Notably, patients who did not exhibit symptoms of posttraumatic stress while hospitalized frequently later developed significant posttraumatic stress symptoms, including emotional numbing, avoidance, and increased arousal (Baur et al., 1998), which supports the idea that short-term avoidance may result in long-term deleterious effects. Baur et al. (1998) highlight that because blunted affect, burn severity, and pre-burn adjustment do not predict posttraumatic stress symptoms, it is difficult to identify burn patients who have or will develop significant, often debilitating posttraumatic stress symptoms.

Other researchers focus on more general measures of adjustment, such as quality of life, to glean information regarding the psychological impact of severe burn injuries. Body image and body satisfaction in burn have been widely investigated by Fauerbach and his colleagues. Specifically, the effects of body image on different aspects of quality of life were investigated two months after discharge in 86 individuals who sustained burn injuries (Fauerbach, Heinberg, Lawrence, Munster, Palombo, Richter et al., 2000). After controlling for pre-burn emotional quality of life (QOL), facial burn, and size of burn, those with poorer body image satisfaction had poorer psychosocial adjustment (Fauerbach et al., 2000). Furthermore, after controlling for pre-burn physical QOL, facial burn, and size of burn, those with poorer body image satisfaction had poorer physical functioning (Fauerbach et al., 2000). When Fauerbach et al. (2000) further controlled for depression and posttraumatic stress symptoms, the effect of body image satisfaction on physical, but not mental QOL was eliminated, suggesting that body image directly impacts mental QOL.

The effectiveness of various coping styles in adults coping with burn injuries has been investigated by several groups of researchers and the results from these studies can be conceptualized within an experiential avoidance framework. Experiential avoidance has been defined as unwillingness "to remain in contact with particular private experiences (e.g., bodily sensations, emotions, thoughts, memories, behavioral predispositions) and steps to alter the form or frequency of these events and the contexts that occasion them" (Hayes, Wilson, Gifford, Folette, & Strosahl, 1996, pp. 1154).

An extensive review of factors related to psychological adjustment in those with burn injuries suggests that avoidance symptoms, anxiety and dissociation during the fire, tendency toward emotion-focused coping, and limited social support are associated with development of PTSD and/or depression (Van Loey & Van Son, 2003). Fauerbach, Lawrence, Bryant, & Smith (2002) found that it is the interaction between avoidant and emotion-focused coping, which they refer to as ambivalent coping, that is associated with poor post-burn quality of life, not avoidant coping or emotion-focused coping alone.

The review of pre-burn characteristics, burn injury medical complications, and psychological adjustment presented above can be understood in terms of the coping process (Lazarus & Folkman, 1984). Individuals may experience a host of stressors including homelessness, unemployment, and medical problems which may be exacerbated by a burn injury and may result in a significant deficit in resources. Additionally, individuals may have protective factors such as female gender and high extraversion, and/or complicating factors such as male gender and high neuroticism that may contribute to the resulting emotional response, such as fear and anxiety, initiated by the constellation of stressors.

Individuals may then appraise their ability to manage or tolerate the stressor, its context, and subsequent emotions. If individuals perceive the stressor or its context as unmanageable they may tend toward avoidant coping strategies (e.g., experiential avoidance, emotional numbing, substance abuse, venting, and positive reframing). Such avoidant coping strategies may result in short-term relief of the discomfort associated with emotional responses, such as fear, at the expense of long-term exacerbated anxiety and fear and poorer quality of life. Those with psychiatric diagnoses, who do not seek professional interventions, may be stuck in patterns of experiential or behavioral avoidance that exacerbate psychological symptoms and these patterns are negatively reinforced and thus maintained (Hayes et al., 1996). In contrast, if individuals perceive the anxiety associated with the burn injury as tolerable, they may tend toward acceptance, which may result in short-term distress associated with the experienced anxiety in the service of longer-term resolution of the anxiety and the fear response and/or improved quality of life. Future research warrants examination of the coping process as it relates to experiential avoidance in the burn population.

Intentional Burn Injuries

Despite the broad range of factors examined in the burn literature, there is little data on how circumstances surrounding the cause of burn may impact treatment, adjustment, and outcome. The bulk of current research examines burn patients as a homogeneous group with little attention paid to the circumstances surrounding burn injuries. The intentionality of burn injury may impact course and outcome. Ninety percent of burn injuries that warrant hospitalization are accidental and unintentional (Miller et al., 2006), and may be acquired through work, non-work, or recreational activities. Non-accidental or intentional burns are less

common, and may be self-inflicted or inflicted by others. Self-inflicted burns are the result of non-suicidal deliberate self-injury behaviors or suicide attempts, often referred to as self-immolation (which has a historic religious connotation) or self-incineration (which implies death by self-inflicted burns), so these terms will be avoided here.

Other-inflicted burns are intentional assaults by domestic perpetrators (e.g., spouse, partner, significant other, guardian, parent, or child), non-domestic perpetrators, or those who commit arson (the discussion here will exclude war-related other-inflicted burns). Intentional burn injuries, either self-inflicted or inflicted by others, account for 5% of total burn injuries nationally (Miller et al., 2006), suggesting that this is a somewhat uncommon, but not a rare phenomenon. Intentionally inflicted burns tend to be more severe (larger size and deeper thickness burns) and thus pose significant challenges for medical treatment. Within the past 10 to 15 years, medical treatment of burn injuries has advanced significantly. This has subsequently positively impacted survival rates of those with severe burns. With increased survival rates, psychological adjustment in this population warrants more attention and further study.

Intentional burn injuries, specifically those that were self-inflicted, pose unique challenges to medical professionals who may be subject to prejudiced attitudes toward these patients.

Raskind (1986, pp. 378) describes that nurses in a pediatric burn center feel:

> afraid, dumbfounded or angered by these patients who chose such a violent method of suicide. We wanted nothing to do with such patients who 'brought it on themselves.' We wondered why we should invest so much time, energy, and caring to treat these adolescents who didn't even care about themselves… Many of us have seen how much time and energy, by both patient and nurse, it takes to rehabilitate even a strongly motivated patient, with the strongest of coping skills.

If nurses struggle with negative attitudes toward adolescents with self-inflicted burn injuries when adolescents are widely viewed as coping with one of the most emotionally and socially

trying times of life, then it is a reasonable extension that nurses in adult burn care units experience the same, if not stronger, negative attitudes toward adults with self-inflicted burn injuries. Plattner and Ripley (1982) reviewed two case studies of individuals who had committed suicide, but arrived at the hospital burn unit alive and conscious before dying. They discussed nurse reactions to these challenging cases and suggested that there was "thinly concealed hostility toward the patient" (pp. 92) and further suggested:

> The ability to empathize with the patient may be impaired because of our disbelief of what happened, horror at what we see and of what the patient has done, anxiety that this arouses, anger at the patient for putting his family, himself, and us through the trauma of dealing with his dying, guilt for our emotional reactions, and sense of futility with the patient's throwing his life away and our not being able to save him.

Burn care staff may benefit information that provides greater understanding of how patients with intentionally inflicted burn injuries may differ in pre-burn characteristics, burn injury medical complications, and psychological adjustment.

The following review will introduce current, relevant research to suicide/self-injury and assault/arson as they relate to burn. At the most basic level, this study aims to provide greater understanding for both provider and patient regarding the relevance of intentionality of burn injuries on burn-related demographics and psychological adjustment.

Self-Inflicted Burn Injury

Overview and Epidemiology of Self-Inflicted Burn Injuries

Suicidal ideation is a coping mechanism that provides an avenue by which individuals can escape painful circumstances. Completing suicide would give individuals an "out" that is quick and permanent. Thoughts and acknowledgement of the possibility of such a timely relief to painful events may provide a sense of short-term reprieve for individuals coping with difficult

stressors. Suicidal ideation can be conceptualized as a form of experiential avoidance that, like other forms of experiential avoidance, provides short-term relief, often at the expense of long-term negative consequences. Individuals likely appraise their circumstances as intolerable and unmanageable, which contributes to the contemplation of such extreme and permanent acts.

Suicidal ideation is far more common than actual suicide attempts, and many people who contemplate suicide have no actual plan or intent. However, some with long-standing suicidal ideation who did not plan to commit suicide make attempts during bouts of depression, psychosis, or intoxication. It is estimated that suicide is the 11th leading cause of death in the United States (CDC, 2002). In individuals aged 15 to 24, it is the third leading cause of death and in individuals aged 25 to 34, it is the second leading cause of death (CDC, 2002). Furthermore, rates of suicide are highest among those older than 65 years of age (CDC, 2002).

The American Burn Association National Burn Repository study, which reviewed more than 250,000 hospital burn admissions from 1995 to 2005 found that five percent of burn injuries are intentional, a large portion of which are self-inflicted (Miller et al., 2006). In a nationally representative survey of 5,877 respondents from the general population, aged 15 to 54, 13.5% reported lifetime suicidal ideation, 3.9% reported having had a plan, and 4.6% reported having made a suicide attempt (Kessler, Borges, & Walters, 1999). Chapman, Gratz, and Brown (2006) point out that suicidal ideation occurs in the general population and individuals who struggle with suicidal ideation may not meet diagnostic criteria for one or more psychiatric disorders. There are numerous risk factors that predispose individuals to suicide. Linehan (1993) suggests that among others, male gender, single marital status, a recent loss, recent discharge from a psychiatric hospital, absences at work, social isolation, hopelessness, depression, poor health, and alcohol and drug abuse are prominent risk factors for suicide in the general population.

Kessler et al. (1999) suggest that being female, divorced, less than 25 years of age, low education, and having a psychiatric disorder places individuals at risk for suicidal ideation, but points out that these factors are less strongly associated with a suicide attempt. Risk factors that have been investigated for burn injuries as a method of suicide are reviewed below, after a brief discussion of the other portion of self-inflicted burn injuries, those who are not suicidal, but rather, intend to self-injure.

Research reviews suggest numerous risk factors for self-injury, including female gender, single marital status, hopelessness, poor social support, substance use disorders, and eating disorders (Greenbaum, Donne, Wilson, & Dunn, 2004; Linehan, 1993). Suicidal ideation and self-injury behaviors often co-occur and it is important to note that those who self-injure are at significantly greater risk for attempting and completing suicide (Linehan, 1993). Thus, despite the often stated absence of intent to die, self-injury behaviors warrant attention.

Non-suicidal self-injury behaviors may occur because individuals perceive situations (i.e., stressors) as uncontrollable and have poor ability to cope (Greenbaum et al., 2004). Greenbaum et al. (2004) suggest that individuals may not self-injure in order to be distracted by the pain, as some theories posit, but rather because of the short-term relief that results from self-injury behaviors (Greenbaum et al., 2004). Various theories exist regarding the function of deliberate self-injury. Chapman et al. (2006) reviewed the following existing theories of self-injury: 1) Affect Regulation Model: self-injury is a means to express or control intense emotions; 2) Dissociation Model: self-injury and dissociative behaviors regulate affect; 3) Boundaries Model: self-injury reaffirms boundaries that were threatened by intense emotions related to perceived abandonment.

Chapman et al. propose what they suggest is a more comprehensive model to understand deliberate self-injury behaviors: the Experiential Avoidance Model. Chapman et al. suggest that non-suicidal self-injury is a form of emotional avoidance that begins with a stimulus (or stressor) that results in an unwanted emotional response. A number of factors (e.g., high degree of emotional intensity, inadequate distress tolerance, poor regulation during arousal, or emotion dysregulation) initiate the avoidance process whereby individuals self-injure to achieve temporary relief from the unwanted and uncomfortable emotional response that resulted from the stressor (Chapman et al., 2006). The effects of this response are temporary and the stressor is still present and oftentimes worse because the stressor has not been effectively coped with resulting in a "rebound effect" in which the salience and frequency of the stressor and related emotions increase (Chapman et al., 2006). Repetition of this pattern occurs and thus a cycle of stressor → emotional arousal → avoidance → temporary relief → exacerbation of emotional arousal is initiated (Chapman et al., 2006). Chapman et al. further suggest that a number of factors (i.e. negative reinforcement and rule-governed behavior) not only maintain this cycle, but inadvertently strengthen it, resulting in a more automatic response with the consequences of self-injury behavior becoming decreasingly evident.

Risk Factors for Self-inflicted Burn Injuries

Greenbaum et al. (2004) conducted a review of national and international burn literature that investigated those with intentionally self- and other-inflicted burn injuries, and found that younger aged individuals and those with a psychiatric diagnosis are at greater risk for self-inflicted burns. A retrospective study of 35 individuals with self-inflicted burns and 61 individuals with other-inflicted burns found that those with intentionally self-inflicted and other-

inflicted burns are a younger sample compared to those with unintentional burn injuries (Reiland, Hovater, McGwin, Rue, & Cross, 2006). A study investigating a small sample of 34 individuals with self-inflicted burn injuries with suicidal intent suggest that the 30-39 year old age group may be at greatest risk (Krummen, James, & Klein, 1998). Another group of researchers found that 50% of suicidal individuals who had self-inflicted burn injuries were between age 30 and 50 (Malic, Karoo, & Phipps, 2007). Another study found that the majority of individuals with self-inflicted burn injuries were under the age of 40 (Baker Tonkin, & Wood, 2007). Furthermore, Sonneborn and Vanstraelan (1992) suggest that individuals with self-inflicted burns who intended to commit suicide or had suicidal ideation were older (41 years) on average than those who had non-suicidal deliberate self-injury intent (28 years).

High rates of unemployment are found in self-inflicted burn populations (Ali, Soueid, Rao, & Moiemen, 2006; Baker et al., 2007; Palmu, Isometsa, Suominen, Vuola, Leppavuori, & Lonnqvist, 2004; Pham, King, Palmieri, & Greenhalgh, 2003). Davidson and Brown (1985) suggest that high rates of unemployment (38%) in those with self-inflicted burns may be related to their psychiatric diagnoses. Greenbaum et al. (2004) also found from their review that low SES and recent stressors were prevalent in those who self-inflicted burn injuries.

The role of gender as a risk factor remains unclear, since some studies found greater prevalence of women with self-inflicted burn injuries (Ali et al., 2006; Copeland, 1985; Greenbaum et al., 2004; O'Sullivan & Kelleher, 1989; Squyres, Law, & Still, 1993), some studies found a predominance of males (Garcia-Sanchez, Palao, & Legarre, 1994; Krummen et al., 1998; Malic et al., 2007; Pham et al., 2003; Rashid & Gowar, 2004), and several found no gender differences for self-inflicted burn injuries (Baker et al., 2007; Bhaduri, 1982; Davidson & Brown, 1985; Greenbaum et al., 2004). Given that more males than females sustain burns in

general, the studies that found no sex difference and those that found more females than males sustain self-inflicted burn injuries taken together support the idea that females may be more likely to sustain self-inflicted than accidental burn injuries. Furthermore, a study conducted in Italy with a sample of 31 individuals with self-inflicted burns found that there was a greater predominance of males in the younger age group (ages 20-39), whereas there was a greater predominance of females in the older (ages 40-70) self-inflicted group (Castellani, Beghini, Barisoni, & Marigo, 1995), which may explain some of the differences found above.

A substantial portion of individuals with self-inflicted burns have a lifetime history of suicidal ideation. Some researchers have found that in their samples of individuals with self-inflicted burns, 20-40% had a history of previous suicide attempts (Castellani et al., 1995; Davidson & Brown, 1985; Squyres et al., 1993), whereas another study found previous suicide attempt rates greater than 45% (Pham et al., 2003). Several studies found evidence for substantial histories of deliberate self-injury behaviors (e.g., Ali et al., 2006; Malic et al., 2007), and previous suicide attempts (Garcia-Sanchez, 1994; Krummen et al., 1998; Sonneborn & Vanstraelen, 1992). Previous suicide attempts are of significant importance. In a study of 32 self-inflicted completed suicides, Shkrum and Johnston (1991) found that a substantial majority of the sample had verbalized their intention to kill themselves or had previously attempted suicide. Greater than half of their sample verbalized their intent to die around the time of their suicide (Shkrum & Johnston, 1991), which suggests an important area of intervention.

Several studies found that a majority of those with self-inflicted burns have a history of one or more psychiatric diagnoses (Ali et al., 2006; Copeland, 1985; Davidson & Brown, 1985; Garcia-Sanchez et al., 1994; Sonneborn & Vanstraelen, 1992), including depression (Ali et al., 2006; Baker et al., 2007; Erzurum, & Varcellotti, 1999; Greenbaum et al., 2004; Krummen et al.,

1998; Sonneborn & Vanstraelen, 1992), schizophrenia (Ali et al., 2006; Erzurum, & Varcellotti, 1999; Krummen et al., 1998), substance abuse (Ali et al., 2006; Baker et al., 2007; Copeland, 1985; Krummen et al., 1998; Reiland et al., 2006), and personality disorders (Erzurum, & Varcellotti, 1999; Greenbaum et al., 2004; Sonneborn & Vanstraelen, 1992). In addition to those with a history of one or more psychiatric diagnoses, a significant portion had current psychiatric diagnoses.

In a study of 32 individuals with self-inflicted burn injuries, Pham et al. (2003) found that prior to their burn injury, 91% had an active psychiatric diagnosis and 51% a second comorbid diagnosis at the time the injury took place. The most common diagnoses, prevalent in 20-40% of their sample, were depression, bipolar disorder, personality disorder, or substance abuse. PTSD, schizophrenia, and psychosis not otherwise specified occurred in less than 20% of the sample (Pham et al., 2003). Unfortunately, Pham et al. described little of their methodology making the generalizability of these results unclear. Furthermore, a somewhat outdated study of psychiatric inpatients with self-inflicted burns suggests that those who are single and those with schizophrenia or a personality disorder may also be at greater risk for self-inflicted burns (O'Sullivan & Kelleher, 1989). However, conclusions from these results are tentative, given the very small sample size ($N = 7$) in this study. O'Sullivan and Kelleher (1989, pp. 42) conclude from their study that "only those with severe psychopathology resort" to self-inflicted burns; however, these claims are not well-substantiated in a study using psychiatric inpatients with no control group.

Previous research suggests that individuals with suicidal intent differ diagnostically from those with intent for non-suicidal deliberate self-injury. Preliminary research on suicide and self-injury by burn further support those findings. Cameron, Pegg, and Muller (1997) compared those

with burn injuries who had suicidal intent (who also used an accelerant) versus those with non-suicidal self-injury in an Australian sample. They found that in the deliberate self-injury group, 16% had a schizophrenia diagnosis, 16% had a depressive disorder diagnosis, and 39% had a personality disorder diagnosis (Cameron et al., 1997), a majority of whom likely had borderline personality disorder (Wiechman, Ehde, Lawrence, Wilson, & Patterson, 2000). In contrast, in the suicide intent group, 26% had a schizophrenia diagnosis, 19% had a depression diagnosis, and only 13% had a personality disorder diagnosis (Cameron et al., 1997). Other researchers also found that personality disorders were most common in the non-suicidal self-injury group, whereas affective disorders were most prevalent in the suicidal intent group; of note, however, is that the self-injury groups were fairly small ($N = 9$; $N = 16$, respectively; Sonneborn & Vanstealen, 1992; Tuohig, Saffle, Sullivan, Morris, & Lehto, 1995). Cameron et al. further suggest that in both groups, those who had not been diagnosed with a psychiatric disorder tended to be intoxicated at the time of the burn injury.

One group of researchers concluded that because their sample of 10 males recruited from a military hospital in Turkey self-inflicted their burn injuries in public places, their intent was not to commit suicide, but to draw attention to themselves through non-suicidal deliberate self-injury (Zor, Deveci, Bozkurt, Dikkatli, Duman & Sengezer, 2005); however, there was little evidence in their study to sufficiently substantiate the claim that these individuals did not intend to commit suicide. Although 80% of their sample were diagnosed with a personality disorder, 60% of these were antisocial personality disorder (Zor et al., 2005), which is infrequently diagnosed in self-injury populations because antisocial personality is typically associated with a tendency to externalize, rather than internalize emotions.

Researchers have identified several psychosocial stressors that may contribute to coping resource deficits that result in suicide attempts through self-burning. Through retrospective chart reviews of 32 individuals with self-inflicted burns, Pham et al. (2003) found that greater than 50% of their sample had a pre-burn chronic medical illness and/or pre-burn long-term disability (e.g., lupus, paraplegia, chronic pain) and greater than 50% had interpersonal relationship conflicts that served as stressors. Similarly, other researchers found significantly higher rates of pre-burn disability status in the self-inflicted compared to the accidental burn population (Palmu et al., 1993). Both Krummen et al. (1998) and Shkrum and Johnston (1991) suggest that conflicted interpersonal relationships were the primary precipitating factor for suicide attempt/completion through self-burning. Other studies also support pre-burn medical problems as a primary stressor for this population (Hammond, Ward, & Pereira, 1988; Shkrum & Johnston, 1991). It is interesting that individuals with physical disabilities choose such a violent method of suicide/self-injury that physically destroys their bodies.

At present, it is unclear whether standard risk factors for suicide and self-injury are associated with self-inflicted burn injuries. This method of self-injury/suicide is particularly violent and may differ from other types of self-injury/suicide with regard to risk factors. For example, poorer pre-burn physical functioning and quality of life may be a significant risk factor for such a violent method of self-injury/suicide.

Burn Complications in those with Self-inflicted Burn Injuries

Intentionally inflicted burns are likely to be more severe, given that accelerants are often used. Research has shown that the mean size of burn injury for individuals with self-inflicted burns is significantly greater than those with other types of burn injuries (e.g., Ali et al., 2006;

Baker et al., 2007; Castellani et al., 1995; Davidson & Brown, 1985; Horner, 2005; Pham et al., 2003; Rashid & Gowar, 2004; Palmu et al., 2004; Reiland et al., 2006; Wallace & Pegg, 1999). Full thickness burns (Ali et al., 2006) and inhalation injuries (Reiland et al., 2006) are also more prevalent in those with self-inflicted burn injuries compared to the general burn population, which, like size of burn injury, may be due to use frequent use of accelerants in this population.

It makes sense that individuals with self-inflicted burn injuries might have significantly more difficulty recovering from burn injuries, given the increase in risk factors in this population (see above section on risk factors in self-inflicted burns). Throughout the few studies that investigate self-inflicted burns, it was found that individuals with self-inflicted burns do, in fact, have longer hospital stays (e.g., Ali et al., 2006; Horner et al., 2005; Pham et al., 2003; Reiland et al., 2006; Wallace & Pegg, 1999). Van der Does et al. (1997) investigated patients who were hospitalized with burn injuries in the Netherlands who did and did not have psychiatric diagnoses and found that it is not self-inflicted burn injuries per se, but rather psychiatric diagnosis that results in longer hospital stays; specifically, those with substance dependence, but not mood or psychotic disorders, remained in the hospital longer. Van der Does et al. suggested this might be related to the deleterious health consequences of substance dependence. Furthermore, there was higher mortality in both those with psychiatric diagnoses and those with self-inflicted burns (Van der Does et al., 1997). Unfortunately, Van der Does et al. did not clearly describe their method of group categorization; for example, were individuals in both the self-inflicted burn group and the psychiatric disorder group? It is likely that a large portion of the self-inflicted burn group had psychiatric diagnoses and this is not discussed in their method or results. The conclusions of their results would be clearer with an additional group of those with self-inflicted burns and psychiatric diagnoses and with a more comprehensive method section with detailed procedures

specifying group structure. Clearly, more severe burns and longer hospital stays are likely to significantly increase the already very expensive cost of hospital care in those with self-inflicted burns (Ali et al., 2006).

