Unintentional home injuries among children aged 1–9 years in slums of Burdwan Municipality, West Bengal: A cross-sectional study

Tanmoy Mukherjee, Sima Roy, Sutapa Mandal, Dilip Kumar Das

From Department of Community Medicine, Burdwan Medical College, West Bengal, India

Correspondence to: Dr. Sima Roy, P-50, New Parnasree, Kolkata – 700 060, West Bengal, India. Phone: +91-9830409617. E-mail: Simaroy214@gmail.com

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ABSTRACT

Context: Unintentional home injuries result in morbidities among children. **Aims:** This study aimed to find out the prevalence and patterns of unintentional home injuries among children aged 1–9 years, in slums of Burdwan Municipality; to determine an association of various sociodemographic factors with such injuries; and to assess known risk factors for unintentional injuries. **Settings and Design:** This community-based cross-sectional study was conducted in three randomly selected slums of Burdwan Municipality, West Bengal. **Materials and Methods:** The study was conducted during July–November 2017 among 219 children aged 1–9 years residing in the study area. Data were collected at the household level by interviewing the respondents, record review, and observation. The occurrence of any unintentional home injury during the last 1 year was considered to estimate period prevalence. **Results:** Overall prevalence of unintentional home injury was 19.6%; with 20.8% and 18.6% among girls and boys, respectively. Mean episode of injuries was 0.37±0.9 in a year. Majority of injury episodes were cut by fall (73.2%), affected ankle and foot (44%), and occurred in the living room (84.1%) and while playing (98.8%). Overcrowding (82.2%), access to sharps in the kitchen (59.4%), and sharp objects within reach in living rooms (44.7%) were the prevalent known risk factors at the households. **Conclusions:** Unintentional home injuries among children are substantially high in the area with some of the prevalent risk factors. Intensive health education activities for mothers and awareness campaigns for preventive measures need to be implemented.

Key words: *Community based, Episodes of injury, Prevalence, Unintentional home injury*

Injuries account for 9% of global mortality and are a threat to the health of every country in the world [1]. In 2011, the World Health Organization estimated that over 630,000 children under 15 years of age were killed by injuries. In many countries, injuries are the leading cause of mortality as well as morbidity [2].

Unintentional injury can be defined as events in which (1) injury occurs in a short period of time – usually seconds or minutes, (2) the harmful outcome was not sought, and (3) the outcome was the result of one of the forms of physical energy in the environment or normal body functions being blocked by external means. The common unintentional injuries result from motor vehicle crashes, falls, fires and burns, drowning, poisonings, and aspirations [3].

Unintentional home injuries to the children aged <10 years occur in a substantial proportion as the children spend relatively a long period of time at home [4]. With these unintentional injuries, millions of children require medical care as well as hospital admission and are often left with a lifelong disability [5]. Low- and middle-income countries have almost double mortality rate than that of high-income countries (65 versus 35 per 1,00,000 population) because of the unintentional injuries. This may be due to the inadequate preventive measures, lack of access to timely and appropriate medical care, etc [6,7].

Unintentional home injuries among children may occur in the form of fall, burn, poisoning, animal bite, etc. [5], and the potential risk factors are unprotected electricity inlets, products such as makeup products, cleaning products, and plastic bags those are within the reach of children, lack of protection rails to staircases, and free access to the roof [8]. In addition, challenging living conditions such as poor housing infrastructure, lack of barriers to cooking or washing areas, inadequate recreational space, use of open fires and paraffin stoves, and a lack of safe storage for harmful substances are among the risk factors that place children at risk for burns, poisoning, and falls [9,10].

Information regarding unintentional home injuries among children <10 years old is limited in India. In the state of West Bengal also, no such studies had been found exploring the comprehensive aspect of unintentional home injuries among children aged <10 years. Evidence generation on this public health concern will certainly help to understand the magnitude of the problem and in developing strategies/interventions. In this perspective, this present study had been planned in a slum area with the following objectives:

1. To find out the prevalence and patterns of unintentional home injuries among children aged 1–9 years, in slums of Burdwan Municipality.

2. To determine an association of various sociodemographic factors with such unintentional injuries and also to assess known risk factors for unintentional injuries at the households of the study children.

