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The impact of patient demographics and comorbidities upon burns admitted to Tygerberg Hospital Burns Unit, Western Cape, South Africa

*T. Cloake, T. Haigh *, J. Cheshire, D. Walker*

University of Birmingham Medical School, University of Birmingham, UK

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ABSTRACT

In South Africa, burns are a major public health problem responsible for significant morbidity and long-term physical disability. This is, in part, due to a significant proportion of the urban population living in poorly constructed, combustible accommodation. The presence of co-morbid diseases such as diabetes and malignancy in patients with burns has been associated with a poorer outcome. The impact of other diseases such as HIV has yet to be defined.

A retrospective data collection study analysed the 221 patients admitted to Tygerberg Hospital Burns Unit in 2011 and the first six months of 2013. Using hospital records, patient demographic data was collected alongside burn agent, ICU admission, complications, and patient outcome in terms of length of stay and mortality.

The most common burn agent was hot liquid (45.7%). A significant proportion of patients were subject to intentional attacks (34.3%). Shack fires and flame accounted cumulatively for 85% of total inhalational burns, the highest rates of admission to ICU (85.5%), the highest rate of complications, as well as 92.3% of all total fatalities. HIV+ patients had a higher mortality (13.3% vs 5%, p=0.22) and a higher complication rate (46.7% vs 30%, p=0.21). There was no difference in length of stay between the HIV+ and HIV− cohort (12 days vs. 15.5 days, p=0.916).

Burns are a significant yet preventable cause of mortality and morbidity. The rising number of shack fires, responsible for extensive burns and resultant mortality is concerning and indicates urgent attention and action. HIV complicates the recovery from burn and is responsible for an increased rate of in hospital mortality.

1. Introduction

In South Africa, burns are a major and urgent public health problem responsible for issues relating to short-term morbidity such as infection, as well as long-term physical and psychosocial disability. Rode et al. reported that in Africa, over a million people are burned annually with burns accounting for 18% of South African hospital admissions and a mortality of 6–10% [1]. Urbanisation, poorly constructed overcrowded shelters, limited access to electricity and the use of paraffin as the primary energy source all contribute to the high burns incidence [2].

Indirect costs such as lost wages, prolonged care for deformities, emotional trauma, and commitment of family resources, also contribute to the socioeconomic impact. The incidence of burns is predicted to further increase in the coming years due to rural to urban migration culminating in further shack construction.

* *Corresponding author.*
E-mail address: t_haigh@hotmail.co.uk (T. Haigh).
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Recovery from burns injuries is complicated by the presence of co-morbidities. There appears to be disagreement between the few studies that have investigated patient outcome in HIV positive burns patients with some demonstrating a significantly increased in-hospital mortality rate [3–5] whilst others report no effect [6,7]. The lack of consensus surrounding this topic is concerning considering that an estimated 10% of the population are HIV positive [8], a figure that is set to further increase.

The high incidence of HIV infection alongside the increasing prevalence of burns injuries makes South Africa the ideal setting for investigating the association between pre-injury health status and outcome after burns injury.

2. Methodology

A retrospective analysis addressing the impact that patient demographics and comorbidities had on patient outcome following burns in 2011 and 2013 was undertaken at Tygerberg Hospital, Cape Town, South Africa. All subjects had been admitted to Tygerberg Hospital Adult Burns Unit, between the time periods of January 2011–December 2011 and January 2013–May 2013 were included. A total of 221 patients were included, 132 patients admitted in 2011 and a further 89 in 2013.

Prior ethical approval for the project was granted by the Committee for Human Research at the Research Development and Support Division of the Faculty of Health Sciences, University of Stellenbosch.

2.1. *Inclusion/exclusion criteria*

All patients aged above sixteen admitted between said dates were eligible for inclusion. Re-admissions, cold burns and skin donor patients were excluded. Patients who had a significant amount of incomplete or missing data were excluded from the study. A total of 285 patients were admitted to Tygerberg Burns Unit in 2011, 154 patients were excluded as they did not meet the above inclusion criteria or their paper records were unavailable. A further 7 patients were excluded due to incomplete or missing data in their paper records. 112 patients were admitted during the 2013 study period, 20 patients were excluded as they did not meet the inclusion criteria or the paper records were unavailable, a further three patients were excluded due to incomplete or missing data in their paper records. As Tygerberg Hospital is the tertiary burns referral centre for the whole of the Western Cape, only patients sustaining significant enough burns to warrant specialist burns care were included in our dataset. Minor burns injuries were therefore not included in our study.

2.2. *Data set*

Patient information was extracted from the Burns Unit database. In the event that the database was found to be incomplete, information was extracted from the patient's written notes.

Data included age (in years), gender, ethnicity, address, presence of comorbidities (e.g. hypertension, diabetes, HIV, TB, epilepsy), burn size (as percentage of total body surface area, TBSA%), burn depth (first, second, third degree burn), body parts affected, the presence of inhalational burns, burn agent (hot liquid, electrical, shack fire, flame, paraffin, chemical, hot water), activity at time of injury, intentional/unintentional injury, place of injury, alcohol intoxication at time of injury, department admitted to (burns intensive care unit (ICU) or burns ward) and length of stay (days).

Patient co-morbidities were extracted from patient notes, HIV status was determined from routine testing on admission, this took place from January 2013 onwards. No reliable information on HIV status was available prior to this. Bronchoscopy was not performed to diagnose an inhalational burns component. Instead, inhalational burns were diagnosed clinically by the presence of any of the following [9]: oro-facial burns, singed nasal hairs, soot in oral/nasal orifice, dyspnoea, stridor, hoarseness or dysphonia.

Primary outcome was measured in terms of mortality. The secondary outcomes included complications and length of hospital stay.

2.3. *Statistical analysis*

Statistical analysis was performed using the statistics package R; appropriate statistical tests were used according to the nature and distribution of the data. All reported p-values are two-tailed, a p-value of less than 0.05 was deemed significant.

3. Results

A total of 221 patients were admitted with burns injuries, 152 (68.8%) of these were male and 69 (31.2%) female (Table 1). The median age of this group was 31 years (IQR 25-41). On average 15% of total body surface area was affected by burn with 26.7% of patients suffering an inhalational burn. The overall in-hospital mortality rate was 11.8%, the average (median) length of hospital stay was 13 days. Over a quarter of patients (28.1%) suffered from a complication during their recovery from their burn.

88 patients between the ages of 21 and 30 years suffered burns accounting for 39.8% of the study population (Table 2). There were few admissions at the extremes of age with 20 patients less than 20 years and 4 patients over the age of 60 years. In all age groups a greater proportion of males sustained

Table 1 – Patient demographics and burn characteristics.

Total	221
Gender	
Male (%)	152 (68.8)
Female (%)	69 (31.2)
Age (median (IQR))	31 (25–41)
Intentional (%)	76 (34.4)
TBSA (median (IQR))	15 (9–25)
Inhalational injury (%)	59 (26.7)
ICU admission (%)	61 (27.6)
LOS (median (IQR))	13 (7–26)
BAUX score (median (IQR))	54 (41–68)
Complication (%)	62 (28.1)
Mortality (%)	26 (11.8)