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Original Research Article

A Community-based Study on the Incidence and Risk factors of Unintentional Fall Related Injuries Among Children in Patna District, Bihar, India

Shikha[1], Khalid Anwar[2], Pragya Sinha[3], Amita Sinha[4]

[1]Tutor, Department of Community Medicine, Patna Medical College & Hospital, Patna, Bihar, India.

[2]Tutor, Department of Community Medicine, Nalanda Medical College & Hospital, Patna, Bihar, India.

[3]Tutor, Department of Community Medicine, Patna Medical College & Hospital, Patna, Bihar, India.

[4]Associate Professor & Head, Department of Community Medicine, Nalanda Medical College & Hospital, Patna, Bihar, India.

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Corresponding author: Dr. Pragya Sinha

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Abstract

Objectives: This study was to assess the incidence and risk factors of unintentional fall related injury among children residing in Patna district, Bihar.

Methods: Data was collected by house-to-house survey in the community, If the first one was not met the criteria the next house was utilized for the study. And parents/guardians of child were asked questions using a predesigned questionnaire specially designed for this purpose. At the end of the interview, the parents/guardians of child were educated about the safety and prevention from unintentional fall injury in children.

Results: Incidence of unintentional fall related injury was 9.8%. A total of 19(35.18%) fall injuries got first aid and 29(53.70%) falls injuries children were admitted in hospital admissions. Unintentional fall injury was mostly seen in 31(57.41%) children who belonged in nuclear family as compared to joint family children 23(42.6%). 30(55.56%) unintentional fall injury was found in age 5-10 years and 14(25.92%) injury was found in age 11-14 years of children. 34(62.96%) were males and 20(37.03%) were female children. The commonest place for unintentional fall injury occurred at 39(72.22%) home followed by 10(18.52%) road and 5(9.26%) school. Commonest unintentional fall injury was 24(44.44%) fracture, 14(25.92%) cut injuries and 9(16.67%) dislocation.

Conclusions: Male children are more preponderance for unintentional fall injury as compared to female. It was commonly occurred in home and school. Lower socioeconomic status, lower literacy of mother, children belong from nuclear family, leisure/play activity of children and child falls from stair, falls from arms of the person, falls from height less than 2 meter are the major risk factors for unintentional fall injury in children. Upper limb and head are the major anatomical site for injury. Fracture, abrasion/cut/open wound and dislocation are the common unintentional fall injuries in children. Thus, the educational status of mother, type of family, gender and age of the children had a great influence on unintentional injuries. The lack of attention and proper care, transport facilities also make the children more prone to unintentional fall injuries. So that, this study suggests in modifying the home environment to reduce injuries, teaching people about home safety, and providing safe equipment to prevent injuries.

Keywords: Children, Unintentional Fall Injury, Gender.

Introduction

Injury continues to be a major global public health problem. It claims about 4.3 million lives and accounts for 10% of all disability-adjusted life years incurred annually [1]. Falls are responsible for 17.5% of all injury-related deaths annually, with 35,000 involving individuals below 20 years [1]. The contribution of falls as a leading cause of death is expected to increase by 2030 [2]. Most of the unintentional injuries are preventable [3, 4]. According WHO 12% of the global disease burden is due unintentional injuries and is largely responsible for 30% of the mortality rate among children aged 1-3 years, 40% among children aged 4 years, and 50%-60% among adolescents [5]. The severity of fall-related injuries ranges from minor to severe, necessitating a medical visit and possibly hospitalisation. However, establishing a global spectrum of unintentional fall-related injuries is difficult due to a lack of valid data from low- and middle-income countries (LMICs), particularly for nonfatal injuries. Unintentional injuries are a leading cause of death in developing countries such as India and it was common in both urban and rural areas [4, 6]. According to the studies done in India, 50 percent of children under the age of 12 who sustained an unintentional injury suffered from mild to moderate disability [7]. The serious complications of unintentional fall injury not only affect children's health education but also have a significant impact on the socioeconomic class of the children's family [8].

Such injuries have a major impact on the education, family relationship, and emotional and psychological well-being of the child and cause economic and social burden on the families; therefore, preventing these injuries is paramount [9]. The spectrum of fall-related home injuries varies from minor injuries requiring first aid or those requiring outpatient health care visits that can lead to hospitalizations, such as burns and scalds, to major injuries such as choking, strangulation, and drowning, which are often fatal [10,11]. Objectives of our study was to assess the incidence and risk factors of unintentional fall related injury among children residing in Patna district, Bihar.

Material & Methods

This study community-based study was conducted in urban region of Patna during a period from August 2021 to January 2022. A total of 550 children with age up to 14 years (i.e., A permanent residents of the house for a period of minimum one year) were interviewed in this study. Attendant of entire subjects signed an informed consent approved from the institutional ethical committee of Patna Medical College, Patna was sought. People who not willing to participate, and disabilities due to other communicable diseases were excluded from the study.

