ISSN: 0975-8585

Research Journal of Pharmaceutical, Biological and Chemical Sciences

Awareness of Unintentional Childhood Injuries among Mothers of Under-five Children in Rural Bangalore: A Health Educational Intervention Study.

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ABSTRACT

The WHO 2008 World Report on Child Injury Prevention reported that UI death rates were 3.4 times greater in developing countries as compared to developed countries. 50% of the children having unintentional injuries who seek hospital facility are left with some form of deformity.[1] Unintentional injuries are a major and largely preventable cause of death and disability amongst children in low- and middle-income countries with majority of the death attributed by injuries due to Road traffic accidents, drowning, poisoning, burns, etc. The main aim is find out the factors influencing the unintentional childhood injuries among under five children, to assess the awareness regarding unintentional childhood injuries among mothers of under five children and to provide health education and re-evaluate awareness regarding unintentional childhood injuries among mothers of under five children. Field Practice area of the Primary Health Centre attached to the Community Medicine Dept. of the Institution. It is a Health Educational Intervention Study (Pre- and Post- test study). A Health Educational Intervention Study was carried out in 100 houses from the field practice area where questionnaires were given to the mothers. Before intervention, mothers were aware of dangerous objects like Hot water (73%), Electrical Instruments (75%), Fireplaces (79%), leading to (UI) but majority of them did not perceive that object like Small Items (28%), Small playthings (30%), Threads & Ropes (38%), lead to UI. Many mothers were aware of the severity of injuries like Poison Intake (56%), Asphyxia (44%), Drowning (42%) and Animal Bite (34%) whilst their knowledge w.r.t. Broken nail (7%), Mechanical Injuries (6%), Internal Injuries (4%) and falling 4%) was less. After Health Education, there was an increase in the knowledge and awareness about UI and it was statistically significant

Keywords: unintentional injury, childhood, health education

https://doi.org/10.33887/rjpbcs/2024.15.4.8

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ISSN: 0975-8585

INTRODUCTION

The mortality rates among under 5 children are one of the important indicators of the development of the country's healthcare systems, therefore reducing it is a necessity for all nations. The United Nations (UN) set the Millennium Development Goal (MDG) 4 in order to reduce the mortality of under 5 by two-thirds between 1995 to 2015 and to eliminate preventable deaths among children of under the age 5 by 2030, the Sustainable Development Goal (SDG) was proposed by the UN. One of the major aspects of preventable deaths in under five children are Unintentional Injuries (UI) [1].

Injuries are a major cause of concern with over 5 million deaths occurring per year or 16,000 deaths occurring per day due to injuries. As per the World Health Organization's (WHO) Global Burden of Disease Study report, unintentional injuries (UI) account for greater than 3.9 million deaths worldwide [2].

Unintentional injuries are one of the leading cause of death amongst children and adolescents and is a major health problem in the world. Out of these, 90% takes place in the middle or the poorer income countries.

In India, the WHO estimated that unintentional injuries accounted to 0.8 million deaths. This was supported by the reports provided by the National Crime Records Bureau (NCRB) [3]. Various studies have reported different fatal injuries underreported by up to 10–20 %, differing by location. Out of these figures, 875,000 deaths are contributed by the pediatric age group [4].

The WHO 2008 World Report on Child Injury Prevention reported that UI death rates were 3.4 times greater in developing countries as compared to developed countries. 50% of the children having unintentional injuries who seek hospital facility are left with some form of deformity.[2] Unintentional injuries are a major and largely preventable cause of death and disability amongst children in low- and middle-income countries with majority of the death attributed by injuries due to Road traffic accidents, drowning, poisoning, burns, etc. [5].

Injuries in childhood are both predictable and preventable. Children having limitations in growth, development, vision, hearing and risk perceptions as compared to adults have an increased susceptibility and vulnerability to injuries. Therefore, it is of extreme importance to make household products, school and home environment safer [4].

