



ISSN Print: 2394-7500  
ISSN Online: 2394-5869  
Impact Factor: 5.2  
IJAR 2016; 2(12): 795-801  
www.allresearchjournal.com  
Received: 27-10-2016  
Accepted: 28-11-2016

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## A study to assess the Safety practices of mothers for prevention of unintentional injuries among children

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### Abstract

Childhood the most crucial stage, ready to take on the world for overall development and cumulative lifetime learning. But child endurance - till today, is the most imperative moral dilemma, as injuries bounce to amplify spectacularly with the succession of child age. Still, injury prevention is not of a serious apprehension in India. In concomitant to this a study divulged the fact that the injury is a neglected epidemic in India (Jagnoor, *et al.*, 2012) <sup>[1]</sup> and also parallel to it our former Union Minister of Health and Family Welfare, Govt. of India and advisor to World Health Organization- Dr. Harshvardhan revealed that the emerging area where urgent action is required is Injury Prevention and Control. Seeing the grimed injury scenario, specific directed efforts are required to study the problem to retract the unintentional injuries in children. Along with this research is needed to develop suitable interventions for the credible advocate of child safety especially the mothers. Consequently, the initiative through present research is intended to identify mothers safety practices regarding the injuries which will help formulate effective communication strategies towards prevention of injuries among children and will forever help mothers, caretakers and all the related ones to stand by to safe guard children from injuries which can put in the child to either death or hospitalization or a visit to an emergency care unit or can result in a temporary or permanent disabilities whether physical or social or either psychological.

**Keywords:** Unintentional injuries, Safety practices, communication strategies

### Introduction

Global Burden of Disease Study 2013 make known that, important gaps exist in the empirical data for cause of death estimates of injury for country like India where there is no national data available for the past decade (GBD, 2015) <sup>[2]</sup>. Correspondingly, there are no proper records nor the exact pathway to defeat the disease of injury which is clear from the research conducted by an eminent researcher in the field of injury prevention- Gururaj in 2008<sup>3</sup>. Similar to this, other studies (Zaidi, *et al.*, 2013 and Sharil, 2014) <sup>[4,5]</sup> also expose to that the burden of child injuries is not clearly known and scientific efforts in injury prevention and control are yet to begin in India. Research in the field of injury prevention will definitely help reduce health disparities (Georgia Child Fatality Review, 2015) <sup>[6]</sup>.

Unintentional injuries are the leading threat to child's continued existence once they reach the age of five years. In concomitant to it, studies reveal that injury is responsible for 30% of deaths in 1-3-year-olds, with the figure approaching 40% in 4-year-olds and 50% to 60% among those aged 5 to 17 years (Linnan, *et al.*, 2007) <sup>[7]</sup>

Consequently, the most hopeful one to battle the problem is starting from the bottom and that could be achieved by addressing the mother's knowledge base or to strengthen mothers orientation, as they are a vital care provider and is powerfully accountable to nurture child's curiosity and perk up their safety from the inimitable challenges of unintentional injuries (Subbiah, 2006, Nath, and Naik, 2007) <sup>[8, 9]</sup>. But, there also it was astounding to be acquainted with mothers' awareness regarding the injury dilemma, its scope and the preventability remains inappropriately lower and also the mothers don't habitually assume regarding injury hazards in the course of their everyday interactions with their child. Most parents cannot identify specific prevention strategy (Van Beleen, *et al.*, 2010) <sup>[10]</sup>. The findings also indicated that parents do not hold a strong belief in the preventability of injuries, though they believe that they can somehow keep their child safe (Vincenten, *et al.*, 2005 and Shrestha, *et al.*, 2014) <sup>[11, 12]</sup>.

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Looking to this, various prevention strategies need to be adopted by mothers to prevent the little bubbling lives from the fatalities of unintentional injuries. But simply “being careful” is not an adequate protection from injury. An instructive programme delivered by via mass media through a teacher or a trained personnel or a health worker or community leader in classes, courses, and special sessions can be a powerful medium to empower mother, on the various aspect of domestic accidents specially the cause and safety promotion. Arulogun, *et al.*, 2013, Olutayo, 2013 and Suguna, 2015 <sup>[13, 14, 15]</sup>. In their studies have also highly recommended the same. The Georgia Action Plan for Child Injury Prevention, 2015 <sup>[6]</sup> have make known that to alleviate the risk of injury among mass the application of multi-media can be a good step forward to bring not only awareness but also to promote safer interventions as ample prospects subsist for modern technology and information systems to improve injury outcomes.