Sampling: Systematic sampling methods was used to select the study population. Pre-structured questionnaires were used to collect data.

Methods: Data was collected by house-to-house survey in the community, If the first one was not met the criteria the next house was utilized for the study. And parents/guardians of child were asked questions using a predesigned questionnaire specially designed for this purpose. At the end of the interview, the parents/guardians of child were educated about the safety and prevention from unintentional fall injury in children.

Statistical Analysis: Data was analysed by using simple statistical methods with the

help of MS-Office software. All data was tabulated and percentages were calculated.

Observations

A total of 550 children with age up to 14 years were interviewed in different colony/Mohalla of Patna district, Bihar. Out of 550 children, 54 children were found unintentional fall related injury who were required first aid treatment or hospital admission. Overall, incidence of unintentional fall related injury was 9.8%. A total of 19(35.18%) fall injuries got first aid and 29(53.70%) falls injuries children were admitted in hospital admissions. Unintentional fall injury was mostly seen in 31(57.41%) children who belonged in nuclear family as compared to joint family children 23(42.6%).

Children 29(53.71%) who belonged from low socio-economic status were more associated with unintentional fall injury as compared to middle 17(31.48%), above middle 6(11.11%) and 2(3.70%) high socio-economic strata children. Out of 54 unintentional fall injury children, 34(62.96%) children were male and 20(37.03%) were female children. 33(61.11%) mothers of child were below the primary education.

Table 1: Age wise distribution of unintentional fall injury in children

Children age (Years)	Frequency (N=54)	Percentage
≤4 years	10	18.52%
5 – 10	30	55.56%
11 – 14	14	25.92%

In the present study, most of the unintentional fall injury30(55.56%) was found in age 5-10 years.14(25.92%) injury was found in age 11-14 years of children.

Table 1: Places, where the injury occurred

Place	Frequency (N=54)	Percentage
Home	39	72.22%
School	5	9.26%
Road	10	18.52%

The commonest place for unintentional fall injury occurred at 39(72.22%) home followed by 10(18.52%) road and 5(9.26%) school.

Table 2: what was the victim doing at the time of injury?

Variable	Frequency (N=54)	Percentage
Sports	3	5.55%
Leisure/play	33	61.11%
Vital activity	4	7.41%
Unspecified activity	6	11.11%
Unpaid work	8	14.81%

The victim was doing 33(61.11%) leisure/play of during which fall injury occurs, followed by 8(14.81%) unpaid work, 6(11.11%) unspecified activity, 4(7.41%) vital activity and 3(5.55%) sports.

Table 3: Part of the body injured

Injured body part	Frequency (N=54)	Percentage
Head	12	22.22%
Upper limb	31	57.41%
Abdomen	2	3.70%
Lower limb	09	16.66%

Nearly 31(57.41%) of the injury was happened the in upper limb and 12(22.22%) of the fall injury was in the head. And 09(16.66%) injury was occurred in lower limb.

Table 4: Physical nature of injury

Physical nature of injury	Frequency	Percentage
Dislocation	9	16.67%
Fracture	24	44.44%
Bruise/superficial injury	7	12.96%
Other open wounds	14	25.92%

Among the children, the physical nature of injury due to fall was almost 24(44.44%) fracture, 14(25.92%) cut injuries and 9(16.67%) dislocation.

Table 5: Object from which fall occurred

Objects	Frequency	Percentage
Tree	2	3.70%
Stairs	19	35.18%
Arms of the person	15	27.77%
Bath room	10	18.52%
Don't know	8	14.81%

In this present study, fall from the stair's was found for maximum number of fall injury19(35.18%) children, 15(27.77%) from arms of the person and 10(18.52%) bathroom.

Table 6: Distance of fall

Distance of victim fell	Frequency	Percentage
Same level as one was standing	13	24.07%
Height less than 2 meters	35	64.81%
Height greater than 2 meters	6	11.11%

In this present study, according to distance of fall, fall from height of less than 2 metres were found in 35(64.81%) of injury cases, and falling from same level as one was standing accounts for 11(24.07%) of cases and fall from height of more than 2 metres resulted in 6(11.11%) of injuries in children.

Discussions

Unintentional fall injuries in children are a major public health concern globally, accounting for up to 90% of all injuries [1] Road crashes, drowning, burns, falls and poisoning are the most common causes of death and disability among children <9 years of age [1]. Childhood unintentional falls are associated with various factors such as age; sex; geographical area; child development; parental literacy; overcrowding at home; home environment including unsafe building designs such as stairs, windows, and roofs without safety grills; unsafe storage of potentially hazardous substances such as kerosene and medicine; unsafe kitchen with access to stove and knives; and insufficient household lighting [12,13].

