Epidemiology of High Falls from Windows in Children

Abstract

Falls from a height result in significant morbidity and mortality worldwide. Targeted prevention strategies in the US combined data collection, publicity campaigns and building regulation and reduced high falls in New York by 93%. This retrospective cohort study describes children who fell from a height presenting or referred to Children's University Hospital Temple St. over a two year period. Case ascertainment was through the Emergency Department, Symphony registration system and the Trauma Area Research Network (TARN) database. Forty five falls were identified. Thirty (66.7%) were in children less than 5 with boys being three times more likely to fall. For purposes of data collection, 31 falls were from windows, 4 from < 12 feet and 7 were witnessed. Injury severity Scores (ISS) correlated to height of fall; both deaths falls from >24ft. A publicity campaign is warranted to highlight the frequency of injury following falls from windows. Building legislation is required to safeguard high windows and balconies. A post fall questionnaire would enable the collection of unbiased forensic data.

Introduction

In Ireland, injury is the leading cause of death in children and adolescents aged 0-19 years. Unintentional injuries contributed to 19.41% of child and adolescent mortality in Ireland. Falls are one of the main causes of presentation to the emergency department. They are the leading cause of unintentional injury in children under 14 in the United States. In Australia they account for 41% of hospital admissions and 43% of accident and emergency presentations due to injury in children. In developing countries they account for up to 25% of incident paediatric hospital admissions. Targeted safety programs have been shown to be effective in urban safety. In New York city the Children Can't Fly program consisted of an extensive educational program, the distribution of free window guards and legislation mandating owners of multiple dwellings where children reside to provide window guards. This initiative led to a 96% reduction in the incidence of unintentional window falls over a ten year period. The same program showed an 83% reduction in falls in Boston. Building regulations in the UK are not explicit to children but state that balconies and stairs should be guarded with barriers so as to protect people from falling. Trauma and injury research group in Victoria have recommended for specific legislation around building safety for windows and balconies.

Comprehensive data collection with respect to childhood injuries provides the necessary information to inform prevention strategies and enact change. It is the role of trauma centres to collect and collate such data. Validated scoring systems such as ISS (Injury Severity Score) are in use in international databases such as TARN (Trauma Audit and Research Network) and allow comparison of trends and outcomes. Local data enables targeting of vulnerable populations and locally relevant risk factors. Data collected by public health nurses and social workers following a fall was a central part of the NICE guidelines on injury prevention to children in the home recommend community and household surveys to identify vulnerable homes. The aims of this study were to quantify the morbidity and mortality associated with high falls in presenting to an Irish tertiary emergency department and furthermore to use available data to describe the circumstances of these falls in order to inform prevention messages.

Methods

The study cohort was made up of all children treated in the Children's University Hospital Temple St, from January 2010-September 2012 who had fallen from a height. There was no set definition for fall with patient, parent or proxy reporting accepted. There were two main methods of data collection. The Emergency Department clinical management system Symphony was searched for the words window, height and fall under the categories triage, diagnosis and discharge. A further seven patients were identified from the TARN database. This is an international database to which the Childrens University Hospital contributes data. Patients included in this database are deaths due to trauma, trauma patients admitted to a critical care area who are inpatients for > 72 hours and those who are transferred in for specialist care. Patients entered on the TARN database are allocated severity scores based on injuries sustained. This allowed capture of a further 7 patients transferred directly to the Intensive Care unit or the neurological service. Data were entered into Excel for Mac 2011. Descriptive and demographic data were sought.

Results

There were 45 high falls from windows in this time period. Thirty three were male and 12 female with a Male:Female ratio of 3:1 ratio. Thirty three (73.3%) falls were in the age group 1 to 5 years, 4 (8.9%) were between 6 and 10 years old and 8 (17.8%) were over 10 years of age. The male: female dichotomy was most marked in the early years of age, 31 men and 7 women fell in this age group. The male:female dichotomy was most marked in the early years of age, 31 men and 7 women fell in this age group.
described to have jumped from a height. Three of these cases were associated with suicidal ideation. Table 1 provides details regarding location, supervision, height and landing surface of falls. Documentation of the circumstances was incomplete in 5% of cases with respect to level of supervision and in 60% of cases with respect to landing surface.

Five patients were transferred from other hospitals direct to the Intensive Care Unit (ICU). Seventeen were admitted from the emergency department for observation and treatment. Of the twenty patients discharged home from the emergency department only five required follow up; 3 fracture clinic, one plastic surgery outpatients and one Medical Assessment Centre (MAC) work department. There were two deaths; one in the ICU and one where death established on arrival to emergency department. Both had high window falls from a second floor window or above (greater than 7.35 metres). Of the two deaths, both had multiple injuries and significant brain contusions. Details of injuries sustained in surviving children can be seen in Table 2. Children eligible for inclusion in the TARN database have Injury Severity Scores allocated. Extent of injuries as measured by the ISS was directly associated with the height of the fall.

Discussion

In our study falls were mostly (n=31) from under 12 feet. It is a common misconception that significant falls occur predominantly from apartments or high rises. There was a significant burden of injury in falls from this height with eight head injuries including four skull vault fractures, 2 subdural bleeds and two cerebral contusions. There were also five extremity fractures from this height. There is a documented association between height of fall and severity of injury. It was also evident in our cohort as the two deaths had both fallen more than 24 feet. As previously described, males under five were the group most at risk of a high fall. This is borne out in the literature in both local and national level epidemiological data. Within our population there is a second distinct at risk group made up of children where there was an intentional component to the fall, either behavioural or suicidal (n=10). Prevention strategies need to recognize these distinct groups.

Identifying circumstances surrounding a fall are essential to the formulation of local prevention strategies. As part of the successful American prevention programs individual risk assessments were conducted after a fall. This allowed identification of risk factors such as low-lying windows, balcony design faults, items of furniture placed near windows and supervision levels to be identified and targeted. There was very limited forensic information on circumstances of falls in our dataset. Supervision was documented in 33 cases with only 7 falls being witnessed by a caregiver. Parental education and supervision requirements is obviously a key prevention strategy. The limitations of our study are its cross sectional nature and reliance on self-report for data. This is a recognised problem in injury data collection. There is also a lack of information of forensic issues around falls, limiting its utility in injury prevention. A major strength is the use of two datasets to capture all significant falls. Reliance on emergency department presentations will miss a significant number of falls patients who are transferred in or who may die at the scene.

Childhood falls in Ireland are most frequently from first floor windows and are not witnessed by caregivers. Education campaigns may be helpful in this regard. There is a lack of forensic data to inform structural risk factors for falls. However, there is little doubt that prevention strategies such as window guards and building legislation have been effective in other jurisdictions.

Correspondence: AJ Nicholson
Department of Paediatrics, Childrens University Hospital, Temple St, Dublin 1
Email: Alf.Nicholson@cuh.ie

References


10. (NICE) NIfHaCE. Preventing unintentional injuries in the home among children and young people under 15: home safety assessments and providing safety equipment. NICE Public Health Guidance. 2010;No. 30.


Comments: