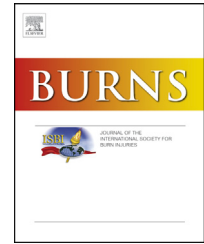


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Aetiology of adult burns treated from 2000 to 2012 in a Swiss University Hospital

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ABSTRACT

Background: Burns in Switzerland are frequent and lead to high economic and social costs. However, little is known about the aetiology of burns suffered by patients seeking treatment in hospital emergency departments. This knowledge could be used to develop preventive measures.

Methods: This retrospective analysis included all patients (≥ 16 years old) with acute thermal injuries of known cause admitted to the adult emergency department in Bern University Hospital (Switzerland, not a specialised burns unit) between 2000 and 2012. Clinical and sociodemographic data were extracted from medical records, i.e. the environment in which the burn occurred, as well as details of burn severity and aetiology.

Results: Seven hundred and one (701) patients with a mean age of 35.0 ± 14.5 years (56% men) were included in the analysis. The winter season and the days around Christmas, turn of the year and Swiss National Day were identified as times with high risk of burns. Household (45%) and workplace (31%) were the most common locations/settings in which the burns occurred. Approximately every second burn was caused by scald, every fourth by flame and every seventh by hot objects. The analysis identified cooking, tar and electricity in workplace accidents, barbecues and the use of gasoline as aetiological factors in burns in leisure time, together with water in domestic thermal injuries. Burns occurred predominantly on non-protected skin on the hand and arms. The most severe burns were seen in electrical and flame burns. Men suffered more severe burns than women in all settings except psychopathology.

Conclusions: The data suggest that the incidence and severity of burns in Switzerland could be reduced by preventive strategies and public campaigns, including education on fire protection systems, raising awareness about the times and locations where the risks of

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Abbreviations: ABSI, Abbreviated Burn Severity Index; MDB, maximal documented degree of burn of all affected body parts of the burned patient; TBSA, total body surface area burned; SD, standard deviation; no., number.

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burns are greater, further improvement in workplace safety, particularly with cooking facilities and electrical equipment, and the development of innovative safety devices (i.e. machines, protective gloves). These findings have to be interpreted carefully, as this study includes only adult patients who presented in our ED and, in most cases, the burns covered less than 20% of the body surface.

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1. Introduction

Burns are considered to be one of the leading causes of injury throughout the world [1]. It is estimated that the lifetime prevalence of severe burns is 1% worldwide [2]. Each burn comes at the cost of physical, emotional and psychological suffering [3]. Most burn prevention programs focus on active education programs, laws enforcing the use of smoke detectors in homes, reducing tap water temperatures, fire evacuation and first aid teaching programs [3]. As stated by Ahn and Maitz [3], more than 90% of all burns are preventable. But burns are still very common, a major public health problem and economic burden [3,4]. According to the Swiss Accident Prevention Agency, approximately 1.5 per 1000 injured persons suffer burns in Switzerland [5]. This number only includes patients who burnt themselves in their leisure time. The aetiologies and distribution of burns during leisure time and work in Switzerland are not well known [6]. Therefore studies are needed to examine burn aetiologies, in order to provide a more solid basis for the expansion of preventive measures [4].

Several studies have been recently published on the aetiology of burns [2,4,7,8]. Most of these originate from developing countries [9]. But there are some fundamental differences between developing countries and Central Europe, as for example the use of shack fires and fuel or kerosene stoves. It is therefore likely that aetiologies of burns in Central Europe are strikingly different.

There are two specialised Burn Units in Switzerland (Zurich, Lausanne). In general, patients with severe burns of more than 20% of the body surface, as well as severe burns to the face and the genitals, are directly transferred to these units by paramedic services. However, the vast majority of patients with burns suffer from burns of less than 20% of their body surface [10]. Therefore this study focuses on the population with burns that is seen in a non-burn unit hospital, but with a burn specialist team on call 24/7. The primary aim of this study is to describe the aetiological aspects of burns in a tertiary care setting (university hospital) in Central Europe.

2. Methods

2.1. Setting

Bern University Hospital (Inselspital) is one of the largest hospitals in Switzerland and a centre providing maximum medical care. In the last 15 years, 25,000–35,000 patients per year were seen in the emergency department.

2.2. Data collection

The retrospective data analysis comprised patients admitted to the adult emergency department in Bern University Hospital between 2000 and 2012 with burn or scalding injuries. Patients younger than 16 years are generally treated at a paediatric emergency department in the paediatric hospital and were therefore excluded from our study. The analysis also excluded patients for whom the aetiology of the burn could not be evaluated and patients whose burn was subacute (>24 h).

A keyword search (“burn injuries”, “burns” and “scalding” with different semantic combinations) through the saved medical records was performed to identify burn cases. The following data were extracted: the setting/location in which the burn occurred, details on burn aetiology, affected body parts, degree of burn for each injured body part, overall area of affected body surface and hospitalisation rates. Demographic data, such as gender and age, as well season and year, were also assessed. All medical records were reviewed. Where body surface area or burn thickness was not documented per se in the records, it was estimated by expert rating on the basis of the rule of nines [11]. The burn wound was classified by the degree of the burn, where a first degree burn only involves the epidermis. Increasing areas of dermis are involved in a superficial second (2a, 2.0), a deep second (2b, 2.5 for mathematical operations) and a third degree burn. In a third degree burn, the entire dermis is involved and in a fourth degree burn, the burn extends into subcutaneous fat tissue [12]. The Abbreviated Burn Severity Index (ABSI), “an accurate and valuable tool in the prediction of burn patient mortality” [13], was calculated on the basis of age, gender, the total body surface area burned (TBSA), the presence of inhalation trauma and of full thickness burn (third degree). In addition, the maximal documented degree of burn of all affected body parts of the burnt patient (MDB) was used as a summary measure of the patient’s degree of burn.

2.3. Statistics

Data analysis was performed using Stata[®] 13.1 (StataCorp, The College Station, Texas, USA). The chi-square test was used to compare two categorical variables. The Mann–Whitney U test or the Kruskal–Wallis test was conducted to compare two or more medians of categorical variables with skewed distribution. The t test was used to test the hypothesis that a mean of a sample has a specific value and to compare two sample means. The proportion test was used to test the hypothesis that a proportion has a specific value. The significance level was set at an alpha level of <0.05.

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