Original Article

Pediatric Trauma Requiring Admissions to a Referral Hospital in Oman: Analysis of Epidemiology and Environmental Factors

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Abstract

Objectives: We present the epidemiology of pediatric fractures requiring admission, to a referral hospital, in Oman and analysis, of the environmental factors associated with the injuries, with a view to developing preventive strategies. **Methods:** A retrospective cross-sectional study was conducted in Sohar Hospital between December 2012 and September 2014. We ascertained the circumstances of the injury from the patient records and telephonic interviews. We also determined the safety measures in place at the homes of the victims. **Results:** A total of 380 consecutive pediatric fractures requiring admission were studied. A majority of the fractures occurred in males (75%). The most common fracture was distal forearm (28%). Falls at or near-home was the predominant mechanism of injury (53%). We found variations in the activities before the falls. Most of the injuries occurred in the evening. Home design played a major role in the causation of the injuries. **Conclusions:** Pediatric fractures cause significant morbidity, and there is a need for educating the community about home child safety in Oman. Similar patterns may exist in other countries in the Gulf region and the rest of the Middle East.

Keywords: Fall, injury, musculoskeletal, Oman, pediatric, prevention

Introduction

Children are vulnerable to injuries, which, unfortunately, cause significant morbidity and mortality. Strategies toward prevention of pediatric injuries are important due to the global impact of these injuries on the public health systems. As per the world health organization report,[1] an estimated 9,50,000 children and young adults, <18-year-old, will die every year due to injuries and millions of others will face the consequences of nonfatal injuries. The majority of these injuries result from falls, motor vehicle collisions (MVCs), burns, drowning or poisoning.[1] Musculoskeletal injuries account for 10%–15% of all pediatric injuries.[2] Delay or missed diagnosis of such injuries, may end in a child with a lifelong physical disability, and lead to emotional wounds in the growing child, and the caregivers, that are difficult to heal. It has been estimated that 90% of fatal childhood injuries are unintentional.[2] Many of these injuries are predictable and largely preventable. Up to 80% of childhood injuries are thought to be preventable.[1] It has been suggested that in each child injury there are proven ways to avoid or reduce the severity of the injury.[1-6] To formulate effective preventive strategies, accurate region-specific epidemiological information is very useful. The aim of this study was to collect and analyze such data from Al-Batinah region in Oman.

Materials and Methods

A retrospective cross-sectional study was conducted in Sohar Hospital, the only referral hospital in North Al-Batinah region, Sultanate of Oman, with a catchment area drawn from six states (Shinas, Liwa, Sohar, Saham, Al-Khaboura, and Al-Suwiaq). North Al-Batinah region is the second most populous area in Oman after Muscat with a population of 413, 241 of which, about 32%, are children (<16 years of age).[7]

The study included all children (<16 years of age) admitted to the hospital with a history of having sustained a traumatic injury. The study period was from December 1, 2012, to

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September 30, 2014. The study was approved by the Ethical Committee of the North Al-Batinah region health governorate.

We documented the age, gender, date, time, and mechanism of injury.

We telephonically contacted parents/guardians of all the patients who sustained injuries due to falls, to fill any gaps that may have existed, in our retrospective data collection, as well as to ascertain further details, regarding the circumstances of the injury. Specifically, we enquired about the activity immediately before the injury, fall height, landing surface, supervision of the caregiver, and safety features at the victims' home, including window guards and locks, furniture around the windows, stair gates and special baby bed, existing playground, and presence of games involving >1.5-m height. The data were analyzed using SPSS Version 20 (IBM, New York, USA).

Results

A total of 380 cases were admitted during the study, and all of them were included in this study. There were 279 males (73.4%) and 101 females (26.6%). Of them, 135 were Preschool children (<6 years), 134 were School children (>6 and <10 years), and 111 victims were adolescents (>10 and <16 years). The peak time for injuries was the evening between 15 and 18 h in all age groups [Figure 1]. The most common part injured was distal forearm 108 cases (28.4%), with a peak in school-age children.

There were 25 cases of (22%) femur fracture, and it was the main fracture type in preschool children [Figure 2].

The most common mechanism of injury was falls in both genders and all age groups consisting of 199 cases (52.4%). Thirty-eight cases (10%) of the cases of MVC were recorded, 26 males and 12 females. Victims of MVCs presented with more severe injuries, as all spine and pelvic injuries were in this group [Figure 3]. In 83 cases (22%), there was a history of crush injuries sustained due to objects falling on the children.

Falls-related injuries

About 50% of the falls occurred at home. Only about 2% occurred at the school. Most of the falls (78%) were from <1-m height and 80% of the children had fallen on a rough surface, either ceramic, cement, or a furniture sharp edge. Most of the falls (69%) occurred, while the children were playing inside the house, unsupervised.

House safety measures

All houses had windows protection by guard and lock. A majority (59%) of the families did close the end of stairs with a gate. A special child bed was used by 57% of the families. A dedicated play area for the children was present in 38% of the houses.