Given that burns are more severe in the self-inflicted population, it makes sense that researchers find that mortality rates are significantly greater in this population than in those with unintentional burn injuries (e.g., Ali et al., 2006; Castellani et al., 1995; Davidson & Brown, 1985; Garcia-Sanchez et al., 1994; Krummen et al., 1998; Pham et al., 2003; Rashid & Gowar, 2004; Reiland et al., 2006). In one of the largest studies of individuals with self-inflicted burns, Rashid & Gowar (2004) found that use of an accelerant accounted for burn size, whereas age and burn size accounted for the high rates of mortality, not simply circumstance of burn (e.g., self-inflicted).

Few researchers have investigated differences in burn injury medical complications in individuals with the intent of suicide versus deliberate self-injury. One study, conducted in Australia, found several differences between 44 individuals with deliberate self-injury by burning and 31 individuals with intent to commit suicide through burning (Cameron et al., 1997). Both the self-injury and suicide groups had a preponderance of males, but compared to the self-injury group (64% male), the suicide group had a higher male to female ratio (77% male), larger size burn injuries (suicide - 52% TBSA vs. self-injury - 30% TBSA), longer hospital stays (suicide – 41 days, self-injury – 29 days), and higher mortality rate (suicide – 45%, self-injury – 18%). These findings warrant replication.

Given the research presented above and the degree to which those with intentional burn injuries likely have greater resource deficits, it follows that individuals coping with intentional burns may have significantly more burn injury medical complications and may be at risk for

longer stays in the ICU, more days in rehabilitation, and longer hospital stays compared to those with unintentional burn injuries. Could it be that mortality rates are higher in those with self-inflicted burns compared to those with other-inflicted or unintentional burns given their lack of will to live?

Psychological Adjustment to Self-inflicted Burn Injuries

Unfortunately, little is known about the impact of intentionality of burn injury on psychological adjustment. Few studies have investigated those with self-inflicted or other-inflicted burn injuries. There is evidence for the importance of close psychiatric monitoring following hospital discharge and the need for better interventions during hospital admission for self-inflicted burn injuries. Sonneborn and Vanstraelen (1992) found that a significant portion of both the non-suicidal self-injury and suicide intent groups continued to self-injure and attempt suicide following their burn hospitalization discharge. Importantly, a portion of their sample was readmitted for future suicide attempts through burn (Sonneborn & Vanstraelen, 1992).

In addition, individuals who attempt suicide through burn appear to have difficult reintegration into the community. Daniels, Fenley, Powers, and Cruse (1991) investigated a small sample ($N = 7$) of mostly psychotic individuals who survived self-inflicted burn injuries. They found that of the five who could be contacted, none were employed, only one was living independently, and two made subsequent suicide attempts after discharge from the hospital (Daniels et al., 1991). However, it is unclear if the challenges to community reintegration were a consequence of self-inflicted burn injury, psychotic illness, or some combination of factors.

Experiential avoidance may be an important factor in those with self-inflicted burn injuries. Erzurum and Vancelotti (1999) investigated the motives for suicide/self-injury by burn

in a small sample (N = 11) of individuals with self-inflicted burn injuries and found that the majority of their sample, 56%, self-inflicted their burns to “escape from stress/sadness”, 18% attempted suicide, and 18% were responding to hallucinations or delusions. Similar results were found in a slightly larger sample (N = 17), in which 41% hoped to die, whereas 41% desired to escape from or somehow control painful emotions (Squyres et al., 1993). Desire to escape from internal events such as painful emotions, desire to die, or desire to burn oneself to in order to resolve troublesome hallucinations/delusions are avoidance strategies that aim to decrease short-term distress, but fuel the cycle of ineffective coping. Some might argue that responding to hallucinations/delusions is not a form of experiential avoidance; however, if the intention is to resolve the hallucination or delusion through the action of self-injury, then this fits within the definition of experiential avoidance.

Hayes, Strosahl, Wilson, Bissett, Pistorello, Toarmino et al. (2004) found that experiential avoidance is associated with poor quality of life. Given that both suicide and self-injury can be understood as experientially avoidant behaviors, those with self-inflicted burn injuries may have poorer quality of life compared to those with other-inflicted or unintentional burn injuries. More research is needed to test this hypothesis. Furthermore, given research findings regarding poorer outcomes in a general burn group regarding self-blame, those with self-inflicted burn injuries may also be at risk for self-blame given the intentional nature of their injuries, and thus may be at risk for greater symptoms of depression. Given the violent nature of suicide and self-injury those with self-inflicted burn injuries may have higher rates of hostility than those with other-inflicted or unintentional burn injuries; however, there is no current research to date regarding this assertion. Research is also needed to replicate the findings that those with self-inflicted burn injuries are likely to continue to have suicidal ideation.

Other-Inflicted Burn Injury

Overview and Epidemiology of Other-inflicted Burn Injuries

Very little research has been conducted on intentionally inflicted burn injuries when those intentional injuries are not self-inflicted. There is, however, some research that has been conducted to understand the phenomenon of child abuse by burning. Because children will not be included in the analyses for the proposed project because it is beyond the scope of this comparison study, research on child abuse by burning will not be reviewed here.

Greenbaum et al. (2004) discuss various intentional other-inflicted burns such as elder abuse by burn, intentional burns inflicted by interrogators or torturers, burnt wife syndrome in India, and acid attacks in Bangladesh. Greenbaum et al. reviewed literature on elder abuse by burning and found that there were no prevalence rates reported on elder abuse, but that most elderly burn admissions that appeared to be intentionally inflicted occurred in those with dementia. Greenbaum et al. reviewed assault, torture, and interrogation studies and found that electrical shocks and other government-sponsored torture and interrogation tactics were prevalent in Kasmir, Spain, Georgia, and Afghanistan. In India, Sati, the burning of a widow following her husband's death, was banned nearly 2 centuries ago, yet its occurrence is not rare (Greenbaum et al., 2004). Finally, a predominance of male perpetrated acid attacks is on the rise in Bangladesh, and reasons for such violence included the rejection of sexual proposition/advance, marital conflict, familial/land disputes, and dowry conflict (Greenbaum et al., 2004).

As reviewed above, intentional burn injuries account for 5% of total burn injuries in the United States (Miller et al., 2006) and a portion of these are other-inflicted burn injuries. A retrospective review of adult burn hospital admissions over a 22 year time-period found 1.8% of

individuals were intentionally burned by others (Dorn, Still, Saw, & Still, 2001). A 14-year retrospective review of adult burn admissions revealed that 4% of admissions had intentionally other-inflicted burn injuries (Purdue & Hunt, 1990). A 2-year retrospective review found that 10% of all burn admissions were intentionally burned by others (Krob, Johnson, & Jordan, 1886). Brodzka, Thornhill, & Howard (1985) reported that as many as 21% of burn admissions were a result of assault.

Risk Factors for Other-inflicted Burn Injuries

Few studies were found that investigated intentional other-inflicted burn injuries. Most studies reported only demographic characteristics. Only two research studies compared self-inflicted to other-inflicted burn risk factors. A retrospective study of 35 individuals with self-inflicted burns and 61 individuals with other-inflicted burns found that overall, those with intentional burns are a younger sample compared to those with unintentional burn injuries (Reiland et al., 2006). Dorn et al. (2006) found that 54% of their sample of those with other-inflicted burn injuries was between the ages of 21 to 50, when individuals under the age of 18 were omitted from analyses. In one of the only studies to date that compared other-inflicted to self-inflicted individuals who sustained burn injuries, Reiland et al. (2006) found significant age differences between those with intentional and accidental burn injuries, but no group differences between those with other-inflicted and self-inflicted burn injuries.

It appears that those with other-inflicted burn injuries are likely to be male. Previous research reveals that 67% to 78% of those with other-inflicted burn injuries were male (Achebe & Akpuaka, 1989; Brodzka et al., 1985; Dorn et al., 2001; Kaufman, Graham, Lezotte, Fauerbach, Gabriel, Engrav et al., 2007; Krob et al., 1886; Purdue & Hunt, 1990). Similarly, in a

study conducted in Jamaica that investigated chemical burns related to assault, they found a preponderance of males (Branday, Arscott, Smoot, Williams & Fletcher, 1996). In a study conducted in South Africa regarding assault inflicted by hot water, they found that males were assaulted more commonly than females and that the majority of injuries were perpetrated by domestic partners (Duminy & Hudson, 1993). However, one study conducted in Taiwan that specifically investigated assault with chemicals that resulted in facial mutilation did find a preponderance (67%) of females (Yeong, Chen, Mann, Lin, & Engrav, 1997). Two studies suggested that no significant gender differences are found between those with other-inflicted burn injuries and those in the general burn population (Ho, Ying, Chan, & Chow, 2001; Purdue & Hunt, 1990). Kaufman et al. (2007) found a majority of males in both groups, but a significantly greater proportion of females in the other-inflicted compared to an accidental burn group of similar age. Reiland et al. (2006) found that the ratio of male to female burn injuries was significantly greater in self-inflicted compared to other-inflicted burn injuries.

Previous research found a preponderance of African Americans (72-79%) with other-inflicted burn injuries (Dorn et al., 2001; Kaufman et al., 2007; Krob et al., 1986; Reiland et al., 2006; Stone, 1988). One study suggested that compared with the general burn population, there is a six-fold increase in the number of African Americans with other-inflicted burn injuries (Purdue & Hunt, 1990).

Research suggests that low levels of education and low socioeconomic status may place South Africans at risk for such injury (Duminy & Hudson, 1993; Stone, 1988). Previous research conducted in the United States and abroad suggests that low education, unemployment, and homelessness are prevalent in the other-inflicted burn population (Kaufman et al., 2007; Krob et

al., 1986; Stone, 1988; Yeong et al., 1997). Other research suggests high rates of unmarried individuals (71% - Kaufman et al., 2007; 73% - Krob et al., 1986).

High rates of substance abuse appear prevalent in the other-inflicted burn population (Duminy & Hudson, 1993; Kaufman et al., 2007; Stone, 1988). One study found significantly higher rates of alcohol abuse (30%), but not drug abuse, in the other-inflicted burn population compared to those with other types of burn injuries (Purdue & Hunt, 1990). Another study found significantly higher rates of both alcohol and drug abuse in the other-inflicted compared to an unintentional burn group (Kaufman et al., 2007). Other research found that compared to those with self-inflicted burn injuries, those with other-inflicted burn injuries had statistically equivalent rates of blood alcohol content, but fewer positive drug screens, upon admission to the hospital for burn injury (Reiland et al., 2006).

In the general population, several risk factors for trauma and subsequent development of PTSD have been identified. Seedat and Stein (2000) investigated risks for assault and found that compared to men, women were at higher risk for assault and more likely to have been assaulted by someone they know. In contrast, women were less likely to have been intoxicated during the assault or to need surgical intervention than men (Seedat & Stein, 2000).

Neale, Bloor, and Weir (2005) found that in a non-burn sample of 560 individuals with drug addictions, 25 percent had been assaulted within the past six months. They found that male gender, recent drug use, history of physical abuse, and having slept in a shelter were associated with being a victim of an assault (Neale et al., 2005). In another study of individuals without burn injuries, but who had potential substance abuse disorders, Chermack, Booth, and Curran (2006) investigated correlates of assault in a large sample of men and women who they identified as “at-risk drinkers” that they recruited from urban and rural settings. They found that for

women, alcohol dependence, depression, or both alcohol dependence and depression were significantly associated with experiencing physical assault (Chermack et al., 2006). In contrast, they found that for men, alcohol dependence alone or alcohol dependence in addition to depression, but not depression alone were significantly associated with experiencing physical assault.

Burn Complications in those with Other-inflicted Burn Injuries

Compared to the general burn population, those with other-inflicted burn injuries appear to have larger burn injuries and more inhalation injuries. Ho et al. (2001) found that compared to other-inflicted burn injuries by chemicals or scalds, other-inflicted burn injuries by fire resulted in larger burns, higher prevalence of inhalation injuries, and longer stays in intensive care units.

Burn sizes vary in this population, which may be related to the place of burn-treatment. Research suggests that average burn sizes are large, between 14 to 25% total body surface area burns, in the other-inflicted burn population (Bowden, Grant, Vogel, & Prasad, 1988; Dorn et al., 2001; Duminy & Hudson, 1993; Ho et al., 2001; Kaufman et al., 2007; Purdue & Hunt, 1990). Previous research suggests that compared to those with unintentional burn injuries, burn sizes are larger in the other-inflicted burn population (Kaufman et al., 2007). However, one study found smaller burn sizes in individuals with other-inflicted burns (14%) compared to those with other types of burn injuries (22%; Krob et al., 1986).

Compared to those with self-inflicted burn injuries, length of hospital stay for those with other-inflicted burn injuries appears to be comparable (Malic et al., 2007). Additionally, compared to those with unintentional burn injuries, those with other-inflicted burn injuries have comparable length of hospital stay (Kaufman et al., 2007). Research found that a substantial

number of individuals who sustained other-inflicted burn injuries required mechanical ventilation (22.4%; Dorn et al., 2001).

Research suggests that mortality rates are high (17.6%) in the adult other-inflicted burn population (Dorn et al., 2001). Furthermore, compared to those with other types of burn injuries, mortality rates appear to be higher in those with other-inflicted burn injuries (Dorn et al., 2001; Ho et al., 2001; Kaufman et al., 2007). Malic et al. (2007) reported that mortality in those with other-inflicted burn injuries (4.9%) appears to be lower than that of self-inflicted burn injuries (29%). The Malic et al. study found a substantially lower mortality rate than other studies, which may be related to the inclusion of children in their sample of other-inflicted individuals. The comparison of child and adult to adult only mortality may not be a clear comparison.

Psychological Adjustment to Other-inflicted Burn Injuries

Only one study, to date investigated the psychosocial adjustment of individuals with intentional other-inflicted burn injuries. This study found that at discharge and for up to one-year follow-up compared to those with unintentional burn injuries, those with intentionally other-inflicted burn injuries had significantly higher levels of psychological distress, as measured by the Brief Symptom Inventory (Kaufman et al., 2007). Kaufman et al. (2007) did not find statistically significant differences between groups at 2-year follow-up, which may be related to their small sample size ($N = 16$) at that time-point. They also found some difficulties in community integration at follow-up (Kaufman et al., 2007).

Given the dearth of research investigating psychosocial adjustment in both those with self-inflicted and other-inflicted burn injuries, it is not surprising that to date, there are no studies that directly compare psychosocial adjustment in self-inflicted and other-inflicted burn injuries.

The limited research regarding all aspects of other-inflicted burn precludes hypotheses regarding adjustment in this population. Although directional hypotheses are difficult to make given the paucity of research in this area, those who experience an intentional traumatic event might respond with greater symptoms of anxiety than those who experience an accidental, unintentional traumatic event. Comparison research is needed to clarify complicated posttraumatic stress reactions to allow for adjustment to treatment delivery. Despite the limited research on other-inflicted burn injuries, it is likely that those with intentional burn injuries have more psychological symptoms, and poorer quality of life and satisfaction with life compared to those with accidental burn injuries. More research is needed in this area.

Summary and Conclusions

Much of the current burn research investigates those with burn injuries as a homogeneous group with little attention paid to intentionality of burn injuries. Yet, the few studies that investigate intentional burn injuries suggest that there are important differences in those who were intentionally versus unintentionally burned. There is a paucity of literature on those with intentionally other-inflicted burns such that it is difficult to even hypothesize how adjustment in those with other-inflicted and self-inflicted and unintentional burn injuries would differ. Most research on those with self- and other-inflicted burn injuries merely describes these populations with regard to demographic and burn-related characteristics. The limited research that compares adjustment processes in individuals with self-inflicted, other-inflicted, and unintentional burn injuries precludes treatment providers from adequately distinguishing the clinical needs of the various groups. For example, those with other-inflicted burn injuries may struggle with trauma-related symptoms that affect notions of safety in the world and negatively impact quality of life

and satisfaction with life. Similarly, those with self-inflicted burns may struggle with residual symptoms of depression, psychosis, or substance abuse, which may negatively impact quality of and satisfaction with life. Without research that indicates the need for a different approach, mental health treatment providers are likely to focus on general adjustment to burn injuries, rather than factors unique to those who were intentionality burned; thus comparison studies are needed.

On a practical level, when an individual presents to a hospital with a self-inflicted gun shot wound to the chest, he is often discharged within days to weeks and transferred to an inpatient psychiatric treatment to address his emotional functioning. In contrast, those with self-inflicted burn injuries are hospitalized from weeks to months and the focus of their treatment is surviving the high risk for infections and the many surgical interventions that are needed. Without published data to highlight the additional challenges to adjustment in this population, their mental health needs are likely to be overshadowed by the complicated physical recovery unique to burn injuries.

Overall, there is an insufficient amount of research that investigates the role of intentionality of burn injuries on burn injury complications and psychological adjustment. From a review of the current literature, it is clear that there is limited literature that investigates risk factors, complications, and psychosocial adjustment in those with intentional burn injuries. Additional research regarding demographic, psychosocial, and medical risk factors may highlight areas of primary intervention. Additional research regarding burn complications and adjustment in those with intentional burn injuries may allow for secondary interventions that potentially facilitate increased survival, given that this population is likely to sustain more severe burns because of their intentional nature. Research regarding general emotional functioning and quality

of life in individuals who sustain such severe intentional physical injuries may provide clinicians with psychosocial areas of intervention.

Although there is some research regarding demographic, psychosocial, and medical risk factors for self-inflicted burn injuries, most of the sample sizes are small. Larger sample sizes are needed to replicate these studies. Similarly, although there is some research regarding severity of burns, length of stay in the hospital, and mortality rates in the self-inflicted burn population, there is little information regarding the amount of time individuals remain in the intensive care unit, on ventilators, and how long they spend in rehabilitation. Additionally, there is little information about how these burn complications compare for those with different circumstances of their burn injuries (i.e., intentional vs. unintentional). Importantly, there is little research that investigates quality of life and satisfaction with life in individuals with intentional burn injuries. Post-burn psychiatric symptoms are fairly well identified by previous research in the general burn population, but few studies have investigated equally important outcome measures that examine functioning to indicate whether individuals perceive themselves to have adequate quality of and satisfaction with life.

Only two studies compared risk factors and burn injury medical complications in those with self-inflicted to other-inflicted burns. Unfortunately, one study had a small sample sizes and the findings require replication. The other study included children in the other-inflicted burn population, which confused comparisons with the unintentional and self-inflicted burn populations. Additionally, only one study compared those with other-inflicted burn injuries to those with unintentional burn injuries with regard to psychological adjustment. No study to date has compared individuals with self-inflicted and other-inflicted burn injuries to each other with regard to psychosocial adjustment in the areas of emotional functioning, quality of life, or

satisfaction with life. Understanding differences in these three burn injury groups is important in order to identify potential areas of intervention.

Statement of Purpose

The present study aimed to address some of the aforementioned gaps in the current literature with a focus on the differential impact of intentionality of burn injuries with regard to pre-burn characteristics, burn complications, and psychological adjustment. The primary goal of this project is to describe the different burn injury groups and compare and contrast these groups with regard to pre-burn characteristics, burn medical complications, and psychological adjustment. The present study aimed to impact treatment delivery and guide future research by conceptualizing the results of this study in a manner such that the results are relevant to both researchers and treatment planners/providers alike.

Hypotheses and Research Questions

Pre-burn Characteristic Hypotheses

The present study aimed to identify pre-burn characteristics for the different burn groups that will aid in primary and secondary prevention efforts.

I. Based on previous research (e.g., Linehan, 1993; Kessler et al., 1999; Greenbaum et al., 2004), it was hypothesized that standard demographic risk factors for deliberate self-injury and suicide (e.g., ethnicity, marital status, employment) would be associated with self-inflicted burn injuries to a greater degree than they will other-inflicted or unintentional burn injuries, which were not attempts at self-injury or suicide. These specific independent predictions include:

A. Compared to those with other-inflicted and unintentional burn injuries, those with self-inflicted burn injuries would be more likely to be unmarried.

B. Compared to those in the other-inflicted burn group, those in the self-inflicted burn group would be more likely to be Caucasian.

C. Compared to those in the unintentional burn group, those in the self-inflicted burn group would be more likely to be unemployed.

D. Compared to those in the unintentional burn group, those with self-inflicted or other-inflicted burn injuries would be more likely to be younger in age.

II. Based on previous research that suggest poor pre-burn psychological functioning in the self-inflicted burn population (e.g., Ali et al., 2006; Greenbaum et al., 2004; Pham et al., 2003), it was hypothesized that:

A. Those with self-inflicted burn injuries would have a greater prevalence of pre-burn psychiatric diagnoses compared to individuals with other-inflicted or unintentional burn injuries.

B. Those with self-inflicted burn injuries would have poorer pre-burn emotional quality of life than those with other-inflicted and unintentional burn injuries.

III. Based on previous research (e.g., Ali et al., 2006; Krummen et al., 1998; Reiland et al., 2006), it was hypothesized that those with intentional burn injuries (self- and other-inflicted) would have significantly higher rates of substance abuse treatment and positive alcohol/drug screens at the time of the injury compared to those with unintentional burn injuries.

IV. Based on previous research (Hammond et al., 1988; Shkrum & Johnston, 1991), it was hypothesized that those with self-inflicted burn injuries would have poorer

pre-burn physical functioning and general health compared to those with other-inflicted and unintentional burn injuries.

Burn Injury Medical Complication Hypotheses

Previous research suggests that burn injuries are larger in size and complications are worse in those with intentional (self- and other-inflicted) burn injuries compared to those with accidental burn injuries (e.g., Ali et al., 2006; Duminy & Hudson, 1993; Malic et al., 2007; Reiland et al., 2006; Van der Does et al., 1997). The present study aimed to identify how intentionality of burn affects burn complications in order to identify groups in need of in-hospital intervention.

I. With regard to burn complications, it was hypothesized that after controlling for size of burn and age, compared to those with unintentional burn injuries, those with intentional (self-inflicted and other-inflicted) burn injuries would spend more days in the ICU, more days on a ventilator, and more days in rehabilitation.

II. It was hypothesized that mortality rates will be higher for those with self-inflicted compared to those with other-inflicted or unintentional burn injuries after controlling for age, size of burn, thickness of burn, and inhalation injuries.

Post-burn Psychological Adjustment Research Questions

Based on the paucity of research in the area of post-burn psychological adjustment in those with intentional burn injuries, the present study aimed to identify how post-burn adjustment differs based on the intentionality of burn. It was an aim of the current study to

identify areas in need of future research and to provide medical and psychiatric inpatient and outpatient psychological treatment providers with areas of intervention to facilitate adjustment.

I. Did those with intentionally other-inflicted burn injuries have significantly higher levels of anxiety compared to those with self-inflicted and unintentional burn injuries?

II. Did those with intentional burn injuries have significantly higher pain ratings than those with unintentional burn injuries, even after controlling for size of burn?

III. Did those with self-inflicted burn injuries have significantly higher symptoms of depression and hostility compared to individuals with other-inflicted or unintentional burn injuries?

IV. Did those with other-inflicted and unintentional burn injuries have significantly better satisfaction with life and quality of life compared to those with self-inflicted burn injuries at discharge?

