*Original Article*

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# Environmental Risk Analysis for Unintentional Childhood Injuries in a Rural Area of Delhi, India

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**Abstract**

Unintentional childhood injuries cause high mortality and disability. Objective of this cross-sectional study, conducted in two villages of Delhi, India, wasto assess risk of unintentional childhood injuries. Study population included adolescents and adult women of selected families. Data was collected by interview of the subjects and observation of domestic and peri-domestic environment, covering 121 houses, which included 299 adolescents and 164 women.

Knowledge of the subjects regarding injuries and their prevention was assessed as Mean Subject Knowledge Score, which for the total population was 3.60 (15% of total score). Mean Family Practice Scoreas reported by subjects were 11.50 (38% of total score) and 10.60 (35% of total score) regarding injury prevention and injury treatment seeking behavior respectively. Mean environmental safety score was 19.95 (49.8% of total score).

Mean knowledge score was 3.58 for adolescents and 5.00 for women. The difference was not statistically significant. Mean score regarding family practices for prevention of injuries was 13.45 for adolescents and 10.03 for women, with statistically significant difference. Mean score regarding injury treatment seeking behavior did not show any difference.

Families under study are at high risk of unintentional childhood injuries, as knowledge of subjects and family practices regarding injury prevention and injury treatment seeking behaviorare poor, along with low environment safety score.

**Keywords:** Unintentional Childhood Injuries; Injury Prevention; Environmental Safety.

## INTRODUCTION

According to WHO, unintentional childhood injuries were responsible for over 3.9 million deaths and over 138 million disability adjusted life years (DALYs) lost in 2004, of which over 90% occurred in low and middle income countries. The rate of unintentional injuries in the world is 61 per 100,000 population per year. Road traffic injuries contribute the largest proportion of unintentional injuries (33%). When calculated per 100,000 population, the death rate is nearly double in low and middle income countries versus high income countries (65 vs. 35 per 100,000), and the rate of DALYs lost is more than triple in low and middle income countries (2398 vs. 774 per 100,000).[1]

In India, a nationally representative study conducted by Jagnoor *et al.* showed that

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unintentional childhood injuries were the sixth leading cause of death among children under 5 years of age. In 2005, unintentional injuries led to around 82,000 deaths among children under 5 years of age, which amounts to mortality rate of 302 per 100,000 live births. Mortality rate was higher in rural area than that in urban area (339 vs 173 per 100,000 children). In rural area, drowning cases were more and in urban area falls were the leading cause of child injury mortality.[2]

Death constitutes just a small proportion while major portion of the injury burden is contributed by non-fatal health outcomes. Most of the injuries result in potentially life-long disability, significant psychological trauma and subsequent financial loss.[3]

The present study was conducted with the objective of analyzing environmental safety of families regarding unintentional childhood injuries, in a rural area of Delhi.

## MATERIALS AND METHODS

This study reports a part of a funded intervention research on unintentional childhood injuries, conducted in two villages of Delhi, India. The main research project was approved by institutional ethics committee.

Cross sectional findings regarding environmental risk of injuries in the pre-intervention phase to assess the baseline status of the families, has been covered in this report. The families were selected by consecutive sampling, which was the suitable sampling technique for the main research project that aimed at transmission of information by the adolescents of the families, to increase the knowledge and awareness among their family members and neighbors living around them.

Study population included all the adolescents and adult women in the selected families. Age group of adolescents (10-19 years) was categorized as young adolescents (10-14 years) and older adolescents (15-19 years). Adult women aged 20 years and above in the selected families constituted another group of study subjects, who were the mothers, aunts and grand-mothers of the children included in the study, as they were the ones to care for the children. Total 299 adolescents and 164 adult married women were included in the study.

The data collection involved details about micro environment and macro environment to assessthe risk to occurrence of unintentional injuries, making children of the families vulnerable to being injured and not receive appropriate management. The data was collected using pretested semi structured schedule, by interview of the subjects and observation of domestic and peri-domestic environment. The schedule included questions about socio-demographic details of the study population and also questions to assess the knowledge, attitude and family practices regarding prevention and treatment of unintentional injuries, which reflected the awareness and perception of the two groups of population and gave an idea of the practices followed in the families, as surrogate indicator of safety or vulnerability. The domestic and peri-domestic environment was assessed through observation of the environment in and around the selected households to assess the conditions affecting the risk of unintentional injuries.

