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Fall-related injuries in a low-income setting: Results from a pilot injury surveillance system in Rawalpindi, Pakistan

Junaid A. Bhatti [a,b,c,1,*], Umar Farooq [d,1], Mudassir Majeed [d], Jahangir S. Khan [d], Junaid A. Razzak [e], Muhammad M. Khan [d]

[a] *Sunnybrook Health Sciences Centre Research Institute, Toronto, Canada*
[b] *Department of Surgery, University of Toronto, Toronto, Canada*
[c] *Institute for Clinical Evaluative Sciences, Toronto, Canada*
[d] *Surgical Unit I, Department of Surgery, Holy Family Hospital, Rawalpindi, Pakistan*
[e] *Department of Emergency Medicine, The Aga Khan University, Karachi, Pakistan*

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Abstract This study assessed the characteristics and emergency care outcomes of fall-related injuries in Pakistan. This study included all fall-related injury cases presenting to emergency departments (EDs) of the three teaching hospitals in Rawalpindi city from July 2007 to June 2008. Out of 62,530 injury cases, 43.4% (N = 27,109) were due to falls. Children (0—15 years) accounted for about two out of five of all fall-related injuries. Compared with women aged 16—45 years, more men of the same age group presented with fall-related injuries (50% vs. 42%); however, compared with men aged 45 years or more, about twice as many women of the same age group presented with fall-related injuries (16% vs. 9%, P < 0.001). For each reported death due to falls (n = 57), 43 more were admitted (n = 2443, 9%), and another 423 were discharged from the EDs (n = 24,142, 91%). Factors associated with death or inpatient admission were: aged 0—15 years (adjusted odds ratio [aOR] = 1.35), aged 45 years or more (aOR = 1.94), male gender (aOR = 1.15), falls occurring at home (aOR = 3.38), in markets (aOR = 1.43), on work sites (aOR = 4.80), and during playing activities (aOR = 1.68). This ED-based surveillance

Abbreviations: ED; emergency department; LMICs; low- and middle-income countries; SD; standard deviation; WHO; World Health Organization

* Corresponding author at: Sunnybrook Health Sciences Centre Research Institute, 2075 Bayview Avenue, G1-06, Toronto M4N 3M5, Canada. Tel.: +1 416 480 4055; fax: +1 416 480 6049.
E-mail addresses: junaid.bhatti@yahoo.com, junaid.bhatti@ices.on.ca (J.A. Bhatti).

[1] Equally contributed.

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study indicated that fall prevention interventions in Pakistan should target children, older adult women, homes, and work sites.

1. Introduction

Injuries account for about 12% of the disease burden worldwide and have a major impact on the health system [1]. Out of 5 million deaths that were attributed to injuries in 2000, falls accounted for about 424,000 deaths, making it the second leading cause of unintentional injury deaths worldwide after road traffic injuries [1—3]. The Global Burden of Disease report has estimated that fall-related deaths have increased by 55% from 348,000 deaths annually in 1990 to about 540,000 deaths in 2010 [4]. More worrying is the fact that this burden was disproportionately distributed as more than 82% of fall-related mortality and 92% of disability adjusted life year (DALY) loss occurred in low- and middle-income countries (LMICs) [5].

Research conducted in developed countries showed that fall-related injuries were frequent in children, older adults, and occupational settings [6]. The economic costs of such injuries are overwhelming because of the high number of childhood injury visits, hospital care of the older adult population, and productivity losses [2,7—10]. The most immediate consequence of falls, however, is engaging available healthcare resources in dealing with injury problems that are amenable to prevention [11].

The situation in LMICs could be much worse where the burden of fall-related injuries might affect performance of the healthcare system more rapidly than high-income settings because of limited resources [12]. To date, few surveillance studies have been carried out to assess the impact of fall-related injuries in LMIC settings, in particular on emergency care systems that could be overwhelmed by the care of such injuries [13,14]. This lack of data on local injury problems could hamper appropriate resource allocation to prevent and control fall-related injuries in LMICs [15].

Pakistan is a low-income country with a population of over 160 million inhabitants [16]. One previous health survey conducted at the national level indicated that falls accounted for almost half of the injury incidence in the country and were more frequent in urban settings than rural settings [17]. Another national survey indicated that fall-related injuries were the most common mechanism of injuries after injuries that occur on roads [18,19]. Both surveys, however, lacked clarity about circumstances of fall-injuries because both classified all injuries occurring on roads as road traffic injuries. More worryingly, none of the previous studies had evaluated the impact of this burden on the healthcare system, in particular, the emergency care outcomes that could be used for monitoring healthcare burden of these injuries, as well as informing about preventive interventions [7,12,20]. The aim of this study is to assess the characteristics and emergency care outcomes of fall-related injuries in an urban setting in Pakistan.

2. Methods

2.1. Study setting and population

This prospective observational study was conducted in Rawalpindi city which had a population of 1.6 million in 2006 and an urbanization rate of around 4% [21,22]. An injury surveillance system was established at the emergency departments (EDs) of three teaching hospitals, namely: Holy Family Hospital, Benazir Bhutto Shaheed Hospital, and District Headquarter Hospital. A fall in the injury cases was defined as ''a sudden and unintentional change in position resulting in an individual landing at a lower level such as on an object, the floor, or the ground, with or without injury'' [23]. This definition was concordant with the Prevention of Falls Network Europe Consensus [24] and the International Classification of Disease W00—W19 [25]. All cases presenting to EDs over a period from July 1, 2007 to June 30, 2008 with a fall-related injury were included in the study. The questionnaire used in this study distinguished fall-related injuries from road traffic injuries, as the variable used for defining both mechanisms ensured that both events were recorded as mutually exclusive [26,27]. Ethical approval of the study protocol was obtained from Rawalpindi Medical College research ethics council before beginning the study.

2.2. Data collection

Data were recorded on minimal dataset questionnaires for injury surveillance by the World Health