

# Falls- Underestimated but Significant Mode of Trauma!

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## Abstract

**Aim.** To review the common causes of injuries and high light the importance of falls in trauma.

**Method.** This retrospective study was carried from 1<sup>st</sup> of January to 30 November 2013 at Zayed Military Hospital Abu Dhabi, UAE. The International Classification of Diseases Ninth Revision, Clinical Modification (ICD-9-CM) code is applied to all cases who attended for various types of injuries for data recording. Top five causes were further analyzed. **Result.** A total number of 2295 cases visited for care of

various injuries, 777 were due to different type of falls. Male cases were 505 and 272 were females. Age distribution showed 45% cases were up to 14 years, 51% were between 15 to 64 years old and 4% were above 65 years old. Seventy six cases were admitted in the hospital and remaining were treated on outpatient basis. **Conclusion.** Falls constitute a very significant percentage of trauma. This is potentially preventable through public awareness and application of safety measures. **Key Words:** Falls, Trauma

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## INTRODUCTION

Trauma constitutes an important and significant proportion of surgical patients. Generally speaking trauma is taken as motor vehicle accidents and violence. However analysis of visits of trauma victims revealed interesting figures with highest number from falls. Falls can be from heights or same level. Falls are a persistent hazard found in all occupational settings. A fall can occur during the simple acts of walking or climbing a ladder to change a light fixture or as a result of a complex series of events affecting an ironworker 80 feet above the ground. Circumstances associated with fall incidents in the work environment frequently involve slippery, cluttered, or unstable walking / working surfaces; unprotected edges; floor holes and wall openings; unsafely

positioned ladders; and misused fall protection. Healthcare support, building cleaning and maintenance, transportation and material moving, and construction and extraction occupations are particularly at risk of fall injuries. Fall height<sup>1</sup> correlated positively with the injury severity score, hospitalization and mortality. According to the 2009 data from the Bureau of Labor Statistics USA, 605 workers were killed and an estimated 212,760 workers were seriously injured by falls to the same or lower level. The issue of fall injuries is worldwide.<sup>2,3,4.</sup>

## MATERIALS AND METHODS

This is a retrospective study carried out at Zayed Military Hospital Abu Dhabi, UAE, from 1st of January to 30th of November 2013. Hospital data was reviewed which was recorded according to The International Classification of Diseases Ninth Revision, Clinical Modification (ICD-9-CM) code. Top five causes of injuries visit were analyzed with particular attention to falls.

Inclusion criteria: All patients visiting Hospital for

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any reason of trauma including cases which were admitted and cases which were treated as outdoor patients.

## RESULTS

Data analysis revealed the following facts. Total numbers of patients visiting to Hospital were 2295 during eleven months of study. Injuries due to falls were 33.85%. Falls included from heights, stairs, ladders, cleaning and construction scaffolding, balconies, rooftops, slippery surfaces, bathrooms, caught in carpets, water sports and falls at children play areas.

Motor vehicle accidents made 22% of trauma related hospital visits. Over exertion from sudden strenuous movement resulted in injuries in 14% of cases. This resulted from strenuous military exercises especially during summer and sport injuries like football, martial arts, Jiu Jitsu etc. Environmental and accidental causes were 10.5% and included mostly work place injuries.

**Table-1**  
**Common causes of trauma**

Description	ICD-9-CM Code	Total cases	Percentage
Falls ( all types included with different ICD codes)	For example E888.9, E880.9	777	33.85%
Road traffic accidents	For example E928.9	505	22%
Over exertion from sudden strenuous movement	E927.0	327	14%
Other environmental and accidental causes	E928.8	241	10.5%
Accidents caused by unspecified cutting and piercing instruments or objects	E920.9	98	4.2%
Miscellaneous	For Example E917.0, E920.8, E924.0, E819.9	347	15.45%

Accidents caused by various cutting and piercing instruments made 4.2 % and included stabbing and sharp object injuries. Miscellaneous causes included hot liquids and vapor injuries, striking against an object or person, caught in or between objects, drowning, work injuries at Hospital, burns etc. and made 15.45%. Top five causes of trauma visits are shown in table 1. The total of 777 victims of falls were further analyzed. Sex distribution shows male to female ratio of 1.85 versus 1, (505 versus 272 cases). Age distribution showed that no age was immune. Toddlers fell from trolleys and beds, children fell while playing; middle age suffered work and sports injuries, old age with slips from bathrooms, caught in carpets etc. A total of 350, (45%) cases were from age group of up to 14 years, 395, (51%) cases were from 15 to 64 years age group and 32, (4%) cases were above 65 years old.

There is a seasonal variation which showed fewer cases in the month of August and September. This time is for school holidays and many people traveled abroad. (This is shown in the table 2.)

**Table-2**  
**Month and sex wise distribution**

Month	Male	Female	Total
January	55	17	72
Feb	46	29	75
Mar	45	24	69
Apr	60	30	90
May	48	25	73
June	42	20	62
July	44	26	70
Aug	32	18	50
Sept	34	21	55
Oct	47	32	79
Nov	52	30	82

Seventy six patients were admitted in the hospital, 52 were males and 24 were females. Significant injuries sustained were head and face 5 cases, spine, pelvis and abdomen trauma 4 cases, lower limb fractures 34 cases, upper limb fractures 37 cases. Thirteen old age patients suffered fracture

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neck of femur by fall in bathroom which is significant percentage and a lot of morbidity and which is potentially preventable.