Outcome variables included the following:

- Subject knowledge Score regarding unintentional childhood injuries.
- Family practice score regarding injury prevention and treatment seeking behavior as reported by subjects, which gave an indirect measure of risky family practices.
- Environmental safety score of housing regarding domestic and peri-domestic environment, which was a direct measure of the environmental risk factors to injuries.

Risk of injuries, their prevention and management was assessed in the context of internal and external environment. Internal environment comprised of micro environment related to subjects and macro environment related to families. Micro environment was assessed by Knowledge Score of subjects, regarding unintentional childhood injuries. It included the knowledge about common types of injuries, common causes of injuries, risk factors of injuries, probable outcomes following injuries and importance of knowing blood group and about vaccination for tetanus. Macro environment was assessed by practice Score of families for injury prevention and injury treatment seeking behavior, as reported by the subjects. Injury prevention practices included adult supervision of children and method of storage of harmful objects within the house. Treatment seeking behavior included type of treatment sought, time between injury and seeking treatment for it, treatment compliance and adherence to advice. External environment was assessed by safety score of environment regarding domestic and peri-domestic environmental conditions with regard to injuries. Domestic environment included condition of house and floor, lighting, kitchen, bathroom, terrace, stairs etc. Peri-domestic environment

included road/street, traffic, water bodies, stray animals around house etc. Danger points included open electric points, accessible chemicals, sharp instruments, fire/heating appliances etc. Higher scores indicate better condition.

Data was entered in MS-excel and was analyzed using SPSS version 25.0. Mean and standard deviations of all quantitative variables were calculated. Statistical significance was calculated using wilcoxon Sign Rank test. Statistical significance was considered at a p value <0.05.

## RESULT

Total 121 houses were covered, which included 299 adolescents and 164 married women. Regarding knowledge about common causes of unintentional childhood injuries, electric shock was stated to be the most common cause by adult women in the study population whereas adolescents reported falls to be the commonest cause (Fig. 1).

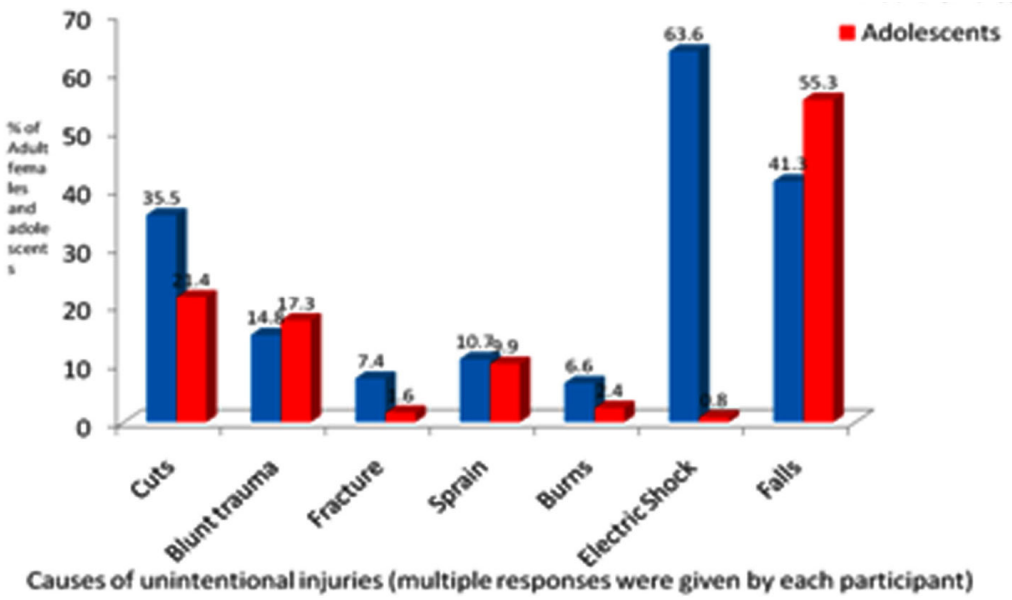



**Fig. 1:** Comparison of knowledge about common causes of unintentional injury among adolescents and adult women

Subjects scored poorly in all the aspects (Table 1). Mean knowledge score of the total population was 3.6 (15% of total score). Mean practice score of families for injury prevention was 11.5 (38% of total score). Mean practice score regarding injury treatment seeking behavior as reported by subjects was 10.6 (35% of total score). Mean safety score of houses was 19.95 (49.8% of the total score).