MATERIALS AND METHODS

This was a community-based cross-sectional study. The study was conducted during July–November 2017 in a particular ward of Burdwan Municipality, West Bengal, which is the urban field practice area of Department of Community Medicine of a Medical College. Besides the medical college, Burdwan Municipality area is served by a municipality hospital and peripheral health outposts. An overall literacy rate of the area is 88.31% [11]. The selected ward is slum dominated with 13 slums and, among these, 3 slums (i.e., 20% of the slums) were selected by simple random sampling for the present study.

Study participants were children aged 1–9 years whose families were residing in the selected slums at least for 1 year. All such children were identified by complete enumeration with the help of field-level health workers of the municipality in the studied slums and were included in the study. A total of 24 children could not fulfill the criteria of living in that particular slum for at least 1 year. Either parents/caregiver of the children were the respondents. Respondents who were not willing to participate or absent for interview even after two visits were decided to be excluded from the study. Altogether, there were 219 eligible children and all of them could be studied all of them could be studied without any non-response.

Tools and Techniques: Data Collection

A tool was developed by the researchers, looking into the available relevant literature, particularly for selecting the different variables of interest. The pre-designed schedule so developed was also pretested on a slum other than those selected for the study. Data were collected by interviewing the respondents using this schedule. Relevant records or prescriptions (if any/available) were reviewed and various risk factors for injuries at households were also observed through a checklist. Measurement of the floor space of the living room was also done to assess overcrowding.

Different study variables were sociodemographic characteristics of the study participants, unintentional home injury episodes (in the last 1 year), patterns of injuries, and various known risk factors for unintentional home injuries in the households of the study participants. Prevalence was defined as an occurrence of at least one injury episode within the last 1 year. Prior to the data collection, the permission of the Municipality Health Authority was obtained and co-operation was sought from the Field Training Supervisors of the municipality ward and field-level workers in the slums.

Ethical Considerations

The ethical approval for the study was obtained from the Institutional Ethics Committee of Burdwan Medical College, West Bengal. Before interviewing the respondents, the nature and the purpose of the study were briefed and they were assured about the confidentiality of their information. Informed consent was obtained from each and every respondent.

Data Analysis

The collected data were rechecked for completeness and consistency, entered into a computer on Excel data sheets, and analyzed using statistical software (SPSS20, IBM Corporation, Armonk, New York City, United States of America). Descriptive statistics were performed to present the data. A statistical test (Chi-square test) was applied to find out an association between sociodemographic factors with such injuries.

RESULTS

A total of 219 children aged 1–9 years were found in 144 households in the study area and all could be studied without any non response. Parents of the respective children were interviewed. Out of the 219 children, 43 had at least one episode of unintentional home injury within a reference period of 1 year, with the overall period prevalence being 19.6%. Prevalence of the same among children aged 1–4 years and 5–9 years was 22% and 17.3%, respectively. Girls had 20.8% prevalence as compared to 18.6% among boys (Table 1). However, none of the studied sociodemographic factors had statistically significant association with the occurrence of unintentional home injuries (Table 1).

Out of these 43 children who had at least one episode of unintentional home injury, 24 (55.8%) children had single episode, 4 (9.3%) children had two episodes, 10 (23.3%) children had three episodes, and 5 (11.6%) children had four episodes of injury. During the reference period of 1 year, altogether, 82 episodes of injuries occurred; thus, the overall mean episode of unintentional home injury was 0.37±0.9 among the study participants. Majority of the injury episodes were cut by fall (73.2%), affected ankle and foot (44%), and mostly occurred in living room (84.1%) and while playing (98.8%); 74.4% episodes of injury could be managed at home and only 2.4% required hospitalization (Table 2).

The presence of known risk factors for unintentional home injuries among children (open electric circuits, sharp objects within reach in living room, slippery floor, medicine/chemicals within reach, access to sharps in kitchen, overcrowding, pets, stairs without railing, and terrace without railing) was also elicited and depicted in Table 3. The most common risk factor present was overcrowding (82.2%) followed by access to sharps in kitchen (59.4%) and sharp objects within reach (44.7%).

