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Epidemiology of occupational injuries by nationality in Qatar: Evidence for focused occupational safety programmes

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ABSTRACT

Introduction: Occupational injuries are the second leading cause of trauma admission in Qatar. Given the wide diversity of the country's migrant worker populations at risk, this study aimed to analyse and describe the epidemiology of these injuries based on the workers nationality residing in Qatar.
Methods: A retrospective analysis of trauma registry data on occupational-related injuries was conducted. The analysis included all patients [aged ≥18 years] admitted to the Level I Hamad Trauma Center, from January 1, 2010 to December 31, 2013.
Results: Out of 6555 trauma admissions, 2015 (30.7%) patients had occupational injury. The admitted Case Fatality Rate (CFR) was 4.3 per 100 occupational injury related trauma admissions. Overall non-fatal occupational injury rate was 37.34 per 100,000 workers, whereas fatal injury rate was 1.58 per 100,000 workers. Most of the workers experiencing occupational injuries were from Nepal (28%), India (20%) and Bangladesh (9%). Fatal occupational injuries were predominately among Indians (20%), Nepalese (19%), and Filipinos/Bangladeshis (both 8%). Filipinos had the highest admitted CFR at 8.2 deaths per 100 trauma admissions with the next highest being Indians and Indonesians (4.2 per 100 trauma admissions). During the study period, the incidence of severe occupational injuries decreased despite a simultaneous increase in the worker population within Qatar. Almost one in four occupational injuries was a major trauma (ISS ≥ 16). Nepalese and Indian workers represented 29% and 18% of all major trauma cases.
Conclusions: Non-fatal occupational injuries appear to follow a pattern distinct from fatal ones. High-risk worker populations as defined by those with high admitted CFRs, experiencing the most severe or fatal injuries, must be the focus of targeted risk factor analysis and occupational safety interventions.

Introduction

Occupational injuries are the second leading cause of trauma admission in Qatar, after motor vehicle crashes [1]. Global estimates of the health burden from these injuries showed that 10% of the attributable fraction of global disease and injury is due to occupational risk factors [2]. The International Labor Organization (ILO) reported that every year around the globe an estimated 317 million injuries are occupational-related, while more than 2.34 million occupational deaths are due to injury and disease [3]. Despite wide variations between countries, occupational injuries and fatal occupational injuries are estimated to account for an economic loss of 4% of the global gross domestic product (GDP) per year [3].

Estimates by Hamalainen et al. showed that the average fatal occupational injury rate in the Gulf Cooperation Council (GCC) countries including Qatar was 8 deaths per 100,000 workers [4]. However, the national rates were higher in the United Arab Emirates (UAE) (9.8), Qatar (9.2) and Bahrain (8.3) and lower in Saudi Arabia (7.9), Oman (7.1) and Kuwait (5.9) [4]. A hospital based data analysis in the UAE reported the incidence of severe occupational injuries as 136 per 100,000 workers per year [5]. Severe occupational injury was defined as injury necessitating

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hospital admission. On the other hand, one of the oil company databases in Oman reported a markedly higher rate of non-fatal injuries as 1980 occupational injuries per 100,000 workers from 2003 to 2005 [6]. A previous study based on trauma registry data in Qatar reported occupational injuries as 49.27 per 100,000 workers which in fact was one third of occupational injuries reported in UAE [7]. Variations in the data sources and predominant industries (i.e. exposures or risks), as well as in the definition of occupational injuries across the region may contribute to this differential reporting.

The fatal occupational injury rate in Qatar, from the previously cited trauma registry database, was 1.97 per 100,000 workers per year from 2010 to 2012 [7]. When compared with the published data of Hamalainen et al., in the last decade, this represents a 79% reduction in Qatar's fatal occupational injury rate [4,7]. In this time, Qatar has received an unprecedented influx of migrant or expatriate workers; these workers account for the 10% annual growth rate of its population [8]. This dramatic reduction in occupational injury death rates, despite the continued arrival of hundreds of thousands of 'new' workers, cannot be attributed to a single factor. More likely they are due to the successful implementation of multi-faceted occupational safety and injury prevention strategies but this has not been explicitly documented.

This rapid influx and turnover of expatriate workers is expected to continue and it is estimated that one million more foreign workers will be recruited to participate in construction projects like soccer stadiums, roads, subways and rail systems in preparation for the World Cup football matches in 2022. This phenomenon increases the potential for a derailment of the dramatic reductions in occupational injury death rates and as such they have become a priority concern for the national government and the concerned ministries.

