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One hundred injured patients a day: multicenter emergency room surveillance of trauma in Pakistan

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ABSTRACT

Objectives: Injuries increasingly contribute to the global burden of disease in low- and middle-income countries. This study presents results from a large-scale surveillance study on injury from several urban emergency departments (EDs) in Pakistan. The objective is to document the burden of injuries that present to the healthcare system in Pakistan and to test the feasibility of an ED-based injury and trauma surveillance system.

Study design: Cross-sectional study conducted using active surveillance approach.

Methods: This study included EDs of seven tertiary care hospitals in Pakistan. The data were collected between November 2010 and March 2011. All patients presenting with injuries to the participating EDs were enrolled. The study was approved by the Institutional Review Boards of the Johns Hopkins School of Public Health, Aga Khan University, and all participating sites.

Results: The study recorded 68,390 patients; 93.8% were from the public hospitals. There were seven male for every three female patients, and 50% were 20–39 years of age. About 69.3% were unintentional injuries. Among injuries with a known mechanism (19,102), 51.1% were road traffic injuries (RTIs) and 17.5% were falls. Female, patients aged 60 years or older, patients transferred by ambulance, patients who had RTIs, and patients with intentional injuries were more likely to be hospitalized.

Conclusion: The study is the first to use standardized methods for regular collection of multiple ED data in Pakistan. It explored the pattern of injuries and the feasibility to develop and implement facility-based systems for injury and acute illness in countries like Pakistan.

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Introduction

Injuries are responsible for approximately 10% of the global burden of disease (GBD).[1] Globally, the leading causes of death from injuries are road traffic injuries (RTIs), falls, drownings, and burns.[1] In 2013, nearly 1.4 million people died due to RTIs, and 88% of these fatalities occurred in low- and middle-income countries (LMICs).[1] Another half a million died from fall injuries in the same year, also overwhelmingly in LMICs.[1] Annually, around 368,110 drown and another 237,516 die from burns.[1] These injuries are consuming more lives than before because of globalization, motorization, and concurrent decrease in other causes of deaths such as infectious diseases.

Global averages, however, mask a great deal of variation between countries. LMICs include approximately 85% of the world's population and more than 90% of the injury burden.[2] Pakistan, an LMIC with a per capita gross national income of USD 1,260 and an estimated population of 180 million, is the sixth most populous country in the world.[3] In 2013, an estimated 118,558 deaths occurred in Pakistan due to injuries, of which 22.7% were RTIs, 10.3% falls, and 10.3% interpersonal violence.[1] Projections based on data from GBD 2010 estimate that between 2010 and 2025, the annual number of deaths just from RTIs will increase from 19,700 to 30,900 in Pakistan.[4] The burden of injuries in Pakistan is also high among children.[5,6] Younger children are exposed to high risks of home injuries such as burns and poisoning due to home hazards, whereas older children suffer largely from RTIs in an increasingly motorized Pakistan.[5,6] The healthcare system in Pakistan is decentralized and comprises both public and private sector providers. The public sector includes basic health units, district headquarter hospitals, and tertiary-level teaching hospitals, while the private sector comprises clinics and some teaching hospitals, which are mostly located in urban regions of the country.[7]

Surveillance is a cornerstone of an efficient response to the tremendous burden posed by injuries.[2] A global childhood unintentional injury surveillance program was piloted in Karachi, Pakistan, along with four other sites in LMICs.[8] There is also an RTI surveillance program in Karachi.[9,10] However, to our knowledge, there is no ongoing injury surveillance either at a community or hospital level that covers more than one Pakistani city using a standardized, uniform methodology. This study reports results from a pilot multisite surveillance from emergency departments (EDs) in each province of Pakistan. The objectives were to document the burden of injuries that present to the healthcare system in Pakistan and to test the feasibility of an ED-based injury and trauma surveillance system on a large scale.

Methods

Study setting and population

The Pakistan National Emergency Department Surveillance (Pak-NEDS) study was conducted in seven hospitals in six major cities of Pakistan (Supplementary Fig. 1). Two hospitals are private (Shifa International Hospital and Aga Khan University [AKU]), and five are public sector (Lady Reading Hospital, Benazir Bhutto Hospital, Mayo Hospital, Sandeman Provincial Hospital, and Jinnah Postgraduate Medical Center)(Supplementary Table 1). All have high-level tertiary facilities and formal EDs as well as affiliated staff working around the clock. All the EDs based in public hospitals see a heavy patient load with annual census exceeding 75,000 patients and a daily patient-to-physician ratio of over 25:1.[2]

Data collection

A standardized surveillance form was administered to all patients presenting to EDs of the seven participating hospitals. The form was based on the National Hospital Ambulatory Care Survey of the Centers for Disease Control, USA, and previous surveillance studies done in Pakistan.[8–11] The form was a one sided, single page with questions on demographics; mode of arrival; reasons for ED visit; intent, mechanism, and nature of injury; history of care; laboratory investigations; and disposition classified according to the International Classification of Diseases version-10[12] (Supplementary Fig. 2).

Data collection was done between November 2010 and March 2011. In each participating hospital, an ED physician was designated as onsite supervisor. Specially trained data collectors worked in three 8-h shifts. At the end of each shift, a cell phone text message from each hospital was sent by the data collector to the study coordinators at AKU (coordinating center) to document the total number of patients seen during the shift. Completed data forms were couriered to AKU within 5 days. Investigators at AKU matched the number of hard copies received with the actual numbers reported at the end of each shift (Fig. 1). This study was approved by the Ethics Review Committee of AKU and the Institutional Review Boards of the Johns Hopkins Bloomberg School of Public Health and of all participating hospitals. Written informed consent was taken from patients/next of kin or caretaker in case of children. Detailed methods of Pak-NEDS are explained elsewhere.[13]

Statistical analysis

Data entry was done at AKU using Epi Info[14] and Stata, version 12[15] was used for data analysis. An 'index injury' was defined as any unintentional or intentional damage to a body part resulting in the patient coming to one of the participating EDs during the study period. Injury intent was presented as unintentional, assault, and self-inflicted. 'Nature' of injuries was grouped as sprains or bruises, cuts/lacerations or puncture wounds, fractures of bones, burns, and head injuries. Injury 'mechanisms' or causes included RTIs, falls, animal attacks, poisoning, and others. Injuries categorized as these specific mechanisms are considered as unintentional injuries. For instance, if a patient fell as a result of assault, this injury is considered intentional injury (assault) and not fall injury.

Descriptive analyses were reported for sociodemographic and injury characteristics and key information about ED visits. The logistic regression model explored factors associated with hospital admission using age, gender, mode of arrival, injury mechanisms, and injury intention as covariates. These variables in the final regression model were first selected based on