Original Article

Prevalence of unintentional injuries and its risk factors among under-five children residing in urban poor resettlements in Rishikesh

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Abstract

Background: A community-based study on childhood injuries would provide valuable information on the epidemiology of injuries to undertake appropriate preventive measures. Therefore, the current study was conducted in urban poor resettlements of Rishikesh to estimate the prevalence of unintentional injuries and to document the sociodemographic risk factors associated with unintentional injuries among under-five children. **Aims and Objectives:** Estimation of the prevalence of unintentional injuries and their risk factors among under-five children of urban poor resettlements in Rishikesh. **Materials and Methods:** A community-based cross-sectional study was conducted in urban poor resettlement areas of Rishikesh for a period of 1 year. It included 300 children selected using a simple random sampling technique to collect data on injury status. **Results:** The prevalence of unintentional injury among study participants was 16%. Falls were (64.6%) the major cause of injury, followed by dog bites (12.5%). The major sites of the injury were the head (25%), face (22.9%), upper limb (27.1%), and lower limb (18.8%).75% of the injuries happened at home. 66% of injuries happened when the child was playing alone or playing with peers. About 20.8% of injuries were bruises or superficial injuries. 39.6% of children had cut/bite/open wound injuries. Fractures happened in 14.6% of injured children. More than half (54.2%) of children did not develop any physical disability due to injury. Among children who developed a disability, more than 90% are able to recover completely. The majority of study participants were taken to nearby hospitals (66.6%) or health centers (10.4%). Only one of them went to a traditional bone setter, rest all visited either a general practitioner or pharmacy. The median expenditure for the treatment of the injured child was INR 425 (175-2750). The age of the child and unintentional injury showed a statistically significant association. **Conclusion:** The prevalence of the injury was 16% (12–20.7%) similar to a number of similar studies. Although the majority of the injuries were mild in severity, injuries have also contributed to temporary disability among children and have led to loss of school days.

Keywords: Children, poor resettlements, unintentional injury, urban area

Introduction

Injuries are among the leading causes of death in children, especially those who survive beyond 1 year. After the age of 1 year, unintentional injuries, particularly road traffic accidents, drowning, and fire-related burns, become significant contributors to death among children. Every day around the world, the lives of more than 2000 families are torn apart by the loss of a child

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Received: 31-10-2023 **Revised:** 11-01-2024
Accepted: 01-02-2024 **Published:** 26-07-2024

Access this article online

Quick Response Code:

Website: http://journals.lww.com/JFMPC

DOI: 10.4103/jfmpc.jfmpc_1759_23

How to cite this article: Ajun UN, Sinha S, Saxena V, Sriram S, Hariprasad, Salam A. Prevalence of unintentional injuries and its risk factors among under-five children residing in urban poor resettlements in Rishikesh. J Family Med Prim Care 2024;13:2999-3004.

to an unintentional injury or so-called "accident" that could have been prevented. The grief that these families suffer – mothers, fathers, siblings, grandparents, and friends – is immeasurable and often impacts entire communities. Such tragedy can change lives irrevocably. Injuries share 13% of the total burden of morbidity among children ≤15 years of age in low-and middle-income countries, and the fatality is 3.4 times higher than in high-income countries. A global school-based student health survey reported a 42% annual incidence of injuries among school adolescents in four Southeast Asian countries. The medical costs and the special care that is often needed for a severely injured or disabled child resulting from injuries can place a huge financial burden on parents.

Childhood injury is a major public health problem that requires urgent attention. Child injuries are not purely "accidental" or random events; they are predictable to a certain extent and are largely preventable. As a public health problem, injuries cannot be neglected. Injury and violence are a major killer of children throughout the world, responsible for about 950,000 deaths in children and young people under the age of 18 years each year. Unintentional injuries account for almost 90% of these cases. They are the leading cause of death for children aged 10–19 years. A proactive, preventive approach to reduce the injury mortality is required.