## DISCUSSION

The issue is worldwide and significant as 33% of trauma visits in our hospital belong to this group. In a regional study in Oman, the most common cause of injury visits were falls.<sup>2</sup> In an Indian study of overall trauma, falls is at number two with 17 % incidence<sup>3</sup>. Falls from heights is common in Nigeria at Benn<sup>4</sup> as suggested in epidemiological study as a preventable way of injury. There is a high incidence of seeking out care in urgent care centers due to falls, which constitutes a severe public health problem that affects both genders in different age groups in Brazil.<sup>5</sup>

No age is immune to falls. It starts from toddler and play group of child hood, to workforce of adult hood and to old age where reasons may be different, (dementia, loss of power, medications, poor vision, slippery floors etc). In our study, age wise review of data reveals some interesting facts as factors causing falls are different and various strategies need to be applied to prevent falls. Starting from children which are 45% in our study, mechanisms of falls is very variable. In our study the common causes in this age group were falls from beds, household furniture, bicycles, children play areas, balconies and while riding cars. In an interesting study from Brazil<sup>8</sup>, data showed 29 cases of falls from roof slabs involving children and adolescents, males were accounting for 84%, predominant age group was schoolchildren. Leisure activities at the time of the fall and flying a kite were the most prevalent game. Most importantly in 72% of the cases, the children were unaccompanied by an adult responsible for them which may have prevented some of these falls.

Going to the other end age group of 65 years and above which is only 4% in our study, but 13 out of 76 (17%) admissions in hospital were from this group posing significant morbidity. All cases

suffered injuries by slipping in bath rooms and had fracture neck of femur. This is further vindicated by a Columbian study<sup>9</sup> which showed that falling is a significant cause of injury and death in frail older adults. Residents in long-term care facilities fall for a variety of reasons and are more likely to endure injuries after a fall than those in the community. A Canadian study<sup>10</sup> also confirms that fall-related mortality in adults aged 65 years and above in Quebec from 1981 to 2009 has increased.

Among middle age group which makes 51 % in our study, work place injury and sports related injuries made the bulk. Work place fall injury is a very important aspect of trauma as it needs adequate application of safety measures. This is further reiterated in Qatar study<sup>6</sup>, where 315 fall injuries review showed that 298 were workplace related falls, with mean age of  $33 \pm 11$  years. Falls from height continue to cause significant morbidity and mortality across the construction industry in North Carolina<sup>12</sup>.

Sex distribution in our study shows that males are more prone to falls than females. In Qatar study<sup>6</sup> 97 % were male at construction related falls. In Brazilian study of roof slab falls 84% were male. In American study for health care workers<sup>11</sup> however 91% injured were females. The reason for this variable pattern is probably the predominant work force gender where study was carried out. In our region most of physically demanding work and construction related work force is from male population and most of the workers in military set up males. There was a minor seasonal variation noticed that during summer holidays when schools were closed and significant population travelled for holidays, the overall injuries and falls decreased.

The fall injuries are at times life threatening or crippling. Out of seventy six admitted cases, thirteen suffered fracture neck of femur, 5 cases had spine and head injury, 4 suffered pelvic fractures and blunt abdomen trauma and 71 limbs bones fractures. This is comparable to a review of

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skeletal injuries from falls in India,<sup>7</sup> where 138 were injured due to fall from height and total of 126 fractures occurred in 101 patients: 55 in the upper limbs, 50 in the lower limbs, 14 in the spine, and 7 in the pelvis. Associated injuries included head (n = 17), chest (n = 9) and abdominal injuries (n = 6). The severity of injuries is also reflected in regional study in Qatar where most common injuries were to the spine, head, and chest<sup>6</sup>.

Fall injuries constitute a considerable financial burden; unfortunately it was not possible to assess exact treatment cost in our study. In nearby Qatar with similar living style, mean cost of care per admitted patient was approximately 16,000 USD,<sup>6</sup>. Workers compensation and medical costs associated with occupational fall incidents have been estimated at approximately \$70 billion annually in the United States, (NSC 2002.)

### PREVENTION

Protect your future by protecting children. Children are the responsibility of parents and care takers and should be never left alone unattended. Old age and frail need special attention. Older adults, their caregivers, and emergency and primary care physicians should be aware of the significant risk for fall injuries and of environmental modifications that may reduce that risk.

Successful reduction of fall injury and fatality rates at work place requires continued concerted efforts of regulators and industry leaders, professional associations and labor unions, employers and employees, safety professionals and researchers in enhancing the work environment, implementing new effective fall prevention and protection technologies, and improving the work safety culture through continuous education of the workforce.

### CONCLUSION

Falls make a significant volume of trauma patients. Different strategies need to be applied to different

age groups of population, and variety of environment factors. This can be achieved to significant level through public awareness programs and strict application of safety rules and regulations.

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