As a result, to develop a concise injury fortification instructional multimedia package, the study aimed to explore from the mothers the safety practices followed for prevention of the prevalent unintentional injuries i.e. Road Traffic Injury, Burns/Scalds/ Electrocutation, Poisoning, Falls/Slips/Trips and Drowning among children of 4-6 year of age group.

### Materials and Methods

The study was conducted purposively in Udaipur city (Rajasthan). The three study areas (private-schools) were selected in Udaipur. A Sample of 180 mothers of children of two age groups 4-5 years and 5-6 years formed the part of the study as studies (Verma, *et al.*, 2009 and Zaidi *et al.*, 2013) <sup>[16, 4]</sup>. Disclose that the observed frequency of injuries are more in the age group of 6-12 years, respectively. From all the three schools a sample of 30 mothers of 4-5 year children and 30 mothers of 5-6 year children were purposively selected who were willing to participate in the research study.

### Distribution of sample units

S. No.	Age of children	School -1	School-2	School-3	Total
1	4-5 years	30	30	30	90
2	5-6 years	30	30	30	90

For collection of data structured questionnaire (schedule) was used which consisted of 73 closed ended questions regarding safety practices followed by mothers for prevention of unintentional injuries. This had five parts i.e. Part-I, Part-II, Part--III, Part-IV and Part-V. All the questions were closed ended eliciting the response in either yes or no. The respondents scored one point for each safety practice answered correctly and zero for wrong and “don't follow” answers. The highest score was '180' and the least score was '0'. The level of adoption scores of mothers was classified as follows:

### Scale 1 (1 to 180)

Average Score	Level of Adoption
1 to 60	Low
61 to 120	Medium
121 to 180	High

### Results

This segment of the research bring forth the Mothers' Safety Practices towards the Prevention of Unintentional Injuries and to serve the objective unintentional injuries was divided into five parts i.e. road traffic injuries, burns/scalds/electrocution, poisoning, falls/slips/trips and drowning. From literature review and expert's opinion various possible safety measures were identified and then respondents were requested to freely contribute to their adopted practices for various injuries at home as well as on road.

### Part- I Safety Practices for Road Traffic Injuries

Part- I elicited the response of the mothers regarding the Safety practices followed to prevent their children for fatal Road Traffic Injuries classified under sub heads associated to bicycling, car injury, at the time of two wheeler riding, during walking or crossing the road, because of school bus/van/auto and along with this the safety equipments. Responses are revealed in Table 1.1

**Table 1.1:** Safety Practices for Road Traffic Injuries

S. No.	To Prevent Road Traffic Injuries	Mean Score
I	During Bicycling	102.3
II	Related to car	110
III	Two-wheeler (Scooter/Scooty/bike etc)	118.6
IV	Walking/Crossing the road (Pedestrians)	94
V	School Bus /Van/Auto	109.5
VI.	Safety Equipment	52.5

Bicycling is an all the age form of recreation with positive health consequences. Perusal of Table 1.1 reveal that the adoption score for bicycle safety was found to be average (102.3) out of 180 maximum score. The obtained adoption score reveals that maximum mothers followed the practice of regularly checking the functional brakes, air in tyres etc of their child's bicycle and nearly medium were able to stop their child from showing stunts with the bicycle and riding with uncontrollable speed but substantial mothers followed the wrong practice of permitting their child to ride cycle all alone on a nearby empty road which could cause immense harm to their children. Children should be at least 10 years old (85%) to cycle independently (Soole and Lennon, 2010) <sup>[17]</sup>. Reducing bicycle injuries in children requires avoidance of hazardous situations (Finnoff, *et al.*, 2001) <sup>[18]</sup>.

