

Unintentional Injuries and Its Characteristics Among Children Aged 0 to 14 Years in Field Practice Areas of the Community Medicine Department of a Tertiary Care Institute in South Gujarat : A Cross-sectional Study

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Abstract:

Introduction: Childhood Unintentional Injuries (UI) are a major yet preventable public health concern, particularly in low- and middle-income countries. They contribute significantly to morbidity, and identifying associated risk factors is essential for prevention. **Objectives:** To estimate the proportion of UI in children. To document the characteristic, outcome and first-aid practices of UI in children. To assess the association of various socio-demographic factors and UI. **Methods:** A community-based descriptive cross-sectional study was conducted from April to August 2023 among 206 children using convenient sampling technique in the urban and rural field practice areas of Department of Community Medicine, Government Medical College, XYZ. Data were collected through house-to-house surveys using a pre-tested semi-structured questionnaire administered to caregivers. Descriptive statistics and chi-square/Fisher's exact tests were applied, with $p < 0.05$ considered significant. **Results:** The proportion of UIs in the preceding six months was 26.7%, higher in rural (30%) than urban (22.1%) areas. Children aged 5–9 years were most affected (47.3%), with mean age 7.27 ± 3.32 years. Significant associations were observed with age ($p = 0.04$), education ($p = 0.0125$), and parental marital status ($p = 0.025$). Falls (41.8%) and burns (21.8%) were leading causes, with 56.4% occurring indoors. Traditional remedies like turmeric and toothpaste were common for first aid, while only 12.7% sought medical care. **Conclusion:** Childhood UIs are common and strongly influenced by sociodemographic factors. Promoting safer home environments, improving caregiver awareness, and providing first-aid training are essential to reduce this preventable burden.

Keywords: Children, First Aid, Community Health Services, Injuries Field practice area, Unintentional Injuries.

Introduction:

An injury is described as “the physical damage that results when a human body is unexpectedly subjected to energy in amounts that go beyond the level of physiological tolerance –else wise the result of a lack of one or more vital elements, for example, oxygen” according to WHO report on child injury. Unintentional

injury (UI) as described by WHO that occur in the lack of predetermined aim, of which important causes are road traffic injuries, falls, drowning, burns, poisoning and animal bites.^[1] According to CDC report on injury prevention & control, UI means which is not inflicted by intentional means. Injuries and poisonings that are characterized as unplanned or accidental are included,

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regardless of whether the harm was brought on by oneself or by another. Additionally, it covers injuries for which the emergency department's report had no indication of hostile intent.^[2]

Childhood injury is a most important public health problem that demand immediate action. Injury and violence are important killer of children throughout the world, accountable for approximately 9,50,000 deaths in children and young people under the age of 18 years each year (WHO Global Burden of Disease: 2004 update). UI responsible for nearly 80% of these cases. Although everyone is at risk of injuries, but children are more vulnerable because of their age, gender, curiosity, and risktaking behaviour. Childhood is a susceptible age for injuries because of physical and mental boundaries in comparison to adult age groups. Deaths due to injuries have a huge effect on families and society, mainly in low- and middle-income countries (LMICs), where injury-related mortality among young children is 4 to 6 time greater than in high-income countries (HICs). Injuries and other NCD (Non-Communicable Disease) have a total contribution to the disease burden on children under 14 years of age in developing countries which is estimated to increase from 13% in the year 1990 to 22% in the year 2020.^[1]

Identifying the factors related with UI may help minimize injuries. Several factors associated with UIs can be classified as- Child-related factors such as impulsiveness, experimenting, and lack of understanding on the judgment of speed. Environment-related factors such as poor housing set-up, inadequate storage places for hazardous substances, and lack of barriers to cooking/washing areas. These living circumstances are more prevalent in poor and middle-income nations like India. Other factors for example, parent's sociodemographic characteristics, age, education, and socioeconomic status have been associated with an increased risk of UI and their seriousness and accidents at home. A large number of such injuries occur in the home environment where children spend most of their time.^[3]

Childhood unintentional injuries are largely preventable but continue to contribute substantially to morbidity among children in low- and middle-income countries. Data regarding injury patterns, associated socio-demographic factors, and first-aid practices in both urban and rural settings of XYZ are limited. Understanding these factors is important for planning targeted preventive interventions and improving caregiver awareness regarding child safety.

Objectives:

- 1) To estimate the proportion of UI in children.
- 2) To document the characteristic, outcome and first-aid practices of UI in children.
- 3) To assess the association of various socio-demographic factors and UI.

