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A population-based retrospective cohort study to assess the mental health of patients after a non-intentional burn compared with uninjured people

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ABSTRACT

Background: The objective of this study was to describe and quantify mental health (MH) admissions experienced by patients with unintentional burns subsequent to their injury.
Methods: A retrospective population-based cohort study that used de-identified linked hospital, death and mental health in-patient case registry data of all burn patients hospitalised for unintentional burns (n=10,460) between 2000 and 2012 in Western Australia and an age and gender matched uninjured comparison cohort (n=42,856). Cohorts had a median age at study index of 26 years with males comprising 66% of each cohort. MH admissions for 5 years before and after the injury were examined. Negative binomial and Cox proportional hazards regressions were adjusted for socio-demographic and pre-existing health conditions and used to quantify associations between burns and MH hospitalisations.
Results: In the burn cohort during the 5-year post-burn period, 4% had a MH admission, 2% were admitted for self-harm, and 3% were admitted for a behavioural disorder caused by drugs/alcohol. Significantly elevated adjusted admission rates for MH conditions were observed for the burn cohort compared with the uninjured cohort (IRR, 95% CI: 4.89, 3.52–6.79). Increased MH admission rates were found for all age groups but were most pronounced in those younger than 18 years of age at time of burn (IRR, 95% CI: 6.28, 3.00–13.14), followed by those aged 18–60 (5.14, 3.59–7.35) and those over 60 years (IRR, 95% CI: 2.97, 1.38–6.39) compared to the uninjured cohort. Gender-specific analyses showed significant differences for male (IRR, 95% CI: 4.48, 3.05–6.59) and female burn patients (IRR, 95% CI: 6.00, 3.62–9.92), compared to uninjured. The burn cohort had higher adjusted first time admissions for MH conditions (HR, 95% CI: 3.55, 2.72–4.64), mood and anxiety disorders (HR, 95% CI: 3.77, 2.81–5.08), psychotic disorders (HR, 95% CI: 3.55, 1.99–6.15) and behavioural disorders related to alcohol/drugs (HR, 95% CI: 4.75, 3.09–7.28) for five years after the initial burn.
Conclusions: Patients hospitalised for unintentional burns had significantly higher MH admission rates after discharge than that observed for an uninjured cohort. Ongoing mental health support is clearly indicated for many burns patients for a prolonged period after discharge.

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1. Introduction

Burn injury is an important cause of unintentional morbidity and for many it can be a traumatic life experience [1]. Advances over the past decades in the surgical care of burn patients have resulted in improved survival rates. However, many burn survivors face long periods of treatment and recovery, as well as physical [2] and psychosocial issues [3]. Extended hospital stays are often associated with feelings of social isolation, loss of independence, issues related to return to work and financial dependency, and increased stress [4]. The most common psychological difficulties affecting burn patients include pain and itch, concerns about body image, depression and anxiety [5–8], emotional distress [9], acute distress disorders (ASD) [10] and posttraumatic stress disorder (PTSD) [10,11].

Many patients with visible burn scars to the head and neck are reported to experience social anxiety, avoidance and reduced quality of life [12,13]; however, reported effects of burn scar severity are inconsistent [14,15]. Psychological responses associated with the acute trauma and subsequent health effects vary between individuals. Some patients with good social support and active coping skills are more able to deal with high levels of stress, whilst depression is a known barrier to coping [16–18]. Predisposing characteristics such as pre-existing depression, grief, pain and social isolation during hospital admissions are also associated with higher risk of post-burn depression [19].

In addition to the psychological impact of the trauma and resulting scarring, burn injury is associated with significant disruption to the immune system and response to stress. Burns are associated with acute and potentially sustained depression of humoral and cell-mediated immunity [20–22], sustained levels of oxidative stress [23,24] and prolonged elevation of stress hormone levels [25,26], with effects persisting for at least 3 years after burn [27].

A volume of research has identified inflammation and cell-mediated immune activation, as well as activation of the compensatory anti-inflammatory system, as key factors in depression [28–33]. Additionally, depression is accompanied by increased oxidative and nitrosative stress, which contributes to the progression of neuropathology [34]. Given the similarity of the systemic effects triggered by burns and the underlying pathology associated with a range of mental health conditions, burn patients may also be at increased risk of exacerbation of pre-existing mental health conditions as well as new diagnoses related to systemic factors.

Two recent Canadian studies using retrospective cohort designs with linked health data have examined the mental health of burn patients, the first by comparing burn patients with non-burn controls (burns n=157 vs non-burn n=785; 2-year follow-up) [35], and the second by conducting a pre-post assessment of burn patients (n=1530) [36]. Both studies showed no significant change over time in mental health care utilisation and emergency department visits, respectively, and reported high prevalence of pre and post-burn mental health conditions. However, earlier work published from the Manitoba Injury Outcome Study found post-injury hospitalisations and physician claims for mental health conditions were significantly elevated among injury patients (including burns) when compared with uninjured adults, after adjustment for comorbidities and pre-existing mental health service use [37].

To understand the mental health experience and health needs of burn patients in an Australian setting, this paper presents results of a population-based retrospective cohort study using record linkage across hospital morbidity, death and mental health case registers. The aim of this study was to describe and quantify the 5-year after burn mental health hospital admissions of a cohort of patients hospitalised with an unintentional burn in comparison with a cohort of uninjured people, adjusting for socio-demographic factors and pre-existing comorbidities.

2. Methods

This retrospective cohort study used linked population-based health data from the Western Australia Population-based Burn Injury Project (WAPBIP) that incorporated records from the Western Australian Hospital Morbidity Data System (hospital records), death register and Mental Health Information System (inpatient mental health records). The Mental Health Information System is a comprehensive psychiatric case register and includes all contacts with in-patient mental health services (private and public) in Western Australia since 1966. Records were linked and extracted by staff of the Department of Health, Western Australia Data Linkage System (WADLS) which is a validated record linkage system that routinely links administrative health data for the whole population of Western Australia [38]. The project was approved by the Human Research Ethics Committees of the Western Australian Department of Health and the University of Western Australia. Multiple papers have been published using data from the WAPBIP and methods have been previously published [39–41].

For this study, the burn cohort comprised all persons hospitalised with an index (first) admission in Western Australia for an unintentional burn for the period 1 January 2000 to 30 June 2012. The index burn was defined using the International Classification of Diseases (ICD) codes (ICD10-AM T20-T31); those with an index admission for an intentional burn (assault and self-harm) were excluded. The population-based comparison uninjured cohort was randomly selected from the Western Australian Birth Registrations and Electoral Roll and excluded any person with a record of a traumatic injury hospitalisation (ICD10 S00-T32) during the study period. The uninjured comparison cohort was frequency-matched on birth year (~4:1) and gender of the burns cases for each year from 2000 to 2012. Cohort identification and extractions were undertaken by WADLS staff and de-identified data supplied to researchers.

Hospital morbidity files, mental health admissions and death data were linked to each cohort (burn, non-injury) for the period 2000–2012. Indices of geographic remoteness [42] and socio-economic disadvantage [43] based on responses to 40 items in the Australian census, were also linked to each cohort. This socio-economic index is highly correlated in Australian studies with lifestyle risk factors (e.g. nutrition, physical activity, alcohol, smoking and substance abuse) [44–47]. Hospital admissions data included principal and

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