Table 1 also shows the risk scores of the two groups of study population separately. There was no significant difference between the mean knowledge scores of adolescents and women in study population. Mean practice scores of awareness regarding injury prevention in family, differed significantly between adolescents and women, the mean practice score reported by women being

**Table 1:** Safety Scores of total study population

| Scores | Total population | | | Adult females | | | Adolescents | | | p*** value |
|---|---|---|---|---|---|---|---|---|---|---|
| | Mean | SD | %* | Mean | SD | %* | Mean | SD | %* | |
| Subject Knowledge Score | 3.60 | 3.04 | 15.0 | 5.00 | 3.29 | 20.8 | 3.58 | 1.81 | 14.9 | 0.457 |
| Family Practice score: | | | | | | | | | | |
| Injury prevention | 11.50 | 6.04 | 38.0 | 13.45 | 7.15 | 44.8 | 10.00 | 5.08 | 33.3 | 0.00 |
| Treatment seeking | 10.60 | 2.70 | 35.0 | 10.56 | 2.56 | 35.2 | 10.80 | 2.40 | 36.0 | 0.09 |
| Environmental Safety Score** | 19.95 | 5.13 | 49.8 | - | - | - | - | - | - | - |
| Overall safety score# | 23.89 | 12.36 | 28.4 | 29.16 | 5.95 | 34.7 | 24.58 | 5.90 | 29.2 | 0.00 |

*Percentage of total score
**Environmental safety score of the house hold
***p value is for comparing the mean scores of adult females and adolescents
#Overall safety score includes both knowledge score and practice scores

more than that of adolescents. However, there is no statistically significant difference between mean practice score reported by women and adolescents regarding treatment seeking behavior in case of occurrence of injury.

Comparison of mean knowledge score of different age groups of adolescents showed no significant difference with age or gender. There was also no statistically significant difference between the mean knowledge score of male and female adolescents (Table 2).

**Table 2:** Comparison of Subject Knowledge Score by demographic characteristics of adolescents

| Categories of Adolescents | Knowledge score | | | p value |
|---|---|---|---|---|
| | Mean | SD | %* | |
| *Age* | | | | 0.085 |
| Young adolescent | 3.42 | 1.70 | 14.25 | |
| Old adolescent | 3.78 | 1.89 | 15.75 | |
| *Gender* | | | | 0.661 |
| Male | 3.6 | 1.79 | 15 | |
| Female | 3.56 | 1.83 | 14.83 | |

*percentage of the total score

Comparison of environmental safety scores according to socio-economic indicators shown in Table 3 indicates that mean safety score of houses increases as the monthly family income increases, which is statistically significant. It was also seen that there is no statistically significant change in mean environmental safety score of the houses with change in education of the head of the family.

**Table 3:** Comparison of Environmental Safety Score of houses in study area by socioeconomic indicators of family

| Category of family | Safety score | | | p value |
|---|---|---|---|---|
| | Mean | SD | % | |
| ***Education of the head of the family*** | | | | 0.05 |
| Illiterate | 18.48 | 4.5 | 46.2 | |
| Middle school | 19.48 | 5.11 | 48.7 | |
| Intermediate | 20.62 | 4.97 | 51.55 | |
| Graduate | 22.62 | 3.97 | 56.55 | |
| ***Monthly income of the family (Rs.)*** | | | | 0.02 |
| 1000-20,000 | 19.56 | 4.77 | 48.9 | |
| 21,000-40,000 | 19.57 | 7.44 | 48.92 | |
| 41,000-60,000 | 25 | 1.26 | 62.5 | |
| 61,000-80,000 | 22 | 0 | 55 | |
| 81,000- 1,00,000 | 24 | 3.46 | 60 | |
| ***Over all safety score of house holds*** | 19.95 | 2.25 | 50 | |

*- percentage of the total score

## DISCUSSION

The present study showed that there was low mean knowledge score of the study population (15% of total score). Among mothers in study population, majority reported electric shock as more common type of unintentional childhood injuries, while according to adolescents fall was the commonest cause.