Method:

Study design: Community based descriptive cross sectional study

Study settings: Urban & rural field practice area of Community Medicine department, Government Medical College, Surat

Urban- UHTC, Althan (Indira-Nagar / Rasulabad / Azad-Nagar)

Rural- RHTC, Vanz (Aahir faliyu / Halpati vas / Hanuman faliyu of village Vanz) and (Halpati vas / Chhavisgara faliyu of Vaktana village)

Study participants: 0 to 14-year-old children population in study settings area of UHTC- Althan & RHTC-Vanz field practice area.

Inclusion criteria:

- Children aged 0–14 years residing in the study area for at least 6 months whose parents/guardians provided written informed consent were included. Assent was not applicable as children were not interviewed directly.
- Children whose primary caregiver is mother/or any elder person of the household present at the time of data collection.

Exclusion criteria:

- Parents/guardians of children with physical or mental disabilities were excluded from the study.
- Parents/guardians who could not be contacted even after three home visits were excluded from the study.
- Parents/guardians of children who had sustained serious intentional injuries were excluded from the study.
- Children with any physical or mental disability were excluded from the study.

Data collection period: April 2023 to August 2023

Sample size calculation:

- The sample size was calculated using OpenEpi software at a 95% confidence level ($\alpha = 0.05$) with 5% absolute precision based on the expected prevalence from previous studies. Taking prevalence of Unintentional Injuries (UI) in rural area 8.5 and in urban area 5.9, sample size comes out to be 120 for rural and 86 for urban area. So, total sample size was 206.^[4]

Sampling method: Convenient sampling technique was used

Data Collection:

Mother/or any elder person of the household of 0 to 14 years old children residing in both field practice areas would be contacted by house to house visit and interviewed using pre-tested semi-structured questionnaire regarding Unintentional Injuries (UI). Caregivers were encouraged to recall injury events using temporal landmarks such as festivals, school events, or family occasions to improve recall accuracy. Injuries were classified as intentional or unintentional based on caregiver history during the interview. Cases involving assault, self-harm, or violence were excluded. If a child had multiple injury in past 6 month then information of most recent injury was obtained. If there is more than one child living in one house with our inclusion criteria then

only youngest child /or who had injury in last six month which required medical treatment of an OPD/indoor basis were included in study.

Study tools:

Pre-tested semi-structured questionnaire was used. The Questionnaire was divided into 2 Section. Section A focused on the child's and parent's socio-demographic characteristics. Section B focused on types, patterns, first-aid treatment and outcome of UI in children.

Data entry and analysis:

The obtained data was recorded in a printed format and there after entered in Microsoft Excel. After data cleaning, analysis of data was done using Microsoft Excel and IBM SPSS software version 23. The frequencies (n), percentage (%), arithmetic mean standard deviation (M-SD), range, mode was calculated within the context of descriptive statistics. The statistical test of chi-square and Fischer's Exact were used to compare categorical variables. Significant data was defined as a p-value of 0.05 or lower at 95% Confidence interval.

Ethical consideration:

The study was started after obtaining ethical clearance from the Institution Ethics Committee of Government medical College (Approval No GMCS/STU/ETHICS -3/Approval/5559/23). Informed written consent of the participant children's parent (mother/father/any elder person) was obtained after explaining the contents of the participant information sheet to them in a language they can understand and comprehend.

Results:

Proportion of UIs:

The overall proportion of unintentional injuries (UI) during the preceding six months was 26.7% (55/206). Among these, 19 cases (22.1%) were reported from the urban field practice area, while 36 cases (30.0%) were reported from the rural field practice area. As the present study was descriptive in nature, no statistical comparison between rural and urban areas was performed. Most

children experienced only one episode of injury during the recall period. Death due to UI was not observed in the study participants.

Sociodemographic characteristics of all participant children:

The majority of UI were reported in children aged 5–9 years (47.27%), with a mean age of 7.27 ± 3.32 years. UI were slightly more common in boys (54.5%) than girls (45.45%). Over half of the children (56.36%) had primary education, while 20% were not attending school, though some were enrolled in Anganwadi. Most children (50.91%) had a birth order of two.

Sociodemographic characteristics of all participant children's parents:

Most children (92.8%) had married parents, with a few either divorced or separated. The mean ages of mothers and fathers were 29.09 ± 4.88 years and $30.34 \pm$

6.5 years, respectively. A majority of mothers (81.8%) had primary education, and over half (54.5%) were homemakers. Among fathers, 62% had primary education, and 74.54% were engaged in semiskilled work.