DISCUSSION

Unintentional home injury has been considered as a priority health concern, particularly among children, leading to significant morbidities. The extent and its pattern are less studied in India, particularly among children <10 years of age. The present study among children of 1–9 years revealed a period prevalence of

Table 1: Distribution of the study participants according to their sociodemographic characteristics and occurrence of unintentional home injury (n=219)

Socio-demographic characteristics	Unintentional home injury			Test of significance
	Yes (%)	No (%)	Total	
Age (in years)				
1–4	24 (22.0)	85 (78.0)	109	χ^2=0.78
5–9	19 (17.3)	91 (82.7)	110	p=0.377
Gender				
Boys	21 (18.6)	92 (81.4)	113	χ^2=0.163
Girls	22 (20.8)	84 (79.2)	106	p=0.686
Educational of mothers of the study participants				
Up to middle school	29 (18.6)	127 (81.4)	156	χ^2=0.375
Secondary and above	14 (22.2)	49 (77.8)	63	p=0.540
Occupation of mothers of the study participants				
Homemaker	40 (19.2)	168 (80.8)	208	χ^2=0.428
Maid servant	3 (27.3)	8 (72.7)	11	p=0.531
Socioeconomic status of the family[a]				
Lower middle and above	2 (28.6)	5 (71.4)	7	χ^2=1.875
Upper lower	7 (13.5)	45 (86.5)	52	p=0.392
Lower	34 (21.2)	126 (78.8)	160	
Type of family				
Nuclear	21 (19.8)	85 (80.2)	106	χ^2=0.004
Joint	22 (19.5)	91 (80.5)	113	p=0.949

Figures in the parenthesis show row percentage. According to modified Kuppuswamy scale[12] for socioeconomic status, January 2017

unintentional home injuries as 19.6% in a year. Truly comparable studies in this age group are limited. However, a study in coastal Karnataka in 2013 by Shriyan *et al*. [14] reported a much higher prevalence of 33.7% unintentional home injury among under-five children based on the last 4 weeks' recall. Segregated data in our study for children aged 1–4 years revealed a lower prevalence of 22%, although another study by Zaidi *et al*. [15] in Aligarh in 2006–2007 reported only 11.1% prevalence of unintentional home injury among under-five children based on 6 months' recall. Relevant comparable studies outside India are also not adequately available. A study in Mexico by Híjar-Medina *et al*. on unintentional home injury among children <10 years of age reported a prevalence of 15% [8]. Another study by Nouhjah *et al*. among under-five children in Southwest Iran, in the year 2012–2013, revealed overall 30.7% prevalence of unintentional home injury based on at least one episode of home injury since birth [16].

Interpretation of our findings and other available evidence indicates that varied proportions of children are subjected to unintentional home injuries. The difference in geographical and sociodemographic characteristics, settings of study, methods of estimation including recall periods, etc., might be the reasons for variations in prevalence. Although the prevalence of unintentional home injury in this study was slightly higher among girls (20.8%) than boys (18.6%), including gender, no other sociodemographic factors were found to be significantly associated with the occurrence of such injuries in this urban setting.

In this study, the most common type of unintentional home injury, among all episodes of injury, was found to be cut injury by fall (73.2%) followed by cut injury by sharp objects (14.7%). However, Híjar-Medina *et al*., mentioned that contusions, head injuries, and fractures were the most common types of unintentional home injuries among children <10 years of age [8]. On the other hand, Nouhjah *et al*. found burn injury as the most common mechanism of unintentional home injury followed by fall, among under-five children [16]. This variation might be due to different study settings, study participants, and sociodemographic characteristics. However, similar to the present study, Parmeswaran *et al*. [17] reported accidental fall as the most common mechanism of all episodes of childhood injuries.

In this study, ankle and foot (44.0%) were affected in the majority of episodes followed by head and face (39.0%). A study by Zaidi *et al*. also revealed that lower extremities and head and face were most commonly affected [15]. In this study, further analysis revealed that most of the injuries occurred in the living room (84.1%) and during playing (98.8%); this might be because in the urban slums many families had a single room in their households which is being used for all purposes including the single room used as the playing place for the children.

For 2.4% of episodes of injuries, hospitalization of the child was done, indicating that the nature of injuries in most cases is less severe. Contrary to this, in the study by Híjar-Medina *et al*., it was found that 19.9% of the children below 10 years, who suffered from unintentional home injuries, were hospitalized [8]. Nouhjah *et al*. reported that 17.3% of the unintentional home injury cases among under-five children needed to be hospitalized [16].