A study conducted by Eldosoky in Egypt reported that burns were the highest percentage of home injuries among children under 12 years of age which is different from that reported in the present study, possibly because of difference in socio-economic status and geographical conditions. The difference may also be due to difference in assessing the unintentional injuries. The study conducted in Egypt considered only unintentional injuries that occurred in home, while present study included injuries occurring at other places too like in school, on road and at playground.[4] Shriyan *et al.* observed that mothers in coastal Karnataka reported falls as most common cause of unintentional injuries followed by burns and chemical bites.[5]

Present study reported low awareness about family practices regarding injury prevention and use of first aid following occurrence of injuries. Eldosoky also showed that mothers had less knowledge about first aid.[4] Studies conducted by researchers in rural areas of India showed finding similar to present study. Shriyan *et al.* found that almost 50% mothers were aware about first aid following injuries.[5] This difference may be because most of the women in the study were educated at least up to high school. In baraj *et al.* conducted a study about perception of unintentional childhood injuries in rural area of South India, which showed that mothers had low perception about childhood unintentional injuries and their prevention, which are similar to results of our study. This study also emphasizes the need for health education for prevention of childhood unintentional injuries.[6] Low level of awareness of parents or guardians about unintentional injuries, has been shown to be associated with three times higher odds of risk of injuries in children.[7]

Several factors pose risk for occurrence of childhood injuries at home. Tiruneh *et al.*, in their study in Ethiopia, observed increased risk due to environmental factors like muddy slippery floors, open fires, absence of electricity.[7] A study in Delhi found that presence of stairs, balconies and terrace was unsafe, and there was a significant association

of falls in children with slippery floors, of injury with access of children to sharps and of burns with unsafe kitchen and access to fuel.[8] Though the houses included in the present study were either cemented or made of brick and hence did not have muddy floors, there were other risk factors like slippery floors, low illumination in bathrooms, cooking arrangement within living room with open fire placed on the floor, steep stairs without handrails etc. Environmental safety score was low in these houses (50% of total score), which exposes the children under study to high risk of sustaining unintentional injuries.

## CONCLUSION

Families under study are highly vulnerable to unintentional childhood injuries and their inappropriate treatment, as knowledge of both women and adolescents, family practices regarding injury prevention and injury treatment seeking behavior as reported by subjects are poor, along with low domestic and peri-domestic environmental safety.

## REFERENCES

1. World Health Organisation, The global burden of disease 2004 update; WHO 2008, [Cited February 2018] Available from www.who.int/healthinfo/global_burden_disease/GBD_report_2004update_full.pdf?ua=1.
2. Jagnoor J, Suraweera W, Keay L, Ivers RQ, Thakur JS, Jha P and Million death study collaborators. Unintentional injury mortality in India, 2005: Nationally representative mortality survey of 1.1 million homes. BMC Public Health 2012 12:487.
3. Chandran A, Hyder AA, Peek-ASA C. The global burden of unintentional injuries and an agenda for progress. Epidemiol Rev. 2010 Apr;32(1):110-20.
4. Eldosoky RSH. Home related injuries among children - knowledge, attitude and practice about first aid among rural mothers. Eastern Mediterranean Health Journal 2012;18(10):1021-7.
5. Shriyan P, Prabhu V, Aithal KS, Yadav UN, Orgochukwu MJ. Profile of unintentional injury among under-five children in coastal Karnataka, India: A cross- sectional study. Int J Med Sci Public Health; 2014:3(11): 1317-9.
6. Inbaraj LR, Rose A, George K, Bose A. Perception on unintentional childhood injuries among mothers in rural south India. Indian J Public Health 2017;61:211-4.
7. Tiruneh BT, Bifftu BB, Anlay DZ, Yismaw YS, Tesfaye E, Dachew BA. Factors associated with unintentional injury among the paediatric age population in the hospitals of Amhara National Regional State, Ethiopia. African Journal of Emergency Medicine 2017; 7 (supplement):S55-S59.
8. Bhuvaneswari N, Prasuna JG, Goel MK, Rasania SK. An Epidemiological Study on Home Injuries among Children of 0–14 Years in South Delhi. Indian J Public Health. 2018;62(1):4-9.