In the present study, we were interviewed a total of 550 children/parents of children with age group ≥ 14 years. Among them, unintentional fall injury was found in 54 children i.e. rate of incidence of unintentional fall injury was 9.81%. This was higher than the study done by Ashish Pathak [14] in Madhya Pradesh and Gupta S [15] in Nepal which showed 7.7% and 5.2% of incidence this might be due to geographical variation. In a study by Mohan et al [16] in Haryana revealed more incidence of unintentional fall injuries which might be due to the selection of participants boys were more than girls. In our present study, unintentional fall injury

was greatly seen male children 34(62,96%) as compared to female children 20(37.03%). Unintentional fall injury 30(55.56%) was more common in age of 5-10 years as compared to another age group of children. A study conducted by Mathur A et al [17] also states that children of age group 5-10 years are more vulnerable to injuries 19% compared to other age group, which is similar to another study conducted by Pathak et al [14] in Madhya Pradesh, Ujjain.

In the present study, children 29(53.71%) who belonged from lower socio-economic status were more associated with unintentional fall injury as compared to middle 17(31.48%), above middle 6(11.11%) and 2(3.70%) high socio-economic strata children. And, it was mostly seen in 31(57.41%) children who belonged in nuclear family as compared to joint family 23(42.6%). Rate of incidence was greater in male 34(62.96%) as compared to female. This has been partly explained by patterns of child upbringing, socialization and role expectations. Irrespective of culture, boys naturally engage in more risk-taking behavior than girls. Parental practices also tend to foster greater exploratory behavior among boys while imposing fewer restrictions on them [18].

A study conducted by Mahalakshmi et al [19] factors like type of family and socio-economic status were significantly associated with occurrence of injury. In our study, incidence of unintentional fall injury was greater in nuclear family 31(57.41%). Where as in a study conducted by Parameswaran et al [20] the prevalence of injury is maximum among joint family.

In the present study, the commonest place for unintentional fall injury occurred at 39(72.22%) home followed by 10(18.52%) road and 5(9.26%) school. The victim was doing 33(61.11%) leisure/play of during which fall injury occurs, followed by 8(14.81%) unpaid work 6(11.11%) unspecified activity and 4(7.41%) vital activity. Which is similar to a study done by Chowdhary et al [21] in Bangladesh reported home (51%), roads (21 %) and school (3%) this might due to more hazards in the home more likely for the child to get injuries.

In the present study, out of 54 fall injury children, the commonest injury was 24(44.44%) fracture followed by 14(25.92%) cut injuries and 9(16.67%) dislocation and 7(12.96%) bruise/superficial injury.

whereas in a study done by Pathak et al [14] in Madhya Pradesh, Ujjain abrasions and cuts are considered the commonest outcome of unintentional injury. In another study conducted by Fuglkjaer et al [22], a systematic review reported that the head is the most common anatomical site of injury after a fall. In our study, injury was commonly occurred in 31(57.41%)upper limb followed by 12(22,22%) head, 09(16.66%) lower limb and 2(3.70%) abdomen. Whereas in a study done by Pathak et al [14] in Madhya Pradesh most common anatomical site of injury was the head (31%), followed by lower extremities (26%).

In the present study, the 35(64.81%) most of fall injury was seen at the height less than 2 meters, whereas in a study reported by Pathak et al [14] in Madhya Pradesh shows injury at ground level accounts for majority of fall injuries, whereas in a study reported by Bhuvaneswari et al [23] from south Delhi and Gupta et al15 in a study at Nepal shows, fall from heights as the most common cause of unintentional fall injuries.

International studies have found that developmental, behavioural and biological characteristics of some children put them at higher risk of unintentional injury [24,25]. The role of gender was explicitly explored in two prospective cohort studies in this study; [26] both of which identified males to be at a higher risk of childhood injury than females. This is consistent with

published literature from other countries [24,25]. Similar to international studies [27] other child characteristics such as the child's ability to discover and their intellectual ability, history of injury, and motor development were also identified as risk factors for unintentional childhood injury. The study by Campbell et al. from the UK Millennium Cohort Study found that children from the lowest income quintile were 1.2 times (95%CI 1.05, 1.37) more likely to be injured compared to those from the highest income quintile [24]. A cross-sectional study in New Zealand reported that children living in socioeconomically deprived areas have significantly higher injury rates [28].

Conclusions

This present study concluded that the male children are more preponderance for unintentional fall injury as compared to female. It was commonly occurred in home and school. Lower socioeconomic status, lower literacy of mother, children belong from nuclear family, leisure/play activity of children and child falls from stair, falls from arms of the person, falls from height less than 2 meter are the major risk factors for unintentional fall injury in children. Upper limb and head are the major anatomical site for injury. Fracture, abrasion/cut/open wound and dislocation are the common unintentional fall injuries in children. Thus, the educational status of mother, type of family, gender and age of the children had a great influence on unintentional injuries. The lack of attention and proper care, transport facilities also make the children more prone to unintentional fall injuries. So that, this study suggests in modifying the home environment to reduce injuries, teaching people about home safety, and providing safe equipment to prevent injuries.

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