

Infectious Outcomes Assessment for Health System Strengthening in Low-Resource Settings: The Novel Use of a Trauma Registry in Rwanda

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Abstract

Background: More than 90% of injury deaths occur in low-income countries where a shortage of personnel, infrastructure, and materials challenge health system strengthening efforts. Trauma registries developed regionally have been used previously for injury surveillance in resource-limited settings, but scant outcomes data exist.

Methods: A 31-item, two-page registry form was developed for use in Rwanda, East Africa. Data were collected over a one-year period from April 2011 to April 2012 at two university referral hospitals. Inpatient 30-d follow up data were abstracted from patient charts, ward reports, and operating room logs. Complications tracked included surgical site infection (SSI), pneumonia, urinary tract infection (UTI), decubitus ulcers, transfusion, cardiac arrest, respiratory failure, and blood thromboses. Univariate analysis with chi-square and the Fisher exact test was performed to determine the association between complications and hospital stay and complications and mortality. Multivariable logistic regression was used to control for age, gender, hospital, mechanism of injury (penetrating versus blunt), and Glasgow Coma scale score (GCS).

Results: A total of 2,227 patients were recorded prospectively. One thousand five hundred nineteen patients were admitted for inpatient care (69%) with a 4% (n=67) 30-d mortality. One hundred thirteen patients developed a hospital-acquired infection (88 SSI, 15 UTI, 12 pneumonia). For admitted patients, 25% (n=387) were still in-hospital at 30-d. Whereas the development of any complication was associated with an increased mortality (p<0.0001, unadjusted OR 3.2, 95% CI 1.8–5.7), there was no association between the development of an infection and mortality (p=0.6). Hospital-acquired infection was associated with an increased length of stay (p<0.0001, adjusted odds ratio (OR) 7.3, 95% confidence interval (CI) 4.7–11.2). Surgical site infection and UTI were individually associated with an increased length of stay.

Conclusions: The development of hospital-acquired infections is associated with an increased hospital stay in the trauma population in Rwanda. This has important implications in improving a health system already strained by limited infrastructure, personnel, and finances.

MORE THAN 90% OF INJURY DEATHS occur in low-income countries, amounting to more annual deaths than human immunodeficiency virus/acquired immune deficiency syndrome, malaria, and tuberculosis combined [1,2]. The African region has nearly twice the disability burden of the Americas and Europe, perhaps related to the limited availability of emergency services, and lack of prompt resuscitation, and surgical management of non-fatal injuries [3]. The disproportionate injury burden in resource-limited settings coincides with a shortage of personnel, infrastructure,

and resources that challenge health system strengthening efforts. Whereas they carry nearly a quarter of the global disease burden, countries in sub-Saharan Africa have only 3% of the world's health workforce and spend less than 1% of the world's healthcare dollars [4].

Over 70% of World Health Organization member countries have no data on surgical conditions, and even fewer have data on safety or outcomes; these data limitations are more prominent in low- and middle-income countries (LMIC) [5]. Hospital-based trauma registries developed regionally have

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