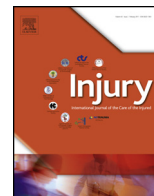




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Patterns of recovery over 12 months following a burn injury in Australia

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ABSTRACT

Objective: To describe patients' generic health status and health-related quality of life (HRQoL) 12-months following admission to a state-wide burns service.

Methods: A total of 114 injured adults with >10% total body surface area burned (TBSA) or burns less than 10% TBSA to smaller anatomical areas such as the hands and feet participated in this study. Retrospective assessment of pre-burn injury status and prospective assessment of generic health and HRQoL were followed up at 3, 6 and 12-months after injury using the 36-item Short Form Health Survey (SF-36 v.2) and Burns Specific Health Scale-Brief (BSHS-B). The SF-36 v.2 was administered retrospectively during the initial hospital stay to assess pre-injury HRQoL. Changes in instruments scores were assessed using multilevel mixed effects regression models. Mean scores were compared over time and between severity groups as defined by <10%, 10–30% and >30% TBSA.

Results: For the overall sample, the SF-36 v.2 physical component scale (PCS) score between 3 and 12-months post-burn injury were significantly lower than pre-injury scores ($p < 0.01$), with no significant change over time for the mental component scale (MCS) ($p = 0.36$). Significant %TBSA-burden by time interactions highlighted changes from pre-burn injury in overall PCS ($p = 0.02$), physical functioning ($p < 0.001$) and role-physical ($p = 0.03$), with subscales worse for the TBSA >30% group. With respect to the BSHS-B, significant improvement from 3 to 12-months post-burn injury was seen for the entire sample in simple abilities ($p < 0.001$), hand function ($p = 0.001$), work ($p = 0.01$), and treatment regime ($p = 0.004$) subscales. The TBSA >30% group showed a greater rate of improvement in simple abilities ($p = 0.01$) and hand function ($p = 0.005$) between 3 and 12 months post-burn injury.

Conclusions: Whilst certain HRQoL measures improve over the 12-months, in most cases they do not reach pre-morbid levels. Patients face ongoing challenges regarding their physical and psychosocial recovery 12-months post-burn injury with respect to generic health and burn-specific health. These challenges vary at different time periods over the 12-month post-burn period, and may provide windows of opportunity in which to address ongoing issues.

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Introduction

The growing number of individuals surviving severe burn injuries calls for an increased focus on regaining independence and

psychosocial adjustment [1]. Most of the literature on psychosocial rehabilitation after burn injury stems from the United States or Europe [2]. However, burns management in Australia may differ in that many burn centres are geographically distant from each other and that expert services cannot always be easily accessed. This can result in a delayed arrival at a tertiary referral centre with access to resources such as a multidisciplinary team that is equipped to deal with the complex issues arising from a major burn injury. The same

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problem occurs after discharge, with patients facing significant barriers to care due to the long distance from services including prolonged travelling times which may hinder the psychosocial follow up of patients [3].

The physical and psychological consequences of both minor and severe burn injuries are well documented in studies from the United States and Europe [4,5]. It is now recognised that burn injury may result in impaired quality of life (QoL) which can persist for a long time after the injury and develop into chronic long-term problems in these patients [6–9]. This notwithstanding, the psychosocial impact of a burn injury and the perception of health-related quality of life (HRQoL) may differ among patient populations, as it is subject to cultural and economic factors as well as the generic health and psychosocial functioning of patients pre-injury.

A small number of Australian studies have described burn-specific health and HRQoL outcomes, with most studies combining a series of functional and QoL instruments [10–13]. However, these studies have been limited by small sample sizes [10,12], inconsistent time frames for data collection, or substantial attrition at follow-up [10–13]. Given the limited data currently available, and potential distinctive features of an Australian burns population, this study aims to build upon existing knowledge by evaluating the short- and long-term health and social functioning outcomes of patients with burn injury over a period of 12 months and how these outcomes change and progress over defined time periods. In particular this study explored the extent to which burn patients with different burn severity return to pre-injury health status at 12 months, as well as the extent to which there is improvement in health status and burn-specific QoL between 3 and 12 months post-burn injury.