V. Did psychosocial adjustment continue to deteriorate as time from the burn injury lengthens such that at follow-up those with intentional burn injuries had increasingly poor psychological adjustment, quality of life, and satisfaction with life?

VI. Based on previous research which found that those with self-inflicted burn injuries continue to have suicidal ideation at follow-up (Sonneborn & Vanstraelen, 1992), compared to those with unintentional or other-inflicted burn injuries, did those with self-inflicted burn injuries have more thoughts of suicide at discharge and at follow-up?

CHAPTER 2

METHOD

Participants

Participants were recruited as a part of a grant funded by the National Institute on Disability and Rehabilitation Research (NIDRR) in the Office of Special Education and Rehabilitative Services in the U.S. Department of Education. This is a multi-center dataset in which participants were recruited from 1994 through 2005 at five sites and the data from the following three sites will be used for the present study: Harborview Medical Center, Seattle, University of Washington; University of Texas Southwestern Medical Center at Dallas, Texas; and Johns Hopkins Regional Burn Center, Baltimore, Maryland. Two sites will be eliminated from the analyses because one site, Shriner's Hospital in Galveston, collected data on primarily children and adolescents and the other site, the University Health Science Center in Denver, participated for only a small period of time in data collection (1994-1997). The University of North Texas Institutional Review Board deemed the current study "exempt from further review" because of the use of an existing, de-identified data set.

Inclusion criteria for participants in the current study were that participants must have met qualifications for a major burn injury. Criteria for major burn injury include the following: 1) those below 14 or above 60 years of age with greater than 9% total body surface area (TBSA) burns; 2) those between 14 and 59 years of age with greater than 19% TBSA; 3) regardless of age, greater than 4% TBSA with full-thickness burns (i.e., burns that required grafting); 4) regardless of age, "significant" burn injuries to major joints, face, dominant hand, feet, perineum/genitalia; 5) electrical burns; 6) inhalation injury; or 7) other trauma (e.g., frost bite). Beyond qualification for a major burn injury, participants had to fulfill the following additional

criteria: need for acute hospitalization, received their care at the center/hospital where the data was collected, and consented to participate in the two-year study (Holavanahalli, Lezotte, Hayes, Minhajuddin, Fauerbach et al., 2006). Additionally, for the current study, participants below the age of 18 were excluded from all analyses.

Measures

General Demographics and Biopsychosocial Variables

Information on general demographics was obtained based on questions developed by the Burn Model System primary investigators. The following demographic information was collected: date of birth, sex, age, ethnicity, dominant hand, marital status, residence at time of burn, state of residence, and highest level of education. Information regarding biopsychosocial functioning was also collected, including: school status, employment status, reason for not attending school/work (if applicable), employment satisfaction prior to injury, employment of primary financial supporter at the time of injury, medical problems prior to injury, preexisting physical disability, whether the individual had received mental health treatment in the year prior to the injury, history of alcohol and drug abuse in the year prior to the injury, and substance abuse or psychiatric illness during the year prior to the injury.

Burn Demographics, Characteristics, Complications and Discharge Status

The survey used to collect information regarding burn demographics was also developed by the Burn Model System primary investigators. Data collected included: primary etiology of injury (e.g., fire, scald, grease, tar), place of injury (e.g., indoors), geographic location of injury (e.g., home), circumstance of injury (e.g., self-inflicted), whether family members were

injured/killed in the incident, whether individuals' died in the hospital, alcohol and drug tests at the time of hospital admission. Data collected regarding burn characteristics included: number of days in ICU, number of days in inpatient rehabilitation, inhalation injury, injury other than inhalation, parts of body burned, parts of body grafted, days on ventilator, and number of trips to operation room. Data collected regarding burn complications include: active range of motion deficits, amputations due to burn, burn-related neuropathy, and vision/hearing/central nervous system problems secondary to burn treatment.

Medical Outcome Short Form (36) Health Survey

The Medical Outcome Short Form (36) Health Survey (SF-36) is a self-report measure that contains 36 Likert-type items that measure eight health profiles (physical functioning, social functioning, role limitations – physical, bodily pain, general medical health, mental health, role limitations – emotional, vitality, and general health perceptions; Ware, Snow, Kosinski, Gandek, 1993). There are two summary scores that give overall indications of physical and emotional health that account for 80% of the measure's reliable variance (APA, 2000). High scores on this measure indicate greater heath-related quality of life. Internal consistency reliabilities range from 0.62 to 0.94 for each of the subscales and summary scores (Scott, Tobias, Sarfati, & Haslett, 1999). Test-retest reliability coefficients ranged from 0.60 to 0.81 over two weeks and 0.43 to 0.90 over 6 months (Ware et al., 1993). McHorney, Ware, and Raczek (1996) found moderate correlations with the Duke Health Profile (Parkerson, Broadhead, & Tse, 1990) and Sickness Impact Profile (Bergner, Bobbit, et al., 1981), suggesting adequate convergent and discriminant validity.

Medical Outcome Short Form (36) Health Survey Estimate of Pre-burn Functioning

Pre-burn functioning was estimated using retrospective reports on the SF-36. As soon as participants were medically stable, they filled out the SF-36 based on self-report of pre-burn functioning. Although there are many limitations to such an approach, the investigators believe that a general estimate of pre-burn functioning is better than no such estimation, even considering the room for error inherent in such retrospective reports.

Brief Symptom Inventory

The Brief Symptoms Inventory (BSI) is a self-report measure that contains 53 Likert-type items that investigated several areas of psychological functioning and distress (i.e., somatization, obsessive-compulsive behavior, interpersonal sensitivity, depression, anxiety, hostility, phobic anxiety, paranoid ideation, and psychoticism) which yields three summary scales: Global Severity Index (GSI), Positive Symptom Distress Index (PSDI), and Positive Symptom Total (PST; Derogatis & Melisaratos, 1983; Derotais & Spencer, 1982). The BSI is a shortened form of the revised 90 item Symptom Checklist (SCL-90). Several studies have suggested very good internal consistency (alpha coefficients ranged from 0.71 to 0.85) and test-retest reliability (0.69 to 0.91), as well as good convergence with dimensions of the Minnesota Multiphasic Psychological Inventory (MMPI).

Satisfaction with Life Scale

The Satisfaction with Life Scale (SWLS) measures global life satisfaction with a 5-item Likert-type self-report measure (Diener, Emmons, Larsen & Griffin, 1985). Pavot and Diener (1993) suggest this scale is useful as a supplement to measures that assess psychopathology, as it

uses individuals "conscious evaluative judgment of his or her life." The instrument has excellent internal consistency (α = .87) and demonstrates adequate convergent validity with other subjective well-being measures (e.g., self-esteem) and discriminant validity from measures that assess emotional functioning (Pavot & Diener, 1993).

Procedures

The present longitudinal study collected data at 4 main points in time: discharge from the hospital, and six months, 12 months, and 24 months post-discharge. At discharge, participants were presented with a battery of self-report measures that included demographic information, medical information, and several psychosocial measures. Participants were also asked to estimate their pre-burn functioning on the SF-36 Health Survey as soon as they were able in the hospital. For some participants, this was at discharge. For others, they estimated their pre-burn functioning prior to discharge. No participants were asked to estimate their pre-burn functioning after discharge from the hospital. Follow-up data was collected through face-to-face interviews, telephone calls, or were mailed to participants with self-addressed stamped envelopes, which participants dated and mailed in upon completion.

Data from the study were deidentified and entered into Microsoft Access. For the present study, the data were exported from Access to Excel and then imported into SPSS for statistical analyses.

Datasets Used

In order to fulfill the criteria for entry into the NIDDR study, individuals had to qualify for major burn injuries. For the present study, individuals less than 18 years old were eliminated

from all analyses. Thus, the full dataset (N = 3,043) for the present study included 2,825 individuals with unintentional burn injuries, 109 individuals with intentionally other-inflicted burn injuries, and 109 individuals with intentionally self-inflicted burn injuries.

One-way ANOVAs and chi square tests of the complete dataset revealed many significant differences between the self-inflicted, other-inflicted, and unintentional burn groups. There were differences in gender, age, ethnicity, marital status, living situation, special education, employment, employment satisfaction, medical problems, physical disability status, psychological treatment within the past year, psychiatric diagnosis, alcohol abuse within the past year, alcohol test results upon admission to hospital, drug abuse within the past year, drug screen results upon admission to the hospital, primary etiology of the burn injury, location of the injury, inhalation injury, head and neck burns, percent total body surface area (TBSA) burn, TBSA that required a graft, days spent on a ventilator, days spent in the intensive care unit (ICU), and days spent in the rehabilitation unit.

The large number of variables that showed significant differences between groups suggested a need to match the other-inflicted burn and self-inflicted burn groups to the accidental burn group on several variables. In order to do subsequent tests of the differential effects of burn injury group, it was decided that matching was necessary on demographic and burn-related variables found in the literature to be significant predictors of outcome. The goal of the matching procedure described below was to increase internal validity in the current study. This procedure increased confidence that findings in the current study are due to burn injury group (i.e., unintentional, other-inflicted, self-inflicted burn) and not due to other confounding variables that covary with these groups.

The first dataset constructed was the matched dataset. In order to construct the matched

dataset, individuals with self-inflicted burns (SIB) and other-inflicted burns (OIB) who had data on one or more of the psychological outcome measures (SF36, BSI, SWLS) were selected. Forty-six SIB and sixty-five OIB participants were selected. These participants were then matched to individuals with unintentional burns (UB) who also had data on one or more of the psychological outcome measures. Existing research on burn injuries suggests that among others, gender, race/ethnicity, age, and severity of burn impact adjustment to burn injuries. Although these are not the only variables that impact psychosocial adjustment, the maximum number of variables that could be sufficiently matched was four. Thus, participants were matched on the following four variables: gender, race/ethnicity, age, and size of burn injury.

Gender was matched perfectly. Race/ethnicity was matched perfectly for SIB, but imperfectly for OIB. Although OIB participants were unable to be matched perfectly to UB participants with regard to race/ethnicity, when chi square tests were run, no significant differences in race/ethnicity were noted ($\chi^2 = 2.61$, $p > .05$). SIB and OIB participants were matched on age to UB participants within 10 years, which resulted in no significant differences between groups on age (OIB: $M = 37.70$, $SD = 10.36$ and UB: $M = 37.74$, $SD = 10.52$, $F = .00$, $p > .05$; SIB: $M = 34.29$, $SD = 9.51$ and UB: $M = 34.53$, $SD = 9.41$, $F = .00$, $p > .05$).

SIB and OIB participants were matched on size of burn using the following categories: 0-9, 10-19, 20-39, and 40-100. These categories were designed fairly arbitrarily. Some guidance was obtained from the National Burn Repository dataset, which indicated large numbers of individuals with 0-9 and 10-19 TBSA burns, moderate numbers of individuals with 20-29 and 30-39 TBSA burns, and much smaller numbers of individuals with 40-100 TBSA burns. Although the National Burn Repository dataset included minor, moderate, and major burn injuries, and our dataset includes only major burns, guidance from that dataset proved fruitful

because no significant differences were found between the matched groups (OIB: M = 23.13, SD = 18.33 and UB: M = 21.89, SD = 17.75, F = .00, p > .05; SIB: M = 33.54, SD = 26.11 and UB: M = 32.31, SD = 23.28, F = .42, p > .05).

After the matched dataset was constructed, t-tests and chi square tests were rerun to explore the impact of matching on the four variables. These tests revealed that the only significant differences between the OIB group and their UB matches were psychological treatment in the last year, alcohol abuse in the last year, drug abuse in the last year, drug test upon hospital admission, primary etiology of the burn, location of the injury, days on a ventilator, days in rehabilitation, and TBSA that required graft. Similarly, the tests revealed that the only significant differences between the SIB group and their UB matches were employment, medical problems, psychological treatment during the past year, psychiatric diagnosis, alcohol abuse in the last year, drug abuse in the last year, primary etiology of the burn, and location of the burn injury. It was found that controlling for the four variables also decreased group differences on related variables (e.g., inhalation injuries, head and neck burns, marital status, living situation, special education, employment satisfaction, physical disability status).

In order to have adequate generalizability and external validity of results, yet another dataset was constructed. Rather than attempting to compare results from the matched dataset analyses to the very large group of individuals with unintentional burns in the full dataset, a random sample of the unintentional burn group from the large dataset was selected. The second dataset that was constructed is the randomly selected UB dataset. The same 46 SIB and 65 OIB participants with one or more psychological outcome measures that were included in the matched dataset were included in the random dataset. Using the SPSS random selection function, 111 UB participants were randomly selected from the remaining unmatched UB participants who

had data on one or more of the psychological outcome measures. The random dataset served two functions. Firstly, it served as a same-sized comparison to the matched dataset and secondly, it served to increase the external validity of the results. The matched dataset increases internal validity - the likelihood that differences between groups on psychological outcome measures are due to group membership (vs. demographic/burn variables). The random dataset provides increased generalizability of results, given that groups exist in their natural form. In other words, out in the real world, those with unintentional burns are more likely to be male, Caucasian, older, and have less severe burns than they are/do in the matched dataset.

Data Analyses

All data analyses were performed using SPSS version 11.0 (SPSS, Inc., Chicago IL). Standard procedures for assuring normality and describing the population were performed. For each continuous variable, skewness was divided by standard error of skewness and kurtosis divided by standard error of kurtosis, which was evaluated as a *z*-test of univariate normality. Based on these evaluations of skewness and kurtosis of continuous variables, departures from normality were not substantial enough to warrant transformations.

Univariate descriptive analyses were performed on demographic variables and variables of interest. Means, standard deviations, and ranges, are presented for the overall sample and by burn injury group (i.e., those with unintentional, self-inflicted, and other-inflicted burn injuries). Internal-consistency reliabilities were reported for scales, again both overall and for each of the three groups. In this way the integrity of the latent constructs can be evaluated overall and for each separate group.

Correlation matrices of variables used in the proposed analyses was created to review and

understand the nature of the data and interrelationships between the constructs of interest. Correlation tables were presented for the overall sample and by burn injury group (i.e., those with unintentional, self-inflicted, and other-inflicted burn injuries).

The hypotheses about risk factors were addressed using chi square analyses for categorical and t-tests for continuous data: (1) Standard demographic risk factors for deliberate self-injury and suicide would be associated with self-inflicted burn injuries to a greater degree than they will other-inflicted or unintentional burn injuries, which were not attempts at self-injury or suicide; (2) Individuals with self-inflicted burns would have significantly higher prevalence of psychiatric diagnoses and poorer pre-burn quality of life than those with other-inflicted or unintentional burn injuries; (3) Participants with self-inflicted burn injuries would have poorer pre-burn physical functioning and general health compared to those with other-inflicted and unintentional burn injuries. and (4) Participants with intentional burn injuries would have significantly higher rates of substance abuse treatment and intoxication blood/urine tests at the time of the injury, compared to those with unintentional burn injuries.

Two logistic regressions were conducted to build a profile of those who self-inflict their burn injuries and those who sustained other-inflicted burn injuries. Age, race/ethnicity, marital status, employment status, education, substance use history, history of psychiatric diagnosis, and pre-burn medical problem were entered into the regression equation in order to predict those who self-inflicted and those who did not. The same regression set-up was used to predict those who have other-inflicted intentional burn injuries and those who did not have other-inflicted burns.

A differential mortality analysis by group was conducted using sequential logistic regression. This tested the hypothesis that after controlling for age, burn size, percent of burn that required a skin graft, and inhalation injuries, circumstance of burn injury would differentially

predict mortality such that those with self-inflicted compared with those with other-inflicted and unintentional burn injuries would have higher mortality rates.

One-way ANOVAs were used for both the matched sample and random sample datasets to test the hypothesis that the burn injury groups (i.e., self-inflicted, other-inflicted, and unintentional burn injuries) would differ in days in ICU, days on a ventilator, and more days in rehabilitation.

Because limitations in sample size precluded the incorporation of all relevant psychosocial variables in one discriminant function analysis equation, separate one-way ANOVAs were conducted on both the matched sample dataset and the random sample dataset for psychological adjustment at discharge and at follow-up. One-way ANOVAs were conducted to test the following hypotheses: (1) levels of quality of life and satisfaction with life will differ between groups such that those with those with self-inflicted burn injuries will have poorer quality of life compared to those with other-inflicted or unintentional burn injuries; (2) level of anxiety will accurately differ between groups such that those with intentionally other-inflicted burns will have significantly higher anxiety than the unintentional burn group and those with self-inflicted burn injuries; (3) symptoms of depression and hostility will differ between those with self-inflicted burn injuries and the other two burn injury groups, such that those with self-inflicted burn injuries will have significantly higher levels of depression and hostility; and (4) higher pain ratings will differ between injury group such that those with intentional burn injuries will have significantly higher pain levels than those with unintentional burn injuries.

Repeated measures ANCOVAs were conducted to test the hypothesis that in those with intentional burn injuries, psychosocial adjustment on variables of interest will continue to deteriorate as time from the burn injury lengthens. A variable was created to indicate the earliest

follow-up time-point (e.g., 6 month, 12 month, 24 month) because sample size precluded analyzing each follow-up period separately. Adjustment at discharge was compared to adjustment at follow-up, with time of follow-up entered as a covariate. This procedure was used to increase sample size to allow this analysis.

Finally, a one-way ANOVA tested the hypothesis that individuals with self-inflicted burn injuries will be more likely than those with other-inflicted or unintentional burn injuries to have thoughts of suicide at discharge and at follow-up. Suicide was assessed with use of the Brief Symptom Inventory item that states, “how distressed were you about thoughts of ending your life.”

CHAPTER 3

RESULTS

Attrition/Missing Data

Of the 3,043 participants in the current study, 50.6% had psychological outcome data. That is, 49.3% of the unintentional burn (UB) group, 42.2% of the other-inflicted burn (OIB) group, and 59.6% of the self-inflicted burn (SIB) group were missing data on psychological outcome measures relevant to the current study. There was also significant attrition within 1,540 total participants who had psychological outcome data at discharge (see Table 1). Of the overall sample, 10.4% of participants were missing data at 6-month follow-up, 46.9% at 12-month follow-up, and 62.6% at 24-month follow-up. Of the UB group, 9.8% were missing data at 6-month, 46.3% at 12-month, and 61.5% at 24-month follow-up. Of the OIB group, 19.0% were missing data at 6-month, 55.6% at 12-month, and 71.4% at 24-month follow-up. Finally, of the SIB group, 15.9% were missing data at the 6-month, 56.8% were missing data at the 12-month, and 63.6% were missing data at the 24-month follow-up. A similar pattern of attrition from the study occurred across groups when time of last follow-up was investigated (see Table 2).

Participant Demographic Characteristics

Descriptive demographic statistics are displayed in Table 1. There are several notable differences between groups. With regard to demographic characteristics, compared to those with accidental burn injuries, those with intentional (self-inflicted and other-inflicted) burn injuries were significantly more likely to be younger ($F = 13.65$, $p < .001$), female ($\chi^2 = 12.84$, $p < .001$), unmarried ($\chi^2 = 16.51$, $p < .001$), unemployed ($\chi^2 = 36.94$, $p < .001$), and had lower employment satisfaction ($\chi^2 = 48.32$, $p < .001$). When intentional burns were examined separately and

compared to accidental burns, those with other-inflicted burn injuries are more likely to be of African American race/ethnicity than those with accidental and self-inflicted burns (UB vs. OIB: $\chi^2 = 112.85$, $p < .001$; OIB vs. SIB: $\chi^2 = 32.99$, $p < .001$).

Differences in pre-burn medical status were noted between groups. Compared to those with accidental and those with other-inflicted burn injuries, those with self-inflicted burn injuries were significantly more likely to have pre-burn medical problems (UB vs. SIB: $\chi^2 = 19.80$, $p < .001$; SIB vs. OIB: $\chi^2 = 14.64$, $p < .001$).

Differences between groups with regard to psychiatric history also emerged. Compared to those with accidental burn injuries, those with intention burns were more likely to have received psychiatric treatment within the past year ($\chi^2 = 215.83$, $p < .001$). Compared to both other groups, those with self-inflicted burn injuries were more likely to have a psychiatric diagnosis (UB vs. SIB: $\chi^2 = 283.09$, $p < .001$; SIB vs. OIB: $\chi^2 = 58.68$, $p < .001$).

The groups also differed with regard to substance abuse. Although a majority of the overall sample and all three groups denied having abused alcohol within the past year, higher percentages of alcohol abuse were reported in the OIB (34.5%) and SIB (43.6%) groups, compared to the unintentional burn group ($\chi^2 = 71.19$, $p < .001$). Upon admission to the hospital for their burn injuries, significantly greater percentages of positive alcohol tests were found in the OIB (46.3%) and SIB (42.9%) compared to the UB group (20%; $\chi^2 = 40.98$, $p < .001$).

A similar pattern was found for non-alcohol drug abuse and non-alcohol drug tests. A minority reported drug abuse for the overall sample and all three groups, with greater percentages of drug abuse for the OIB (33.3%) and SIB (38.4%) groups compared to the UB group (10.3%; $\chi^2 = 102.25$, $p < .001$). Of those who were screened for drugs at admission to the hospital for burn injuries, greater percentages of positive drug screens were found in the OIB

(56.4%) and SIB (48.2%) groups, compared to the UB group (17.7%; $\chi^2 = 84.16$, $p < .001$). Despite these high rates of substance use, 33% of those with self-inflicted and 48% of those with other-inflicted burns were not tested for alcohol intoxication. Similarly, 36% of those with self-inflicted and 45% of those with other-inflicted burn injuries were not tested for drug use upon admission to the hospital.

Participant Burn Characteristics

Table 4 displays burn demographic characteristics and Table 5 displays burn injury characteristics. Compared to those with accidental burn injuries, those with other-inflicted burn injuries were more likely to be burned by flames or chemicals ($\chi^2 = 42.17$, $p < .001$). Compared to both other groups, those with self-inflicted burn injuries were more likely to have flame burns (UB vs. OIB: $\chi^2 = 47.24$, $p < .001$: SIB vs. OIB: $\chi^2 = 22.67$, $p < .01$). Compared to those with unintentional burn injuries, those with intentional burn injuries were significantly more likely to have larger burns ($F = 41.46$, $p < .001$), burns that require skin grafts ($F = 26.90$, $p < .001$), inhalation injuries ($\chi^2 = 17.39$, $p < .001$), and have their head or neck burned ($\chi^2 = 7.77$, $p < .01$). Compared to those with accidental burn injuries (12.4%), those with self-inflicted burn injuries (24.2%) were more likely to die in the hospital ($\chi^2 = 12.02$, $p < .01$) and there were no significant differences in death rates between other groups.

Univariate Descriptive Analyses

Univariate descriptive analyses were performed on psychological outcome variables of interest and means, standard deviations, ranges, and internal-consistency reliabilities are presented for the random sample dataset in Table 6 and for the matched sample dataset in Table

7. Results from the random sample dataset will be presented below and can be compared with the matched sample dataset results in Table 7.

Higher scores on the SF-36 indicate greater health-related quality of life. The mean health-related quality of life scores on the SF-36 General Health scale for the overall sample were in the below 50th percentile range when compared to the general population. The UB group fell in the below 50th percentile range, the OIB group fell right at the 25th percentile, and the SIB group fell below the 25th percentile. The mean health-related quality of life scores on the SF-36 Mental Health scale for the overall sample were in the below 25th percentile compared to the general population. The UB group fell in the below 50th percentile, whereas the OIB and the SIB groups fell in the below 25th percentile range.