This study also revealed the presence of many known potential risk factors at the household settings of the study children. Sharp objects

Table 2: Patterns of unintentional home injury episodes (n=82)

Patterns	Frequency (%)
Types of injuries	
Cut by fall	60 (73.2)
Fracture of bones by fall	2 (2.4)
Abrasion or bruise by fall	7 (8.5)
Cut by sharp objects	12 (14.7)
Burn injury	1 (1.2)
Body parts affected	
Head and face	32 (39.0)
Arm including shoulder	2 (2.4)
Forearm including elbow	6 (7.3)
Wrist and palm	5 (6.1)
Leg	1 (1.2)
Ankle and foot	36 (44.0)
Place of injury	
Living room	69 (84.1)
Kitchen	6 (7.3)
Courtyard	7 (8.6)
Activities during injury	
Playing	81 (98.8)
Feeding	1 (1.2)
Care received for injuries	
Managed at home	61 (74.4)
Treated by a doctor	19 (23.2)
Hospitalization required	2 (2.4)

Table 3: Presence of known risk factors for unintentional home injuries at the households of the study children (n=219)

Risk factors	Present n (%)
Open electric circuit within reach	58 (26.5)
Sharp objects within reach in living room	98 (44.7)
Slippery floor	67 (30.6)
Medicines/chemicals within reach	42 (19.2)
Overcrowding[a]	180 (82.2)
Access to sharps in kitchen	130 (59.4)
Pets (bites, scratch)	20 (9.1)
Access to terrace	26 (11.9)
Stairs without railing	23 (10.5)
Terrace without railing	3 (1.4)

[a]Assessed by floor space criteria for overcrowding [13]

within reach in the living room and in the kitchen and slippery floor in the living room, being the predominant risk factor, might increase the risk of cut injury and fall among children. Overcrowding was present in majority of the households. Overcrowding leads to lack of place for free movement. Moreover, there is an accumulation of all sorts of necessary household materials in a single place, making the hazardous material more accessible to children. Access to active fire in kitchens/cooking places might also increase the chance of burn injury. Medicines/chemicals were found to be present within reach for nearly one-fifth of the study children. Accidental ingestion of those could cause poisoning.

The World Report on Child Injury Prevention [5] mentioned that fire-related burn injuries are very much common and are the 11th leading cause of deaths for children aged 1–9 years, and poisoning by accidental ingestion of medicines/chemicals is common among children aged 1–4 years in low- and middle-income countries. Open or unprotected electric inlets, which might cause electrical injury, were present in many of the households. Stairs to the terrace, without railing, was present for 10.5% of the study children and terrace without railing was present for 1.4% of the study children. These might cause serious injury by fall. Híjar-Medina *et al*. also mentioned that unprotected electric circuits, lack of protection rails to staircases, and free access to the roof were potential risk factors for unintentional home injuries in children <10 years of age [8].

Although the occurrence of injuries has not been correlated with these risk factors, the presence of these risk factors in the household setting of the children, particularly among disadvantaged slum dwelling children, provides the contextual risk situation. The present study being conducted only in three slums of Burdwan Municipality and with smaller sample size, generalization of the study findings is certainly restricted and, while interpreting, chances of recall bias should also be considered as mostly these kind of studies are interview based. Sample size calculation was not done, which further restricts extrapolation of the findings. Despite these limitations, in the stated contextual risk situation, the substantial high prevalence of unintentional home injury among disadvantaged and vulnerable slum dwelling children provides useful indication toward building strategies/interventions and the necessity for further research.

CONCLUSION

Unintentional home injury, a public health concern, is quite prevalent among children aged 1–9 years residing in slums of Burdwan Municipality. Prevalence was not significantly different by age, gender, or any other sociodemographic characteristics. Cut injury by fall and sharp objects, abrasion, bruise by fall, fracture of bones by fall, and burn injuries were found to be the different types of unintentional home injuries. Various known risk factors for unintentional home injuries were also found to be present in many of the households. Intensive health education activities for mothers/caregivers of the children on the causes as well as prevention of childhood injuries would be helpful to cut down the episodes of unintentional home injuries. Home environment modification can also go on a long way to prevent childhood home injuries.

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