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Burns in Nepal: A population based national assessment



S. Gupta^{a,*}, U. Mahmood^b, S. Gurung^c, S. Shrestha^d, A.L. Kushner^e,
B.C. Nwomeh^{e,f}, A.G. Charles^g

^a University of California San Francisco, East Bay, Department of Surgery, Surgeons OverSeas, 1411 East 31st Street, Oakland, CA 94602, USA

^b University of South Florida, Department of Surgery, Division of Plastic Surgery, Tampa, FL, USA

^c Kathmandu Medical College, Kathmandu, Nepal

^d Nepal Medical College, Department of Surgery, Kathmandu, Nepal

^e Surgeons OverSeas, Johns Hopkins Bloomberg School of Public Health, USA

^f Nationwide Children's Hospital, Ohio State University School of Medicine, USA

^g University of North Carolina, Chapel Hill, Department of Surgery, USA

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ABSTRACT

Background: Burns are ranked in the top 15 leading causes of the burden of disease globally, with an estimated 265,000 deaths annually and a significant morbidity from non-fatal burns, the majority located in low and middle-income countries. Given that previous estimates are based on hospital data, the purpose of this study was to explore the prevalence of burns at a population level in Nepal, a low income South Asian country.

Methods: A cluster randomized, cross sectional countrywide survey was administered in Nepal using the Surgeons OverSeas Assessment of Surgical Need (SOSAS) from May 25th to June 12th, 2014. Fifteen of the 75 districts of Nepal were randomly chosen proportional to population. In each district, three clusters, two rural and one urban, were randomly selected. The SOSAS survey has two portions: the first collects demographic data about the household's access to healthcare and recent deaths in the household; the second is structured anatomically and designed around a representative spectrum of surgical conditions, including burns.

Results: In total, 1350 households were surveyed with 2695 individuals with a response rate of 97%. Fifty-five burns were present in 54 individuals (2.0%, 95% CI 1.5–2.6%), mean age 30.6. The largest proportion of burns was in the age group 25–54 (2.22%), with those aged 0–14 having the second largest proportion (2.08%). The upper extremity was the most common anatomic location affected with 36.4% of burns. Causes of burns included 60.4% due to hot liquid and/or hot objects, and 39.6% due to an open fire or explosion. Eleven individuals with a burn had an unmet surgical need (20%, 95% CI 10.43–32.97%). Barriers to care included facility/personnel not available (8), fear/no trust (1) and no money for healthcare (2).

Conclusion: Burns in Nepal appear to be primarily a disease of adults due to scalds, rather than the previously held belief that burns occur mainly in children (0–14) and women and are due to open flames. This data suggest that the demographics and etiology of burns at a population level vary significantly from hospital level data. To tackle the burden of burns,

* Corresponding author. Tel.: +1 9728410242; fax: +1 510 437 5127.

E-mail addresses: Shailvi.gupta@gmail.com, shagupta@jhsph.edu (S. Gupta).

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interventions from all the public health domains including education, prevention, health-care capacity and access to care, need to be addressed, particularly at a community level. Increased efforts in all spheres would likely lead to a significant reduction of burn-related death and disability.

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1. Introduction

The burden of burns, sustained in low- and middle-income countries (LMICs) resulting not only in mortality but also tremendous morbidity, has been well established [1–4]. Despite a disproportionate increased burden and prevalence of burns in LMICs, hospitals in LMICs do not appear to be well equipped for burn management [5]. Data exist about the incidence of burns, in both high and low-income countries, however, this information is primarily derived from hospital based trauma registries, with inherent limitations of presentation bias. In LMICs, there currently is little understanding about the occurrence of burns in the general population.

To help bridge this information gap, Surgeons OverSeas (SOS) created a population based survey to assess the prevalence of surgical needs, including burns. This survey has been executed in Rwanda and Sierra Leone in 2011 and 2012, respectively [6,7] and in Nepal in 2014. In Sierra Leone, 3.98% respondents reported at least one burn [8] and in Rwanda 9% of all injuries were due to burns [9]. However, comparable data are not available in South Asia, which is home to one fifth of the world's population, approximately 1.7 billion people [10].

Nepal is a landlocked low-income country in South Asia (147,181 km²), with a population of 27.8 million, and one of the least developed South Asian countries [11]. Nepal is ranked 145th of 187 countries in the United Nations Development Programme's Human Development Index [12]. The per capita total expenditure on health is \$36 (US \$) categorizing Nepal as a low-resource setting in health standards [13], with an average life expectancy at birth of 68 [14]. The majority of the population lives in rural areas (17% in urban settings) with an average household size of 4.88 individuals [14]. One quarter of the population in Nepal is considered at the national poverty line, with higher rates in the mid-Western and far-Western regions of about 45% [15]. Agriculture is the mainstay of the economy, with 70% of Nepal's livelihood of the population dependent on it and makes up one-third of Nepal's Gross Domestic Product [16].

The landscape of Nepal varies from flatland in the south, to hills in the central regions, to the Himalayas in the north [17]. Given this varied terrain, only 43% of the population has access to all weather roads [17], resulting in delays in presentation to healthcare facilities within an inherently inadequate, and under-resourced primary healthcare delivery system [10,18]. The Nepal health system includes: 2987 sub-health posts, 822 health posts, and 205 primary healthcare centers. More complex cases are referred to the 70 district, 8 zonal, 2 sub-regional, 3 regional, and 8 central level hospitals.

This referral hierarchy is designed in such a way that the majority of the population can receive public healthcare and minor treatment from accessible locations [19]. As of 2011, Nepal had 0.042 doctors per 1000 population and 0.25 nurses for 1000 population, significantly less than the 2.3 per 1000 population recommended by the World Health Organization in 2011 [20].

Elucidating the epidemiological status of injury is a critical component of any proposed preventive strategy. The aim of this study is to assess burn prevalence at a population level and to provide detailed information about burn epidemiology via a population-based countrywide survey in Nepal.

2. Methods

A countrywide survey was administered in Nepal using the Surgeons OverSeas Assessment of Surgical Need (SOSAS) from May 25th to June 12th, 2014. SOSAS is a cluster randomized cross sectional countrywide survey, previously described [21]. The SOSAS survey is divided into two parts. The first part collects demographic data regarding the household's access to healthcare and recent deaths in the household. The second part randomly selects two household members, each of whom undergoes a verbal head to toe examination for six anatomical regions: (1) face, head and neck, (2) chest and breast, (3) abdomen, (4) groin and genitalia, (5) back and (6) extremities. Questions are designed around a representative spectrum of surgical conditions; each respondent verbally elicits symptoms or experiences for conditions such as wounds, masses, deformities, burns or other surgical conditions. Questions were asked to determine the mechanism of burn and healthcare-seeking behavior patterns of the individuals with an injury. Innovative for the Nepal SOSAS study was the addition of a visual physical examination by a local physician in order to validate and strengthen to SOSAS tool.

Two-stage cluster sampling was performed. Fifteen of the 75 districts of Nepal were randomly selected proportional to population, after which 45 Village Development Committees (VDCs) were randomly selected, three per each district, after stratification for urban and rural population distribution, two rural to one urban (Figs. 1 and 2). This methodology was similar to that used by the Demographic and Health Surveys in Nepal [22]. In each selected cluster, interviewers began at a central location and sampled every 5th household, sampling thirty households per cluster, with a total sample size of 1350 households countrywide. Sample size estimation was established from a prevalence of unmet surgical need of 5%, noted from the pilot study for SOSAS Nepal [23]. The surveys were conducted by a total of 100 Nepali medical interns and

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