Response regarding car safety practices uncovered that nearly one third of the mothers sometimes forget to put child lock in car. About half of the mothers sometimes leave the child alone in car and get down to buy things. A similar study, discovered the same problem that parents often make the decision to leave their child in the car to run a quick errand. Educational campaign raising awareness of the dangers of leaving children in cars, especially on a hot day was recommended (Killian, *et al.*, 2010) <sup>[19]</sup>. Also, respondents were not alert of the child getting out from the wrong side in the stopped car which can be extremely deleterious as well as utmost mothers fulfilled child's wish to sit on the front seat of the car which again was a wrong practice followed. Ensuring rear seat placement of children has shown to decrease injury related morbidity and mortality and needs to carefully looked and inculcated into our system (Petridou, *et al.*, 1998) <sup>[20]</sup>. In the present research it was found that greater part of the mothers didn't allow child to

play all alone in a closed car which was admirable. The medium adoption score 110 of 180 compel for enhanced safety practices for mothers related to car safety.

Respondents don't know the menace of a two wheeler ride with children as the mean adoption score was medium (118.6) of maximum 180. According to a study school-going children were affected by the two-wheelers most (Sharma, *et al.*, 2011) [21]. Practices for two-wheeler ride disclosed that mothers sometimes adopted a wrong practice of overloading the two-wheeler by 3 or 4 riders on one vehicle to cover short distances. The present study as well as the study conducted by Nakitto and Lett reveals that riders do take risks despite knowing the fact that it is injurious (Nakitto and Lett, 2010) [22]. It was also found that sometimes the mothers used to carry the children, their bags, vegetable etc on the same vehicle. The above two practices followed by some mothers are disagreeable. But, it was admirable to find that despite of the inevitable use of mobiles, sizeable respondents didn't used mobile while riding a two wheeler.

While talking of pedestrian safety in our research the respondents sometimes attempted to cross the busy road which was an extremely perilous practice. Besides that, only partially mothers make their child to practice regularly to cross road safely. Lack of pedestrian discipline practices in both of our cases by the respondents can heighten the road injury as the mean adoption score was found to be only 94 of 180 score. Training can create lasting improvements on preschool children's conceptual knowledge of traffic safety and road-crossing behavior on a real street (Dong, *et al.*, 2011) [23]. Age-specific rates showed peak incidence of pedestrian injuries among 6-10 year old children (Sheriff, *et al.*, 2011) [24].

Response related to school bus/auto/van discovered that mothers sometimes entrusted her child with other children while waiting for the school vehicle forgetting that there is no substitute supervision and some mothers also allowed the child to travel in an overloaded auto/van for school. Here again both the practices were woeful as the mean score was merely 109.5 of 180.

When the practice for safety equipments was reviewed it was found that the mean adoption score was merely 52.5 i.e. low which divulge the fact that mothers didn't provided an ISI mark helmet to their child and also they didn't took any measurement test for helmet before buying.

The overall score analysis of Road traffic injuries conclude that in all the safety practices the score range in medium adoption category (Mean Score = 94 to 118.6) apart from one practice i.e. safety equipment for which the score is low. This confirms that mothers are taking few preventive measures but, since road injuries are life threatening, all the mothers need to identify and follow specific prevention strategies to reduce the debilitating road injuries.

## Part- II Safety Practices for Burns/Scalds/Electrocution

Part-II discovered the Preventive practices reported by respondents for Burns/Scalds/ Electrocution classified under sub heads linked to electric current and equipments, in the kitchen, for hot liquids and solid prevention, for fire prevention and in case of fire/electrocution the emergency contact number which is revealed in Table 1.2

**Table 1.2:** Safety Practices for Burns/ Scalds/ Electrocution

S. No.	To Prevent Child from Burns/ Scalds/ Electrocution	Mean Score
I.	Electric current and Electric equipments	99.4
II	In Kitchen	61.6
III	For Hot Liquids and Solid Prevention	76.6
IV	For Fire Prevention	32.5
V	In case of Fire/Electrocution, the Emergency Contact Number	86.5

A glance through Table 1.2 indicate that the adoption score was merely 99.4 of 180 for electric current and equipments safety, which wind up with the reality that not all of the mothers were following safe practice of protecting the unused plugs/sockets with tapes and socket guards, only half of the respondents removed the charger from plug after every use while others didn't removed it from the socket and also utmost were using two pin plugs. It was impressive to know that only few left the automatic equipment on and unattended but nearly one third of the respondents uncovered to the reality that due to lack of appropriate sockets in the home a wrong practice of permanent use of extended cord was followed.