Studies suggest that "adequate" adult supervision can play an important role in injury prevention, though often overlooked. Many factors including parenting experiences, beliefs, parenting style, knowledge, and perception contribute to supervision practices [6].

Proximity or being at a short distance from the child during play activities has been shown to reduce injury risk [7]. A survey on the obstacles to achieving child safety showed that a lack of awareness in the caregivers about the causes of accidents was the second most frequently given answer, providing continuous supervision was the first response [8].

Mortality due to injuries is 8.2% among children of 14 years & less and injuries are the second leading cause of death among them [9,10]. Hence, this study was conducted to assess the awareness of mothers and their perception regarding the risks leading to unintentional childhood injuries.

Aims And Objectives

- To find out the factors influencing the unintentional childhood injuries among under five children
- To assess the awareness regarding unintentional childhood injuries among mothers of under five children.
- To provide health education and re-evaluate awareness regarding unintentional childhood injuries among mothers of under five children.

ISSN: 0975-8585

METHODOLOGY

Study Area: Field Practice area of the Primary Health Centre attached to the Community Medicine Dept. of the Institution.
Study Duration: 2 months

Study Design: Health Educational Intervention Study (Pre- and Post- test study)

Sample Size: Sample size was calculated using the formula, $n= (z_{\alpha/2})^2 pq /e^2$, with $z_{\alpha/2}=1.96$, p = assuming 50% of the children experience some form of injury till 5 years of age ,q = 1-p with e = 20% of p as allowable error at 95% level of significance and 80% power. Sample size was calculated to 96.100 houses from the field practice area were taken.

Inclusion Criteria

All women having an existing child or children who gave consent to participate in the study.

Exclusion Criteria

- All Mothers who do not give consent.
- Mothers with already diagnosed with any mental illness.

Study Instrument: A pretested semi-structured questionnaire was used.

Study process

The study was done in the following phases.

Phase 1: Semi structured, Self-administered questionnaire was developed both in Kannada & English language to assess the awareness regarding UI among mothers of under 5 children. It contained simple questions to find out the knowledge of the mothers regarding the same.

Phase 2: Pilot testing of the questionnaire was done on 20 mothers and the necessary changes were implemented.

Phase 3: The process of data collection was done as follows.

- Records/Family folders of the field practice area were already available with the Department of community medicine.
- The families having under 5 children were listed.
- Random Sampling was done and 100 houses were selected.
- These 100 houses along with a medical social worker were visited and the study subjects were explained the intention of the study.
- The questionnaire was administered to all the mothers of under 5 children who agreed to participate in the study.
- The study population was explained about how to fill the questionnaire. Sufficient time was given to the study subjects to fill up the questionnaire. Difficulties faced while answering the questionnaire were sorted out immediately.
- Intervention: Health education was conducted in a group of 5-6 in one of the houses. Audio-visual aids such as slide presentations, charts, posters, handouts were used along with the lecture. The education was followed by an interactive session with the mothers to clarify doubts.
- Post intervention survey: After one month the houses were again revisited and the questionnaire was administered to reevaluate the awareness and to assess the improvement in the knowledge.

Statistical Analysis

- Data was entered in Microsoft Excel sheet and analyzed using SPSS version 21.
- Descriptive statistics was used for statistical analysis.
- Frequency and percentage was used for variables.

- Chi square test was used to compare the pre and posttest improvement of knowledge

Among study participants. The statistical significance was evaluated at 5% level of significance.

Ethical Clearance

Ethical clearance was obtained from the Institutional Ethical Committee (IEC).

- Informed consent: Permission from the village head and some panchayat members was taken before the study.
- Informed written consent was taken from mothers by informing them about the benefits and risks involved in the study.
- Confidentiality- The participants' names and personal details was not recorded.

RESULTS

A total of 100 houses were randomly selected and mothers of under five children were interviewed. The results were as follows.

