Epidemiology and Factors Associated with Operative Treatment of Pediatric Fractures in Malawi

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Purpose: Our objective was to identify patient- and injury-specific characteristics associated with operative treatment of children with fractures entered in the Malawi Fracture Registry.

Methods: From the Registry, we retrospectively reviewed patients under the age of 20 years who presented to the orthopaedic clinics of 2 urban central hospitals and 2 rural district hospitals in Malawi. We used bivariate and multivariate modified Poisson regression to evaluate association between operative treatment and the following covariates: age, sex, referral status, injury mechanism, fracture type, open fracture, treating provider, and inpatient hospital admission.

Results: 11,041 patients in the registry were <20 years old and met the inclusion criteria for our study. Most injuries were due to falls (80.0%), and the most common fractures were of the wrist (distal radius/ulna) (31.5%), elbow (supracondylar humerus) (19.6%), and forearm (midshaft radius/ulna) (19.6%). 5.5% had a polytraumatic injury. 1.7% had open fractures, predominantly of the tibia/fibula (27.5% of open fractures). The vast majority (97.4%) of patients were managed by non-physician orthopaedic clinical officers (OCOs) with 76.7% being treated and sent home the same day. 5.7% were treated operatively, most of whom were 10 to 19 years old (51.9%). Nearly all (98.2%) fractures seen in district hospitals were treated nonoperatively, and 6.9% of fractures seen in central hospitals received an operation. Multivariate analysis demonstrated that operative treatment at central hospitals was independently associated with open fracture (relative risk [RR]: 6.41 [4.89, 8.59]), initial evaluation by an orthopaedic surgeon (RR: 2.72 [2.30, 3.23]), hospital admission (RR: 2.42 [2.12, 2.75]), not being referred from another facility (RR: 1.29 [1.15, 1.45]), and the following fractures: scapula (RR: 4.36 [1.94, 10.30]), shoulder (proximal humerus) (RR: 3.04 [1.91, 4.99]), midshaft humerus (RR: 2.02 [1.18, 3.49]), elbow (supracondylar humerus) (RR: 1.55 [1.02, 2.45]), hand (RR: 2.04 [1.33, 3.05]), ankle (RR: 2.02 [1.28, 3.29]), and knee (RR: 2.07 [1.34, 3.34]). Significance was determined as $P<0.05$.

Conclusion: In Malawi, the vast majority of children with fractures are treated nonoperatively by a non-physician OCO. Only 5.7% of these patients are treated operatively, primarily at central hospitals. Patients referred to a central hospital (as opposed to those who presented without a referral from another facility) were more likely to be treated nonoperatively, possibly indicating ineffective referral systems and lack of care standardization. Although intertrochanteric and midshaft femur fractures in high-income countries are often treated operatively, these injuries were not significantly associated with receiving an operation in Malawi. While clinical outcomes were not examined, we found that pediatric fractures rarely receive surgery in Malawi, suggesting a need to improve operative capacity nationwide.