When practices of mothers in the kitchen was reviewed half of them reported that the child go in the kitchen unattended sometimes when cooking is in process. The practice of always keeping the handle of cooking utensils in middle or back of the stove was not adopted by maximum mothers. In a prospective case-control study conducted on 105 consecutive children admitted to a burn unit in Bangladesh, noted a highly significant association between burns and cooking equipment in the kitchen within reach of children (Daisy, *et al.*, 2001) [25]. Also, the busy schedule of the sizeable mothers forced them to pursue the wrong practice of allowing the child to play sometimes in kitchen while cooking. Present research discovered the low safety practices in the kitchen (61.6) which may cause devastating trauma among the children as the most serious accidents happen in the kitchen (Hadd, 1994) [26].

For hot liquids and solid prevention practices to prevent burns and scalds the mean adoption score was found to be only 76.6 of 180 score which expose to the fact that very few mothers followed the temperature checking practice of keeping the hand in child's bathing water for more than 5 seconds. In consonance, a study unveil that hot water for bathing is amongst the major cause of scalding in children (Chowdhury, *et al.*, 2009) [27]. Also, partially the mothers were always able to serve the microwave cooked food after thorough stirring and testing for hotness. Along with this some mothers also asked to carry hot tea/milk to the table which was an inexcusable practice. Burn from hot water tap/tea were identified by 98.0% respondents respectively (Arulogun, *et al.*, 2013) [13].

The practices for fire prevention was shocking. It was found that only very small proportion of mothers trained the child to stop, drop and roll in case of fire on clothes and simultaneously very few possessed fire extinguisher in home and knew its operation. Exceptionally few mothers practiced the home fire escape plan with their family. This result is slightly parallel to the study that 23% of homes in the U.S. have a fire escape plan and practice it (Ballesteros and Kresnow, 2007) [28]. Also, only some of the mothers were aware of the use of different type of fire extinguishers. The overall awfully low adoption scores for fire prevention

practice 32.5 of 180 expose to the fact that mothers will be unable to deal after any kind of mishap occur due to fire. Along with this in case of fire/electrocution not many respondents were having emergency contact number of the concerned to prevent fire.

Overall the mean adoption scores for Burns/ Scalds/ Electrocution prevention range in medium adoption category which is nerve-racking. An effective strategy for prevention of burn injuries need to be highlighted as burns are one of the most devastating conditions encountered in medicine (Nakitto and Lett, 2010) [29].

### Part- III Safety Practices for Prevention of Poisoning

Unintentional use or consumption of poisoned products is also a major reason of injury as these are materials capable of causing adverse effects in living beings. The part- III of the study examined the safety practices for prevention of poisoning among mothers classified under sub heads allied to the medicines, mosquito repellent, toilet cleaner, phenyl etc, art/craft material marker, sketch pen, clay, instant glue etc, lead, poisonous gases, pet animals and unknown plants so that an effective preventive programme can be developed to secure the impending life of the tiny ones.

**Table 1.3:** Safety Practices for Prevention of Poisoning

S. No.	To Prevent Child from Poisoning	Mean Score
I.	Against Medicines	85
II.	Against Mosquito Repellent, Toilet cleaner, Phenyl etc	85.6
III.	Against Art/Craft material (marker, sketch pen, clay, instant glue etc.)	80.5
IV.	Against Lead	57
V.	Against Poisonous Gases	139
VI.	Against Pets	108.5
VII.	Against Unknown Plants	25

Various safety practices adopted by mothers to prevent their children from poisoning are listed in Table 1.3. When the response regarding medicinal/therapeutic drug safety practices was elicited it was found that majority of the respondents followed the practice of using spoon instead of measuring cup while giving medicine to their child. Also, many mothers asked their child sometimes to take medicine themselves which was a wrong practice. Measurement errors lead to the (30%) of dosing errors in children ages 5 and under (Ferguson and Mickalide, 2013) [30]. Over again half of the sample reported that the left over / extra medicines were actually found to be within the reach of children. In another study, 65.5% of respondents agreed that they keep medications where children can swallow them whereas preventive practices by respondents included keeping drugs in safe place was reported by (55.5%) (Arulogun, *et al.*, 2013) [13]. All the practices related to medicine were found to be a sign of negligence and unawareness as the mean adoption score was only 85 of 180.

The mean score for the practices followed for mosquito repellent, toilet cleaner, phenyl etc was only 85.6 which clearly reveals for an immediate need for detailed informational tips for mothers regarding use, storage, disposal of these products. Research is needed to develop effective prevention strategies to further reduce household cleaning product-related injuries (McKenzie, *et al.*, 2010) [31].

