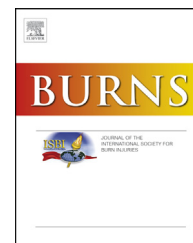


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Epidemiology of operative burns at Kijabe Hospital from 2006 to 2010: Pilot study of a web-based tool for creation of the Kenya Burn Repository

Elizabeth L. Dale^{a,b,*}, Melissa A. Mueller^b, Li Wang^c, Mary D. Fogerty^d,
Jeffrey S. Guy^{d,e}, Peter M. Nthumba^{f,**}

^a Department of Plastic Surgery, University of Tennessee College of Medicine Chattanooga, United States

^b Vanderbilt University School of Medicine, United States

^c Department of Biostatistics, Vanderbilt University School of Medicine, United States

^d Vanderbilt University, Division of Burn Surgery, United States

^e TriStar Centennial Women's and Children's Hospital, United States

^f Plastic and Reconstructive Surgery, Kijabe Africa Inland Mission Hospital, Kijabe, Kenya

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ABSTRACT

Introduction: In order to implement effective burn prevention strategies, the WHO has called for improved data collection to better characterize burn injuries in low and middle income countries (LMIC). This study was designed to gather information on burn injury in Kenya and to test a model for such data collection.

Methods: The study was designed as a retrospective case series study utilizing an electronic data collection tool to assess the scope of burn injuries requiring operation at Kijabe Hospital from January 2006 to May 2010. Data were entered into a web-based tool to test its utility as the potential Kenya Burn Repository (KBR).

Results: 174 patients were included. The median age was 10 years. There was a male predominance (59% vs. 41%). Findings included that timing of presentation was associated with burn etiology ($p = 0.009$). Length of stay (LOS) was associated with burn etiology ($p < 0.001$). Etiology differed depending on the age group, with scald being most prominent in children ($p = 0.002$).

Conclusions: Burn injuries in Kenya show similarities with other LMIC in etiology and pediatric predominance. Late presentation for care and prolonged LOS are areas for further investigation. The web-based database is an effective tool for data collection and international collaboration.

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* Corresponding author at: Department of Plastic Surgery, University of Tennessee College of Medicine, 979 East Third Street, Suite C-920 Chattanooga, TN 37403, United States. Tel.: +1 423 778 9047.

** Corresponding author.

E-mail addresses: edale@uthsc.edu (E.L. Dale), melissa.a.mueller@vanderbilt.edu (M.A. Mueller), li.wang@vanderbilt.edu (L. Wang), mary.d.fogerty@vanderbilt.edu (M.D. Fogerty), Jeffrey.Guy@HCAHealthCare.com (J.S. Guy), nthumba@gmail.com (P.M. Nthumba).
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1. Introduction

Burn injury in resource-poor settings is a complex problem, the scope of which has not been adequately defined. The World Health Organization (WHO) estimates that the annual death toll due to burns is over 310,000, with burns in low and middle income countries (LMIC) accounting for 95% of all annual burn deaths [1]. Among those populations, women and children are the most frequently affected [2,3]. In addition to burn-related mortality, burn-related disability causes a marked functional and economic impact. Functional disability is defined in the Global Burden of Disease (GBD) report as daily-adjusted life years (DALY) or the number of years lost due to poor health, disability, or early death. Strikingly, fires rank third worldwide for DALY lost due to unintentional injury in Africa, second in Eastern Mediterranean and South East Asian countries, yet fifth in high-income countries. Worldwide, burns covering greater than 20% total body surface area rank first among injury types causing of short or long-term disability. There are an estimated 116 million cases of such burns, roughly four times the prevalence of HIV/AIDS (31 million) [4].

In 2008, the WHO and the International Society of Burn Injury (ISBI) proposed a 10-year plan to develop interventions for burn injury in the resource-poor setting. The plan emphasizes the dearth of available data characterizing the burn injuries in of these populations as a significant hindrance to implementing and testing burn prevention strategies [5]. Peck and colleagues characterized the scope of burn injury in LMIC based on data from small retrospective studies. They, along with others, similarly noted that improved surveillance with formal epidemiological studies is necessary to improve disparities in burn injury [6–14].

Unfortunately, to date, efforts to create formal burn databases in LMIC have been unsuccessful, primarily owing to lack of finances, interest, and awareness of the burden of burn injuries. Characterization of the scope of the problem in LMIC will not only allow for focused intervention, advocacy and public education, but will also strengthen future requests for resources for clinical care and training.

Collaboration between burn surgeons at Vanderbilt University Medical Center (VUMC) and those at the African Inland Church (AIC) Kijabe Hospital (KH) in Kenya was initiated to further delineate the burden of burns in Kenya and to create a web-based repository for thermal injury at KH. This study describes the epidemiologic characteristics of operative burns at KH, and demonstrates the effectiveness of a web-based data collection tool as the potential future Kenya Burn Repository.

2. Methods

2.1. Setting and participants

Kijabe Hospital is in Kijabe, Kenya, a rural setting (population 4679), and has only 260 beds. However, it serves as a tertiary care center because of the medical specialists available [15,16]. The subject sample comprised 174 patients who underwent operation from January 2006 to May 2010.

2.2. Study design

This study was designed as a retrospective case series with collaboration between Vanderbilt University and AIC Kijabe Hospital in Kenya. Patients with burn injury were identified by a manual search of operative logs. At the time of our retrospective review, the computer system in which patients were registered was unavailable. For this reason our search was limited to the operative log. Case descriptors included debridement, split thickness skin graft, full thickness skin graft, burn contracture release, excision of scar or keloid, flap, reconstruction, tissue expander, and burn. The patient identification number was then matched to the patient chart, and the patient was included if burn was the etiology of injury. Patients with any other reasons for surgery, such as trauma or congenital malformation, were excluded.

2.3. Database development

The database was created using REDCap electronic data capture tool hosted at VUMC [17]. REDCap (Research Electronic Data Capture) is a secure, web-based application designed to support data capture for research studies providing: (1) an intuitive interface for validated data entry; (2) audit trails for tracking data manipulation and export procedures; (3) automated export procedures for seamless data downloads to common statistical packages; and (4) procedures for importing data from external sources.

Authors ED and PT had rights to edit the database, and all editing was performed prior to initiating data entry. The data were entered at KH by a research assistant who was trained in the use of the database and the chart review process. The private health information (PHI) was safe-guarded by removing identifiers prior to downloading the data for analysis by the authors and biostatistician. For example, medical record numbers were reassigned, and dates were adjusted to maintain length of stay information but remove actual admission and discharge dates.

Table 1 presents data collected. These fields were based on a registry worksheet published by the American Burn Association (ABA) and the ISBI and adapted to suit data collected at KH [18]. Data variable descriptors matched these fields, and data were entered with a windows format and dropdown menus where descriptors were written in full, i.e. not coded as a descriptor. More detailed etiologic information, when available, was entered in the history of present illness.

When patients returned for follow-up visits, outcome information was recorded under the same medical record number, but with a “follow-up” template, therefore avoiding multiple entries for the same burn.

2.4. Statistical analyses

Descriptive statistics were calculated as the median with interquartile range (IQR) for continuous variables. For categorical variables, frequency and percentage were presented. Pearson Chi-square tests were used to examine the association between two categorical variables. Wilcoxon rank sum and Kruskal–Wallis tests were used to compare continuous outcome between groups. All statistical analyses were

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