In 2012, 94% of the total workforce in Qatar was expatriate, consisting of 1.26 million migrant workers, mainly from South Asian countries like India, Nepal, Pakistan, Bangladesh and Sri Lanka [8,9]. The present study analyses trauma registry data on occupational injuries in Qatar for four years (2010–2013) with a focus on the differential epidemiology of these injuries among the diverse nationalities that make up Qatar's work force. Its objectives were to provide an evidence base for the formulation of recommendations to improve occupational safety in Qatar. This was done to inform the 'source countries', employers and labour officials about the highest risks for migrant workers in order to help target interventions and to promote prospective occupational surveillance systems in Qatar.

Methods

The Hamad Trauma Center (HTC) and its Trauma Registry at Hamad General Hospital (HGH) was developed in late 2007, it encodes and stores records on all trauma patients who are admitted to or treated by the Trauma Surgery Section. This registry collects data related to patients' demographics, occupation, mechanism of injury, associated risk factors (comorbidities, use of protective devices, safety measures), injury severity scoring (ISS), emergency medical services (EMS) (mode of transportation, transportation time, first aid care and resuscitation), disposition (intensive care, operating room, surgical word or transfer to rehabilitation hospital), surgical and non-surgical interventions (i.e., intubation, tracheostomy, laparotomy, bone fixation, craniotomy etc.), complications, hospital length of stay and mortality. The present study is a descriptive analysis of data from this trauma registry on occupational injuries in Qatar. The study included all occupational injury patients [aged $\geq$18 years] admitted to the Level I HTC, which is the national trauma referral centre and the only provider of tertiary trauma care in Qatar. The HTC receives and treats all the major cases of injuries in Qatar, in compliance with the standards of the American College of Surgeons Committee on Trauma. Therefore, the study provides figures that are nationally representative. Fatalities transferred directly from the scene to mortuary are not included in this dataset. The study excluded all minor occupational injuries that did not require hospital admission (i.e., patients seen at the emergency department or outpatient clinic for minor occupational injuries and discharged home). The study duration was from January 1, 2010 to December 31, 2013. The population-based incidence and mortality rates from severe occupational injuries in Qatar were based on population data from the Qatar Statistics Authority.

In this study, occupational injuries were defined as injuries taking place while the employee was engaged in work-related activities during his/her specified working hours and required hospital admission for >24 h. Injuries that occurred while travelling to and from work were also included. Fatal occupational injuries were in-hospital and pre-hospital deaths that resulted from work-related injuries. To calculate ISS, six anatomical regions were scored with the Abbreviated Injury Score (AIS) and the square of the high values of the three most severely injured body regions were added (total score ranged from 1 to 75). Injury burden is the proportion of all injuries that affect a certain sub-population of workers (i.e. 5 out of 10 patients injured were from country X so the injury burden is 50%). Moderate injuries were defined as those with an ISS from 9 to 15 and major injuries were defined as those with an ISS $\geq$ 16 [10]. The mortality burden is the proportion of deaths (pre-hospital and in-hospital) caused by a specific injury mechanism among the total number of pre-hospital and in-hospital deaths due to occupational injury. Ethical approval for the study was obtained from the Medical Research Center (IRB number 13186/13) at Hamad Medical Corporation, Doha, Qatar.

Statistical methods

Data were presented as proportion, mean ($\pm$standard deviation; SD) and median with range, whenever applicable. Student *t* test was used for comparison of continuous data. To assess the probability of events, data were expressed as relative risk and 95% confidence intervals and *Z*-statistic was used. A significant difference was considered when p value was $<$0.05. Case fatality rate (CFR) is the number of deaths in a specific population divided by the total number of occupational injuries that occurred in that population. The term 'admitted CFR' was used to specify that only fatalities that happened in-hospital were included. Data analysis was carried out using the statistical package for social sciences version 18 (SPSS Inc., Illinois).

Results

During the four-year study period, a total of 2015 patients with occupational injuries were admitted to the HTC, these patients comprised 30.7% of all trauma admissions from all causes. Qatar witnessed a 21.2% rise in its workforce population from 1.27 million in 2010 to 1.54 million in 2013. The average annual incidence of occupational injury hospitalizations over the four years was estimated as 37.34 per 100,000 workers per year while the fatal occupational injury rate during the study period was 1.58 per 100,000 workers per year.

Of the 2015 occupational injuries, 99% (1995) met the inclusion criteria, and 98% were males. There were 784 (39%) cases aged 25–34 years, 493 (24%) aged 35–44, 270 (13%) aged 45–54, and 83 (4%) aged $\geq$55 years (Table 1). The mean age of occupational injury patients was 32 years (SD 10.3) while the median age was 34 years (range: 18–76). By nationality, those experiencing occupational injuries were Nepalese (28%), Indians (20%), Bangladeshi (9%), Egyptian (9%), Sri Lankan (8%), Pakistani (5%), Filipinos (4%), Syrian