Approximately half of the study population (48%) belonged to age group 23 to 27 years. Almost all of them (94%) had education beyond primary school. Almost all of them were literate (99%) and most of them (80%) belonged to the middle SES category and they were house wives (77%). Table 1

Table 1: Socio-demographic characteristics of the study population

Socio-Demographic characteristics		N
Age	18-22	30
	23-27	48
	28-32	18
	>32	4
Education	not educated	3
	less than primary	3
	Higher than primary	94
Occupation	House wife	77
	Working	23
Fathers education	not educated	1
	less than primary	2
	Higher than primary	97
No of children	1	58
	2	34
	3	8
Family size	5 members & less	62
	More than 5 members	38

Almost all the mothers (93%) denied making any changes inside and outside their house environment after the birth of the child and expressed that they did not feel it was necessary. The proportion of unintentional injury in the study population where they had to visit a health center for the past 2 weeks was 15%.

ISSN: 0975-8585

In our study population the majority of the mothers recognized items like vehicles, hot water, electrical instruments, fire places, sharp objects and stray dogs can cause unintentional injury to the child. But the knowledge and awareness regarding things like stairs, small items which can be put in the nose or mouth, small or broken pieces of toys, plastic bags, cribs, threads, ropes, curtains, doors and windows etc was poor initially which increased significantly after the health education sessions. Table 2.

Table 2: Mothers' awareness and knowledge on instances under which child can get injured unintentionally

Objects that lead to UI	Pre-Test		Post-Test		p-Value
	Yes	No	Yes	No	
Vehicles	57	43	89	11	0.001
Dangerous Items	73	27	95	5	0.001
Stairs	66	34	89	11	0.001
Door& window	49	51	76	24	0.001
Hot Water	73	27	100	0	0.001
Electrical Instrument	75	25	99	1	0.001
Power Lines	68	32	94	6	0.001
Fireplaces	79	21	95	5	0.001
Small Items	28	72	100	0	0.001
Small Playthings	30	70	95	5	0.001
Plastic bags	50	50	97	3	0.001
Cribs	44	56	63	37	0.01
Threads& Ropes	38	62	67	33	0.001
Sharp Objects	79	21	92	8	0.01
Dogs	79	21	90	10	0.05
Playground	50	50	64	36	0.06
Insect bite	68	32	95	5	0.001
Other Kids	42	58	48	52	0.47

In many Indian households, small objects, toys, rope, etc., are often used as toys to engage toddlers as mothers have a poor perception and awareness on likelihood of injuries caused by these objects.

In our study it was seen that at least 50% of the mothers knew that burns, electricity, poison intake, drowning, suffocation, asphyxia could be fatal for their child. After the health education session and interaction, they were increased awareness on the other type of injuries that could be fatal too in children. Table 3.

Table 3: Mothers' perception on instances under which child can get seriously injured unintentionally

Objects that lead to serious UI	Pre-test (n=100)			Post-test (n=100)			p Value
	mild	Moderate	severe	mild	moderate	severe	
Falling	45	51	4	29	63	8	0.01
Burn Wounds	16	47	37	2	38	60	0.001
Entrapment	53	29	18	13	62	25	0.001
Electricity	20	47	33	1	45	54	0.001
Poison intake	6	38	56	0	12	88	0.001
Drowning	15	43	42	2	12	86	0.001
Suffocation	28	36	36	9	30	61	0.001
Strangulation	26	50	24	9	48	43	0.001
Asphyxia	13	43	44	5	49	46	0.02
Mechanical Injury	49	45	6	31	63	6	0.03
Internal Injury	47	49	4	28	62	10	0.001
Domestic Injury	57	34	9	18	66	16	0.001
Animal Bite	17	49	34	6	52	42	0.03
Head Injury	21	48	31	5	63	32	0.04

Broken nail	56	37	7	8	80	12	0.001
Insect Bite	28	48	24	7	53	40	0.001
Injury by other kids	69	55	3	62	49	3	0.88

One third of the mothers believed that childhood unintentional injuries are inevitable due to fate. In our study population, 52 % believed that injury can be prevented, 11 % believed it can be completely prevented if the mothers supervise the children.

