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A national trauma capacity assessment of Haiti

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ABSTRACT

Background: Trauma systems in high-income countries have been shown to reduce trauma-related morbidity and mortality; however, these systems are infrequently implemented in low- and middle-income countries. Haiti currently lacks a well-resourced and structured trauma system and in turn loses an estimated 800,000 y of healthy life to injuries annually. In the present study, we perform a nationwide trauma capacity assessment, and using the World Health Organization's Guidelines for Essential Trauma Care as a framework, we attempt to identify achievable steps that can be taken toward improving trauma care in Haiti.

Materials and methods: This cross-sectional study was performed at 12 facilities nationally using a survey tool assessing the areas of infrastructure, supplies and equipment, personnel and training, and procedural capabilities. Additionally, the total number of trauma cases presenting to each facility was tabulated from emergency room logbooks.

Results: A total of six secondary and six tertiary facilities were surveyed. Secondary facilities received an average of 35 trauma cases per week, whereas tertiary facilities received an average of 65 cases per week. Survey results demonstrated a shortage of airway, breathing, and circulation equipment and supplies in both facility levels, particularly in emergency rooms. All facilities lacked access to essential surgical personnel and trauma training.

Conclusions: This study makes recommendations for improvements in trauma care in Haiti in the areas of infrastructure and administration, physical resources, and training and human resources. These recommendations represent feasible steps that can be taken toward the construction of a national trauma system in Haiti.

1. Introduction

The burden of traumatic injury in low- and middle-income countries (LMICs) has received growing attention from the international community as a matter requiring urgent action [1–3]. The 2004 Global Burden of Disease study estimated that over 5.8 million lives were lost worldwide to traumatic injuries, representing 32% more than the lives lost to

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tuberculosis, malaria, and human immunodeficiency virus and/or AIDS combined [4]. Ninety percent of this burden falls on LMICs with enormous socioeconomic consequences for families in developing countries [5]. Trauma systems in high-income countries (HICs) have been shown to reduce morbidity and mortality resulting from injuries; however, these systems are infrequently implemented in LMICs because of financial, logistical, and human resource barriers [6]. Multiple studies from the developing world tell a story of medically preventable deaths because of the lack of an organized system of trauma care delivery [7–10]. One such study found that those with life-threatening but salvageable injuries are six times more likely to die in LMICs than in HICs with functional trauma systems [10].

Several international organizations have developed tools and guidelines in an effort to assess and improve trauma care in LMICs [11–13]. The World Health Organization (WHO) and the International Association for the Surgery of Trauma and Surgical Intensive Care (IATSIC) have collaborated to develop the Guidelines for Essential Trauma Care (Guidelines for EsTC). These guidelines provide a minimum standard of care that should be available to every injured person worldwide regardless of setting [6]. The major theme of these guidelines is that large improvements in the outcomes for injured persons can be made through affordable interventions in organization and planning. To this end, the Guidelines for EsTC set forth a list of essential trauma services including the physical resources and corresponding knowledge and skills that should be available to every injured person globally.

Haiti, the poorest country in the Western hemisphere, is affected by a growing trauma burden with an estimated 800,000 y of healthy life lost to injuries in 2012 alone [14]. In 2013, our group performed a trauma capacity assessment of Haiti's Central Plateau and found an underresourced and unstructured regional trauma system [15]. Apart from this regional assessment, little was known of the state of trauma care in Haiti. With the support of Haiti's Ministère de la Santé Publique et de la Population (Ministry of Public Health and Population, MSPP), we have expanded our regional study to a nationwide trauma capacity assessment. Through this assessment and using the Guidelines for EsTC as a framework, we attempt to identify achievable steps that can be taken toward improving trauma care in Haiti.

2. Methods

This cross-sectional study of trauma capacity in Haiti was performed as part of a collaboration between Haiti's MSPP, the nongovernmental organization Project Medishare for Haiti, and Emory University School of Medicine and the Rollins School of Public Health. As previously reported, a survey tool focused on trauma capacity was adapted based on the WHO's Tool for Situational Analysis to Assess Emergency and Essential Surgical Care covering the areas of infrastructure, supplies and equipment, personnel and training, and procedural capabilities [15]. Following observations made during this initial study, we adapted our survey tool to better capture the current state of trauma care in Haiti. These adaptations included gathering data on (1) the percentage of time select items of equipment were available; (2) the location of select items within the facility (i.e., emergency room [ER] *versus* operating room [OR]); (3) the 24 h per day/7 d a week (24/7) availability of essential services (e.g., blood bank, radiology); and (4) the availability of essential personnel (e.g., surgeon availability in-house *versus* on-call).

Haiti is divided into ten geographic departments. Surveyed facilities were selected if they either represented the MSPP departmental referral facility or had substantial surgical capacity and acted as a regional surgical subspecialty referral facility. Site visits were conducted and surveys were administered at eleven facilities from June 2014–July 2014. A 12th facility was visited for survey administration in February 2015. With the assistance of Haitian interpreters, two Emory University medical students administered the survey at each facility. Surveys were completed by a combination of administrators, medical directors, clinicians, and technicians at each facility. Most survey items were directly observed during facility tours. Most survey questions were answered during these in-person visits, and missing information was gathered via phone or during additional site visits during the period of July 2014–February 2015. Facilities were categorized as secondary or tertiary based on either the population size that they served or by the infrastructure and surgical capabilities of the facility. Estimated 2009 department populations were used for populations served by MSPP departmental facilities [16]. Facilities serving a population >700,000 people, or possessing an intensive care unit (ICU) and serving as a surgical subspecialty referral center, were classified as tertiary care facilities.

The percentage of time each survey item was available in each location was recorded. Open-ended sections were also included in the survey to allow for facility-specific notes in each section. The quantity of each case type performed per month as reported by medical directors and clinicians was recorded as a range: 1–10, 11–25, 26–50, 51–75, 76–100 and 101+. A value of less than 1 indicates that the procedure is performed less than once a month, and if the facility is not capable of performing the procedure, it was recorded as not performed. Procedure counts include both emergent and nonemergent cases. The total number of adult and pediatric trauma cases presenting to each facility were tabulated from government-mandated ER logbooks that record every patient presenting to the ER. When reported in the ER logbook, the total number of motor vehicle accidents (MVAs) and injuries due to violence reported in the ER logbooks was also tabulated. Surveys were initially completed on paper and then loaded into Adobe FormsCentral (Adobe Systems Inc, San Jose, CA). Aggregate data were exported to Microsoft Excel (Redmond, WA) for analysis. Approval of this study was granted by Emory University's Internal Review Board and Haiti's National Bioethics Committee.

3. Results

A total of 12 facilities were visited for survey administration including six secondary and six tertiary facilities (Table 1). None of the surveyed facilities used a trauma registry and so epidemiologic data were gathered from ER logbooks (Table 2). Secondary hospitals experienced an average of 35 trauma