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# Epidemiology and financial implications of self-inflicted burns



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## ABSTRACT

**Introduction:** The cost of the treatment of burns is high especially in self-inflicted burns with prolonged treatment. We performed a retrospective review of the self-inflicted burns at our regional burns centre to determine the costs incurred in their management and to identify factors which could reduce the financial burden in the future.

**Methods:** The data was collected retrospectively of all the inpatient and outpatient self-inflicted burns presenting to our regional burns centre in the year 2011.

**Results:** Twenty one patients (out of a total of 870 patients) presented with self-inflicted burns to our centre in 2011. Five (23.8%) were major burns with an average of 53.2% Total Body Surface Area (TBSA) and 16 (76.2%) were minor burns with an average of 0.5% TBSA. 11 (52.4%) patients had flame burns including 4 self-immolation burns. The mortality rate was 4.8% ( $n = 1$ ). Five (23.8%) patients underwent surgical treatment. Seven (33.3%) patients were treated in intensive care and with average stay of 46.85 days. Critical care and theatre attendances made up most of the costs with average ICU stay per patient calculated at £313,131/day. The total cost of all 21 patients was £1,581,856.

**Conclusion:** Burns are preventable injuries, early detection and intervention in patients with propensity to self-inflict burns can possibly reduce the costs of treatment in the future.

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## 1. Introduction

Self-inflicted, Deliberate self harm or non-accidental burns are some of the synonyms used to describe self-inflicted burns in literature. Patients presenting with self-inflicted burns usually have a history of a pre-existing psychiatric disorders, chronic medical illness, substance and alcohol abuse and social problems such as financial instability and unemployment [1–3]. Religious overtones, racial backgrounds and even political protests have also been implicated to a variable extent in self-inflicted burn aetiology. Though, self-inflicted

burns account for only approximately 4% of the admissions to burns units worldwide, their incidence has been reported to be increasing in recent years [2,4]. Their incidence also varies globally and can range from 2% of all burn admissions in North America, 15–20% in the middle-east to a sharp increase to 46% in some parts of India and China [1,2,5,6]. Our incidence of self-inflicted burns of 2.4% of our total burns is similar to numbers in North America. Thombs et al. performed what was probably the largest study on self-inflicted burns looking at 70 burns centres across North America totaling over 30,000 burns, 593 being self-inflicted (2%) [5].

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When compared to non-intentional burns, these injuries tend to have a higher morbidity and mortality probably secondary to involvement of large surface areas which induce frequent trips to theatre, critical care and prolonged hospital stays and therefore incurring a significant cost to the healthcare providers [5–9]. While there are many studies in the literature exploring the demographics, aetiology and management of these self-inflicted burns, there are few focusing on the cost implications to the health service [9,10].

## 2. Aims

This study was aimed at investigating the cost and financial impact of self-inflicted burns on the National Health Service (NHS) and our regional adult burns centre, the Welsh Centre for Burns and Plastic Surgery. Information was analysed on this cohort, specifically looking at demographics, mechanism, mental health demographics and extent of burns treated at our centre.

## 3. Methods

The Welsh Centre for Burns and Plastic Surgery in Swansea is an adult regional burns centre and as we cover a population base of 2.3 million in central and South Wales and a further 5–6 million people in the south west of England for large burns. We are part of the South West United Kingdom (SWUK) Burn Care Network, formally established in January 2006, one of 4 burn care networks in the United Kingdom and aims to achieve the standards for burn care and fulfil the principles set out in the National Burn Care Review [11].

For the purpose of the study, a retrospective analysis was conducted of a 12 month period between January 2011 and December 2011. This included those treated as inpatients as well as outpatients. The patients admitted or treated following self-inflicted burns was determined from our centre's burn database that presented during this period (The burns database records both inpatient and outpatient, admission and attendance of all the burns treated at our unit. All the data recorded is maintained on an Excel sheet database). Then the clinical notes and discharge summaries were accessed to confirm the history of self harm. Only patients with self-inflicted burns were included in the study. The clinical data was recorded on a proforma and included the date of admission & discharge, demographics, mechanism and total body surface area of burn, treatment given, intensive care given, inpatient stay and outpatient follow up. To determine the mental health history and outcome of patients mental assessment on admission the data collected was further cross-referenced with records from our resident mental health liaison team to acquire patient's mental health background and diagnosis (The mental health team recorded data on all the patients attending with self-inflicted burns, the patients who had history of mental health problems and those referred to the team for mental health review). Further to determine the cost of treatment, hospital financial records maintained by hospital's finance department were accessed. The financial

costs were calculated from using predetermined hospital standard tariffs for the cost of treatment, for example, of a single day stay in a ward, intensive care, single outpatient appointment and number and type of operative procedures performed which were coded accordingly against a standard tariff. It should be noted that these are not costs charged to the patient as an individual but costs to the National Health Service (NHS) and society as healthcare is free for patients on the NHS in the United Kingdom.

All the data collected was extracted on a excel sheet and Microsoft Excel and Access were used for analysis. The study did not require a formal ethical review and appropriate letters of exemption were acquired from our National Health Service Trust's Research Ethics Committee and Research & Development office.

## 4. Results

During the study period a total of 870 acute burns presented to the centre. Of these, 2.4% ( $n = 21$ ) were self-inflicted burns. 38% ( $n = 8$ ) of these burns were admitted while the other 61.9% ( $n = 13$ ) were treated on an outpatient basis.

### 4.1. Demographics

The ages ranged from 14 to 72 years, with a mean age of 37.4 years (Median = 38, SD = 15.7, IQR = 26.5). 47.6% of these patients were male ( $n = 10$ ) and 52.3% were female ( $n = 11$ ). Majority of these patients, 80.9% ( $n = 17$ ), were single, unmarried or divorced while only 19% ( $n = 4$ ) were married. A significant proportion, 85.7% ( $n = 18$ ), were also either unemployed, retired or did not disclose their occupation while only 4.8% ( $n = 1$ ) were employed and the remaining 9.5% ( $n = 2$ ) were still in school (Table 1).

### 4.2. Total Body Surface Area (TBSA)

The mean Total Body Surface Area (TBSA) involved was 13% (range 0.25–80%, IQR = 18.25%, Median = 0.5%, SD = 23.6%). Further stratifying this into two groups show that 23.8% ( $n = 5$ ) of these were major burns with a mean TBSA of 53.2% (range = 35–80%, Median = 48%, SD = 15.3%, IQR = 13%) while the remaining 76.2% ( $n = 16$ ) were minor burns with a mean of 0.5% TBSA (range 0.25–2%, Median 0.5%, SD = 0.5%, IQR = 0.75%). 19% ( $n = 4$ ) of the patients had mixed thickness burns and these made up most of the major burns while the smaller and contact burns were predominantly full thickness 52.4% ( $n = 11$ ). There were 5 (23.8%) partial thickness burns and 1 patient was purely an inhalational injury.

### 4.3. Mechanism

The predominant mechanism was flame burns accounting for 52.4% ( $n = 11$ ) of all self-inflicted burns including 4 self-immolation burns. The remaining were minor burns caused by contact 28.6% ( $n = 6$ ) and 4.8% ( $n = 1$ ) each of electrical, inhalation, scald and chemical burns. The mortality rate was 4.8% ( $n = 1$ ) of the total number of patients or 12.5% ( $n = 8$ ) of the total number of patients that were admitted (Table 2).

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