Higher scores indicate increased psychological distress on the Brief Symptom Inventory (BSI). The mean subscale scores on the BSI for the overall sample and the 3 groups were greater than the mean scores on the subscales for adult non-patients.

On the Satisfaction with Life Scale (SWLS), higher scores indicate greater satisfaction with life. The means scores on the SWLS fell in the Slightly Dissatisfied range for the overall sample (M = 19.25, SD = 8.53). The average scores for the UB group (M = 22.78, SD = 7.80) fell in the Slightly Satisfied range, whereas the average scores for the OIB (M = 15.18, SD = 7.76) and the SIB (M = 16.13, SD = 7.64) groups fell in the Slightly Dissatisfied range.

Relationships between Variables

Five correlation matrices were constructed to provide insight into the relationships between variables and facilitate interpretation of results. The first correlation matrix displays the overall sample with demographic, burn-related, and psychological outcome variables shown in

Table 8. This correlation matrix revealed that there were significant correlations between variables of interest. These findings were consistent with the one-way ANOVA and chi square findings described above. In addition, this correlation matrix revealed that those with intentional (self-inflicted and other-inflicted) burn injuries were significantly more likely to have more psychological symptoms, poorer quality of life, and lower satisfaction with life at discharge, compared to those with unintentional burn injuries.

There were significant correlations between being of Caucasian race/ethnicity and older age, having more education, more psychiatric diagnoses, higher percent TBSA burn, higher post-burn health-related quality of life scores, and higher post-burn satisfaction with life scores. There were significant correlations between being of African American race/ethnicity and having lower percent TBSA burn, higher rates of drug and alcohol abuse within the past year, having higher post-burn psychological symptom scores, and lower post-burn satisfaction with life scores. There were also significant correlations between being of Hispanic ethnicity and younger age, having less education, and lower rates of alcohol and drug abuse within the past year.

There were significant correlations between higher rates of alcohol and drug abuse within the past year and having a more severe burn injury, higher post-burn psychological symptom scores, lower post-burn health-related quality of life scores, and lower post-burn satisfaction with life scores. There were also significant correlations between severity of burn injury and lower post-burn health-related quality of life scores and lower post-burn satisfaction with life scores.

Correlation matrices by group are displayed in Tables 9 – 11 with unintentional burn, other-inflicted burn, and self-inflicted burn displayed respectively. The intercorrelations between the three burn groups and each of the 8 subscales on the SF-36 and the 9 subscales of the BSI are displayed in Tables 12 and 13 respectively.

Pre-burn Characteristic Results

It was hypothesized that standard demographic risk factors for deliberate self-injury and suicide (e.g., ethnicity, marital status, employment) would be associated with self-inflicted burn injuries to a greater degree than other-inflicted or unintentional burn injuries. Table 3 displays one-way ANOVA and chi square results.

It was found that there were significant differences between the self-inflicted and other-inflicted/unintentional burn groups with regard to age ($F = 13.65$, $p < .001$), gender ($\chi^2 = 13.45$, $p < .001$), ethnicity ($\chi^2 = 114.23$, $p < .001$), marital status ($\chi^2 = 17.81$, $p < .001$), and employment ($\chi^2 = 40.99$, $p < .001$). Specifically, compared to the unintentional and/or other-inflicted burn groups, those with self-inflicted burns had a higher proportion of females, were more likely to be younger, Caucasian, unmarried, and unemployed. There were no significant differences between groups in education level. Thus, the following hypotheses were supported: 1) Compared to those in the unintentional burn group, those with self-inflicted or other-inflicted burn injuries were more likely to be younger in age; 2) Compared to those in the other-inflicted burn group, those in the self-inflicted burn group were more likely to be Caucasian; 3) Compared to those with unintentional burn injuries (but not those with other-inflicted burns), those with self-inflicted burn injuries were more likely to be unmarried; and 4) Compared to those in the unintentional burn group, those in the self-inflicted burn group (and those in the other-inflicted burn group) were more likely to be unemployed.

It was also hypothesized that those with suicide/self-injury behaviors (i.e., the SIB group) inherently appraise their situations as unmanageable and may utilize experientially avoidant coping strategies, such as alcohol and drug use, and would be more likely to have psychiatric diagnoses and treatment. The results (See Table 3) revealed that those in the SIB group were

significantly more likely than the UB and OIB groups to have had psychiatric treatment within the past year ($\chi^2 = 326.48$, $p < .001$), and to have psychiatric diagnoses ($\chi^2 = 286.25$, $p < .001$). Those in the SIB and OIB groups were significantly more likely than those in the UB group to have alcohol abuse ($\chi^2 = 76.64$, $p < .001$), positive alcohol tests at hospital admission ($\chi^2 = 45.65$, $p < .001$), drug abuse ($\chi^2 = 103.50$, $p < .01$), and positive drug screens at hospital admission ($\chi^2 = 85.79$, $p < .01$). Thus, the following hypotheses were supported: 1) those with self-inflicted burn injuries would have a greater prevalence of pre-burn psychiatric diagnoses compared to individuals with other-inflicted or unintentional burn injuries and 2) those with intentional burn injuries would have significantly higher rates of substance abuse treatment and drug/alcohol tests at the time of the injury.

It was also hypothesized that those with self-inflicted burn injuries would have poorer pre-burn physical functioning and general health compared to those with other-inflicted and unintentional burn injuries. There were significant differences between the SIB group and other two groups regarding pre-burn medical diagnosis or physical disability status, such that those in the SIB group were significantly more likely to have a pre-burn medical problem ($\chi^2 = 21.12$, $p < .001$) and pre-burn physical disability for which they were receiving state or federally sponsored aid ($\chi^2 = 28.27$, $p < .001$). There were also significant group differences with regard to estimated pre-burn health-related quality of life (See Table 14). It was found that those with self-inflicted burn injuries compared to those with unintentional burn injuries had significantly poorer estimated pre-burn quality of life in the following areas: general health ($F = 4.66$, $p < .05$), vitality ($F = 7.92$, $p < .01$), and mental health ($F = 10.19$, $p < .01$). In addition, those in the SIB group (compared to both the UB group and the OIB groups) had significantly poorer estimated pre-burn quality of life in the following areas: social functioning ($F = 8.04$, $p < .01$) and role

limitations related to emotional factors ($F = 5.75$, $p > .01$). Thus, the following hypotheses were supported: 1) those with self-inflicted burn injuries would have poorer pre-burn physical functioning and general health compared to those with unintentional burn injuries and 2) those with self-inflicted burn injuries would have poorer pre-burn emotional quality of life than those with other-inflicted and unintentional burn injuries.

In order to gain a more comprehensive understanding of the variables implicated above, a binary logistic regression analysis was used to predict self-inflicted versus non-self-inflicted burn injuries (i.e., UB and OIB groups collapsed into a group called non-self-inflicted burns) from the demographic and psychological variables listed above. Using the full dataset, which had more power, it was found that age below 40 years ($OR = 2.22$, $p < .05$), psychiatric treatment within the past year ($OR = 13.82$; $p < .001$), and alcohol abuse ($OR = 2.17$, $p < .05$) significantly predicted those with self-inflicted burn injuries (see Table 15). The Hosmer and Lemeshow goodness-of-fit statistic was 7.79 with a p value of .45, which indicates the model was a good fit.

In the matched sample dataset, which controls for gender, race/ethnicity, age, and size of burn injury, only psychiatric treatment within the past year reached significance (See Table 15). This suggests that after controlling for size of burn injury, having received psychiatric treatment within the past year significantly predicts likelihood of self-inflicting a burn injury. In the random sample dataset, which mirrors the full dataset but has less power, psychiatric treatment within the past year reached significance, but age and alcohol abuse did not reach statistical significance (See Table 15). We would expect the random sample dataset to mirror the full dataset, so the lack of significant findings may be related to insufficient power in the smaller dataset. In the random sample dataset an additional variable reached significance. It was found that compared to Caucasian race/ethnicity, individuals of African American race/ethnicity were

significantly less likely to self-inflict a burn (random sample: *OR* = .29, $p < .05$). Again, we would expect the random sample dataset to mirror the full dataset. This finding is likely related to the collapsed grouping of OIB and UB participants into a non-SIB group, which resulted in increased proportions of African American participants in the non-SIB group. Therefore, it is unlikely that this is a meaningful finding.

In order to gain better understanding about pre-burn characteristics that predict intentionally other-inflicted burn injuries, the same approach as listed above was used – a binary logistic regression analysis was used to predict other-inflicted versus non-other-inflicted burn injuries (i.e., UB and SIB groups collapsed) from the demographic and psychological variables (See Table 16). Using the full dataset, it was found that race/ethnicity and drug abuse significantly predicted those who had intentionally other-inflicted burn injuries. Specifically, those who are Caucasian ($p < .001$) were significantly less likely, those who are of African American race/ethnicity (*OR* = 7.80, $p < .001$) were significantly more likely, and those who abused drugs within the past year (*OR* = 3.70, $p < .001$) were significantly more likely to sustain an other-inflicted burn injury. The Hosmer and Lemeshow goodness-of-fit statistic was 11.41 ($p = .18$), which indicates that the model was a good fit. As expected, a similar pattern of results emerged for the random sample dataset, with the same significant variables. Drug abuse did not retain significance in the matched sample dataset, which matched on gender, race/ethnicity, age, and burn size. Given that drug abuse was significantly correlated with African American race/ethnicity, younger age, and larger burn size, this finding may be related to those variables versus having an other-inflicted burn injury per se.

Burn Injury Medical Complication Results

It was hypothesized that after statistically controlling for size of burn and age, compared to those in the UB group those in the SIB and OIB groups would spend more days in the ICU, on a ventilator, and in rehabilitation. The matched dataset controls for differences between SIB and UB groups and OIB and UB groups with regard to age and size of burn, which have been shown by previous research to impact these variables. When these variables were controlled for, no differences between groups were evident with regard to levels of service utilization (time in the ICU, days on a ventilator, or in rehabilitation). Thus, this hypothesis was not supported.

It was also hypothesized that in-hospital mortality rates would be higher for those with self-inflicted compared to those with other-inflicted or unintentional burn injuries after controlling for age, size of burn, thickness of burn, and inhalation injury. A binary, sequential logistic regression was used to predict in-hospital death. Age was entered into the first block, size of burn, thickness of burn, and inhalation injury into the second block, and circumstance of burn group was entered into the third block, with death as the dependent variable. The logistic regression revealed that circumstance of burn significantly predicted death above and beyond the contribution of age, percent TBSA, percent TBSA that required a skin graft, and presence of inhalation injuries (See Table 17). Specifically, compared to those with unintentional burn injuries, those with self-inflicted burn injuries were 3 times more likely to die in the hospital (*OR* = 3.1, $p < .01$). The Hosmer and Lemeshow goodness-of-fit statistic was 7.65 ($p = .47$), which revealed that the model was a good fit for the data. Thus, the hypothesis that individuals with self-inflicted burn injuries were significantly more likely to die in the hospital compared to those with accidental (but not other-inflicted) burns was supported.

Post-burn Psychological Adjustment Results

It was hypothesized that those with self-inflicted burn injuries would have significantly poorer satisfaction with life and quality of life compared to those with other-inflicted and unintentional burn injuries at hospital discharge. One-Way ANOVA comparisons (see Table 6) of the SF-36 and SWLS scales in the random sample dataset revealed that those with self-inflicted burn injuries had significantly worse social functioning ($F = 3.17$, $p < .05$), role functioning due to emotional limitations ($F = 6.60$, $p < .01$), and mental health ($F = 4.91$, $p < .05$) compared to those with unintentional burn injuries. Additionally, those with other-inflicted burn injuries had significantly worse role functioning due to emotional limitations ($F = 6.60$, $p < .01$) and mental health ($F = 4.91$, $p < .05$) compared to those with unintentional burn injuries. Interestingly, there were no significant differences between those in the OIB and SIB groups. In the matched sample dataset (see Table 7), which controls for several demographic and burn-related variables, only role functioning due to emotional limitations ($F = 3.11$, $p < .05$) was significant, with self-inflicted participants having worse outcome than unintentional burn participants. This suggests that differences between the SIB and UB groups on role limitations due to emotional limitations were not due to group differences in age, race/ethnicity, gender, or size of burn injury.

In the random sample dataset (see Table 6) those with self-inflicted and other-inflicted burns had significantly lower satisfaction with life at discharge compared to those with unintentional burn injuries ($F = 18.38$, $p < .001$). In the matched sample dataset, the same pattern of significant results was found for satisfaction with life (see Table 7), suggesting that group differences with regard to satisfaction with life were not due to differences in gender, age, race/ethnicity, or size of burn injury.

It was also hypothesized that those with intentional other-inflicted burns would have significantly higher levels of anxiety at discharge from the hospital compared to those with self-inflicted and unintentional burn injuries. One-way ANOVAs (See Table 6) revealed that those in the OIB group had significantly higher anxiety, phobic anxiety, paranoia, and psychotic symptoms compared to those with unintentional burn injuries, with no significant differences found for the SIB group. In the matched dataset (See Table 7) – the only significant anxiety variable was paranoia. This suggests that differences between groups unrelated to paranoia may be due to group differences on gender, race/ethnicity, age, or size of burn. In contrast, differences in level of paranoia are likely to be related to having an other-inflicted burn injury rather than demographic or other burn-related factors.

It was also hypothesized that those with intentional burn injuries would have significantly higher pain ratings at discharge than those with unintentional burn injuries, even after controlling for severity of burn. No significant differences in pain ratings between groups were found in the random sample or the matched sample datasets (See Tables 6 and 7); thus, this hypothesis was not supported.

It was hypothesized that those with self-inflicted burn injuries would have significantly higher symptoms of depression and hostility at discharge from the hospital compared to individuals with other-inflicted or unintentional burn injuries. In the random sample dataset (See Table 6), it was found that those in the SIB group had significantly more symptoms of depression than the UB group ($F = 3.98$, $p < .05$). However, no significant differences were found between the SIB group and other groups in the matched dataset (See Table 7), which suggests that the differences in depression may be related to gender, race/ethnicity, age, or size of burn injury. There were no significant differences found in depression measures between

those in the SIB group and those in the OIB group. Additionally, no significant differences were found between any of the groups on hostility for the random or matched datasets.

It was hypothesized that group differences would persist over the follow-up period. Significant group differences emerged at follow-up after discharge. One-way ANCOVAs were conducted with time of follow-up entered as a covariate and one-way ANOVAs were run to determine post-hoc differences between groups. Significant one-way ANOVAs for the random dataset that remained significant when time of next follow-up was entered as a covariate in the ANCOVA are presented in Table 18. Significant group differences were found among several variables at follow-up. Those in the both the OIB and the SIB group had significantly higher depression scores compared to the UB group. Compared to the UB group, those in the OIB group had significantly higher symptoms of anxiety, hostility, interpersonal sensitivity, paranoia, and psychosis. Compared to both the UB group and the SIB group, the OIB group had significantly higher symptoms of phobic anxiety. Compared to the UB group, both the SIB and the OIB groups had significantly lower satisfaction with life.

In the matched dataset, which controlled for differences in gender, race/ethnicity, age, and size of burn, several significant group differences were still found (see Table 19). Those in the OIB group had significantly more anxiety, phobic anxiety, and paranoia compared to the UB group. Those in the SIB group had significantly greater role limitations related to emotional and physical factors compared to the UB group. Both the OIB group and the SIB group had significantly poorer satisfaction with life compared to those in the UB group. This suggests that these findings are likely related to group membership versus other demographic or burn-related variables that vary by group.

It was also hypothesized that for those with self- and other-inflicted burn injuries,

psychosocial adjustment would continue to deteriorate as time from burn lengthens, such that compared to those with unintentional burn injuries, those with intentional burns would have more psychological symptoms, poorer quality of life, and lower satisfaction with life at follow-up. Repeated measures ANCOVAs were conducted to determine whether the differences found above accounted for a significant worsening in psychological functioning. Within the random sample dataset, significant deterioration of psychosocial functioning was found mostly in the OIB group (see Table 20). In the OIB group, hostility ($F = 4.87$, $p < .01$), anxiety ($F = 10.44$, $p < .01$), phobic anxiety ($F = 5.11$, $p < .05$), paranoia ($F = 11.10$, $p < .01$)), and psychosis ($F = 4.96$, $p < .05$) significantly worsened over time. The UB group also displayed a worsening in phobic anxiety symptoms from discharge to follow-up ($F = 6.56$, $p < .05$).

Several significant repeated measures ANCOVAs were also found within the matched sample dataset, again, for the OIB group. The same results were found for anxiety, phobic anxiety, and paranoia, with one additional significant variable – role limitations due to physical functioning. It was found that for the OIB group, role limitations due to physical factors improved over time from discharge ($M = 25.27$, $SD = 35.98$) to follow-up ($M = 54.35$, $SD = 38.82$; $F = 6.86$, $p < .05$). These results suggest that after having controlled for several demographic variables and burn size, although quality of life related to physical functioning improved in the OIB group, psychological symptoms related to anxiety were worsening in this group. With the exception of an increase in phobic anxiety in the UB group, no significant deterioration and no improvement in psychological functioning was found for either the UB or the SIB groups.

Finally, it was hypothesized that those with self-inflicted burn injuries would be more likely than those with other-inflicted or unintentional burn injuries to have thoughts of suicide at

discharge and at follow-up. As seen in Table 21, using the random dataset, it was found that compared to the UB group, the SIB group had significantly higher rates of suicidal ideation at all four time periods (discharge, 6-month follow-up, 1-year follow-up, and 2-year follow-up). Compared to the OIB group, the SIB group also had significantly higher rates of suicidal ideation at 6-month follow-up. A similar pattern of results was found for the matched dataset (see Table 22), with the 1-year follow-up time-point falling just below significance (p = .06). This suggests that group differences in suicidal ideation at follow-up were unrelated to group differences in gender, race/ethnicity, age, or size of burn injury. Additionally, suicidal ideation appeared to increase over time for the SIB group (see Table 21). Although the increasing means in suicidal ideation could not be tested for significance due to limited sample sizes, it appeared that suicidal ideation in those with unintentional and other-inflicted burn injuries generally trends down over time. The exception to this was a spike in suicidal ideation for those with other-inflicted burn injuries at 12-month follow-up which may be related to trauma anniversary depression and anxiety. Future research is needed to clarify these results.

CHAPTER 4

DISCUSSION

Is it meaningful to distinguish between intentional and accidental burn injuries? It appears to be a meaningful distinction because such defined burn injury groups revealed significant differences across several pre-burn characteristic and post-burn adjustment dimensions. Of our sample of 3,043 individuals who sustained major burn injuries that required hospitalization, 7.2% of burn injuries were intentionally inflicted by self or other. The results of the current study suggest that both groups (self- and other-inflicted) with intentional burn injuries look similar to each other and different than those with accidental burn injuries in several ways, across pre-burn characteristics, burn complications, and outcome. These differences suggest the need for heightened clinical attention and more research in the area of intentional burn injuries. Given the similarities found between those with self- and other-inflicted burn injuries in the current study and the low base rate of occurrence, it may be feasible to group the two types of intentional burn injuries together for some aspects of treatment planning. However, with closer inspection, the results of the currents study suggest that the two intentional burn injury groups also differ from each other on important pre-burn characteristics and post-burn adjustment dimensions. This suggests a need to further distinguish those with self-inflicted burn injuries from those with other-inflicted burn injuries.

Intentional versus Unintentional Burn Injuries

Individuals who suffer intentional burn injuries (i.e., both other-inflicted and self-inflicted) had high percentages of individuals who were younger, female, unmarried, unemployed and had more severe burn injuries, which is consistent with previous research

(Reiland et al., 2006). It may be that lack of supportive economic, social, and instrumental resources in this demographic may place these individuals at risk for assault or self-injury. Lacking basic necessities may also lead to vulnerabilities, and these stressors may exceed coping resources.

Nearly half of those with intentional burn injuries in this study who were tested for alcohol or drugs tested positive upon hospital admission for their burn injuries. Firm conclusions on the role of substance use in burn injury are elusive because few individuals were screened, although positive alcohol tests and drug screens were more prevalent in patients with intentional burn injuries. Previous research found that those who self-inflicted a burn and did not have a psychiatric diagnosis were often intoxicated (Cameron et al., 1997). Substance intoxication may lead to poor judgment or impulsivity that increases the risk of intentional burn injuries. The high rates of substance abuse found in those with intentionally inflicted burns suggests a need for hospital staff to mandate alcohol and drug tests upon admission to a burn unit for those with suspected intentionally inflicted injuries. Alcohol and drug tests coupled with thorough substance use interviews may help hospital staff identify individuals with burn injuries in need of substance abuse treatment. Lack of screening may result in undetected and unmet treatment needs, which could place individuals at future risk for self-injury/suicide or violence.

The present findings suggest that overall, those with intentional burn injuries had worse psychosocial outcomes (more psychological symptoms, poorer health-related quality of life, and poorer satisfaction with life) even after controlling for gender, race/ethnicity, age, and burn size. This suggests that these differences were not simply related to having a more severe burn injury or being a member of a certain demographic group. Furthermore, significant group differences between those with intentional and unintentional burn injuries persisted over time. What is it

about intentional burn injures that led to decreased life satisfaction above and beyond what other individuals with burn injuries experience? One could assert that pre-burn psychological distress or psychopathology may differ in those who self-injure, but it is unclear how this would operate in victims of other-inflicted burns. It may be that those with intentional burn injuries do not receive sufficient in-hospital social work services, mental health treatment, and appropriate outpatient referral resources to facilitate adjustment to their injuries. It may be that the status quo treatment for those with accidental burn injuries is not sufficient for those with intentional burn injuries.

Psychological vulnerabilities unique to individuals with intentional burns are likely compounded by the fact that the severity of their injuries often preclude or delay psychological interventions. Previous research suggests that individuals with burn injuries are not satisfied with the level of psychiatric care they receive in the hospital (Van Loey, Faber, & Taal, 2001). The findings of the current study and Van Loey et al. (2001) suggest the need for earlier in-hospital identification of those with intentional burn injuries and proper referral to in-hospital mental health services (e.g., consult liaison psychiatry). Teams who specialize in mental health should then be responsible for providing individuals with intentional burn injuries with appropriate psychotherapy and/or psychotropic medications to assist in adjustment to their circumstances. Additionally, mental health treatment providers should arrange outpatient mental health treatment to facilitate continued adjustment after hospital discharge.

Satisfaction with life and quality of life are not only relevant at the individual level; they may have societal implications. When individuals are more satisfied with life or believe they have adequate quality of life, they may be more likely to engage in meaningful, healthy, and productive daily activities, despite existing medical or mental health concerns. Enhanced

satisfaction with life and quality of life may result in improved medical and psychiatric treatment adherence, greater likelihood of engaging in functional roles, which may result in more appropriate health care utilization and reduced reliance on governmental programs. Thus, if treatment targets aimed to improve satisfaction with life and quality of life, enhanced outcomes may be relevant not only to the individual but to society and systems of care. Future research in the burn population is needed in this area.

The differences between those with intentional and unintentional burn injuries are critical for treatment providers. Treatment may be largely focused on the *medical* management of burn injuries; how individuals adapt to or process their injuries may be a secondary issue. If so, this may lead to differential outcomes for individuals whose burns are not accidental. Studies such as this are critical to the education of treatment providers who may treat individuals with burn injuries as one homogeneous group, when they could individualize treatment to those with intentional burn injuries, even if this encompasses only 5% of those with burn injuries nationally. Tailored interventions that target substance abuse and psychological adjustment would likely do much to improve outcomes of those who suffer intentional injuries.