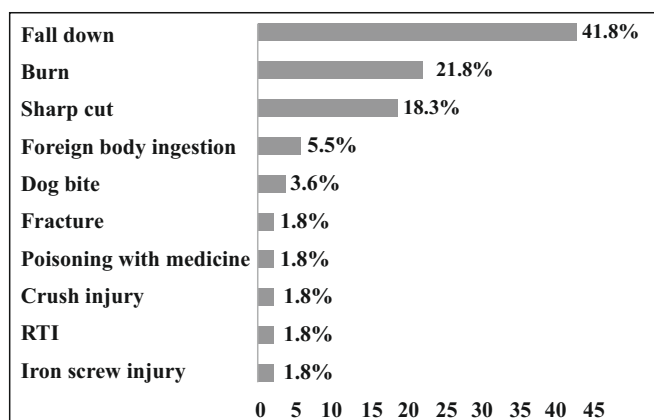
Table 1 shows the significant associations between children & their family characteristics and UI. Age group was significantly associated ($p = 0.04$), with higher injury rates among children aged 5–9 years and 10–14 years. Educational status also showed a significant association ($p = 0.05$), with most injuries occurring among children with primary education. Educational status showed a borderline significant association with unintentional injuries ($p = 0.0125$), with most injuries occurring among children with primary+secondary education, which may be influenced by the younger age distribution of the study participants. Parental marital status was significantly linked to UI ($p = 0.013$), with

Table 1: Association of children and their parent's sociodemographic profile and occurrence of UIs. (n=206)

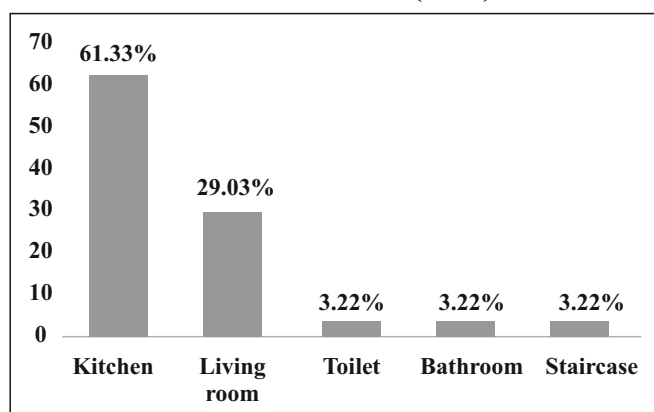
Variable	Category	UI Present n (%)	UI Absent n (%)	χ^2 / Fisher exact	p value
Age group	0–4	12 (16.9)	59 (83.1)	6.525	0.04
	5–9	26 (28.9)	64 (71.1)		
	10–14	17 (37.8)	28 (62.2)		
Sex	Male	30 (27.5)	79 (72.5)	0.08	0.451
	Female	25 (25.8)	72 (74.2)		
Education	Not going to school + Pre-school	22 (19.6)	90 (80.4)	6.244	0.0125
	Primary + Secondary	33 (35.1)	61 (64.9)		
Marital status of parents	Married	51 (25.5)	149 (74.5)	5.0443	0.0247
	Divorced/separated/broken	04 (66.7)	02 (33.3)		
Birth order	≤ 2	44 (28.0)	113 (72.0)	0.343	0.558
	≥ 3	11 (22.4)	38 (77.6)		
Number of siblings	0–1 sibling	37 (25.7)	107 (74.3)	0.2466	0.6195
	≥ 2 sibling	18 (29.0)	44 (71.0)		
Age of sibling(n=110)	≤ 10 year	12 (19.7)	49 (80.3)	0.1267	0.7219
	≥ 10 year	11 (22.4)	38 (77.6)		

*In this Table 1 percentages are calculated row-wise.

Graph 1: Distribution according to types of different UIs (n=55)



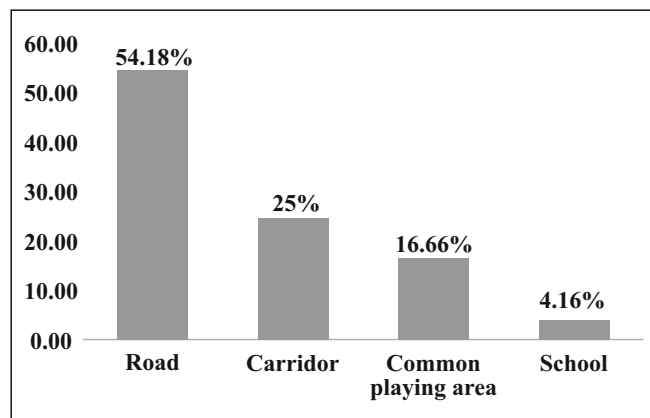
Graph 2: Distribution of UI according to different indoor areas of house. (n=31)



higher rates observed among children of divorced or separated parents. Statistically significant association was observed between parental marital status and unintentional injuries among children ($p = 0.0247$). Most children with unintentional injuries belonged to married parents, this may be due to the higher proportion of married parents in the study population. No significant associations were noted for sex of the child, birth order, number of siblings and sibling age.