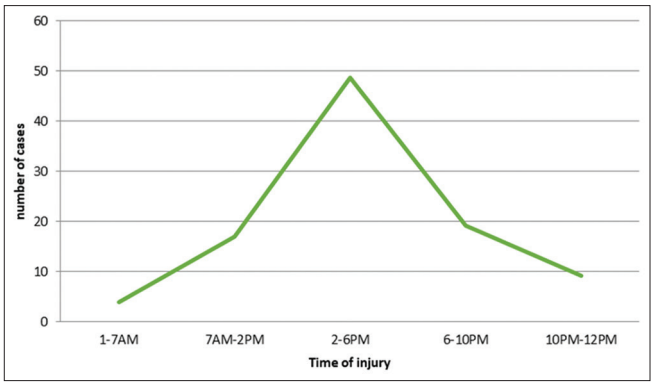

Figure 1: Time of occurrence of the injuries

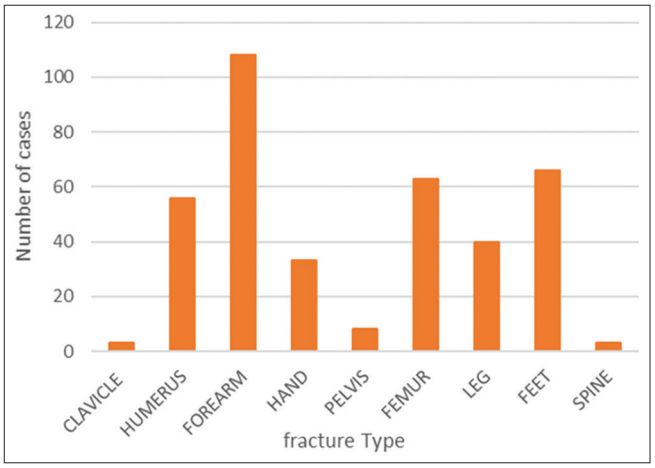

Figure 2: Distribution of cases according to the site of the fracture

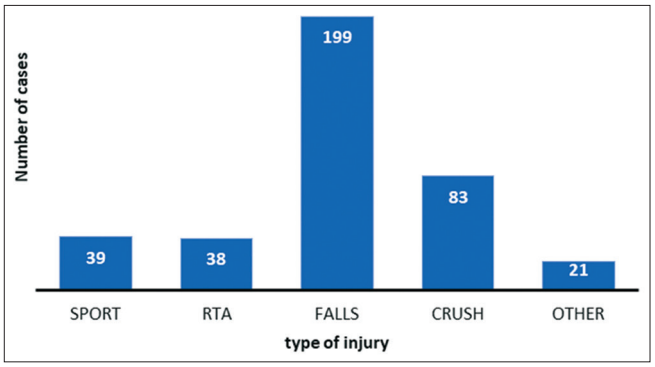

Figure 3: Distribution of cases according to the mechanism of injury

Discussion

In this study, we have tried to analyze epidemiological factors important in the causation of pediatric musculoskeletal injuries in the context of North Al-Batinah region in Oman. We chose to study patients whose injuries required inpatient care as these are likely to represent moderate-to-severe injuries, with a significant impact. Male predominance was similarly seen from other studies from the region.[4,5,8,9] Perhaps, this might be because male children are generally more active.[3]

We found that the peak time of injuries was in the evening time. Possible reasons for this might be that the activity of the children increases at this time where they gather with neighborhood children after school or daycare center. Parental

supervision is lacking at this time either because they are taking a nap after daily duty (as is common in Oman) or busy with their social commitments. Adult supervision has been associated with the decrease in the incidence and severity of injuries.[3]

Sports injuries were seen predominantly in males as females are not involved in sports as much. This can be attributed to the cultural background as females tend to be less involved with sporting activities in the Omani society.

Only 38 cases were admitted with musculoskeletal injuries due to MVCs, In spite of the high incidence of MVCs in Oman. A possible explanation is that parents are much more careful when they are driving with children than otherwise.

Falls were the major cause of injuries representing more than half of the cases (52.4%) in our study. A great majority of these occurred at home. Worldwide, falls account for the majority of all childhood injuries but infrequently result in death.[1,2,10,11]

About 78% of these falls were within a height of < 1 m, but the landing surface was hard in most of the cases. A wide variety of activities has been recorded before the traumatic event, but children falling while running was the most common activity. Children are usually active at home running around with other children not taking care of injury risk. Therefore, home safety is regarded as caregiver's responsibility. In this study, we found that home designs were lacking child-friendly environment and were more influenced by appearance and fashion. Most of the children landed on a hard surface or a sharp edge of furniture. Ceramic was the predominant landing surface. It coincides with the change in preference over the last decade, from soft carpets to hard ceramic. Perhaps, they are unaware of the fact that a running child may end up with a fall over this hard surface, sustaining a much more severe injury, compared to falling on a soft surface such as a carpet. The design of main home entrance was one of the potential factors. The floor height often ranges between 1 and 2 m from the ground level in some houses, and this may be a potential site for falls to occur.

We did not record any traumatic event due to fall from a window as all families were aware of the importance of the window lock and guard and used it.

Recommendations

Prevention of injuries in children should, ideally, be a shared responsibility between the health-care professionals, civic planners, as well as the caregivers. Health-care professionals can contribute by conducting region-specific surveys, looking at epidemiological factors, to develop preventive strategies. They ought to communicate these measures with the local population through campaigns and engage in a dialogue with the local civic authorities, who could help by introducing appropriate legislations pertaining to a child-friendly building design. The caregivers could play an important part by paying attention to children safety factors in the design of the house building as well as the interiors. Specific measures might include the use of soft and cushioned carpets, avoiding the use of furniture with sharp edges, reducing the height of the steps leading to the entrance of the house and children importantly, making sure that children are supervised at all times.

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Conflicts of interest

There are no conflicts of interest.

Authors contributions

AAG contributed in developing the project idea, helped in the interpretation of the results and preparation and revising the manuscript; TF & VA contributed in idea development, data collection, preparation and revising the manuscript; MK contributed in developing the idea and critically revising the manuscript. All authors have critically reviewed and approved the final draft and are responsible for the content and similarity index of the manuscript.

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