Aims and objectives

1. To estimate the prevalence and pattern of unintentional injuries among under-five children of urban poor resettlements in Rishikesh.
2. To document the sociodemographic risk factors associated with unintentional injuries among under-five children of urban poor resettlements in Rishikesh.

Material and Methods

Study type: Community-based cross-sectional study.

Study population: Children aged ≤5 residing in urban poor resettlements in Rishikesh

Study area: The study was conducted in urban poor resettlements of Rishikesh. There were four such areas as marked by the Municipal Corporation. Sarvahara Nagar, Chandreshwar Nagar, Valmiki Nagar, and Krishna Nagar.

Study duration: One year from 1st May 2021 to 30th April 2022.

Inclusion criteria:
1. Children residing in the study area for at least 6 months
2. Parents of participants who have given consent.

Exclusion criteria:
1. Children with primary caregivers other than mothers
2. All injuries requiring emergency care.

Sampling technique: A list of under-five children was generated by registering under-five children in the study area by contacting auxiliary nurse midwives (ANMs) working in these areas. This was the sampling frame for the current study. Under-five children were given a unique identification code. All codes will be entered into Microsoft Excel (version 2017), and 300 children will be selected randomly using a simple random sampling technique.

Study tool: A pre-tested interview schedule was used to collect the data about unintentional injuries suffered by children aged up to 5 years. The interview schedule was used to elicit information on the sociodemographic profile, selected sociodemographic risk factors of injuries and financial burden in terms of loss of wages, decline in wages, need to borrow money, need to take extra employment or if there was a need to sell household assets.

Operational definitions

INJURY: External force/noncontagious substance striking the body or entering into the body and causing anatomical discontinuity of tissue or derange physiological function of the body.

Unintentional Injuries: Refers to injuries that are unplanned and typically preventable when proper safety precautions are followed.

Poor Urban Settlements: A group of 10 or more adjacent households whose house structures are of visibly poor quality and/or whose homes have been laid out in a nonconventional fashion without adherence to ground plan.

Ethical considerations: The study was started after getting approval from the Ethics committee of the institution, All India Institute of Medical Sciences, Rishikesh.

Statistical analysis: Descriptive data was represented as mean t standard deviation (SD) for numeric variables, whereas percentages and proportions were used for categorical variables. Appropriate tests of significance are used to assess association depending on the nature and distribution of variables, like the Chi-square test and Fisher's exact test for categorical variables. The data was analyzed using Statistical Package for the Social Sciences (SPSS) Version 23.0. A value of $P < 0.05$ is considered statistically significant.

Results

The present study was carried out in urban poor resettlements of Rishikesh to estimate the prevalence, pattern, and sociodemographic risk factors associated with unintentional injuries among under-five children.

Sociodemographic characteristics of study participants.

Table 1 shows that out of a total of 300 children, 90 (30.0%) were infants, 133 (44.4%) were toddlers, and 77 (25.6%) were between 3 and 5 years of age. The mean age of the participants was 23.94

Table 1: Sociodemographic characteristics of study participants

Sociodemographic characteristics	Number (*n*=300)	Percentage (%)
Age group (in months)		
0-12	90	30.0
13-36	133	44.4
37-60	77	25.6
Gender		
Male	174	58.0
Female	126	42.0
Birth order		
First	108	36.0
Second	116	38.7
Third and higher	76	25.3
Number of living siblings		
No siblings	93	31.0
One	122	40.7
Two	70	23.3
More than two	15	5.0
Total family members		
Up to 5	174	58.0
6 to 10	101	33.6
More than 10	25	8.4
Type of family		
Nuclear	196	65.3
Joint and Extended	104	34.7
Religion		
Hindu	288	96.0
Others	12	4.0
Caste		
OBC	80	26.7
SC/ST	151	50.3
General	69	23.0
Education of mother		
Illiterate	26	8.7
Up to Primary	24	8.0
Up to middle school	44	14.7
Up to higher secondary school	154	51.3
Graduation and above	52	17.3
Occupation of mother		
Homemakers	272	90.7
Employed	28	9.3
Education of father		
Illiterate	18	6.0
Up to Primary	38	12.7
Up to middle school	54	18.0
Up to higher secondary school	144	48.0
Graduation and above	46	15.3
Occupation of father		
Unemployed	8	2.7
Unskilled laborer	162	54.0
Semiskilled laborer	87	29.0
Skilled laborer and professional	43	14.3
Type of ration card possessed		
No card	126	42.0
Below poverty line (BPL)/Antyodaya Anna Yojana	135	45.0
Above poverty line	39	13.0