23% mothers felt that the fathers should also share some responsibility while the mothers are busy in the household chores.

Education and literacy were associated with perception and awareness of injury and the hazard though it was not statistically significant (p=0.05).

DISCUSSION

The present study was carried out among the mothers who had children below 5 years of age in rural population In the present study, the age of the mothers ranged from 18 to 35 years and the mean age was 27 years +/- 2.4 and most of them were housewives. The mothers in our study population were the primary care takers of their children.

The proportion of unintentional injury in our study population where they had to seek health care services in the hospital was 15%. Mathur et al also reported similar incidence of unintentional injuries of 16.6% [11]. Many studies showed a variable incidence ranging from 7% in urban slums of Delhi [12, 13] to 24.6/1000 population in a study conducted in Nepal [14].

Among the children who had unintentional injury, 91 % had suffered injuries inside their houses. Most of the studies conducted also showed similar results [12]. The other places where the children were injured in our study population were on the road and playground. The higher prevalence in the present study was because only the children under five years were included. Home appears to be the most common site of injury in young children as they spend most of their time there. Hence it was evident that childhood injuries were more likely at home where under-five children play and spend most of their time, making them prone to accidents. Strategies targeting a child's characteristics (temperament, activity level, and cognitive abilities) have been shown to have a positive impact in reducing injury risk behavior but have failed to achieve lasting results [12].

In the study conducted by N Bhuvenswari et al [15] the most common place for domestic injury was inside home which was similar to the present study.

Studies suggest that "adequate" adult supervision plays a protective role in injury prevention but is often overlooked. The behavior of children and parents has been identified as key determinants for childhood injury [16]. In the present study the mothers also opinionated the same. 11% mothers whose children were injured expressed that if they were a bit careful and were aware of the hazard the injury it would be prevented.

The hazards responsible for injuries at home include unsafe building designs (stairs and windows without safety grills), unsafe furnishings, unsafe packaging and storage of toxic materials (access to poisonous substances and pesticides and medicines), open water containers, and unsafe kitchen (access to stoves and knives) [16]. The Injuries caused in the present study at home was mainly because of unsafe home designs. Home injuries are under reported and have not been recognised to the same extent as road traffic injuries. Similar findings were echoed in the study done by Zafar fatmi et al [17].

Home visits in the baby's first week of life in order to assess the home environment is recommended by WHO and many review articles have been published on the impact of home visits and reduction in accidental injuries. Home visits may also encourage parents to reduce potential hazards in their home [18]. In the present study, most of the mothers showed willingness to know the likely causes of injury which might be fatal for the children. The prevalence of unintentional injuries can be reduced if the mothers are educated about it and the home environment assessed.

In our study population, 52 % believed that injuries could have been prevented. Study conducted by Inbaraj LR et al produced almost the similar results [12].

In our study, mothers' knowledge regarding the various ways in which children could get injured and also which could be fatal was very less. Common potential hazards identified by mothers have been enlisted in Table 2. Similar findings were seen by the studies conducted by Sehgal et al [19].

During the initial pretest, it was found that for most of the aspects of unintentional injuries caused especially by stairs, small items which can be put in the nose or mouth, small toys, plastic bags, cribs, threads, ropes, curtains, doors and windows etc., the mothers were not aware that these objects could lead to injuries and sometimes might be fatal too. Similar study by Shriyan P et al [20] also noted similar findings. Our study population was rural based, so Chula and cooking gas were the predominant cooking medium used. In the present study, children were allowed to play in kitchen in a large number of households as it was easy for mothers to supervise them. The children had access to all the items in the kitchen except those kept on the platform. There was general consensus among the mothers that it could be hazardous and could lead to burns or other injuries. But all the mothers expressed their inability to keep children away from the kitchen as they were the primary caretakers.