Methods

Setting

The state of Victoria, Australia, has a population of 5.62 million people. The Victorian Adult Burns Service (VABS) is a state-wide adult burns service located at The Alfred Hospital, one of two designated major trauma services for adults in the state.

Study design and inclusion criteria

Patients meeting the following criteria were eligible for participation in this prospective cohort study:

- (i) age ≥ 18 years;
- (ii) admission to the VABS between February 2008 and October 2009;
- (iii) burns involving $>10\%$ total body surface area burned (TBSA) or
- (iv) burns to the face requiring skin grafting or
- (v) burns to the hands and/or feet with the potential for functional impairment.

Patients were excluded for the following reasons:

- (i) Insufficient proficiency in English to complete the assessments.
- (ii) Complex psychosocial impairment.
- (iii) Documented diagnosis of pre-existing psychiatric illness.
- (iv) Readmission due to pre-existing burn injuries.

Participant recruitment procedures

Participants were recruited during their inpatient stay at the VABS. All participants were recruited within 21 days of admission

or following discharge from the intensive care unit (ICU). The assessments were performed at baseline during their hospital stay to retrospectively assess their pre-injury level of functioning. Telephone interviews were conducted at 3, 6 and 12 months post-injury. In addition, demographic data and information about the nature and extent of the injury was collected from medical records.

Interview instruments

General health measurement tool: SF-36 v.2

The SF-36 v.2 is a brief 36-item measure of health-related quality of life/health status that includes composite or summary scales reflecting perceived physical and psychosocial health and functioning [14]. Individual responses are used to calculate a score for each of the two-summary scales: Mental Component Summary (MCS) and the Physical Component Summary (PCS). The subscales incorporated in the PCS are physical functioning, role-physical, bodily pain and general health. The MCS scores refer to vitality, social functioning, role-emotional and general mental health. Higher scores on the SF-36 v.2 indicate better health and functioning. The SF-36 v.2 currently is the most widely used generic measure of health-related quality of life in medical settings and has very good psychometric properties in general patients [14,15]. The SF-36 v.2 domains are well understood and have been used previously by clinicians in the burn care setting [11,16,17].

Burn specific health scale measurement tool: BSHS-B

The BSHS-B is the only condition-specific health status instrument for use with burns patients. It consists of 40 items divided into nine subscales: simple abilities, hand function, work, heat sensitivity, treatment regimens, affect, body image, interpersonal relationships, and sexuality. Responses are rated on a 5-point scale from 0 (extremely) to 4 (none/not at all) for each of the 40 items, and mean scores are calculated for each of the domains. A higher mean score indicates better function and higher burn specific QoL. The BSHS-B has satisfactory psychometric properties [18,19] and is widely used to study the physical and psychosocial functioning of burns patients [15,19,20].

Statistical analysis

Analysis was performed using SAS version 9.2 (SAS Institute, Cary, NC, USA). To assess HRQoL according to levels of physical burden, %TBSA was categorised into TBSA $<10\%$, TBSA 10–30% and TBSA $>30\%$ as described by Fauerbach et al. [7]. Baseline comparisons between groups were conducted using the Kruskal–Wallis test for continuous variables with skewed distribution, analysis of variance for approximately normally distributed continuous variables and chi-square test for categorical variables. A multivariable longitudinal analysis was performed using the PROC MIXED procedure in SAS with each patient treated as a random effect. Longitudinal models were fitted using main effects for group, time, and an interaction between group and time to ascertain if the groups behaved differently over time. Separate models were fitted for the SF-36 v.2, BSHS-B and their subscales. To facilitate specific comparisons, time was treated as a categorical variable. Post hoc comparisons were performed using Bonferroni adjustment for multiple comparisons. Results from the mixed-effects models were presented as means with standard errors. A two-sided p -value < 0.05 was considered statistically significant.

Results

During the study period, 540 patients were admitted to the VABS with an acute burn injury. Of these, 415 were excluded because of burns $<10\%$ TBSA with no potential for functional

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