Economic loss due to traumatic injury in Uganda: The patient's perspective

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ABSTRACT

Introduction: Traumatic injury is a growing public health concern globally, and is a major cause of death and disability worldwide. The purpose of this study was to quantify the socioeconomic impact of lower extremity fractures in Uganda.
Methods: All adult patients presenting acutely to Uganda's national referral hospital with a single long bone lower extremity fracture in October 2013 were recruited. Consenting patients were surveyed at admission and again at six-months and 12-months post-injury. The primary outcome was the cumulative 12-month post-injury loss in income. Secondary outcome measures included the change in health-related quality of life (HRQoL) and the injury's effect on school attendance for the patients' dependents.
Results: Seventy-four patients were recruited during the study period. Sixty-four (86%) of the patients were available for 12-months of follow-up. Compared to pre-injury earnings, patients lost 88.4% ($1822 USD) of their annual income in the 12-months following their injury. To offset this loss in income, patients borrowed an average of 28% of their pre-injury annual income. Using the EuroQol-5D instrument, the mean HRQoL decreased from 0.91 prior to the injury to 0.39 ($p < 0.0001$) at 12-months post-injury. Ninety-three percent of school-aged dependents missed at least one month of school during their guardian's recovery and only 61% had returned to school by 12-months post-injury.
Conclusion: This study demonstrates that lower extremity fractures in Uganda had a profound impact on the socioeconomic status of the individuals in our sample population, as well as the socioeconomic health of the family unit.

Introduction

Orthopaedic injury is a common cause of disability in low-income countries; often resulting from road traffic injuries [1,2]. The World Health Organization (WHO) recently identified both injury and injury from road traffic accidents as areas of imminent public health concern globally [3]. Road traffic accidents are the main cause of nonfatal injuries, with musculoskeletal trauma accounting for the majority of these injuries [4]. Current estimates suggest that the number of road traffic-related deaths now nears the number of deaths attributed to malaria, tuberculosis and HIV/AIDS combined [5,6]. The number of permanently disabled individuals resulting from traumatic injury has been estimated to be upwards of fifty times the mortality rate [6]. Lower extremity fractures are the most common disabling musculoskel-etal injuries [4].

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Studies conducted in high-income countries suggest that with timely and appropriate treatment, otherwise healthy individuals are expected to recover from a lower extremity fracture, with minimal to no long-term disability, within a year of the injury [7–10]. However, patients in low- and middle-income countries often face substantial barriers to apt and effective care due to frequently inaccessible and inadequate health resources [2,11–13]. While it is assumed that these barriers will have a detrimental effect on the well-being of injured patients, the quantification of this impact remains to be determined for much of sub-Saharan Africa. Understanding the socioeconomic impact of traumatic injuries is necessary for efficiently allocating scarce health resources, assessing health risks, and informing policy.

The primary objective of this prospective study is to quantify the economic loss due to lower extremity fractures in Uganda. The secondary objectives of the study were to quantify the disability due to lower extremity injury, the impact of injury on the school attendance of patient's dependents, and to ascertain whether surgical treatment has a significant effect on these outcomes. This study was a collaborative effort between the Makerere University and the University of British Columbia through the Uganda Sustainable Trauma Orthopaedic Program.

Methods

Study design

This was a prospective, single-center study aimed at investigating the socioeconomic impact of lower extremity fractures in Uganda. The protocol was reviewed and approved by the Ethics Committee at the University of British Columbia (H13-02330, Canada) and Mulago Research and Ethics Committee (MREC–462, Uganda).

Patient selection

All adult patients (18 years and over) admitted to Mulago National Referral Hospital in Kampala, Uganda from September 30 to October 31, 2013, with a single-injury, long bone, lower extremity fracture were invited to participate in this study. Informed consent was obtained within 24-h of admission. Patients with polytrauma, defined as additional injuries involving any system beyond the musculoskeletal extremities, were excluded from the study to ensure a homogeneous pattern of injury.

Data collection

Baseline demographic information was collected on admission to Mulago Hospital. Interpreters were available for all regional dialects and languages. With the support of a research assistant, participants completed a questionnaire derived from the Uganda 2011/12 National Panel Survey describing their socioeconomic characteristics [14]. Clinical information was obtained during patient interviews and supplemented with data collected from medical charts.

Patient follow-up

At the time of enrolment, the phone number of each patient, as well as two additional phone numbers of friends or family were collected in the event that the primary phone number was no longer in service at the time of follow-up. Patients were contacted by phone to arrange an in-person follow-up interview at six-months and a phone interview at 12-months post-injury.

Outcome measurements

The primary outcome for this study was loss in projected income at one-year post-injury. Due to the varied nature of employment terms and employment payments in Uganda, participants were asked several questions to ensure weekly, monthly and annual incomes were accurately quantified. Participants were asked to report the value of their last payment, the time period that payment was based upon, the value of payments received during the last week, and the average number of hours worked per day during a normal week. Study participants were asked to clarify any discrepancies in payment values during the interview. The projected annual income was based on earnings during the month prior to injury, annualized and adjusted for inflation [15]. Additional economic outcomes included: the patient's employment status, occupation, the primary source of income for the patient's household, and value of loans accessed both pre- and post-injury.

The EuroQol-5D-3L (EQ-5D) instrument was used to assess health-related quality of life (HRQoL) [16,17]. The questionnaire includes five dimensions of overall health: mobility, self-care, ability to perform usual activities, pain/discomfort, and anxiety/depression. The EQ-5D is sensitive to change in fracture populations, and is valid and reliable for phone administration [18,19]. Patients were asked to recall their pre-injury health at hospital admission for a baseline value. HRQoL was reassessed at six-months and 12-months post-injury.

Data on demographic, injury and treatment characteristics, household composition, and the school-attendance of the patient's dependents were also collected for analysis.

Statistical analysis

Statistical analysis was conducted using JMP (Version 11.2.0, SAS Institute Inc., Cary, NC). Descriptive statistics were performed for all continuous variables of interest using the mean and standard deviation or the median and interquartile range depending on the distribution of data. Counts and proportions were used for all nominal data. A paired t-test was used to compare baseline, six-month and 12-month data for the primary and secondary outcomes. The mean difference and a 95% confidence interval were used for all primary and secondary outcomes of interest. Analysis of variance assuming equal variance was used to compare the association between post-injury debt and surgical treatment. Ordinary least squares (OLS) regression models (Stata MP 13, Stata Corp, TX) were used to investigate the effect of surgical treatment on income, HRQoL, and school attendance of dependents at 6- and 12-months post-injury. The effect of surgical treatment was presented as the coefficient adjusted for pre-injury levels of the relevant covariate and the severity of the injury, coded as either an open or closed injury.

Results

Patient characteristics

Of the 74 lower extremity fracture patients initially recruited in the study, 64 (86%) were included for six- and 12-month follow-up (two patients died of causes unrelated to their injury in the first six-months of the study and eight could not be contacted). The majority of patients were male (84%) with a median age of 36.7 (IQR 27.8–48.0). A full summary of patient characteristics is detailed in Table 1.

The most common injury was a femur fracture (76%) and 77% of the injuries were due to road traffic accidents. All patients were admitted with the intention to receive some form of definitive