± 15.83. Among the participants, 58% were male, and the rest were female (42%) children. Around 36% (n = 108) of study participants were firstborn, followed by 38.7% (116) second-order births, and 25.3% (76) of the children were third and higher birth order. A majority (40.7%) of the children had only one sibling, 31% had no sibling, and 23.3% had two siblings. Around 5% of children had more than two siblings. More than half (58%) of the children belonged to families with less than five members, and 33.6% (101) were from 6 to 10-member families. Rest, 8.4% (25) belonged to more than 10 family members. Around 65.3% (196) of children were part of a nuclear family, and the rest 34.7% of children belonged to a joint family. Almost all the 37 children (96%) belonged to Hindu religion. Around half (58%) of the children belonged to the Scheduled Castes/Scheduled Tribes (SC/ST) category, 26.7%) were Other Backward Classes (OBC), and the rest (23%) belonged to Others categories. About two-thirds (66%) of the mothers were educated up to high school and 17.3% were graduates. Around 8% were educated up to the primary level, and the rest 8.7% were illiterate. About

Two-thirds (66%) of fathers were educated up to high school, and 15.3% were graduates. Around 12.7% had education up to primary education, and the rest 6% were illiterate. More than 90% of the mothers of participating children were homemakers. And more than half of the fathers of study participants (54%) were unskilled laborers. Around 29% of them were involved in unskilled labor, 14.3% were skilled workers, and the rest 2.7% were unemployed. Almost 58% of the children's families possessed a ration card, 45% possessed a Below Poverty Line (BPL)/Antyodaya Anna Yojana (AAY) card, and the rest 13% possessed an Above Poverty Line (APL) ration card.

The prevalence of unintentional injury among study participants was 16% (12.0–20.7%). Almost all injuries were confined to the head, face, and extremities [Table 2]. Almost 75% of injuries happened when the child was at home. Only 12% of injuries happened when the child was outside the house (street, road, playschool, playground, etc.). Around two-thirds of all injuries occurred while playing alone or with peers. Falls contributed to 64.6% of all unintentional injuries. The distribution of nature of the injury is diverse, and major types were bruises, cuts, bites, and fractures. More than half (54.2%) of the injured children did not suffer from any disability. Those who suffered disability had suffered mostly (54.8%) upper limb disabilities.

The majority of study participants were taken to nearby hospitals (66.6%) or health centers (10.4%). Only one of them went to a traditional bone setter, rest all visited either a general practitioner or pharmacy.

The majority of study participants were not hospitalized due to injury. However, 5.3% of the injured children required hospital admission of varying duration from less than a week to more than a week. The median expenditure for the treatment of the injured child was INR 425 (175–2750). Almost 90% of the family