When the practices for art/craft materials was checked out it was found that the mean adoption score was merely 80.5/180. The nearly low adoption score reveal that mothers didn't checked for the non-toxicity label of the art/craft products while purchasing, also some of them allowed the child to eat and do art and craft work simultaneously. Accidental poisoning in children can usually occur with arts and craft supplies in home (Asghar, *et al.*, 2010) [32].

The adoption score for lead prevention was awfully low i.e. 57 of 180 as mothers used to purchase local colored toys from mela/ fair as well as they were giving drinking water to their child from age old water pipelines.

Response for poisonous gases prevention divulged that few respondents allowed their child to sit in closed car in summers with a functional AC which was totally a lamentable practice.

Against pets, more than half of the mothers do not entrusted the child with food and bath duties which was good whereas nearly half of the respondents were aware of all the implication on health of child when in contact with house pets. The mean score 108.5 for pet safety ends with a suggestion that still few more mothers need to be cautious.

The safety practices for unknown plants was crushing i.e. 25 of 180. It was found that hardly anybody label the house hold plants and had acquired information from experts' regarding in and around house hold plants. Preschool age group formed the largest group of poisoning victims (71.73%) (Sharma, *et al.*, 2011) [22].

As per the scores calculated in Table 1.3 it has been found that the mean scores of first three practices and for pet safety range in medium adoption category. But it was astonishing to know the low preventive measures taken against lead and unknown plants which were only 57 and 25. Therefore, comprehensive poison prevention information highlighting lead and unknown plant safety is aspired.

### Part- IV Safety Practices for Falls/Slips/Trips

Falls is considered as a common mechanism of trauma in 0-9 years age groups or even overall (Jaipuria, *et al.*, 2014) [33]. The part-IV of the present study elicited response concerning various safety measures used by mothers to prevent falls/slips/ trips among the children of 4-6 years age group classified under sub heads related to stairs, window/balconies/places with height, furniture / huge equipments, floor safety, footwear and playground safety. The results revealed are presented in the Table 1.4 given below.

**Table 1.4:** Safety Practices for Falls/Slips/Trips

S. No.	Prevent Child from Slip/trip/falls	Mean Score
I.	Stairs	98
II.	Window/balconies/Places with height	73.6
III.	Furniture/Huge Equipments	29.5
IV.	Floor safety	77
V.	Footwear	147
VI.	Playground safety	93

Respondents when asked to disclose various safety measures used by them to prevent falls/slips/ trips from stairs. It was disturbing to find that the safety adoption score for stairs was 98 of 180 which reveal that most of the mothers did not realized the importance of appropriate size and gripped hand rail on both the side of stairs in their

house. 98.5% mothers reported that staircase without railing can cause domestic accidents (Arulogun, *et al.* 2013) <sup>[13]</sup>. But maximum mothers were always able to keep stairs clear of clutter. The medium safety adoption score reveal that mothers need to strictly follow the safe guidelines for stairs. About more than half of the respondents worried that their child can climb on chair and other furniture left sometimes by them in balcony/near window and also partially believed that their child can reach the rooftop/balconies which are unprotected and have small railing. Mothers should watch out because, the incidence of domestic injuries were aggravated by the house condition such as the unsafe balcony (Kendrik, *et al.*, 2005) <sup>[34]</sup> and similar to this another study reveals that pre-school children are also at a risk of falling by easy access to roofs (Kumar, *et al.*, 2013) <sup>[35]</sup>. Also sizeable mothers were bothered because their child tries to reach/climb for toffee/toys/remote kept at height. If we talk in terms of scores of the practices adopted for fall prevention it range in medium category of adoption as the score was merely 73.6.

When reply regarding furniture/huge equipment was drawn out significant number of respondents have not strapped all the unstable and huge equipments like book shelves, microwave etc by bracket on wall and sizeable respondents have not guarded the sharp edges of furniture with pads/corner cushions. The reason behind low score 29.5 of the practices may be that the concept of anchoring the heavy items and padding the corners is either not known or because these are costlier. Findings also indicate that inadequate safety standards for household furniture and goods are among the cause of childhood falls in low- and middle-income countries (Peden, *et al.*, (eds), 2008) <sup>[36]</sup>.