In the present study none of the houses had swimming pool or were taking children to any pools in that area. But the mothers were aware of the fact that unsupervised swimming in younger children could lead to drowning. But very few mothers were aware that drowning could occur even in very little quantity water in tubs or buckets.

It was observed in the study that there was no supervision when children were playing in or around water or water storages at home for a short period of time. It was identified as a potential risk for drowning. The mothers also accepted not bolting the bathroom when not in use. Awareness about this was created among the mothers during the intervention about the same.

In the present study it was found that children were given hard candy quite liberally by their parents and coins were also found to be common objects of play which is also a potential hazard and can lead to choking. In our study group many of the children (65%) were exposed to small parts of broken toys which they used for playing and the mothers were not aware of their potential hazard. Most of the mothers (72%) were unaware of the fact that such small objects can lead to choking.

Many of the houses visited in our study did not make home environment child safe like artificial gates near stairs, keeping the household medicines and cleansing products out of reach, keeping children out of the kitchen area, drinking hot beverages with the child on the lap or nearby. The mothers were informed about the risks which can lead to fatal injuries. The study population agreed to make some changes in their homes and their behaviour to make it child safe and prevent any injuries.

Mohan et al, in their rural based survey of childhood (<15 y) injuries observed that the ratio amongst the severe, moderate to mild injuries (based on AIS coding) was 1: 18: Findings from other studies indicate that this ratio varies from 1: 10 to 1: 50 [21].

A review study by Babul et al [22] showed that parental intervention seemed to be very effective and that there was good evidence that home visits might have an impact on decreasing the number of injuries among children and has also showed that parental safety behavior increased after the intervention, however no significant reduction of child injury was found in the parent's reports.

In our study, when we visited the houses after a month, we found out that the (48%) mothers did make some feasible changes in their home and the immediate surrounding environment. Most of the mothers stated that their behavior had changed when they were around their child.

Our study showed that the awareness regarding child injury had increased after the health education intervention and it was statistically significant. The limitation of this study is that we could not study the impact of our intervention on the prevalence of unintentional injury because of the paucity of time. Creating awareness and health promotional measures in the community may be considered important. It is recommended that such health education should be done periodically to make a significant

impact along with home visits to identify the potential hazards and reinforcements can only bring down the incidence of injuries in children. Studies conducted by Chandran et al echoed the similar finding [2].

Education and socio-economic status of the study population did not have a statistically significant impact on mothers' awareness towards child injuries and injury prevention ($p>0.05$). This may be due to the sample size in the current study, was too small to enable such associations. Studies conducted by Hemalatha et al showed statistically significant association between socioeconomic status, education of the mothers and the prevalence of injuries [9].

Study conducted by Arvind Sehgal has shown that approximately 30% of all unintentional injuries among children can be prevented [19]. There are not many documented research on the awareness and perception of the primary care givers which in most cases are the mothers. The present study is one among the few to highlight the importance of health education intervention in bringing about behavior and environmental change to prevent unintentional injuries.

The findings of the present study have implications for programs that aim to increase mothers' perception to prevent injuries in the under-fives at home. Mothers need to identify hazards and understand that their child, by virtue of his/her behavior, is likely to interact with this hazard, thereby creating a risk of injury. Similar study conducted in West Bengal, revealed parental supervisory behavior and household level injury hazard score were the significant predictors of unintentional injury [23].

Many of the times the mothers learn through the experiences of others or themselves about injury prevention. Mothers who had experienced unintentional injuries were more aware than the others. Studies conducted by Vladutin et al, showed reduced impact of awareness, when the behaviour of parents become influenced by their experiences and expected effects [24]. Reflection upon the injury caused to their child previously could possibly have influenced the mothers to become more aware and to make necessary modifications in their home.

