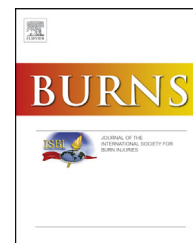


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Factors predicting health status and recovery of hand function after hand burns in the second year after hospital discharge

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ABSTRACT

Introduction: Hands are the most commonly burnt body part given humans' innate response to guard their face from injury, and are known to have detrimental functional and psychological consequences. Conflicting evidence exists regarding the impact of hand burns on long-term health status and global functioning. The objective of this study was to identify patient and clinical characteristics that predict health status and hand function of people at 12–24 months after hand burn.

Methods: The Burns Specific Health Scale-Brief (BSHS-B) and the Brief Michigan Hand Outcome Questionnaire (Brief MHQ) were administered to community-dwelling adults who were between one and two years after admission to a statewide burns service for burns including one or both hands. Demographic, injury, and treatment data were collected to identify which factors predict health status and hand function in the second year after admission. Linear regression analyses adjusted for total burn surface area and burn depth were conducted to identify important predictors or outcomes.

Results: The sample ($n = 41$) was 80.5% male, with a mean age of 44.5 years and total body surface area (TBSA) of 8.4%. Psychiatric illness (regression coefficient -56.6 , confidence interval (95% CI) -76.70 , -36.49) and female gender (-20.3 ; 95% CI -0.77 , -40.29) were key predictors of poorer global health status on the BSHS-B. Females also scored worse on body image (-5.35 ; 95% CI -1.83 , -8.87) and work (-4.13 ; 95% CI -0.64 , -7.62) domains of BSHS-B. The need for reconstructive or secondary surgery (-38.84 ; 95% CI -58.04 , -19.65) and female gender (-16.30 ; 95% CI -4.03 , -28.57) were important predictors of poorer hand function. **Conclusion:** Women and those with a history of psychiatric illness are particularly vulnerable to poorer outcomes in health status and/or hand function after burns, and may benefit from more intensive rehabilitation support and long-term follow-up.

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1. Introduction

Given humans' innate action to guard their face from injury, hands are the most commonly burnt body part [1,2] involved in more than 50% of all burns and greater than 80% of severe burns [2,3]. Of these, dorsal (posterior) hand burns are the most common. This area of the hand involves intricate networks of tendons, bones, and connective tissues, with minimal protective subcutaneous tissue, making them prone to deep burns and complicated sequelae [4]. Despite each hand representing less than 3% of TBSA, according to the Wallace Rule of Nines, the American Burn Association classifies hand burns as major injuries benefiting from specialized treatment [5].

The challenges that burn survivors face are far more complex than the functional limitations that they may experience. Some aspects of burns, including aesthetics and decreased control of the body and environment, can lead to people experiencing decreased self-esteem, social avoidance, and anxiety about their future [6]. A prospective longitudinal multicentre study of 301 patients with burns found that it is common for this population to develop psychological illnesses [7]. Additionally, a history of psychiatric illness has been associated with reduced psychological functioning at 12 months after burn [8], and poorer long-term health related quality of life (HRQoL) [9]. Males are less likely than females to experience psychological issues [10].

There remains inconsistent and limited evidence of the factors affecting recovery of adults with hand burns. Several factors, such as burn depth, TBSA, and premorbid health have been found to consistently influence patient outcomes. A recent retrospective study of 378 Eastern Chinese patients found that burn depth increased the risk of undergoing surgery [11] and another 11-year retrospective study of 572 patients from Kosovo found that burn severity was associated with complications after injury, including contracture deformities and amputations [12]. Similarly, Williams et al.'s [13] prospective, longitudinal study of 52 hand burn patients reported that burns that could be managed conservatively or with Biobrane had more rapid return to active range of motion (ROM) and daily functioning (1 month), compared to ongoing difficulties with these at 12 months for patients with more severe hand burns that underwent grafting. There is, however, conflicting evidence regarding the impact on health status in the medium to long-term. For example, Öster, Willebrand [14] found that pre-burn psychological impairment was not associated with HRQoL, which is contrary to the findings reported above. There is also a general lack of research focusing on both the physical and psychological impacts of hand burns, with numerous factors yet to be thoroughly researched, including whether damage to specific hand structures results in different impacts.

This study aimed to identify factors that predict health status and hand function of people with hand burns at 12–24 months after injury. We included factors thought to influence outcome hand burns, such as specific hand structures affected, patient co-morbidities, insurance status, time to hospitalization, types of grafting, and the timing of occupational therapy (including hand therapy) interventions.

2. Methods

2.1. Setting

This study was conducted at the Victorian Adult Burns Service (VABS), a state-wide adult burns service located at the Alfred Hospital. The VABS is a 300-bed university affiliated tertiary referral centre in Melbourne, Victoria, Australia. Victoria has a population of approximately 5.91 million people, and approximately 98% of all severely injured adult burn patients in the state are managed at the VABS.

2.2. Ethics

Approval was obtained from University and Hospital Human Research Ethics Committees.

2.3. Study design and inclusion criteria

Patients meeting the following criteria were eligible for participation in this cross-sectional study. They include patients who were aged ≥ 18 years, admitted for burns involving one or both hands to the VABS at least one year prior to data collection, but no more than two years prior. No other exclusions were applied as we aimed to obtain as broad a sample as possible. Informed consent was obtained from all participants prior to commencement of data collection. The researchers were not previously known to participants to minimize any unequal relationships.

2.4. Patient data collection

A chart review of medical records was undertaken, in which we gathered the following demographic and clinical variables: age, gender, work status, comorbidities (neurological, alcohol or substance abuse, psychiatric, prior hand injury), compensation status, smoking status, burn aetiology, %TBSA, anatomical site of burn, depth of worst hand burn, number of surgical procedures, type of permanent wound coverage, hospital length of stay (LOS), infections, hours after injury (HPI) to hospital presentation, days after injury (DPI) to final surgery, wound closure, and days after surgery (DPS) to commencement of splinting, active or passive ROM of hands, and application of pressure garments. The demographic, injury-specific and acute treatment variables collected from time of burn were potential predictors of outcome. Selection of these was informed by a review of the literature, including Falder, Browne [21], Hwang, Chen-Sea [1] and Williams, Stiller [13], as well as consultation with members of the VABS team.

2.5. Dependent variables

2.5.1. Burn-Specific Health Scale-Brief

The 40-item BSHS-B [15] is the only condition-specific measure of health status currently used with the adult burns population [16]. The BSHS-B consists of nine domains: heat sensitivity, affect, hand function, treatment regime, work, sexuality, interpersonal relationships, simple abilities, and body image. The items are rated on a 5-point scale of perceived

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