Intentionally Self-inflicted and Intentionally Other-Inflicted Burns

Although the intentional (self- and other-inflicted) burn subgroups have common elements, the findings of the current study also suggest that there is a meaningful distinction between these intentional burn subgroups. In the current study, each of these two subgroups separately account for 3.6% of the multi-site burn sample, for a total of 7.2%. Thus, intentional burns are frequent enough that they warrant unique clinical attention. More comparison research between all three groups is needed to replicate the results of the current study.

As stated previously, and consistent with existing research, individuals with self-inflicted burn injuries were generally young, Caucasian, unemployed, unmarried, have histories of drug and alcohol abuse, and have psychiatric histories. These results suggest that despite this especially violent and physically destructive method of attempting suicide, those with self-inflicted burn injuries look similar to those in the non-burn population who self-injure and attempt suicide. Not surprisingly, those with self-inflicted burn injuries also had high rates of psychiatric diagnoses and recent psychiatric treatment. Given that 62% of those who self-inflicted a burn were in psychiatric treatment prior to their self-inflicted burn injury, this highlights the need for more regular assessment of suicidal ideation in general psychiatric treatment.

The data from the current study suggests that risks for self-inflicting a burn injury were greatest for individuals under the age of 40 (2.2 times more likely), who abuse alcohol (2.2 times more likely), and who receive psychiatric treatment (13.8 times more likely) compared to the likelihood of sustaining an unintentional or other-inflicted burn injury. Although prevention efforts may prove daunting, community outreach and education about risks for suicide and/or deliberate self-injury, crisis hotlines, and identification of support resources should be performed by mental health care and substance abuse treatment professionals.

The high rates of pre-burn medical problems and pre-burn physical disabilities in the self-inflicted burn population are consistent with previous research that found high rates of chronic medical illnesses and long-term disability in the self-inflicted burn population (e.g., Pham et al., 2003). This is interesting in that self-inflicted burn injury is perhaps one of the most violent methods for attempting suicide. It is plausible that choosing this violent method of self-injury or suicide is related to the presence of perceived physical deformities. Physical destruction of their

bodies may be a secondary goal to the primary aim of escaping or avoiding emotional pain. Perhaps individuals desire not simply to die, but to destroy their perceived damaged bodies. Conversely, some could assert that suicide by burn could be an attempt to communicate something to others. Further research is needed to better understand forces that influence this act.

Previous research suggests that interpersonal conflict and medical problems are primary stressors for those who self-inflict burn injuries (Hammond et al., 1988; Krummen et al., 1998; Shkrum & Johnston, 1991). Given that recent job or home loss, financial difficulties, and legal problems are other common precipitating factors (Krummen et al., 1998; Shkrum & Johnston, 1991), and preexisting health problems and interpersonal conflict appear to be salient stressors in this population, future research is warranted to guide interventions targeting the self-inflicted burn population.

In order to more fully comprehend the impact of stressors in the self-inflicted burn population, greater understanding of the internal, private events that accompany these stressors are needed. Daniels et al. (1991) surveyed 15 individuals with self-inflicted burns to understand their motives and found that 40% desired to "achieve relief from their state of mind" (e.g., delusion), 30% hoped to die, 26% hoped to "manipulate an interpersonal situation", and 20% desired to "escape stressful situations." Of note is that greater than 25% of the sample had premeditated self-inflicted burns, whereas nearly 50% reported the act was impulsive, with the presence of premeditation unknown in the other 25% (Daniels et al., 1991). Similarly, Bhaduri (1982) found that 56% desired to die, 20% sought "relief from their state of mind", 17% "wanted to escape the situation," with 80% of the acts being impulsive. Few studies have attempted to glean retrospective understanding of the internal processes involved during self-inflicted burns and these results provide important insights into the potential role of experiential avoidance in

this population. It is unfortunate that little research has been published in this area in 15 years. Research is needed to further elucidate the role of factors such as experiential avoidance in self-injury/suicide behaviors and to replicate these results in a larger, more typical (i.e., less psychotic) self-inflicted burn sample; however, these preliminary results suggest important areas of interventions with regard to experiential avoidance and impulsivity.

For those with other-inflicted burn injuries, the data from the current study suggest that individuals of African American race/ethnicity were 7.8 times more likely than those of Caucasian race/ethnicity and those who abuse drugs were 3.7 times more likely to sustain an other-inflicted burn injury compared to other types of burn injuries (i.e., accidental or self-inflicted). In contrast, Reiland et al. (2006) found that compared those with self-inflicted burns, those with other-inflicted burns were less likely to have a positive drug screen. It is unclear if race/ethnicity itself or other variables associated with race/ethnicity provide a causal link to other-inflicted burn injury; however, other research conducted on a non-burn population suggests that substance use disorders may put people at risk for assault (Chermat et al., 2006; Neale et al., 2005).

Although the base-rates of other-inflicted burn injuries are low, these results suggest the need for prevention. Educational efforts should target individuals who abuse drugs or focus on what factors increase risk of assault in general. Education, community outreach, and violence intervention programs should target this vulnerable population.

There were also important distinctions with regard to burn complications between those with intentionally self-inflicted burn injuries compared to those with other types of burn injuries. Those with intentionally self-inflicted burn injuries had significantly higher in-hospital mortality rates compared to those with other types of burn injuries, after controlling for age, size of burn,

thickness of burn, and inhalation injuries. Specifically, those with self-inflicted burn injuries were 3 times more likely to die in the hospital compared to those with unintentional burn injuries. This is a particularly disturbing finding. Previous research found high rates of mortality in the self-inflicted burn population (Ali et al.; 2006, Castellani et al., 1995; Davidson & Brown, 1985; Garcia-Sanchez et al., 1994; Krummen et al., 1998; Pham et al., 2003; Rashid & Gowar, 2004; Reiland et al., 2006; Van der Does et al., 1997). Some researchers suggested that age and burn size accounted for high rates of mortality (Rashid & Gowar, 2004); however, the analysis in the current study controlled for age, size of burn, and thickness of burn injury, and inhalation injuries and still found significantly higher likelihood of mortality in those with self-inflicted burn injuries compared to those with accidental burn injuries.

Explanations for why self-inflicted burns appear more lethal are limited at present. It is unclear if patient characteristics, treatment variables, or some combination of the two play a role in increased mortality. In the current study, it was hypothesized that those with self-inflicted burn injuries would have higher in-hospital mortality rates, perhaps related to their lack of will-to-live. Plattner and Ripley (1982) suggest that necessary medical procedures may not be followed when medical staff identify with self-inflicted burn patients' wishes to die. Plattner and Ripley (1982) and Raskind (1986) discussed the hostility and stigma medical staff experience toward those with self-inflicted burn injuries. Thus, it appears that either having too much empathy for the self-inflicted burn patient or lesser medical treatment efforts related to stigma may both affect mortality rates. Perhaps earlier referrals to mental health treatment providers will prove to be life-saving interventions. More research is needed to understand whether high mortality rates in the self-inflicted burn population are related to medical treatment staff attitudes toward the

patients, patient attitudinal variables, or an interaction between self-inflicted patient presentation and medical staff attitudes.

There are also important distinctions between those with intentionally self-inflicted and those with intentionally other-inflicted burn injuries with regard to post-burn psychological adjustment. Those with intentionally other-inflicted burn injuries experienced a significant degree of anxiety at discharge and at follow-up that did not statistically differ from those with self-inflicted burn injuries. Given the high rates of pre-burn psychiatric treatment and diagnoses in the self-inflicted burn population, it is possible that this lack of difference between the self-inflicted and other-inflicted group were related to pre-burn psychiatric disorders in the self-inflicted burn population. Those with other-inflicted burn injuries had significantly higher levels of anxiety, phobic anxiety, paranoia, and psychotic symptoms at discharge compared to those with unintentional burns. Even after controlling for gender, ethnicity, age, and size of burn, individuals with other-inflicted burn injuries had significantly higher levels of paranoia compared to those with unintentional burn injuries. Anxiety, paranoia, and psychotic symptoms may all be related to traumatic reactions in response to other-inflicted burn injures, and may in some ways be warranted given the extreme violence these patients had experienced. Past research suggests that high levels of phobic anxiety were related to traumatic responses (Yu & Dimsdale, 1999). Symptoms of paranoia and psychosis may also be related to hypervigilence, symptoms of re-experiencing the trauma, and detachment from others and/or feelings, and these symptoms appear at higher frequency among those who sustained other-inflicted burn injuries.

It appears that when global measures are used to assess for psychological symptoms, those in the other-inflicted, but not those in the unintentional or self-inflicted burn groups showed a worsening over time of psychological symptoms related to anxiety. Even when

demographic variables and burn size were controlled for, those with other-inflicted burn injuries had significantly worse symptoms of anxiety, phobic anxiety, and paranoia at follow-up compared to that at discharge. Although positive symptoms of anxiety, phobic anxiety, and paranoia are not diagnostic of posttraumatic stress disorder, it is plausible that even if diagnostic criteria for posttraumatic stress disorder are not met, that with continued worsening of anxiety symptoms posttraumatic stress disorder may develop over time. The worsening of anxiety symptoms in those who sustained intentional burn injuries inflicted by others suggests a need for psychological intervention in those with other-inflicted burn injuries. These results highlight the importance of treatment efforts. In-hospital consults to mental health services and firm outpatient mental health treatment plans may be necessary to address trauma-related symptoms and to facilitate adequate post-discharge adjustment in those with other-inflicted burn injuries.

One of the more troubling findings in the present study was the high, if not increasing, rates of suicidal ideation in the self-inflicted burn group. Although limited to a one-item assessment of suicidal ideation, it appears that those with self-inflicted burns were more likely to have suicidal ideation at follow-up compared to those with other-inflicted and unintentional burn injuries. Although in the current study, global measures of depression (e.g., BSI depression subscale) did not show substantial group differences at discharge, there were significant differences between groups, such that suicidal ideation in individuals with self-inflicted burn injuries were apparent at discharge and follow-up. This demonstrates the need to assess suicidal ideation regularly, regardless of depression screen scores or presenting mood.

Suicidal ideation in those with self-inflicted burn injuries may trend upward over time. Shortly after a suicide attempt or severe self-injury episode, individuals may receive an outpouring of attention and social support. Those with self-inflicted burn injuries may benefit on

a longer-term basis from hospital staff (i.e., social work) working to arrange family meetings and discharge plans that include family members or friends to assist in attending to the burned individual's intensive physical and emotional needs. As in most crises (e.g., familial death, car accident), social support may increase immediately after the crisis and then decrease over time. It appears that this decrease in social support over time did not affect increased suicidal ideation rates in those with unintentional and other-inflicted burn injuries, but may have affected those vulnerable by history to suicidal ideation and impulses. Thus, maintaining this support for those with self-inflicted burn injuries may be a central intervention around which a discharge plan may be created.

Previous research suggests that a substantial portion of those with self-inflicted burns have a lifetime history of suicidal ideation and attempts (Castellani et al., 1995; Davidson & Brown, 1985; Garcia-Sanchez, 1994; Krummel et al., 1998; Pham et al., 2003; Sonneborn & Vanstraelen, 1992) and self-injury behaviors (Ali et al., 2006; Baker et al., 2007). Those with self-inflicted burn injuries are likely to verbalize their intention to kill themselves or had previous suicide attempts (Shkrum & Johnston, 1991), which suggests the importance of interventions to target suicide behaviors in individuals at high risk for repeated attempts, which increases the likelihood of future completion of suicide. Of note is that a portion of self-inflicted burns occur in regulated environments such as psychiatric inpatient wards or prisons, suggesting that basic interventions such as restricted access to cigarette lighters for smoking may decrease prevalence of self-inflicted burns in vulnerable populations (Horner et al., 2005).

Future suicidal thoughts and actions may seem unlikely to an individual who self-inflicted a burn at a time in which s/he is in the process of enduring significant physical and emotional pain associated with the recent suicide attempt or severe self-injury; despite this,

individuals with self-inflicted burn injuries need to be educated about the risk for future thoughts of suicide, even if such thoughts or actions seem highly unlikely at the time. Research suggests that those with self-inflicted burn injuries were likely to attempt suicide again and/or continue to self-injure at some point in the future (Sonneborn & Vanstraelen, 1992). Individuals who self-inflicted a burn injury are at risk for future suicidal ideation and future suicide attempts (Sonneborn & Vanstraelen, 1992). This suggests that critical adjustments to treatment for those with self-inflicted burns are needed.

Hospital staff and in-hospital mental health teams should take responsibility for making appropriate consults. Hospital staff should refer those with self-inflicted burn injuries for in-hospital mental health treatment at the earliest point such treatment is medically feasible. Previous research shows that less than one fourth of those who attempted suicide through self-inflicted burn injuries were referred for mental health treatment (e.g., consult-liaison psychiatry) during their hospitalization (Sonneborn & Vanstraelen, 1992). This suggests poor identification of the most basic needs of this vulnerable population who necessitate interventions for coping skills acquisition to prevent future suicide attempts and self-injury. Mental health treatment providers should involve family and friends in treatment when possible and explain the effects of decreased social support and the importance of continued mental health treatment after discharge from the hospital. Early consultation, even if the self-inflicted burn patient is unable to fully participate in treatment, would allow mental health staff to engage family members in support provision, and enhance coordination of treatment. Additionally, outpatient mental health treatment should include regular assessment of suicidal ideation, plan, and intent.

Other than continued and potentially worsening suicidal ideation, overall there appeared to be little improvement or worsening in functioning at follow-up for the self-inflicted burn

injury group. This suggests psychosocial functioning at follow-up in this group looked much like it did at discharge. Lack of evidence for worsening of psychological functioning is encouraging, but the lack of improvement in psychological functioning is worrisome, especially for those with self-inflicted burn injuries who continue to have suicidal ideation. It may be that individuals with intentional burn injuries are not readily identified while in the hospital and are thus not receiving necessary in-hospital psychological interventions and referral resources upon discharge.

Taken together, the results of the current study emphasize the importance of distinguishing between those with intentional and those with unintentional burn injuries. Those with intentional burn injuries are a vulnerable population who warrant increased clinical and research efforts. The current results argue the importance and responsibility of hospitals initiating investigations examining intentionality of burn injuries. Treatment considerations and areas of intervention may vary depending on whether the burn injury was accidental or intentional. If the burn injury was intentional, it is important to focus treatment efforts in different areas depending on whether the injury was other-inflicted or self-inflicted.

Clinical Implications

The present findings highlight a number of needed modifications to burn injury treatment. As a central recommendation, the medical and psychiatric community that has contact with burn patients should be educated with regard to basic descriptions of those with intentional versus unintentional burn injuries. Such education may reduce stigma associated with intentional burn injuries, and may thus in itself improve quality of care. A multidisciplinary team treatment approach is essential to effectively treat these vulnerable populations. As with most professions, within both the medical and the psychiatric communities, professionals likely tend not to like

treating those they do not know *how* to treat. When professionals feel knowledgeable and competent to treat a particular population, they may be more likely to enjoy working with that population and be more likely to put forth their full effort. Those with intentionally inflicted burn injuries appear to be vulnerable and are in need of more attention and proper interventions.

Education of in-hospital mental health treatment teams (e.g., consult liaison psychiatry) regarding areas potential of intervention may benefit those with intentionally inflicted burn injuries. Education may focus on information regarding pre-burn characteristics that may serve to (1) identify in advance those who may be at risk for such burn injuries and (2) identify which pre-burn characteristics may act as stressors in these populations that may complicate adjustment. Understanding pre-burn characteristics may help mental health treatment providers identify factors that may complicate adjustment for those with intentional burns. Education of mental health treatment teams may also focus on possible points of in-hospital treatment intervention. Additionally, education should focus on the need for outpatient mental health treatment referral resources and follow-up treatment plans. This appears to be particularly important for those with self-inflicted burn injuries who are at risk for future suicidal ideation and suicide attempts, and those with other-inflicted burn injuries who show worsening symptoms of anxiety over time.

Education directed toward medical staff (i.e., nurses, doctors) on hospital burn units is also needed. Those with intentionally self- and other-inflicted burn injuries are in need of particular attention immediately upon their arrival to the hospital. Burn staff should assess whether the burn injury is suspected to have been inflicted intentionally, and then attempt to distinguish between potentially self-inflicted and other inflicted burn injuries. Upon such suspicion, consults to mental health treatment teams are essential, as are drug and alcohol tests,

and appropriate substance abuse treatment referrals. Drug and alcohol screening tests should be promptly administered to those with intentionally inflicted burn injuries. Thorough substance use interviews should be conducted by burn staff or mental health treatment professionals. Those with intentional burn injuries who have positive drug and/or alcohol tests and those with drug and alcohol abuse histories should be readily identified upon hospital admission. In-hospital and outpatient substance abuse treatment should be promptly arranged. Substance abuse treatment may decrease risk of future assault, self-injury, or suicide attempts. Substance abuse treatment may focus on determining the function of the behavior (e.g., to avoid emotional pain) and encouraging alternative coping strategies. Decreased substance abuse may impact psychological symptoms, health-related quality of life, and satisfaction with life.

Ultimately, the medical and psychiatric community should also be educated about the differences between the intentional and accidental burn injury populations. Burn staff should be educated regarding warning signs and pre-burn characteristics associated with sustaining other-inflicted or self-inflicted burn injuries. Education regarding basic demographics in these two burn sub-populations may facilitate greater empathy, especially for those with self-inflicted burn injuries. Previous literature showed that there was significant stigma on burn units regarding those patients who intentionally inflict their own burn injuries (Plattner & Ripley, 1982; Raskind, 1986). Education regarding what these groups look like, what pre-burn stressors may complicate their current situations, and what may be helpful to prevent a repeated intentional self-inflicted burn injury may decrease stigma associated with such injuries.

For those with self-inflicted burn injuries, it is often difficult, if not impossible, to promptly place these individuals on inpatient psychiatric units because of their intense medical and physical needs (Squyres et al., 1993). Given limitations on intensive psychiatric placements,

alternative mental health treatment should be sought. In-hospital mental health treatment teams (e.g., consult liaison psychiatry services) would likely prove quite helpful in provision of in-hospital psychiatric interventions. Although it may be intuitive to burn staff to hold off on such referrals until the patients are medically stable, there are several reasons to initiate this process immediately. Consults to mental health treatment teams are more likely to be accidentally neglected when not made immediately. Also, medically unstable burn patients may have periods of consciousness during which they experience significant anxiety or guilt that they may want to process with a mental health professional. Oftentimes, medically unstable patients hospitalized for major burn injuries are on ventilators or have tracheostomies that prevent direct oral communication. Mental health treatment teams can work with other treatment teams (e.g., speech therapy) to facilitate communication. Additionally, those with self-inflicted burn injuries may continue to have suicidal ideation, or perhaps even increased suicidal ideation given their current medical status. Thus, they need to be adequately and thoroughly assessed at the earliest possible point of intervention. Finally, some medically unstable patients are in need of psychological services because they will die. Burn nurses often bear the burden of fulfilling the emotional needs of individuals with fatal burns and their families (Plattner & Ripley, 1982). Support of mental health professionals trained in this area or social-service disciplines found in hospital settings (social work, chaplaincy, etc.) will likely help both the patient and the burn staff struggling with the death or anticipated death of a patient. Social work and mental health treatment teams can also facilitate family meetings to communicate difficult medical information, prognoses, and relevant psychological information and/or findings.

Previous research published by those in the field of nursing who were open to address reactions by nurses and the stigma associated with self-inflicted burn injuries suggest several

areas of intervention (Plattner & Ripley, 1982; Raskind, 1986). Plattner and Rippley (1982) suggest that treating individuals with self-inflicted burn injuries is stressful and empathy for the burn patient is often "seriously impaired" (pp. 93). They suggest that "disbelief, horror, anxiety, anger, guilt, and futility … promotes distancing between the patient and those around him" (Plattner & Rippley, 1982, pp. 93). This highlights some important areas of intervention. Plattner and Rippley suggest that medical staff need support in several areas, including regular breaks, frequent consultation between the nurse taking care of the patient and other medical staff, and psychiatric consultation to provide support, reassurance, and encouragement for the patient, the patients' family, and the medical staff.

Research suggests that many individuals hospitalized for burn injuries have symptoms consistent with one or more psychiatric disorders; however, few receive in-hospital mental health treatment. Sixty-nine out of 159 mental health providers and/or medical directors at hospitals throughout North America that treat burn injuries returned surveys that inquired about psychiatric assessment, counseling, and referral resources provided to acutely hospitalized patients with burn injuries (Holaday & Yarbrough, 1996). They found that (1) a large majority or hospital staff (88%) do not provide psychological testing to those with burn injuries; (2) only 74% provide psychotherapy to more than *a fifth* of those who require such services; and (3) only 75-90% provide referral resources upon discharge to more than *a fifth* of those burn patients who exhibit symptoms of depression or posttraumatic stress disorder (Holaday & Yarbrough, 1996). These results suggest that nationally, a large majority of individuals recovering from burn injuries are not receiving sufficient attention to their psychiatric needs in the midst of difficult circumstances. Furthermore, Holaday and Yarbrough found that 30-36% of providers reported that more than 20% of hospital staff exhibited depressive or PTSD symptoms during their initial

employment in caring for burn survivors. The degree to which severe burn injuries are emotionally taxing for hospital staff may serve to decrease their responsiveness to the psychological needs of patients, when remaining resources are directed toward medical, non-psychiatric care to keep these patients alive. Unfortunately, much research suggests that psychiatric symptoms impact physical recovery and thus need to be simultaneously addressed.

For those with intentionally other-inflicted burn injuries, efforts are needed to educate individuals who abuse drugs about violence prevention. Violence intervention programs and mental health professionals should conduct open dialogues with vulnerable populations regarding the relationship between drug abuse and risk for assault (Duminy & Hudson, 1993; Kaufman et al., 2007; Neale et al., 2005).

For those with intentionally other-inflicted burn injuries, mental health treatment referrals should also be made promptly. Additionally, those who sustain an intentionally other-inflicted burn should be assessed for symptoms related to trauma (e.g., anxiety, paranoia, and psychosis). It may be helpful for burn staff and mental health professionals to normalize these frightening psychological symptoms associated with the traumatic event. Outpatient mental health treatment referrals should be made and areas of treatment focus may be the processing of the traumatic event, addressing painful memories, thoughts, and feelings related to the assault, and exploring factors related to quality of and satisfaction of life. Psychoeducation regarding the cycle of abuse and available community resources should be conducted if the assault was a result of domestic violence.

Additionally, previous research found that a large portion of those who sustain other-inflicted burn injuries are men who know their attackers (Brodzka et al., 1985; Dorn et al., 2001; Purdue & Hunt, 1990; Yeong et al., 1997). Yet, a large majority of those who sustain

intentionally other-inflicted burn injuries do not press legal charges against the perpetrators (Dorn et al., 2001; Purdue & Hunt, 1990). Violence prevention efforts are often targeted toward women. The preponderance of males, many of whom are assaulted by their wives (Brodzka et al., 1985; Dorn et al., 2001; Purdue & Hunt, 1990; Yeong et al., 1997), suggests an important area of intervention. In-hospital medical burn treatment may be the only opportunity for medical, social work, and mental health staff to assess risk and social circumstances in those with other-inflicted burn injuries. Hospital staffs have a responsibility to educate victims of violence regarding their rights and to make appropriate referrals. Individuals who sustain other-inflicted burn injuries would likely benefit from encouragement by hospital staff to consider reporting this violent crime to the police.