Table 2: Distribution of study participants according to injury event factors

Injury event factor	Number (*n*=48)	Percentage (%)
Site of injury		
Head	12	25.0
Face	11	22.9
Upper limb	13	27.1
Lower limb	9	18.8
Others	3	6.3
Place of injury		
Home	36	75.0
Outdoor (street, playground, school, etc.)	12	25.0
Situation of the child at the time of injury		
Playing alone	16	33.3
Playing with peers	15	31.3
Playing with adult supervision	6	12.5
Sedentary activities	11	22.9
Mechanism of injury		
Fall	31	64.6
Dog bite	6	12.5
Struck/Hit by a person or object	4	8.3
Fire/flames or heat	4	8.3
Drowning/Near drowning	2	4.2
Road Traffic Accidents	1	2.1
Type of Injury		
Cut/bite/open wound	19	39.6
Bruise or superficial injury	10	20.8
Fracture	7	14.6
Sprain/Strain	4	8.3
Burn	3	6.3
Brain injury	2	4.2
Eye injury	1	2.1
Broken teeth	1	2.1
Physical disability due to injury		
No disability	26	54.2
Unable to use hand or arm	9	18.8
Difficulty in using hand or arm	3	6.3
Walk with a limp	3	6.3
Loss of vision	2	4.2
Shortness of breath	2	4.2
Inability to chew food	3	6.3
Recovery		
Complete recovery	20	90.9
Partial recovery	2	9.1

members of injured children did not lose work to take care of the child. None of the family members of the injured children lost their jobs, or children had to leave school. The majority of families (89.6%) did not have a decrease in household income. Only five families (10.4%) reported a decrease in household food consumption related to the injury event of the child. Nine families (18.8%) had to borrow money for the treatment of the injured child. However, none of the households had to sell any properties to take care of the injured child.

The association between age and unintentional injury was statistically significant. None of the other parameters showed any statistically significant association with unintentional injury.

Discussion

Prevalence of unintentional pediatric injury

In the current study, the prevalence of unintentional injury came to 16% (12–20.7%). Prevalence in males and females was found to be 16.1% and 15.9%, respectively.

Moumita Basak *et al.*, Shriyan P *et al.*, N Bhuvaneshwari *et al.*, Dinesh Mohan *et al.*, Mahalakshmi *et al.*, Sharma *et al.*, Sourabh Paul *et al.* reported a higher prevalence of unintentional childhood injuries which were 21.2%, 46.3%, 39.7%, 30%, 24.5%, 39.1%, and 62.7%, respectively.[1-6]

On the contrary, a lower prevalence of unintentional injuries was also observed in several studies by Parmeswaran GG *et al.,* Zaidi SH *et al.*, Hemalatha *et al.*, Pathak A *et al.*, Masthi R *et al.* who reported unintentional childhood injury prevalence of 7.1%, 11%, 12.9%, 7.78%, and 9.6%, respectively.[7-11] Such variation in unintentional injury variation may be due to differences in the region, the extent of urbanization, Lifestyle patterns, environment and socioeconomic cultural factors.

Determinants of unintentional pediatric injury

Age: In our study, there is an association between age group and the presence of unintentional injuries. The same is also reported by other studies by Zaidi SH *et al.* Hyder *et al.*[8,12] However, the categorization of age groups was different in these studies.

Gender: The study conducted in Agartala by Tripura *et al.* did not find any relation between gender and injury prevalence.[13] Our study also reported similar results.

Family: In our study, type of family, number of family members, number of siblings, and birth order did not have any relation with injury prevalence. This result was similar to results reported by Tripura *et al.* in Agartala. However, the study by Sato *et al.* in Japan and Basak *et al.* in Siliguri showed a higher prevalence among children with more siblings, Sharma *et al.* in Vellore showed a higher prevalence in overcrowded families, and Pathak *et al.* in Ujjain showed a higher prevalence of injury in large and joint families.[1,10,13-15]

Socioeconomic status: Children from poor families are more likely to get injured compared to their affluent counterparts, according to the United Nations International Children's Emergency Fund (UNICEF).[16] However, in our study, we could not find any relationship between socioeconomic factors and injury prevalence similar to Sato *et al.*'s study in Japan.[14] And this contradicts most of the other studies conducted in India, whose results showed a relationship between unintentional injury prevalence and socioeconomic status, especially mothers' education.[6,11,13,17] This may be due to the fact that our study area

was congested urban resettlements with very proximate living of neighbors, resulting in exposure of children of all socioeconomic classes to the same physical and cultural environment.