Graph 1 shows falls were the most frequent cause of UI, contributing to nearly half of the cases (41.8%). Burns (21.8%) and sharp cut injuries (18.3%) were also prominent, whereas foreign body ingestion (5.5%) and dog bites (3.6%) were comparatively less common. These findings emphasize that fall prevention and safe household practices should be key focus areas for child safety interventions.

Graph 3: Distribution of UI according to different outdoor area of house (n=24)



The majority of unintentional injuries (56.4%) occurred indoors, while 43.6% took place outdoors, indicating that children were more likely to get injured within the home environment.

Graph 2 showing that the kitchen emerged as the most common site for UI, accounting for nearly two-thirds of the cases (61.31%). This was followed by the living room (29.03%), while only a small proportion of injuries occurred in the toilet, bathroom, and staircase (3.22% each). These findings highlight the vulnerability of children in domestic spaces particularly in areas where cooking activities take place.

Graph 3 shows that over half of the children 13(54.18%) sustained injuries on the road side, followed by 6(25%) at corridor area, 4(16.66%) at common playing area and 1(4.16%) at school.

Table 2 showing that among the total injured children, 32.7% of children received turmeric application as first aid, while only 12.7% consulted a doctor. Mothers provided first aid in 60% of cases, and 65.45% received treatment within an hour. Most children (58.18%) resumed normal activities immediately; 5.45% took longer than a week. Temporary disability was seen in 5.45% of cases, with no permanent disability reported. Formal first aid training had not been received by any of the caregivers.

Table 2: First aid treatment and outcome of UIs in children (n=55)

Variable	n, (%)
First aid treatment	
Consult doctor	07 (12.70)
Apply bandaged/ minor dressing	12 (21.80)
Apply ice-pack	02 (03.60)
Apply turmeric	18 (32.70)
Apply toothpaste	09 (16.40)
Apply iodex	02 (03.60)
Others (ointment, splintage, lukeman-hyati oil, cold water, nothing)	05 (09.20)
By whom first aid given	
Mother	33 (60.00)
Grandmother	08 (14.50)
Neighbour	02 (03.60)
Aunty	04 (07.30)
Father	05 (09.20)
Teacher	01 (01.80)
Friend	02 (03.60)
Time of receiving actual treatment	
Within 1 hour	36 (65.45)
After 1 hour	19 (34.55)
Routine activity resumed	
Immediately	32 (58.18)
1-7 days	20 (36.37)
>7 days	03 (05.45)
Any disability	
None	00 (00.00)
Temporary	03 (05.45)
Permanent	00 (00.00)
Received any training for first aid	
Yes	00 (00.00)
No	55 (100.0)

Discussion

The present study provides community-based evidence regarding the burden, pattern, and first-aid practices related to childhood unintentional injuries in both urban and rural field practice areas of Department of Community Medicine, GMC Surat. Although several studies on childhood injuries have been conducted in India, limited literature is available from this region incorporating both injury characteristics and caregiver responses to injuries.

Overall proportion of UI in our study during the last 6 months was 55 (26.6%). A study conducted by T Mahalakshmi (2011) in rural Puducherry reported a 1-year prevalence of unintentional injuries of 23% among children aged less than 14 years.^[5] Similarly, Jagriti Bhatia et al. (2020) in Delhi reported a 1-year prevalence

of 29.3%.^[6] Although the recall period differed from the present study, the prevalence estimates were within a comparable range. However, One ICMR funded study conducted in Ahmedabad city of District Gujarat by Viral R. Dave et al. (2021) where they found overall prevalence of UIs was 7.62 % which is in contrast to our study result which may be due to exclusion of minor injuries from the study and another reason the sociodemographic variables, environmental risk factors were also different in our study area compared to them.^[4]

According to age group wise, we found in our study that children of 5-9 years (47.27 %) age group injured more followed by 10-14 years (30.92 %) and 0-4 years (21.81 %). The study conducted by Pant et al. (2015) in Nepal they also found higher UIs among 5-9 years age group.^[7]

Our study has found that male children (54.5 %) were more affected than female children (45.5 %) which was similar to the results of other study conducted in rural area of West Bengal by Sitikantha Banerjee et al. (2016) which was community based cross sectional study.^[8] Same result also found in one of the study conducted by Parmeswaran et al. (2017).^[9] This might be because of the socialization processes, which lead male children to engage in risky behaviour than females, differences in aggressiveness and personality also.