In conclusion, it is imperative that burn treatment providers inquire about the circumstances surrounding burn injuries. When the burn injury is suspected to be intentionally inflicted, hospital staff should consult in-hospital mental health treatment providers at the earliest possible time. Mental health treatment providers should support medical treatment providers, intentionally burned patients, and the family of those who sustained intentional burn injuries. Stigma may exist with regard to those with self-inflicted burn injuries, which may contribute to higher mortality rates. Areas of psychiatric intervention may differ for those with other-inflicted and self-inflicted burn injuries. Those with other-inflicted burn injuries may be in need of psychiatric treatment in the hospital and after discharge for anxiety symptoms and those with self-inflicted burn injuries require regular suicidal ideation assessments and psychiatric treatment as medical inpatients and as psychiatric outpatients. Both groups fall in the slightly dissatisfied range with regard to satisfaction with life, which suggests that on-going mental health treatment after discharge may be imperative to facilitate adjustment.

Methodological Considerations of the Current Study

The present study may have several methodological limitations, in the larger context of biopsychosocial research, but fares very well in comparison to other burn studies. Sample size is quite small in the other-inflicted and self-inflicted burn groups in this study compared to research in many other content areas. However, it is important to note that demographic and burn variable information on 109 individuals in each of these two groups is one of the largest samples when compared to published research in this area. Most other studies in this content area have sample sizes in the single or low double digits. Very few have sample sizes in the triple digits and no other studies have sample sizes in the triple digits for both individuals with self-inflicted and individuals with other-inflicted burn injuries in the same study. Furthermore, this study uses samples from three sites nationally, which is likely to increase generalizability of results. In light of this, although the sample sizes for the SIB and OIB groups are much smaller than the UB groups, the current samples sizes are impressive within this specific literature, with the relative samples sizes being indicative of the proportions in the burn population.

High attrition rates, missing data, and failure to consent to participation in this study may limit the generalizability of results to those who were willing to complete the study. Few studies have thoroughly investigated research study attrition in those with major burn injuries. One study investigated the dataset that was used for the present study and found that 42 to 64 percent of participants were able to be contacted at six, 12, and 24 month follow-up (Holavanahalli et al., 2006). Those with younger age, unemployment, less than 12 years of education, drug abuse history, burn by assault, and those without insurance were more likely to be lost from the Burn Injury Rehabilitation Model Systems (BIRMS) dataset (Holavanahalli et al., 2006). Perhaps somewhat counterintuitive, those with longer hospital stays were less likely to drop out

(Holavanahalli et al., 2006). It is possible that length of hospital stays enhanced individuals attachment to treatment providers, which influenced research participation in the follow-up period. Holavanahalli et al. point out that these variables did not differ by site, suggesting these variables may be stable indicators of risk for attrition from the study. This suggests that the research on adjustment to burn injuries may not generalize well to those with shorter hospital stays, of young age, less education, drug histories, no insurance, and those who were assaulted. It is likely that those who were functioning better were less likely to drop out of the study. Although there is an issue of generalizability of the results of the current study, participants in this study are indicative of this treatment population, and how the larger (non-study) general population of burn patients likely do not even do as well as the participants in the progressive waves of this study.

Given the small sample sizes in intentional burn research studies, researchers are often unable to statistically control for confounding demographic or burn related variables. The current study used a non-statistical approach and matched on four demographic and burn-related variables to increase internal validity. However, it is still possible that other, unidentified variables impacted the relationships found between variables in the current study. There are likely mediating (e.g., response of family members to the patient's burn injury) or moderating variables (e.g., pre-existing coping mechanisms) that were not investigated in the current study that would add to, further explain, or change interpretations found in this study. However, it is important to note that this study is only the third study to compare those with accidental, intentionally other-inflicted, and intentionally self-inflicted burn injuries and the first study to compare post-burn psychological adjustment between all three groups. Thus, within the limited context of burn research, the current project likely provides significant contribution to the

published literature. With continued research in this area, relationships between variables will be replicated and/or will become clearer and more conclusive interpretations can be made.

Unfortunately, information regarding intention of self-inflicted injuries was not included in the dataset used for the current study. It is unclear what portion of those with self-inflicted burn injuries intended to self-injure versus commit suicide. Information regarding self-inflicted burn injury intent would help guide more specific treatment interventions. Also, the analyses that assessed suicidal ideation at different time-points were based on one item from the BSI. It is possible that this item was interpreted in terms of past thoughts of suicidal ideation, guilt related to past/current suicidal ideation, or fear of another attempt (for those who attempted suicide by burn). Thus, future studies are needed that use a more thorough suicidal ideation measure.

The current study utilized an existing database, and hypotheses were limited to data that were collected. A limitation of past research is that most research on burns in general and most, if not all, research on intentionally inflicted burn injuries is a-theoretical. The current study initially attempted to incorporate theories regarding stress and coping and avoidance of feelings, thoughts, and memories in order to better understand the intentionally inflicted burn populations. However, the data collected limited such theoretical conceptualizations. Thus, as a result of the use of pre-existing data, the uncommon nature of intentional burn injuries, and the need for large sample sizes for the analyses proposed, the current study is yet another a-theoretical conceptualization of intentional burn injuries. However, a model proposed to be applicable to those with accidental, intentionally other-inflicted, and intentionally self-inflicted burn injuries is presented in the Future Research section.

Future Research

More research is needed on those with intentionally inflicted burn injuries. While psychological adjustment the self-inflicted burn population has been of some minimal interest to burn researchers, the other-inflicted burn population has been neglected by all but two groups of researchers. More research on risk factors, burn injury medical complications, and psychological adjustment is needed to devise appropriate interventions for these phenomena and to replicate the findings in the current study. There appear to be clear differences between the groups of interest in the current study (i.e., accidental, intentionally other-inflicted, and intentionally self-inflicted burn injuries), even after controlling for confounding variables such as gender, race/ethnicity, age, and size of burn injury. Researchers should consider the intentionality of burn injuries when investigating risk factors, burn complications, and psychological adjustment to burn injuries.

Due to difficulty accessing and retaining this population in research studies and the relative infrequency with which intentional burn injuries occur in comparison to the accidental burn population, sample sizes are exceedingly small and often have inadequate external validity. Although collection of large samples of those with self-inflicted and other-inflicted burn injuries will be arduous and will likely take many years, this data is vital to replicate existing research and to ensure generalizability of results. Additionally, longitudinal datasets are needed to allow causal inference between variables. Previous research suggests that there is significant attrition in the burn injury population; however, attempts at longitudinal data collection and the minimization of attrition are essential to provide information regarding both short- and long-term adjustment to burn injuries in both the intentionally self-inflicted and intentionally other-inflicted burn populations.

Few studies attempted to control for confounding variables, either statistically or through

matching on variables of interest. The current study used both strategies to control for variables found to be confounds in previous research. It is recommended that future research control for age, severity of burn, and race/ethnicity, given the age and severity of burn differences between the intentional and accidental burn groups and given the race/ethnicity differences between the other-inflicted and other two groups. Matching on confounding variables and/or statistically controlling for confounding variables allows researchers to be more confident that their findings are due to the construct or group of interest versus differences in other variables.

Many published intentional burn studies are retrospective or cross-sectional in nature and there is a need for longitudinal studies when at all possible to allow for causal inferences. It would also behoove researchers and those who will ultimately benefit from the research for investigators to use gold-standard measures of the constructs they attempt to measure. Comparisons across studies are difficult when researchers devise their own self-report scales to measure a particular construct of interest.

The findings regarding psychological adjustment of those with intentionally self-inflicted and intentionally other-inflicted burn injuries presented in the current study are the first of its kind and warrant replication. Also, this study did not investigate coping styles, which may have further informed interpretations of results. An illustration of how avoidant coping may impact adjustment can be found in Tedstone et al. (1998). They limited their sample to those who recently sustained a burn injury (less than two weeks ago) and were between 18-65 years of age and they excluded those with psychosis, dementia, learning disabilities, intentional self-inflicted or other inflicted injuries, and those receiving current treatment from a mental health professional. In the 45 individuals (90% of those they recruited to participate), they found that degree of avoidance within two weeks of sustaining the burn injury significantly accounted for

approximately one third of the variance of post-burn avoidance at three month follow-up (Tedstone et al., 1998). Other studies support this research with high levels of avoidance associated with poorer adjustment, as measured by the Brief Symptom Inventory (Ptacek, et al., 1995). Furthermore, levels of acceptance within two weeks of the burn injury significantly impacted anxiety and PTSD symptoms at three month follow-up, such that with greater levels of acceptance, lesser anxiety symptoms resulted (Tedstone et al., 1998).

Furthermore, Tedstone et al (1998) found that a "helpless coping" style in those with unintentional burn injuries further accounted for the variance in avoidance such that those who responded with greater amounts of helplessness within two weeks of the burn injury had significantly greater avoidance and intrusion symptoms at three month follow-up. Helpless coping can be understood as a part of the appraisal process within the stress and coping theory. Helplessness suggests the perception that the stressor or emotions associated with the stressor are unmanageable or intolerable, which logically contributes to experiential avoidance coping. Avoidance immediately following the burn (within two weeks) does not sufficiently resolve the stressor or context of the stressor, yet is maintained, which supports the cyclic nature of experiential avoidance. Future studies that explore differences in coping style across burn injury groups (i.e., accidental, other-inflicted, self-inflicted burn injuries) will likely help guide mental health interventions and clarify the quality of life and satisfaction with life findings in the current study.

Another priority of future research within the self-inflicted burn population concerns medical treatment adherence. Treatment adherence is found to be important for survival and adequate recovery from burns (Kiecolt-Glaser & Williams, 1987). Self-blame for the burn injury significantly decreased compliance with nursing staff requests (Kiecolt-Glaser & Williams,

1987). This suggests that feelings of self-blame should be assessed and targeted as an area of intervention in those with self-inflicted burn injuries. Guilt might be an obstacle in the recovery process and the lessening of guilt may be an especially important intervention point in those with self-inflicted burn injuries. Future research is needed to support these hypotheses.

Although premature at this time, psychological treatment outcome studies are needed to compare treatment efficacy across burn injury groups. It is impossible to be sure that mental health treatments in these populations are effective without research on treatment efficacy.

Unfortunately, most, if not all, research conducted on those with intentionally inflicted burn injuries is a-theoretical. The burn and mental health fields would greatly benefit from future research incorporating theory into their research. Specifically, research conducted on psychological adjustment in those with intentionally inflicted burn injuries could use a theoretical underpinning to guide the construction of the study, allow for more readily interpretable data, to guide interventions and future research.

A model that may be applicable to understand the process of adjustment in various burn populations is the experiential avoidance model used in previous research with those who engaged in self-injury (Chapman et al., 2006). In future research, this model could be used in conjunction with the more comprehensive and perhaps overly general Stress and Coping Theory (Lazarus & Folkman, 1984).

The experiential avoidance model (as designed by Chapman et al., 2006) framed within the context of the broader stress and coping theory could be used to understand adjustment to burn injuries. For example, an individual may sustain a burn injury (stressor) and that individual has complicating or protective factors (e.g., gender), which may affect how the burn injury is experienced internally. An emotional response (e.g., anger, fear) ensues that the individual may

appraise as an unmanageable threat or a manageable challenge. A host of factors impacts an individual's decision to use experientially avoidant or accepting coping strategies (e.g., intensity of emotions, distress tolerance) to deal with the burn injury, circumstances around it, and associated anger or fear. The outcome of acceptance of painful emotions may be short-term distress (e.g., experiencing the fear/anger) at the service of a long-term resolution (e.g., reduction of fear/anger about the injury or its circumstances and/or increased quality of life) to the internal events associated with the stressor. In contrast, the outcome of experiential avoidance of painful emotions is short-term relief (e.g., no fear/anger experienced) at the expense of long-term negative resolution (e.g., fear/anger still present or exacerbated and/or poorer quality of life) and intensified emotional responses (e.g., exacerbated fear/anger). Experiential avoidance may impact the development of posttraumatic stress symptoms following unintentional and intentional burn injuries (Van Loey & Van Son, 2003). In addition, experiential avoidance provides some insight into suicide and self-injury as uncommon, but not rare psychological and behavioral phenomena (Chapman et al., 2006. Future research should focus on incorporating theory into development of research projects and interpretation of their results. A-theoretical approaches to understanding intentional burn injuries may slow the pace of this important research.

Conclusions

Bostic (1973) concluded after a review of 115 self-immolation deaths reported in the New York Times that "as an act of suicide, it is more than just an anguished cry for help – it is a seering demand to be remembered" (pp. 73). The same may be true of those who perpetrate other-inflicted burn injuries. It is imperative that hospital burn units devise policies regarding

how to appropriately treat those with intentional burn injuries. Those with intentionally self-inflicted and intentionally other-inflicted burn injuries are vulnerable populations that require increased medical, psychiatric, and community inpatient and outpatient intervention. Lack of education of hospital staff and a more regular, ongoing line of research on intentional burn injuries are likely to have deleterious impacts on these vulnerable populations. Those with self-inflicted burn injuries may continue to have alarmingly high in-hospital mortality rates that appear related to having a self-inflicted burn injury, rather than burn-related medical factors, and those who do not die may continue to have suicidal ideation after hospital discharge. Those with other-inflicted burn injuries may continue to return to unsafe living situations with abusive domestic partners and thus may be at risk for future other-inflicted injuries. With greater awareness of the needs of those with intentional burn injuries, it is hoped that poor treatment outcome can be minimized, and positive recovery be achieved for individuals who experience self-inflicted and other-inflicted intentional burn injuries.

Table 1

Sample Sizes of Psychological Outcome Data over Time

	Overall Sample *N* = 1,540			Unintentional Burn *N* = 1,433			Other-Inflicted Burn *N* = 63			Self-Inflicted Burn *N* = 44		
	N	%		*N*	%		*N*	%		*N*	%	
Sample Size		present	missing		present	missing		present	missing		present	missing
Discharge	1540	100.0	0.0	1433	100.0	0.0	63	100.0	0.0	44	100.0	0.0
6 month f/u	1380	89.6	10.4	1292	90.2	9.8	51	81.0	19.0	37	84.1	15.9
12 month f/u	817	53.1	46.9	770	53.7	46.3	28	44.4	55.6	19	43.2	56.8
24 month f/u	576	37.4	62.6	552	38.5	61.5	18	28.6	71.4	16	36.4	63.6

Table 2

Time of Last Follow-Up

	Overall Sample *N* = 3,043			Unintentional Burn *N* = 2,825			Other-Inflicted Burn *N* = 109			Self-Inflicted Burn *N* = 109		
	N	%		*N*	%		*N*	%		*N*	%	
Time of Last Follow-up		of Total	of those with d/c data		of Total	of those with d/c data		of Total	of those with d/c data		of Total	of those with d/c data
Admission Info	1312	43.1		1207	42.7		44	40.4		61	56.0	
Discharge	606	6.8	11.9	187	6.6	11.6	13	11.9	20.0	6	5.5	12.5
6 month f/u	590	19.4	34.1	549	19.4	33.9	21	19.3	32.3	20	18.3	41.7
12 month f/u	359	11.8	20.7	340	12.0	21.0	13	11.9	20.0	6	5.5	12.5
24 month f/u	576	18.9	33.3	542	19.2	33.5	18	16.5	27.7	16	14.7	33.3

Table 3

Descriptive Demographic Variables

	Overall Sample *N* = 3,043			Unintentional Burn (UB) *N* = 2,825			Other-inflicted Burn (OIB) *N* = 109			Self-inflicted Burn (SIB) *N* = 109			One-way ANOVAs
	Continuous Variables												
Variables	*M*	*SD*	Range	*M*	*SD*	Range	M	*SD*	Range	*M*	*SD*	Range	F
Age	43.43	17.47	18-90	$43.89_{a,b}$	17.73	18-90	37.22_{a}	12.18	18-90	37.79_{b}	12.49	18-81	13.65***
Education	3.05	.92	1-6	3.06	.92	1-6	2.98	.93	2-6	2.99	.92	2-6	.51
	Categorical Variables												Chi Squares
	N		*%*	*N*		%	*N*		%	*N*		%	Pearson
Gender	**3043**			**2825**			**109**			**109**			13.45**
Male	2,277		74.8	2136		75.6	73		67.0	68		62.4	
Female	766		25.2	689		24.4	36		33.0	41		37.6	
Race/Ethn	**3,028**			**2811**			**108**			**109**			114.23***
White	2,109		69.3	1993		70.9	39		36.1	77		70.6	
Black	448		14.7	380		13.5	52		48.1	16		14.7	
Hispanic	329		10.8	314		11.2	6		5.6	9		8.3	
Pac Islander	9		0.3	8		0.3	0		0.0	1		0.9	
Asian	64		2.1	56		2.0	6		5.6	2		1.8	
Native Am.	46		1.5	40		1.4	3		2.8	3		2.8	
Multiracial	6		0.2	5		0.2	0		0.0	1		0.9	
Other	17		0.6	15		0.5	2		1.9	0		0.0	
Married	**2,970**			**2756**			**108**			**106**			17.81***
No	1,560		52.5	1419		51.5	67		62.0	74		69.8	
Yes	1,285		43.3	1229		44.6	33		30.6	23		21.7	
Partner/SO	125		4.2	108		3.9	8		7.4	9		8.5	
In School	**2,805**			**2618**			**96**			**91**			4.42
No	2,685		95.7	2505		93.3	92		95.8	88		96.7	
≥ Age App	114		4.1	108		4.1	4		4.2	2		2.2	
< Age App	6		0.2	5		0.2	0		0.0	1		1.1	

(table continues)

Notes: *** is significant at the .001 level, ** is significant at the .01 level; * is significant at the .05 level. Means with the same subscript for continuous variables are significantly different at $p<.05$ using a Tukey HSD range test. Also, chi square values presented here differ from those presented in the text because more specific comparisons were made that were difficult to present concisely in this table.

Table 3 (*continued*).

Variables	Overall Sample *N* = 3,043		Unintentional Burn (UB) *N* = 2,825		Other-inflicted Burn (OIB) *N* = 109		Self-inflicted Burn (SIB) *N* = 109		Chi Squares Pearson
	N	*%*	*N*	%	*N*	%	*N*	%	
Employed	**2,866**		**2674**		**99**		**93**		40.99***
No	764	26.7	658	24.6	48	48.5	58	62.4	
Yes	1,701	59.4	1627	60.8	45	45.5	29	31.2	
Homemaker	32	1.1	28	1.0	3	3.0	1	1.1	
Volunteer	2	0.1	2	0.1	0	0.0	0	0.0	
Retired	367	12.8	359	13.4	3	3.0	5	5.4	
Satisfied with Job	**2,516**		**2346**		**86**		**84**		57.72***
No	67	2.7	58	2.5	3	3.5	6	7.1	
Yes	1,332	52.9	1283	54.7	32	37.2	17	20.2	
Indifferent	163	6.5	153	6.5	7	8.1	3	3.6	
N/A	954	37.9	852	36.3	44	51.2	58	69.0	
Medical Prob.	**2,898**		**2691**		**104**		**103**		21.12.***
No	1,768	61.0	1658	61.6	69	66.3	41	39.8	
Yes	1,130	39.0	1033	38.4	35	33.7	62	60.2	
Phys Disability	**2,874**		**2674**		**102**		**98**		28.27***
No	2,570	89.4	2404	89.9	93	91.2	73	74.5	
Yes, w/ comp.	207	7.2	180	6.7	9	8.8	18	184	
Yes, no comp.	97	3.4	90	3.4	0	0.0	7	7.1	
Psych Tx Past Year	**2,685**		**2488**		**100**		**97**		326.48***
No	2,344	87.3	2238	89.9	78	78.0	28	28.9	
Yes	340	12.7	250	10.0	22	22.0	68	70.1	
Psych Dx	**1,523**		**1405**		**55**		**63**		286.25***
No	1,306	85.8	1249	88.9	47	85.5	10	15.9	
Yes-Disclosed	150	9.8	103	7.3	4	7.3	43	68.3	
Yes-Suspected	67	4.4	53	3.8	4	7.3	10	15.9	

(table continues)

Notes: *** is significant at the .001 level, ** is significant at the .01 level; * is significant at the .05 level. Means with the same subscript for continuous variables are significantly different at $p<.05$ using a Tukey HSD range test. Also, chi square values presented here differ from those presented in the text because more specific comparisons were made that were difficult to present concisely in this table.

Table 3 *(continued).*

Variables	Overall Sample *N* = 3,043		Unintentional Burn (UB) *N* = 2,825		Other-inflicted Burn (OIB) *N* = 109		Self-inflicted Burn (SIB) *N* = 109		Chi Squares Pearson
	N	*%*	*N*	%	*N*	%	*N*	%	
EtOH Abuse Past Year	**2,693**		**2508**		**92**		**93**		76.64***
No	2,264	84.1	2149	85.7	63	68.5	52	55.4	
Yes	429	15.9	359	14.3	29	34.5	41	43.6	
EtOH Test	**2,827**		**2628**		**104**		**95**		45.65***
Neg	1,235	43.7	1170	44.6	29	27.9	36	38.0	
Pos	344	12.2	292	11.1	25	24.0	27	28.4	
Not Done	1,247	44.1	1166	44.3	50	48.1	31	32.6	
Drug Abuse Past Year	**2,668**		**2493**		**90**		**85**		103.50***
No	2,348	88.0	2236	89.7	60	66.7	52	60.6	
Yes	320	12.0	257	10.3	30	33.3	33	38.4	
Drug Test	**2,802**		**2613**		**100**		**89**		85.79***
Neg	1,240	44.3	1167	45.4	24	24.0	29	32.6	
Pos	309	11.0	251	9.6	31	31.0	27	30.3	
Not Done	1,252	44.7	1175	45.0	45	45.0	32	36.0	

Notes: *** is significant at the .001 level, ** is significant at the .01 level; * is significant at the .05 level. Means with the same subscript for continuous variables are significantly different at $p<.05$ using a Tukey HSD range test. Also, chi square values presented here differ from those presented in the text because more specific comparisons were made that were difficult to present concisely in this table.