Event factors of unintentional pediatric injury

Bangdiwala S I *et al.*, Hyder *et al.*, Pant *et al.*, Parmeswaran *et al.*, Bhuveneswari *et al.*, Dinesh Mohan *et al.,* and Pathak *et al.* revealed that most of the unintentional injuries happened when a child was at home.[3,4,7,10,18,19] Our study also showed that the majority (75%) of the unintentional injury happened at home.

Similar to most of the international and Indian studies, In our study also, falls were the most common cause of injury.[1-5,7,9,12,13,18-23] Similar to the study by Parmeswaran *et al.,* our study also found that the second most common cause of unintentional injury was dog bites.[7]

Studies by Masthi R *et al.*, Nirgude *et al.*,Hemlatha *et al.*, Zaidi *et al.*, Inbaraj *et al.*, Shriyan *et al.,* and Basak *et al.* showed that frequent sites of injuries were extremities mainly involving the lower limbs.[1,2,8,9,11,22,23] However, in our study, the head and face region and extremities had an almost similar frequency of injuries, 47.9% and 45.9%, respectively. This may be due to the difference in the operational definition of unintentional injury and our study definition, requiring the need for medical care and at least 24 h disruption from normal activities.

Shriyan P *et al.* observed that nearly three-fourths of the injuries occurred when there was the presence of supervision,[2] but in our study, only 12.5% of injuries happened in playing with adult supervision may be due to the difference in the age group, of study subjects.

Masthi *et al.* and Nath A *et al.* reported that the most common type of injury was superficial abrasion/bruise.[11,24]In our study common type of injury was open wounds (39.65%), followed by superficial injuries (20.8%). The results were similar to the findings of Nirgude A S *et al.* and Zaidi SH *et al.*[8,23]

Shriyan *et al.* showed that the majority of the injuries (90.9%) did not cause any disability. In our study, more than half (54.2%) of the injuries did not cause any disability.

Parmeshwaran *et al.*[7] reported that 60% of injured children were given professional medical attention, whereas in our study, 92% of injured children got appropriate professional medical attention.

Inbaraj *et al.*[22]. showed that 91.4% of the unintentional injuries recovered completely. Our study also showed complete recovery in 90.9% of injured children. Masthi *et al.*[11] also reported similar results.

Impact of injury on family members

Parmeswaran GG *et al.* observed that some families needed to borrow money, take additional employment by another family member, and sell off household assets for treatment expenses.[7] In our study also, 18.8% of families of injured children had to borrow money to meet the treatment expenses. Almost the same observations are made by Inbaraj *et al.*[22].

In our study, the median expenditure for the treatment of a child was Rs 425 with an interquartile range of 2713, Inbaraj *et al.*[22] also observed similar results.

Conclusion

To the best of our knowledge, this study was the first community-based study on unintentional injuries in Uttarakhand. The prevalence of the injury was 16% (12–20.7%) similar to a number of similar studies. Although the majority of the injuries were mild in severity, injuries have also contributed to temporary disability among children and have led to loss of school days.

Recommendation

1. To reduce the occurrence of injuries and to reduce the severity, multipronged approaches are essential, which could focus on many factors leading to injury.
2. Education of the community and family members, mainly mothers, regarding safety practices at home and surroundings can reduce the occurrence of the majority of injuries.
3. Measures to reduce road traffic injuries so that severe and life-threatening injuries can be reduced.
4. Measures to reduce the risk of dog bites in the community.
5. There is a need for establishing state or nationwide injury registries to help understand accurate estimates of DALY and loss of productivity.

Limitation of the study

1. The research work in the midst of the ongoing Coronavirus disease (COVID-19) pandemic and during the lockdown period was difficult. Involving healthcare workers in field visits, conducting household visits, and face-to-face interviews of study participants were cumbersome.
2. Recall bias would have affected the prevalence of injuries among children.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

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