On finding association between sociodemographic characteristic of children and being victim of UI, it was found that age group ($p=0.04$) and education level ($p=0.05$) were significantly associated as $p\leq 0.05$, while other characteristics like sex, birth order, no. of siblings, age of the siblings were not significantly associated. While the contrasting finding seen in study conducted by Prafulla Shriyan et al. (2014) in coastal Karnataka where they saw that number of the sibling was significantly associated with occurrence of UIs.^[10] This difference may be due to difference in study population, cultural patterns and environmental factors difference in both study region. However statistically significant finding highlights that age group and level of education has significant impact on UIs, so it indicates that we should focus on developing age specific and educational preventive strategies.

Our study revealed that among the total UIs, Fall-related (41.8%) were highest followed by burn (21.8 %) and sharp cut injury (18.3 %). These findings were similar to another study conducted in India.^[4,8] The high prevalence of fall related injuries attributed to several factors especially in rural areas. Environmental hazards such as uneven ground surfaces, lack of safety equipment and poor lighting may increase the risk of falls. Burn injuries, which constitute second highest percentage, may be due to common use of wooden chulha in rural areas for cooking and in urban slum area for water heating, as well as inadequate supervision of children around the fire sources.

The current study showed that majority of UIs occurred inside home of the children (56.4 %) and this

result similar with the study conducted by Prafulla Shriyan et al. (2014) in coastal Karnataka.^[10] The high incidence of injuries occurring at home may be attributed different factors like lack of childproofing safety equipment like improper storage of hazardous materials/substance especially in rural area, lack of supervision in urban area especially in nuclear family where mother often engaged in household domestic activities.

Within inside area, majority of UIs occurred in the kitchen area (61.31%) followed by living room (29.03 %). However, Sudhir et al. (2014) and Netra G et al. (2017) reported in their study that courtyard and kitchen were the most common place for occurrence of domestic accidents.^[11, 12] The reason for kitchen being the most common place for UI in our study may be because in our study area majority houses have no separate kitchen area (kitchen along with living room), use of wooden chulha for water heating, improper storage of knife and lack of supervision by parents when they work in kitchen.

Regarding first-aid treatment provided at the time of UI by caregivers, most of them practice application of turmeric paste followed by use of bandaged/minor dressing. Similar results were found in the study conducted by Netra G et al. (2017).^[12] In our study, first-aid were provided by the mother in more than half of the children (60%) and time of receiving actual treatment (in case if required) after first aid was also within one hour in majority of children (65.45%). The reason may be that mothers were the primary caregiver who were present at home in majority of cases and they gain knowledge of first aid from their elder family members and previous experiences. The time of receiving actual treatment was within one hour which may be due to nearby availability of health facilities in our study areas. So, these both factors have positive effect in the outcome of UI.

In our study, when we asked caregivers if they had received any training for providing first-aid treatment in emergency, all of them said no. None of the caregiver had any form of formal training for first-aids. So, this indicate a gap in education and resources for caregiver that can be improved by implementing training program related to first-aid treatment.

Limitation:

As the study was conducted in selected urban and rural field practice areas attached to a tertiary care institute, the findings may not be generalizable to all community settings. However, the study provides useful baseline information regarding childhood unintentional injuries in similar settings. Additionally, reliance on six-month recall of UIs may introduced recall bias, although efforts were made to ensure accuracy. Preferential inclusion of children with recent unintentional injuries in households with multiple eligible children may have introduced selection bias.

Conclusion

The present study demonstrates that unintentional injuries are common among children, particularly among those aged 5–9 years. Significant associations were observed with age and parental marital status. Most injuries occurred indoors, especially in kitchen areas, and were frequently managed using traditional remedies rather than professional medical care. Lack of formal first-aid training among caregivers highlights the need for preventive interventions, caregiver education, and safer household environments to reduce childhood injuries.

Further, we should encourage child-safe home practices, especially in kitchens and play areas, and promote closer supervision of young children.

Provide basic first-aid training to caregivers through community health workers and increase awareness about when to seek medical help.

Use schools, Anganwadi, and local health platforms (Subcentre, Primary Health Centre) to educate both children and parents about injury prevention and safe behaviour.

Declaration:

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