Child injuries happen to be predictable and also preventable. Several interventions can yield positive results and can reduce mortality and disability. Public health should focus on primary prevention (preventing occurrence of new injuries), secondary prevention (reducing the severity of injuries through early management) and tertiary prevention (decreasing the frequency and severity of disability after an injury). Factors in and around the child should be assessed and the risks should be eliminated. The products and environment should be made safer through a systematic approach. It requires an integrated coordination of education, engineering, enforcement and emergency care.

Several studies have reported, that effective community based interventional programs potentially reduce the risk for a child to be injured in their home, although few reviews gave any proof of its effectiveness [25-27] Prevention of childhood injury should receive the due importance in India like those given to other childhood problems. Child injury is closely related to child's health and should be a part of all policies and programs to reduce child mortality, morbidity, disability and thus in the overall growth and development of a child [28].

Research done and the data collected from various surveys, registries are immensely important to identify the problem, understand various risk factors, and monitor interventions and to measure their impact. Research conducted for safe products and environment safety is crucial. Further well defined multi centric studies from representative populations are essential to formulate policies. Moving forward towards the agenda of child safety requires political will along with strong policies and legislation, feasible environmental modification, advocacy and public awareness campaigns, implementing solutions that are evidence based with modification to suit local context, along with monitoring and evaluation.

Policy makers at national and state levels and professional bodies, societies and media should recognize the loss of young lives and work towards spreading awareness and thus preventing injuries among children.

CONCLUSION

A Health Educational Intervention Study was carried out in 100 houses from the field practice area where questionnaires were given to the mothers.

- Before intervention, mothers were aware of dangerous objects like Hot water (73%), Electrical Instruments (75%), Fireplaces (79%), leading to (UI) but majority of them did not perceive that object like Small Items (28%), Small playthings (30%), Threads & Ropes (38%), lead to UI.
- Many mothers were aware of the severity of injuries like Poison Intake (56%), Asphyxia (44%), Drowning (42%) and Animal Bite (34%) whilst their knowledge w.r.t. Broken nail (7%), Mechanical Injuries (6%), Internal Injuries (4%) and falling 4%) was less.
- After Health Education, there was an increase in the knowledge and awareness about UI and it was statistically significant.

Awareness and perception about objects causing unintentional and serious hazards and injuries, that can lead to life-threatening consequences is poor among rural Indian women. We conclude that there is a need for interventions to improve parental awareness and which will eventually contribute to better supervision of young children. These strategies should adjunct other engineering and environmental preventive measures from policy makers.

The present study has attempted to explore the awareness about the risk factors of unintentional injuries in children under-fives. This may be one of the first attempts to explore the problem of child injuries in Bangalore Rural. During the study period, the study population were enabled to think about the neglected problem of unintentional injuries among children. There was positive feedback and the study population wanted some more health education sessions to be conducted on a routine basis.

Critics of health education suggest that environmental changes are more significant in preventing injury.

The authors like to make the following recommendations

- To reduce the prevalence of injuries and to reduce the severity, multipronged approaches are essential which could focus on many factors leading to injury.
- Environmental modification is an especially important strategy. Improvements in the home and making the home child safe like appropriate staircases and windows, type of flooring – non slippery, locked cupboards for storage of hazardous materials (such as cleaning agents/tablets, medicines, and matches), separate kitchen away from the reach of children, sharp equipment out of the reach of children's hands, and use of safe systems such as electric heater for warming water
- Health -promoting initiatives during every opportunity will create awareness and might lead to behavioral change in parents.
- The health workers can make use of the opportunity of home visits during pregnancy and create awareness about child safe home.
- Health information systems should monitor child injuries as an indicator of child health at national and local levels.
- IEC materials can be displayed in Anganwadi's, schools, OBG and paediatric wards.

Limitations

- We could not study the impact of our intervention on the prevalence of unintentional injury over a longer time
- There are no studies done in a rural set up so comparison with the other studies with similar settings was not possible.

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