Table 4

Descriptive Burn-Related Demographic Variables

Variables	Overall Sample *N* = 3,043 *N*	%	Unintentional Burn (UB) *N* = 2,825 *N*	%	Other-inflicted Burn (OIB) *N* = 109 *N*	%	Self-inflicted Burn (SIB) *N* = 109 *N*	%	Chi Squares Pearson
Primary Etiology	**3,035**		**2819**		**107**		**109**		87.90***
Fire/flame	1,649	54.3	1476	52.4	74	69.2	99	90.8	
Scald	275	9.1	264	9.4	10	9.3	1	0.9	
Hot object	116	3.8	109	3.9	4	3.7	3	2.8	
Grease	204	6.7	196	7.0	8	7.5	0	0.0	
Tar	53	1.7	53	1.9	0	0.0	0	0.0	
Chemical	68	2.2	54	1.9	10	9.3	4	3.7	
Electricity	196	6.5	196	7.0	0	0.0	0	0.0	
Other burn	14	0.5	13	0.5	0	0.0	1	0.9	
Frostbite/cold	5	0.2	5	0.2	0	0.0	0	0.0	
Stevens John.	36	1.2	36	1.3	0	0.0	0	0.0	
Abrasions	6	0.2	6	0.2	0	0.0	0	0.0	
Flash	143	4.7	141	5.0	1	0.9	1	0.9	
Place Injury	**2,994**		**2780**		**108**		**106**		6.12
Indoors	1,794	59.9	1649	59.3	74	68.5	71	67.0	
Outdoors	1,200	40.1	1131	40.7	34	31.5	35	33.0	
Loc Injury	**2,738**		**2557**		**90**		**91**		
Home	1,594	58.2	1468	57.4	53	58.9	73	80.2	78.67***
Other Private Dwelling	207	7.6	184	7.2	17	18.9	6	6.6	
Work	637	23.3	635	24.8	2	2.2	0	0.0	
Building	93	3.4	79	3.1	7	7.8	7	7.7	
Conveyance	207	7.6	191	7.5	11	12.2	5	5.5	
Fam Killed	**1,727**		**1599**		**62**		**66**		16.01*
No	1,599	92.6	1481	85.5	53	85.5	65	98.5	
Yes	45	2.6	39	2.4	6	9.7	0	0	
N/A	81	4.7	77	4.8	3	4.8	1	1.5	

Note: *** is significant at the .001 level, ** is significant at the .01 level; * is significant at the .05 level.

Table 5

Descriptive Burn-Related Injury/Outcome Variables

Variables	Overall Sample *N* = 3,043			Unintentional Burn (UB) *N* = 2,825			Other-inflicted Burn (OIB) *N* = 109			Self-inflicted Burn (SIB) *N* = 109			Chi Squares Pearson
	N	%		*N*	%		*N*	%		*N*	%		
Inhalation Injury	**2,974**			**2766**			**104**			**104**			19.47***
No	2,558	86.0		2397	86.7		83	79.8		78	72.9		
Yes	419	14.1		369	133		21	20.2		29	27.1		
Head/Neck Burned	**2,993**			**2779**			**106**			**108**			19.31***
No	1,337	44.7		1272	45.8		34	32.1		31	28.7		
Yes	1,656	55.3		1507	54.2		72	67.9		77	71.3		
Amputation	**2,748**			**2552**			**99**			**97**			3.23
No	2,573	93.6		2389	93.5		96	89.9		88	89.9		
Yes	175	6.4		163	6.5		3	3.0		9	9.2		
Mortality	**2,698**			**2507**			**92**			**99**			12.13**
No	2,351	87.1		2197	87.6		79	85.9		75	75.8		
Yes	347	12.9		310	12.4		13	14.1		24	24.2		
	M	*SD*	Range	*M*	*SD*	Range	*M*	*SD*	Range	*M*	*SD*	Range	*F*
% TBSA Burn	22.06	19.54	0-100	$21.24_{a,b}$	18.66	0-100	27.79_{a}	23.10	2-94	37.41_{b}	28.56	1-98	41.46***
TBSA Req. Skin Graft	8.18	11.07	0-87	$7.86_{a,b}$	11.33	0-86	11.13_{a}	12.83	0-70	15.67_{b}	18.71	0-87	26.90***
Ventilator Days	4.36	13.25	0-194	4.10_{a}	12.74	0-194	6.58	17.10	0-114	9.04_{b}	19.73	0-96	8.68***
ICU Days	10.01	18.90	0-208	9.68_{a}	18.43	0-208	11.86	22.05	0-132	16.88_{b}	25.32	0-127	7.94***
Rehabilitation Days	5.94	14.14	0-120	5.69_{a}	13.55	0-108	6.35	14.83	0-67	11.92_{b}	24.20	0-120	3.69*

Note: *** is significant at the .001 level, ** is significant at the .01 level; * is significant at the .05 level. Means with the same subscript for continuous variables are significantly different at p<.05 using a Tukey HSD range test.

Table 6

Univariate Statistics at Discharge from Hospital - Random Sample Dataset

Variables		Overall			Unintentional Burn			Other Inflicted Burn			Self-Inflicted Burn			One-way ANOVAs
		M	*SD*	α	*M*	*SD*	α	*M*	*SD*	α	*M*	*SD*	α	*F*
Physical QOL	General Health	50.38	23.10	.79	63.26	22.46	.80	57.89	24.48	.80	52.56	21.46	.72	2.02
	Physical Function	33.07	28.91	.92	35.86	29.32	.92	32.57	32.46	.95	27.36	21.63	.84	.76
	Role Lim – Phys	21.59	27.95	.92	22.92	27.68	.89	22.97	33.21	.96	16.03	18.06	.86	.56
	Bodily Pain	29.80	22.03	.79	32.07	22.76	.77	29.51	23.70	.88	24.96	17.23	.56	.91
Mental QOL	Mental Health	58.83	25.29	.87	$66.03_{a,b}$	24.08	.87	52.97_{a}	24.87	.85	50.80_{b}	24.90	.88	4.91**
	Vitality	42.66	24.33	.79	45.91	25.66	.79	41.27	23.39	.79	36.50	22.00	.78	1.35
	Social Function	45.83	31.89	.73	52.16_{a}	30.81	.64	44.26	32.35	.77	33.50_{a}	30.98	.82	3.17*
	Role Lim – Emotion	54.03	37.91	.94	$65.80_{a,b}$	35.45	.94	47.41_{a}	37.88	.96	36.50_{b}	35.59	.92	6.60**
BSI	Glob Severity Index	60.76	12.64	.95	$57.24_{a,b}$	13.75	.96	65.02_{a}	10.34	.95	64.48_{b}	9.17	.94	8.36***
	Depression	.80	.82	.84	$.64_{a}$	.82	.87	.93	.78	.80	1.06_{a}	.81	.80	3.98*
	Anxiety	.87	.79	.80	$.72_{a}$	.79	.83	1.10_{a}	.81	.76	.92	.68	.73	3.76*
	Hostility	.55	.70	.78	.55	.76	.81	.59	.70	.82	.51	.50	.48	.14
	Interpersonal Sens	.69	.83	.78	.55	.77	.77	.79	.82	.78	.93	.95	.82	3.01
	Somatization	.91	.65	.73	.80	.65	.75	1.06	.66	.69	.99	.58	.66	3.05
	O-C	.81	.80	.83	$.67_{a}$	.76	.84	.89	.86	.86	1.09_{a}	.74	.74	3.61*
	Phobic Anxiety	.52	.71	.75	$.38_{a}$	.62	.75	$.71_{a}$	.78	.72	.63	.76	.77	4.01*
	Paranoia	.77	.82	.75	$.63_{a}$	.84	.81	1.07_{a}	.77	.58	.68	.74	.75	4.91**
	Psychotic Sxs	.56	.68	.71	$.43_{a}$	.62	.73	$.73_{a}$	.80	.71	.67	.58	.57	3.85*
SWLS Total		19.25	8.53	.87	$22.78_{a,b}$	7.80	.85	15.18_{a}	7.76	.86	16.13_{b}	7.64	.74	18.38***

Notes: *** is significant at the .001 level, ** is significant at the .01 level; * is significant at the .05 level. Means with the same subscript for continuous variables are significantly different at $p<.05$ using a Tukey HSD range test.

Table 7

Univariate Statistics at Discharge from Hospital - Matched Sample Dataset

Variables		Overall			Unintentional Burn			Other Inflicted Burn			Self-Inflicted Burn			One-way ANOVAs
		M	*SD*	α	*M*	*SD*	α	*M*	*SD*	α	*M*	*SD*	α	*F*
Physical QOL	General Health	57.59	22.48	.79	58.01	21.89	.77	57.89	24.48	.80	52.56	24.46	.72	.79
	Physical Function	30.24	27.72	.92	30.06	27.28	.92	32.57	32.46	.95	27.36	21.63	.84	.27
	Role Lim – Phys	20.39	26.65	.92	20.45	25.47	.90	22.97	33.21	.96	16.03	18.06	.86	.48
	Bodily Pain	31.64	23.02	.79	34.67	23.95	.85	29.51	23.70	.88	24.96	17.23	.56	1.94
Mental QOL	Mental Health	56.49	24.32	.87	59.85	23.62	.87	52.97	24.87	.85	50.80	24.90	.88	1.87
	Vitality	41.61	23.63	.79	43.13	24.28	.82	41.72	23.39	.79	36.50	22.00	.78	.75
	Social Function	43.44	30.32	.73	46.14	28.89	.55	44.26	32.35	.77	33.50	30.98	.82	1.70
	Role Lim – Emotion	50.82	37.41	.94	56.79_{a}	36.78	.92	47.41	37.88	.96	36.50_{a}	35.59	.92	3.12*
BSI	Glob Severity Index	62.08	10.81	.96	59.72_{a}	11.09	.97	65.02_{a}	10.34	.95	64.48	9.17	.94	5.02**
	Depression	.85	.82	.84	.73	.83	.86	.93	.78	.80	1.06	.81	.80	2.35
	Anxiety	.93	.81	.80	.84	.84	.83	1.10	.81	.76	.92	.68	.73	1.74
	Hostility	.57	.65	.76	.58	.68	.78	.59	.70	.82	.51	.50	.48	.18
	Interpersonal Sens	.77	.89	.78	.71	.90	.78	.79	.82	.78	.93	.96	.82	.70
	Somatization	.98	.63	.68	.94	.64	.68	1.06	.66	.69	.99	.58	.66	.65
	O-C	.89	.86	.85	.82	.90	.88	289	.86	.86	1.09	.74	.74	1.17
	Phobic Anxiety	.60	.80	.80	.53	.82	.83	.71	.78	.72	.63	.76	.77	.89
	Paranoia	.76	.80	.75	$.62_{a}$	.79	.82	1.07_{a}	.77	.58	.68	.74	.75	5.48**
	Psychotic Sxs	.61	.71	.73	.52	.71	.77	.73	.80	.71	.67	.58	.57	1.58
SWLS Total		18.79	8.39	.87	$.21.60_{a,b}$	7.98	.88	15.18_{a}	7.76	.86	16.26_{b}	7.73	.74	12.71***

Notes: *** is significant at the .001 level, ** is significant at the .01 level; * is significant at the .05 level. Means with the same subscript for continuous variables are significantly different at p<.05 using a Tukey HSD range test.

Table 8

Correlation Matrix - Overall Sample at Hospital Discharge

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1.UB	-																
2.OIB	-	-															
3.SIB	-	-	-														
4.Gender	-.07**	.04	.06**	-													
5.Caucasian Race/Eth	.10**	-.14**	.01	-.03	-												
6.African Am Race/Eth	-.13**	.18**	-.00	.08**	-	-											
7.Hispanic Race/Eth	.04	-.03	-.02	-.06**	-	-	-										
8.Age	.09**	-.07**	-.06**	.15**	.13**	-.01	-.17**	-									
9.Education	.02	-.02	-.02	-.00	.22**	-.02	-.25**	.05*	-								
10.Psyc Dx	-.31**	.00	.42**	.13**	.05*	.01	-.08**	-.03	-.05								
11.Drug Ab	-.20**	.12**	.15**	-.01	.02	.05*	-.07**	-.14**	-.09**	.21**							
12.TBSA Br	-.15**	.06**	.15**	-.02	.06**	-.05**	-.02	-.00	.02	.06*	.09**	-					
13.TBSA Gr	-.13**	.05**	.13**	.02	.02	-.02	-.00	-.10**	-.01	.06*	.07**	.42**	-				
14.SF36GH	.10**	-.06	-.09*	-.10**	.07*	-.07	-.02	-.03	.12**	-.14**	-.07	-.12**	-.12**	-			
15.SF36MH	.12**	-.08*	-.09*	-.14**	.05	.00	-.04	.05	.11**	-.13**	-.14**	-.01**	-.07*	.50**	-		
16.BSI GSI	-.16**	.13**	.10**	.03	-.08*	.06*	.02	-.03	-.07*	.16**	.14**	.05	.04	-.47**	-.66**	-	
17.SWLS	.22**	-.18**	-.13**	-.08**	.08**	-.10**	.03	.13**	.13**	-.17**	-.17**	-.10**	-.12**	.34**	.47**	-.43**	

Note: ** is significant at the .01 level; * is significant at the .05 level. (1.UB = Unintentional Burn; 2.OIB = Other-inflicted Burn; 3.SIB = Self-inflicted Burn; 4. Gender was coded 1=male, 2= female; 12.TBSA Br = Size of Burn Injury; 12. TBSA Gr = Percentage of size of burn that required a skin graft, which is an indicator of thickness of burn injury; 14.SF36 GH = SF-36 General Health QOL subscale; 15.SF36 MH = SF-36 Mental Health QOL subscale; 16.BSI GSI = Global Scale Index of the BSI; 17.SWLS = Satisfaction with Life

Table 9

Correlation Matrix - UB Group at Hospital Discharge

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1.Gender	-													
2.Caucasian Race/Ethnicity	-.03	-												
3.African Am. Race/Ethnicity	.09**	-	-											
4.Hispanic Race/Ethnicity	-.07**	-	-	-										
5.Age	.17**	.12**	.01	-.18**	-									
6. Education	-.01	.23**	-.02	-.25--	.04*	-								
7.Psyc Dx	.12**	.06*	.02	-.09**	.00	-.03	-							
8.Drug Abuse	-.03	.03	.03	-.07**	-.12**	-.08**	.19**	-						
9.TBSA Burn	-.03	.07**	-.06**	-.01	.03	.01	.03	.06**	-					
10.TBSA Skin Gr	.02	.03	-.03	.01	-.07**	-.02	.05	.04	.41**	-				
11.SF36 General Health	-.10**	.06	-.05	-.02	-.03	.13**	-.11**	-.06	-.11**	-.10**	-			
12.SF36 Mental Health	-.14**	.04	.02	-.04	.06	.12**	-.14**	-.13**	-.09*	-.06	.48**	-		
13.BSI GSI	.03	-.06	.04	.04	-.02	-.06*	.11*	.13**	.06	.03	-.46**	-.65**	-	
14.SWLS	-.06**	.05	-.06	.01	.12**	.13**	-.13*	-.12**	-.09**	-.10**	.34**	.46**	-.41**	-

Note: *** is significant at the .001 level, ** is significant at the .01 level; * is significant at the .05 level.

Table 10

Correlation Matrix - OIB Group at Hospital Discharge

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1.Gender	-													
2.Caucasian Race/Ethnicity	.08	-												
3.African Am. Race/Ethnicity	-.09	-	-											
4.Hispanic Race/Ethnicity	.09	-	-	-										
5.Age	-.76	.11	-.01	-.15	-									
6. Education	-.04	.09	.10	-.28**	.00	-								
7.Psyc Dx	-.02	.04	-.01	-.01	.12	-.33*	-							
8.Drug Abuse	.07	.08	.02	.04	-.22*	-.06	-.22	-						
9.TBSA Burn	.17	.03	-.04	-.04	-.26**	.25**	-.15	.07	-					
10.TBSA Skin Gr	.14	-.02	-.12	.03	-.17	.13	-.15	.09	.45**	-				
11.SF36 General Health	.17	.19	-.15	-.16	-.22	.06	-.19	.09	-.29	-.25	-			
12.SF36 Mental Health	-.00	-.15	.23	-.29	.03	.03	-.02	-.20	-.30	-.34*	.59**	-		
13.BSI GSI	-.23	.06	-.10	-.09	-.07	-.03	.04	.01	-.09	-.17	-.30	-.65**	-	
14.SWLS	-.02	.08	-.12	.13	.35*	-.03	.29	-.27	-.10	-.15	-.08	.26	-.40**	-

Note: ** is significant at the .01 level; * is significant at the .05 level.

Table 11

Correlation Matrix - SIB Group at Hospital Discharge

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1.Gender	-													
2.Caucasian Race/Ethnicity	.04	-												
3.African Am. Race/Ethnicity	-.00	-	-											
4.Hispanic Race/Ethnicity	-.03	-	-	-										
5.Age	.25**	.26**	-.24*	-.16	-									
6. Education	.24**	.22**	-.06	-.26*	.32**	-								
7.Psyc Dx	.18	.17	-.14	-.16	.07	.02	-							
8.Drug Abuse	-.06	.04	-.03	.01	-.13	-.18	.12	-						
9.TBSA Burn	-.22*	.10	-.15	.03	-.07	.03	-.10	.05	-					
10.TBSA Skin Gr	-.10	.04	.06	-.09	-.26*	.12	-.26	-.02	.41**	-				
11.SF36 General Health	-.19	-.03	-.05	.20	-.19	-.07	.10	-.16	.04	-.10	-			
12.SF36 Mental Health	-.19	.15	-.26	.09	-.55**	-.16	.26	.04	.19	.11	.55**	-		
13.BSI GSI	.06	-.14	.23	-.34	.21	.03	.30	-.24	-.41*	-.29	-.51	-.63*	-	
14.SWLS	-.12	-.34	.01	.42*	-.23	-.20	-.13	.11	.20	.07	.60**	.69**	-.46**	-

Note: ** is significant at the .01 level; * is significant at the .05 level.

Table 12

Correlation Matrix - SF-36 Subscales All Groups at Hospital Discharge

Variable	1	2	3	4	5	6	7	8	9	10	11
1.UB	-										
2.OIB	-	-									
3.SIB	-	-	-								
4.Physical Functioning	.01	.01	-.03	-							
5.Role Limits - Phys	-.03	.04	-.01	.54**	-						
6.Pain	.05	-.02	-.05	.42**	.49**	-					
7.General Health	.10**	-.06	-.09*	.32**	.21**	.27**	-				
8.Vitality	.05	-.02	-.06	.42**	.41**	.46**	.51**	-			
9.Social Functioning	.05	-.01	-.07	.39**	.44**	.50**	.34**	.51**	-		
10.Role Limits - Emot	.10**	-.05	-.10**	.23**	.33**	.24**	.28**	.39**	.29**	-	
11.Mental Health	.12**	-.08	-.09*	.33**	.29**	.38**	.50**	.70**	.45**	.51**	-

Note: ** is significant at the .01 level; * is significant at the .05 level.

Table 13

Correlation Matrix - BSI Subscales All Groups at Hospital Discharge

Variable	1	2	3	4	5	6	7	8	9	10	11	12
1.UB	-											
2.OIB	-	-										
3.SIB	-	-	-									
4.Depression	-.14**	.09**	.10**	-								
5.Hostility	-.06*	.06	.02	.65**	-							
6.Interpersonal	-.12**	.08**	.09**	.74**	.63**	-						
7.Somatization	-.12**	.10**	.06	.58**	.50**	.52**	-					
8.Obsessive-Comp.	-.11**	.06*	.09**	.72**	.60**	.64**	.63**	-				
9.Anxiety	-.10**	.10**	.04	.70**	.60**	.64**	.67**	.70**	-			
10.Phobic Anxiety	-.12**	.10**	.06*	.23**	.55**	.67**	.56**	.65**	.70**	-		
11.Paranoia	-.16**	.17**	.04	.64**	.64**	.70**	.46**	.61**	.57**	.60**	-	
12.Psychosis	-.14**	.12**	.07*	.76**	.67**	.70**	.52**	.68**	.64**	.62**	.67**	-

Note: ** is significant at the .01 level; * is significant at the .05 level.

Table 14

One-Way ANOVA Comparisons of Estimated Pre-Burn QOL by Group

Variable	Unintentional Burn Group *N* = 59		Other-Inflicted Burn Group *N* = 41		Self-Inflicted Burn Group *N* = 22		Group Differences One-way ANOVA	
	M	*SD*	*M*	*SD*	*M*	*SD*	*F*	*p*
General Health	78.61_{a}	20.29	73.37	22.01	61.73_{a}	26.89	4.66	.01
Vitality	$72.35_{a,b}$	20.70	58.54_{a}	27.48	50.00_{b}	28.74	7.92	.00
Social Functioning	78.81_{a}	28.17	75.00_{b}	27.39	$49.43_{a,b}$	37.69	8.04	.00
Role Emotional	80.08_{a}	28.66	74.09_{b}	28.98	$53.79_{a,b}$	40.15	5.75	.00
Mental Health	$77.71_{a,b}$	20.85	66.34_{a}	24.39	52.56_{b}	25.31	10.19	.00

Note: Means with the same subscript are significantly different at p<.05 using a Tukey HSD range test.

Table 15

Logistic Regression - Pre-Burn Characteristics that Predict Self-Inflicted vs Non-Self-Inflicted Burn Injuries

Predictors	Full Dataset *N* = 1,984				Random Dataset *N* = 176				Matched Dataset *N* = 173			
	Exp (B)	*p*	CI Lo	CI Upp	Exp (B)	*p*	CI Lo	CI Upp	Exp (B)	*p*	CI Low	CI Upp
Gender	364	.16	.35	1.18	.57	.27	.21	1.53	-	-	-	-
Age	**2.22**	**.02**	**1.16**	**4.24**	1.99	.19	.71	5.59	-	-	-	-
White Eth	-	.99	-	-	-	.10	-	-		-		
Black Eth	.98	.97	.47	2.05	**.29**	**.04**	**.09**	**.93**	-	-	-	-
Hispanic Eth	.92	388	330	2.84	.46	.37	.09	2.50	.50	.46	.80	3.13
Marital Stat	1.84	307	.96	3.54	1.10	.86	.40	3.00	1.58	.39	.56	4.49
Employ	371	.28	338	1.33	.86	.77	.31	2.38	.59	.32	.21	1.65
Med Prob	1316	.63	363	2.13	.90	.84	.33	2.48	.96	.93	.35	2.61
Psych Tx	**13.82**	**.00**	**7.42**	**25.74**	**12.42**	**.00**	**4.48**	**34.41**	**8.16**	**.00**	**2.97**	**22.37**
EtOH Abu	**2.17**	**.03**	**1.07**	**4.37**	2.30	.13	.78	6.73	2.27	.16	.73	7.07
Drug Abu	1.60	.20	.78	3.29	1.09	.89	.33	3.57	1.73	.37	.52	5.73
Education	383	.83	.80	1.32	.94	.73	.65	1.36	.87	.48	.59	1.29

Table 16

Logistic Regression - Pre-Burn Characteristics that Predict Other-Inflicted vs Non-Other-Inflicted Burn Injuries

Predictors	Full Dataset *N* = 1,984				Random Dataset *N* = 176				Matched Dataset *N* = 173			
	Exp (B)	*p*	CI Lo	CI Upp	Exp (B)	*p*	CI Lo	CI Upp	Exp (B)	*p*	CI Low	CI Upp
Gender	.88	.67	.50	1.57	.85	.71	.37	1.95	-	-	-	-
White Eth	-	**.00**	-	-	-	**.00**	-	-		-		
Black Eth	**7.80**	**.00**	**4.54**	**13.38**	**7.57**	**.00**	**3.41**	**16.80**	-	-	-	-
Hispanic Eth	1.53	.41	.56	4.23	.71	.64	.17	2.98	-	-	-	-
Marital Stat	1.00	.99	.58	1.70	.50	.10	.22	1.15	1.20	.34	.57	2.52
Employ	.81	.47	.46	1.43	.82	.65	.35	1.95	.84	.38	.38	1.88
Age	1.11	.73	.63	1.95	.56	.15	.25	1.23	-	-	-	-
Med Prob	.93	.81	.53	1.65	.70	.40	.30	1.62	.90	.80	.41	1.98
Psych Tx	1.72	.12	.87	3.38	.57	.30	.20	1.65	.58	.27	.23	1.52
EtOH Abu	1.17	.65	.60	2.23	.93	.89	.35	2.50	1.17	.76	.44	3.08
Drug Abu	**3.70**	**.00**	**1.95**	**7.02**	**3.19**	**.03**	**1.15**	**8.84**	1.88	.18	.75	4.74
Education	1.08	.48	.87	1.35	.96	.79	.71	1.30	.99	.95	.74	1.33

Table 17

Sequential Logistic Regression - Does Circumstance of Burn Group Predict Mortality?