Very few mothers had put hand rails and non-skid mats to prevent slips in bathroom. A study exposed to the fact that slippery floor in the house caused fall accidents among 98.4% preschool children (Arulogun, *et al.*, 2013) <sup>[13]</sup>. Correspondingly findings about childhood injuries in Singapore revealed that the most common injuries occurred in the bathroom was falls (Thein, *et al.*, 2005) <sup>[37]</sup>. Very less respondents were always able to keep heavy- use areas free from shoes, slippers, toys in home. The score of these two statements range in medium adoption category i.e. 77.

It was good to see that generous sample gave priority to good fitting footwear for the children but non-skid and good grip sole was taken into consideration by less than two-third mothers. The mean score ranged in high adoption level.

When the play ground safety aspect was considered it was found that nearly more than half respondents regularly checked the pointed edges and broken hooks of the swings and slides before making the child sit on it and generous numbers did not allowed more than one child to sit on the same swing at the same time. But respondents were sometimes unable to stop the child from climbing the slide from the wrong side and were not able to keep a constant watch on the child. The medium adoption scores for the playground safety can hinder the child for active, social fun and might become a breeding ground for injuries.

Considering the overall scores it can be concluded that despite following high safety measures for footwear safety, significant proportion of mothers will be unable to prevent falls/slips/trips caused due to furniture/huge equipment, windows/balcony, at floor and in the playground because in maximum preventive measures the scores range in low and medium adoption category (29.5 to 98). There should be

community-based injury surveys to obtain epidemiological data on fall injuries and then to organize educational and mass media campaigns for its prevention as no age group up to the age of 10 years was spared from being fall with a peak incidence in the age group 4-5 years (Kumar, *et al.*, 2013) <sup>[35]</sup>. To date India has not established any widespread programme for the prevention of falls (Jagnoor, *et al.*, 2011) <sup>[38]</sup>.

#### Part- V Safety Practices for Prevention from Drowning

“Prevention is better than cure” is idyllically applicable to drowning in its true sense. The safety practices for prevention from drowning were divided into two categories; first at home and outside and second at swimming pool. The detail information has been presented in Table 1.5.

**Table 1.5:** Safety Practices for Prevention from Drowning

S. No.	Prevention from Drowning	Mean Score
I.	To prevent drowning inside the home and outside (pond, under construction tanks etc)	106.5
II.	Swimming pool safety	118.6

The perusal of Table 1.5 regarding the prevention of drowning practices by mothers inside the home and outside (pond, under construction tanks etc) reveals the mean knowledge score of 106.5 of 180 maximum score. This discloses the fact that not all the mothers emptied the water sources (big buckets, washing machine etc) after each use and kept them out of the reach of child all the time. Mere half emptied the inflation pool after each use while other half did not adopted this practice. An average of 12 children under age 10 died in inflatable pools each year from 2003-2005 because of their flexible and low sides, it may be easier for a child to climb inside of an inflatable pool (U.S. Consumer Product Safety Commission) <sup>[39]</sup>. Sizeable sample adopted a praiseworthy practice of ensuring that the tanks inside the home and the tanks under construction were always covered. But the majority of mothers stated that they were not able to use the appropriate size of life saving jacket for their child during boating.

The safe practice score for pool safety was found to be 118.6 of 180. When response regarding pool safety was drawn out it was found that not all the respondents were able to keep a constant watch on their child during swimming. Young children drowned when the supervisor or mother were distracted (Rahman, *et al.*, 2007) <sup>[40]</sup>. Substantial respondents didn't obtained any additional information regarding pool and swim safety signs. It was encouraging to find that almost all mothers ensured swimming in the presence of life guard/trainer.

Overall the mean adoption score for both the preventive practices at home and outside as well as pool range in medium adoption category (106.5 and 118.6). Therefore, education appear to be promising strategy to prevent traumatic event of drowning because still globally, the second highest drowning rates are among children of 5-9 years and low- and middle-income countries account for 91% of unintentional drowning deaths (WHO, 2014) <sup>[41]</sup>.

#### Conclusion

The findings are distressing and needs rapid and vibrant proceedings to prevent such injuries by implying a specialized training program via multimedia package

intended to enhance the mother's safety practices regarding unintentional injury, especially having children of 4-6 years of age group. It will in turn help her in acquiring a better competence to prevent her child from injuries.

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