Predictors	Full Dataset *N* = 2,208			
	Exp (B)	*p*	CI Lower	CI Upper
Age	1.07	.000	1.06	1.08
% TBSA Burn	1.07	.000	1.06	1.08
% TBSA Req'd Graft	.95	.000	.93	.96
Inhalation Injury	5.18	.000	3.51	7.65
Unintentional Burn	-	.009	-	-
Self-inflicted Burn	3.07	.004	1.44	6.56
Other-inflicted Burn	1.82	.194	.74	4.55

Table 18

One-Way ANOVA Comparisons of Outcome Measures by Group at Next Follow-Up if still Significant when Time of Follow-Up was Covaried Out - Random Dataset

Variable	Unintentional Burn Group *N* ~ 68		Other-Inflicted Burn Group *N* ~ 28		Self-Inflicted Burn Group *N* ~ 25		Group Differences One-way ANOVA	
	M	*SD*	*M*	*SD*	*M*	*SD*	*F*	*p*
Depression	$.63_{a,b}$	.87	1.17_{a}	.90	1.27_{b}	1.17	5.59	.01
Anxiety	$.66_{a}$	.76	1.30_{a}	1.00	1.04	.97	5.61	.01
Hostility	$.56_{a}$	.70	1.02_{a}	.84	.91	1.18	3.26	.04
Interpersonal	$.60_{a}$	.84	1.40_{a}	1.11	1.10	1.15	7.08	.00
Phobic Anxiety	$.39_{a}$	.65	$1.16_{a,b}$	.83	$.65_{b}$	.61	11.87	.00
Paranoia	$.78_{a}$	.87	1.46_{a}	.86	.91	.76	6.27	.00
Psychoticism	$.47_{a}$	.77	$.98_{a}$	.84	.94	.98	4.87	.01
SWLS	$21.08_{a,b}$	8.49	14.67_{a}	7.61	13.67_{b}	8.79	9.54	.00

Note: Means with the same subscript per time period are significantly different at p<.05 using a Tukey HSD range test.

Table 19

One-Way ANOVA Comparisons of Outcome Measures by Group at Next Follow-Up if still Significant when Time of Follow-Up was Covaried Out - Matched Dataset

Variables	Unintentional Burn Group *N* ~72		Other-Inflicted Burn Group *N* ~28		Self-Inflicted Burn Group *N* ~25		Group Differences One-way ANOVA	
	M	*SD*	*M*	*SD*	*M*	*SD*	*F*	*p*
Anxiety	$.74_{a}$	.97	1.30_{a}	1.00	1.04	.97	3.57	.03
Phobic Anx	$.55_{a}$	.82	1.16_{a}	.83	.65	.61	6.00	.00
Paranoia	$.82_{a}$	.96	1.46_{a}	.86	.91	.76	5.15	.01
Role Phys QOL	56.35_{a}	35.17	54.09	38.61	31.25_{a}	26.84	3.89	.02
Role Emot QOL	68.25_{a}	30.15	58.05	36.15	45.00_{a}	34.35	4.09	.02
SWLS	$20.22_{a,b}$	8.21	14.67_{a}	7.61	13.67_{b}	8.79	7.78	.00

Note: Means with the same subscript per time period are significantly different at p<.05 using a Tukey HSD range test.

Table 20

Repeated Measures ANCOVAs - Random Dataset

Variables		Discharge		Follow-up		Group Differences One-way ANOVA
		M	*SD*	*M*	*SD*	*F*
OIB Group	Hostility	.63	.67	.97	.85	4.81**
	Anxiety	1.15	.80	1.21	1.0	10.44**
	Phobic Anxiety	.85	.84	1.08	.80	5.11*
	Paranoia	1.06	.82	1.33	.84	11.10**
	Psychotic Sxs	.79	.86	.88	.79	4.96*
UB Group	Phobic Anxiety	.97	.54	.39	.65	6.56*

Note: ** is significant at the .01 level; * is significant at the .05 level.

Table 21

One-Way ANOVA Comparison of Suicidal Ideation over Time, By Group - Random Dataset

Suicidal Ideation	Unintentional Burn Group		Other-Inflicted Burn Group		Self-Inflicted Burn Group		Group Differences One-way ANOVA	
	M	*SD*	*M*	*SD*	*M*	*SD*	*F*	*p*
Discharge	$.22_{a}$	.67	.20	.61	$.61_{a}$	1.12	3.57	.03
6 months	$.15_{a}$	.54	$.17_{b}$	.56	$.79_{a,b}$	1.27	5.44	.01
1 year	$.15_{a}$	.71	.57	1.08	1.07_{a}	1.38	4.83	.01
2 years	$.06_{a}$	.24	.10	.32	1.50_{a}	1.65	16.05	.00

Note: Means with the same subscript per time period are significantly different at p<.05 using a Tukey HSD range test.

Table 22

One-Way ANOVA Comparison of Suicidal Ideation over Time, By Group - Matched Dataset

Suicidal Ideation	Unintentional Burn Group		Other-Inflicted Burn Group		Self-Inflicted Burn Group		Group Differences One-way ANOVA	
	M	*SD*	*M*	*SD*	*M*	*SD*	*F*	*p*
Discharge	$.22_{a}$	.76	.20	.61	$.61_{a}$	1.12	3.21	.04
6 months	$.16_{a}$	.46	$.17_{b}$	.56	$.79_{a,b}$	1.27	5.92	.00
1 year	.35	.86	.57	1.08	1.07	1.38	2.81	.06
2 years	$.27_{a}$	.74	$.10_{b}$	.32	$1.5_{a,b}$	1.65	8.33	.00

Note: Means with the same subscript per time period are significantly different at p<.05 using a Tukey HSD range test.

REFERENCES

Achebe, U. J., & Akpuaka, F. C. (1989). Chemical burns in Enugu. *West African Journal of Medicine, 8,* 205-508.

Ali, S. N., Soueid, A., Roa, K., & Moiemen, N. (2006). Self-inflicted burns, outcome, and cost. *Burns, 32,* 463-466.

Baker, T., Tonkin, C., & Wood, F. (2007). Managing self-inflicted burn injuries. *Australian Nursing Journal, 14,* 28-30.

Baur, K. M., Hardy, P. E., & Van Dorsten, B. (1998). Posttraumatic stress disorder in burn populations: A critical review of the literature. *Journal of Burn Care and Rehabilitation, 19,* 230-240.

Bergner, M., Bobbit, R. A., & Carter W. B. (1981). The Sickness impact profile: Development and final revision of the health status measure. *Medical Care, 19,* 787-805.

Bhaduri, R. (1982). Self-inflicted burns. *Burns Including Thermal Injury, 8,* 403-407.

Bostic, R. A. (1973). Self-immolation: A survey of the last decade. *Suicide and Life-Threatening Behavior, 3,* 66-74.

Bowden, M. L., Grant, S. T., Vogel, B., & Prasad, J. K. (1988). The elderly, disabled and handicapped adult burned through abuse and neglect. *Burns, 14,* 447-450.

Branday, J., Arscott, G. D. L., Smoot, E. C., Williams, G. D., & Fletcher, P. R. (1996). Chemical burns as assault injuries in Jamaica, *Burns, 22,* 154-155.

Brodzka, W., Thornhill, H. L., & Howard, S. (1985). Burns: Causes and risk factors. *Archives of Physical Medicine and Rehabilitation, 66,* 746-752.

Castellani, G., Beghini, D., Barisoni, D., & Marigo, M. (1995). Suicide attempted by burning: A 10-year study of self-immolation deaths. *Burns, 21,* 607-609.

Cameron, D. R., Pegg, S. P., & Muller, M. (1997). Self-inflicted burns. *Burns, 23,* 519-521.

Chapman, A. L., Gratz, K. L., & Brown, M. Z. (2006). Solving the puzzle of deliberate self-injury: The experiential avoidance model. *Behaviour Research and Therapy, 44,* 371-394.

Chermack, S. T., Booth, B. M., & Curran, G. M. (2006). Gender differences in correlates of recent physical assault among untreated rural and urban at-risk drinkers: Role of depression. *Violence and Victims, 21,* 67-80.

Copeland, A. R. (1985). Suicidal fire deaths revisited. *Journal of Legal Medicine, 95,* 51-57.

Daniels, S. M., Fenley, J. D., Powers, P. S., & Cruse, C. W. (1991). Self-inflicted burns: A ten-year retrospective study. *Journal of Burn Care and Rehabilitation, 12,* 144-147.

Davidson, T. I., & Brown, L. C. (1985). Self-inflicted burns: A 5-year retrospective study. *Burns, 11*, 157-160.

Derogatis, L. S., & Melisaratos, N. (1983). The Brief Symptom Inventory: An introductory report. *Psychological Medicine, 13,* 595-605.

Derogatis, L. S., & Spencer, P. M. (1982). *The Brief Symptom Inventory: Administration, scoring, and procedures manual*. Baltimore: Clinical Psychometrics Research.

Diener, E., Emmons, R. A., Larsen, R. J., & Griffin, S. (1985). The satisfaction with life scale. *Journal of Personality Assessment, 49,* 1985.

Dorn, T. W., Still, J. M., Law, E., & Still, R. (2001). Assault by burning – A retrospective review with focus on legal outcomes. *Journal of Burn Care & Rehabilitation, 22,* 334-336.

Duminy, F. J., & Hudson, D. A. (1993). Assault inflicted by hot water. *Burns, 19,* 426-428.

Erzurum, V. A., & Varcellotti, J. (1999). Self-inflicted burn injuries. *Journal of Burn Care & Rehabilitation, 20,* 22-24.

Fauerbach, J. A., Heinberg, L. J., Lawrence, J. W., Munster, A. M., Palombo, D. A., Richter, D., et al. (2000). Effect of early body image dissatisfaction on subsequent psychological and physical adjustment after disfiguring injury. *Psychosomatic Medicine, 62,* 576-582.

Fauerbach, J. A., Lawrence, J. W., Bryant, A. G., & Smith, J. H. (2002). The relationship of ambivalent coping to depression symptoms and adjustment. *Rehabilitation Psychology, 47,* 387-401.

Fauerbach, J., Lawrence, J., Haythornthwaite, J., McGuire, M., & Munster, A. (1996). Preinjury psychiatric illness and post injury adjustment in adult burn survivors. *Psychosomatics, 37,* 547-555.

Fauerbach, J. A., Lawrence, J. W., Haythornthwaite, J. A., & Richter, L. (2002). Coping with the stress of a painful medical procedure. *Behaviour Research and Therapy, 40,* 1003-1015.

Fauerbach, J., Lawrence, J., Haythornthwaite, J., Richter, D., McGuire, M., Schmidt, C., & Munster, A. (1997). Psychiatric history affects post trauma morbidity in a burn injured adult sample. *Psychosomatics, 38,* 374-385.

Garcia-Sanchez, V., Palao, R., & Legarre, F. (1994). Self-inflicted burns. *Burns, 20,* 537-538.

Greenbaum, A. R., Donne, J., Wilson, D., & Dunn, K. W. (2004). Intentional burn injury: An evidence-based, clinical and forensic review. *Burns, 30,* 628-642.

Hammond, J. S., Ward, C. G., & Pereira, E. (1988). Self-inflicted burns. *Journal of Burn Care and Rehabilitation, 9*, 178-179.

Hayes, S. C., Strosahl, K. D., & Wilson, K. G. (1999). *Acceptance and commitment therapy: An experiential approach to behavior change*. New York: The Guilford Press.

Hayes, S. C., Strosahl, K. D., Wilson, K. G., Bissett, R. T., Pistorello, J., Toarmino, D., et al. (2004). Measuring experiential avoidance: A preliminary test of a working model. *Psychological Record, 54*, 553-578.

Hayes, S. C., Wilson, K. G., Gifford, E. V, Folette, V. M., & Strosahl. (1996). Experimental avoidance and behavioral disorders: A functional dimensional approach to diagnosis and treatment. *Journal of Consulting and Clinical, 64*, 1152-1168.

Haythornthwaite, J. A., Lawrence, J. W., & Fauerbach, J. A. (2001). Brief cognitive interventions for burn pain. *Annals of Behavioral Medicine, 23*, 42-49.

Herndon, D. N. (1996). *Total burn care*. Philadelphia, PA: Saunders.

Ho, W. S., Ying, S. Y., Chan, H. H., & Chow, C. M. (2001). Assault by burning – a reappraisal. *Burns, 27*, 471-474.

Holaday, M., & Yarbrough, A. (1996). Results of a hospital survey to determine the extent and type of psychologic services offered to patients with severe burns. *Journal of Burn Care & Rehabilitation, 17*, 280-284.

Holavanahalli, R., Lezotte, D., Hayes, M., Minhajuddin, A., Fauerbach, J. A., Engrav, L., et al. (2006). Profile of patients lost to follow-up in the Burn Injury Rehabilitation Model Systems' longitudinal database. *Journal of Burn Care & Research, 27*, 703-712.

Horner, B. M., Ahmadi, H., Mulholland, R., Myers, S. R., & Catalan, J. (2005). Case-controlled study of patients with self-inflicted burns. *Burns, 31*, 471-475.

Kaufman, M. S., Graham, C., Lezotte, D., Fauerbach, J. A., Gabriel, V., Engrave, L. H., & Esselman, P. (2007). Burns as a result of assault: Associated risk factors, injury characteristics, and outcomes. *Journal of Burn Care & Rehabilitation, 28*, 21-28.

Karter, M. J. (2005). *Fire loss in the United States during 2004*. Quincy (MA): National Fire Protection Association, Fire Analysis and Research Division.

Kessler, R. C., Borges, G., & Walters, E. E. (1999). Prevalence of and risk factors for lifetime suicide attempts in the National Comorbidity Survey. *Archives of General Psychiatry, 56*, 617-626.

Kiecolt-Glaser, J. K., & Williams, D. A. (1987). Self-blame, compliance, and distress among burn patients. *Journal of Personality and Social Psychology, 53*, 187-93.

Kolman, P. B. R. (1983). The incidence of psychopathology in burned adult patients: A critical review. *Journal of Burn Care & Rehabilitation, 4*, 430-436.

Krob, M. J., Johnson, A., & Jordan, M. H. (1986). Burned-and-battered adults. *Journal of Burn Care & Rehabilitation, 7*, 529-531.

Krummen, D. M., James, K., & Klein, R. L. (1998). Suicide by burning: A retrospective review of the Akron Regional Burn Center. *Burns, 24*, 147-149.

Lazarus, R. S., & Folkman, S. (1984). *Stress, appraisal, and coping*. New York: Springer.

Linehan (1993). *Cognitive-behavioral treatment of borderline personality disorder*. New York: The Guilford Press.

Malic, C. C., Karoo, R. O. S., & Phipps, A. A. (2007). Burns inflicted by self or by others – An 11 year snapshot. *Burns, 33*, 92-97.

McHorney, C. A., Ware, J. E., & Raczek, A. E. (1993). The MOS 36-item short form health survey (SF-36): II. Psychometric and clinical tests of validity in measuring physical and mental constructs. *Medical Care, 31*, 247-263.

Miller, S. F., Bessey, P. Q., Schurr, M. J., Browing, S. M., Jeng, J. C., Caruso, D. M., Gomez, M., Latenser, B. A., Lentz, C. W., Sffle, J. R., Kagan, R. J., Purdue, G. F., & Krichbaum, J. A. (2006). National burn repository 2005: A ten-year review. *Journal of Burn Care & Research, 27*, 411-436.

Neale, J., Bloor, M., & Weir, C. (2005). Problem drug users and assault. *International Journal of Drug Policy, 16*, 393-402.

O'Sullivan, G. H., & Kelleher, M. J. (1989). Intentional self burning by psychiatric patients. *Irish Journal of Psychological Medicine, 6*, 41-42.

Palmu, R., Isometsa, E., Suominen, K., Vuola, J., Leppavuori, A., & Lonnqvist, J. (2004). Self-inflicted burns: An eight year retrospective study in Finland. *Burns, 30*, 443-447.

Parkerson, G.R., Broadhead, W. E., & Tse, C. K. J. (1990). The Duke health profile: A 17-item measure of health and dysfunction. *Medical Care, 28*, 1056-1072.

Patterson, D. R., Everett, J., Bombardier, C., Questad, K., Lee, V., & Marvin, J. (1993). Psychological effects of severe burn injuries. *Psychological Bulletin, 113*, 362-378.

Pavot, W., & Diener, E. (1993). A review of the satisfaction with life scale. *Psychological Assessment, 5*, 164-172.

Perry, S., Heidrich, G., & Ramos, E. (1981). Assessment of pain by burn patients. *Journal of Burn Care and Rehabilitation, 2*, 322-326.

Pham, T. N., King, J. R., Palmieri, T. L., & Greenhalgh, D. G. (2003). Predisposing factors for self-inflicted burns. *Journal of Burn Care and Rehabilitation, 24*, 223-227.

Plattner, P. B., & Ripley, H. S. (1982). The fatally burned suicidal patient. *Crisis: The Journal of Crisis Intervention and Suicide Prevention, 3*, 88-94.

Ptacek, J. T., Patterson, D. R., Montgomery, B. K., & Heimbach, D. M. (1995). Pain, coping, and adjustment in patients with burns: preliminary findings from a prospective study. *Journal of Pain and Symptom Management, 10*, 446-55.

Purdue, G. F., & Hunt, J. L. (1990). Adult assault as a mechanism of burn injury. *Archives of Surgery, 125*, 268-269.

Rashid, A., & Gowar, J. P. (2004). A review of the trends of self-inflicted burns. *Burns, 30*, 573-576.

Raskind, S. M. (1986). Suicide by burning: Emotional needs of the suicidal adolescent on the burn unit. *Issues in Comprehensive Pediatric Nursing, 9*, 369-382.

Reiland, A., Hovater, M., McGwin, G., Rue, L. W., & Cross, J. M. (2006). The epidemiology of burns. *Journal of Burn Care and Research, 27*, 276-280.

Rush, A. J., Pincus, H. A., First, M. B., Blacker, D., Endicott, J., Keith, S. J., et al. (2000). *Handbook of psychiatric measures*. Washington, DC: American Psychiatric Association.

Scott, K. M., Tobias, M. I., Sarfati, D., & Haslett, S. (1999). SF-36 health survey reliability, validity and norms for New Zealand. *Australian and New Zealand Journal of Public Health, 23*, 401-406.

Seedat, S., & Stein, D. J. (2000). Trauma and post-traumatic stress disorder in women: A review. *International Clinical Psychopharmacology, 15 Supplemental. 3*, S25-33.

Shkrum, M. J., & Johnston, K. A. (1992). Fire and suicide: A three-year study of self-immolation deaths. *Journal of Forensic Science, 37*, 208-221.

Sonneburn, C. K., & Vanstaelen, P. M. (1992). A retrospective study of self-inflicted burns. *General Hospital Psychiatry, 14*, 404-407.

Squyres, V., Law, E. J., & Still Jr., J. M. (1993). Self-inflicted burns. *Journal of Burn Care and Rehabilitation, 14*, 476-479.

Stone, M. J. (1988). Assault by burning and its relationship to social circumstances. *Burns, 15*, 461-467.

Tedstone, J. E., Tarrier, N., & Faragher, E. B. (1998). An investigation of the factors associated with an increased risk of psychological morbidity in burn injured patients. *Burns, 24*, 407-415.

Tice, D. M., Bratslavsky, E., & Baumeister, R. F. (2001). Emotional distress regulation takes precedence over impulse control: If you feel bad, do it! *Journal of Personality and Social Psychology, 80*, 53-67.

Tuohig, G. M., Saffle, J. R., Sullivan, J. J., Moris, S., & Lehto, S. (1995). Self-inflicted patient burns: Suicide versus mutilation. *Journal of Burn Care and Rehabilitation, 16*, 429-436.

Van der Does, A. J. W., Hinderink, E. M. C., Vloemans, A. F. P. M., & Spinhoven, P. (1997). Burn injuries, psychiatric disorders, and length of hospitalization. *Journal of Psychosomatic Research, 43, 431*-435.

Van Loey, N. E., Faber, A. W., & Taal, L. A. (2001). Do burn patients need burn specific multidisciplinary outpatient aftercare: research results. *Burns, 27*, 103-110.

Van Loey, N. E., & Van Son, M. J. (2003). Psychopathology and psychological problems in patients with burn scars: *Epidemiology and Management, 4*, 245-272.

Wallace, K. L., & Pegg, S. P. (1999). Self-inflicted burn injuries: An 11-year retrospective study. *Journal of Burn Care and Rehabilitation, 20*, 189-194.

Ward, H. W., Moss, R. L., Darko, D. F., Bettty, C. C., Anderson, J., Kolman, P., Green, A., Nielsen, J., Klauber, M., Wachtel, T. L., & Frank, H. (1987). Prevalence of postburn depression following burn injury. *Journal of Burn Care and Rehabilitation, 8*, 294-298.

Ware, J. E., Snow, K. K., Kosinski, M., & Gandek, B. (1993). *SF-36 Health Survey: Manual and interpretation guide*. Boston, MA: Nimrod press.

Watkins, P.N., Cook, E. L., May, S. R., & Ehleben, C. M. (1988). Psychological stages in adaptation following burn injury: A method for facilitating psychological recovery of burn victims. *Journal of Burn Care & Rehabilitation, 9*, 376-385.

Weichman, S. A., Ehde, D. M., Wilson, B. L., & Patterson, D. R. (2000). The management of self-inflicted burn injuries and disruptive behavior for patients with borderline personality disorder. *Journal of Burn Care and Rehabilitation, 21*, 310-317.

Williams, E. E., & Griffiths, T. A. (1991). Psychological consequences of burn inury. *Burns, 17*, 478-480.

Wilson, K. G., & Murrell, A. R. (2004). Values work in acceptance and commitment therapy: Setting a course for behavioral treatment. In S. C., Hayes, V.M., Follette, & M., Linehan (Eds.), *Mindfulness and acceptance: Expanding the cognitive behavioral tradition* (pp. 120–151). New York: Guilford Press.

Yeong, E. K., Chen, M. T., Mann, R., Lin, T-W., & Engrav, L. H. (1997). Facial mutilation after an assault with chemicals: 15 cases and literature review. *Journal of Burn Care & Rehabilitation, 18*, 234-237.

Yowler, C. J., Mozingo, D. W., Ryan, J. B., & Pruitt, B. A. Jr. (1998). Factors contributing to delayed extremity amputation in burn patients. *Journal of Trauma, 45*, 522-526.

Yu, B. H., & Dimsdale, J. E. (1999). Posttraumatic stress disorder in patients with burn injuries. *Journal of Burn Care & Rehabilitation, 20*, 426-433.

Zor, F., Deveci, M., Bozkurt, M., Dikkatli, S., Duman, H., & Sengezer, M. (2005). Psychological evaluation of self-inflicted burn patients: Suicide or parasuicide? *Burns, 31*, 178-181.