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Follow-up household assessment for child unintentional injuries two years after the intervention: A community-based study from Karachi, Pakistan

Uzma Rahim Khan
Aga Khan University, uzma.khan@aku.edu

Asrar Ali
Aga Khan University

Umerdad Khudadad
Aga Khan University

Ahmed Raheem Buksh
Aga Khan University, ahmed.raheem@aku.edu

Nukhba Zia
Johns Hopkins Bloomberg School of Public Health, United States of America

See next page for additional authors

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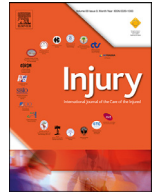
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Follow-up household assessment for child unintentional injuries two years after the intervention: A community-based study from Karachi, Pakistan

Uzma Rahim Khan^{a,*}, Asrar Ali^a, Umerdad Khudadad^a, Ahmed Raheem Buksh^a, Nukhba Zia^b, Iqbal Azam^c, Aruna Chandran^g, Junaid Abdul Razzak^{e,f}, Adnan Ali Hyder^d

^a Department of Emergency Medicine, Aga Khan University Hospital, Karachi, Pakistan

^b Johns Hopkins International Injury Research Unit, Health Systems Program, Department of International Health, Johns Hopkins Bloomberg School of Public Health, Baltimore, MD, USA

^c Community Health Sciences, Medical College, Aga Khan University, Karachi, Pakistan

^d Milken Institute School of Public Health, George Washington University, Washington, DC, USA

^e Centre of Excellence for Trauma and Emergencies, Aga Khans University, Karachi 74800, Pakistan

^f Weill Cornell Medicine, New York, NY, USA

^g Department of Epidemiology, Johns Hopkins Bloomberg School of Public Health, Baltimore, MD, USA

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ABSTRACT

Background: Unintentional childhood injuries are a growing public health concern, and the home is the most common location for non-fatal injuries in children less than 5 years of age. This study describes the long-term effects of two injury prevention educational interventions for caregivers—an educational pamphlet and an in-home tutorial guide—by comparing the change in the prevalence of home injury hazards before and after the interventions.

Methods: This was a pre- (June and July 2010) and post-study with short-term follow-up (November–December 2010) and long-term follow-up (November 2012–January 2013). Neighborhood one included households that received only educational pamphlets after completing a baseline assessment; neighborhood two included households that received an in-home tutorial guide after completing the baseline assessment and receiving the educational pamphlet. The main outcome of this study was the reduction in home injury hazards for children under 5 years of age.

Results: A total of 312 households participated in the long-term phase to compare the effect of the interventions. Between the short-term to long-term follow-up, injury hazards significantly reduced in neighborhood two compared to neighborhood one. These included fall hazards (walker use) (IRR 0.24 [95% CI 0.08–0.71]), drowning hazards (open bucket of water in the courtyard and uncovered water pool) (IRR 0.45 [95% CI 0.85–0.98] and IRR 0.46 [95% CI 0.76–0.94]), burn hazards (iron, water heater within reach of child) (IRR 0.56 [95% CI 0.33–0.78] and IRR 0.58 [95% CI 0.32–0.91]), poisoning hazards (shampoo/soap and medicine within reach of child) (IRR 0.53 [95% CI 0.44–0.77] and IRR 0.7 [95% CI 0.44–0.98]) and breakable objects within reach of child (IRR 0.62 [95% CI: 0.39–0.99]).

Conclusion: An injury prevention tutorial to caretakers of children supplemented with pamphlets could significantly decrease the incidence of falls, drowning, burns, poisoning, and cut injury hazards for children under 5 years of age in their homes in a low-resource setting. This intervention has the potential to be integrated in existing public health programs, such as Lady Health Visitors (LHVs), to disseminate injury prevention information in routine home health visits.

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Introduction

Unintentional childhood injuries are a growing public health concern globally [1]. Injury accounts for 40% of all childhood deaths in low- and middle-income countries (LMICs) [2]. The home is the most common location for non-fatal injuries in children under 5 years of age in LMICs [3] because children in this age group

* Corresponding author.

E-mail address: uzma.khan@aku.edu (U.R. Khan).

have longer exposure to their home environments [4] and are unable to anticipate injury hazards around the home due to a low level of cognitive development [5,6]. Most home injury prevention programs have been implemented in high-income countries (HICs), and there are limited studies in LMICs, specifically Pakistan [7–9]. Previous systematic review literature overwhelmingly suggests that multiple interventions were more effective than single intervention (What makes community based injury prevention work? In search of evidence of effectiveness). Educating caregivers for injury prevention was unique for the study setting where injuries were perceived as unavoidable event due to God-will. Understanding the uptake of single intervention is a simplistic approach for the community where education particularly delivering injury education may be the first time.

Home visitation has shown some promising effects for improving parents' safety practices and knowledge related to home safety for children [10]. Home visitation programs are usually carried out by skilled and professional visitors (e.g., nurses) who inspect homes and educate parents regarding potential hazards that increase the likelihood of childhood injuries. In Pakistan, a randomized trial was conducted in which injury reduction counseling was provided during a home visit following a child being discharged from an emergency department. This study showed a significant reduction in the presence of both fall and choking hazards over the course of six months among children aged three years and younger [11]. Among interventions for children's safety at home, communicating information about home injury hazards to the parents of children can minimize the likelihood of childhood injuries at home [12].

Enough information exists on the risk factors of childhood injuries and practical measures that can be taken at home to minimize the conditions that contribute to injury, yet parents and caregivers, particularly in LMICs, fail to benefit optimally from such useful information [13,14]. A huge gap exists in LMICs between having child injury prevention knowledge and putting it into practice [15]. LMICs have limited predesigned pamphlets or information sheets to educate parents about potential home hazards that contribute to increasing the incidence of injuries among children.

In Pakistan, injury is one of the leading causes of death among children aged 1 to 5 years [16]. A study conducted in Pakistan showed the potential utility of using home visit tutorials in reducing home hazards for falls, poisoning, and choking [11]. However, there is a paucity of evidence on the long-term effect of such home-based injury education interventions in LMICs, such as Pakistan. This study explored the long-term effects of a pilot study by comparing the difference in the prevalence of home injury risks after the dissemination of injury prevention education tools, including an educational pamphlet and a tutorial.

Methods

Study design

This was a pre- and post-intervention study with baseline assessment (June–July 2010), short-term follow-up (November–December 2010), and long-term follow-up (November 2012–January 2013).

Participants and study setting

Respondents were caregivers of children under 5 years of age. The study setting included two neighborhoods within a low-income government housing community in Karachi, Pakistan. Details of selected neighborhoods are described elsewhere [17]. Eligibility criteria for enrollment in the study included: the presence of

at least one child between the ages of 12 and 59 months, a caregiver who was able to read in Urdu, and a current plan to live in the same household for at least another three months. Households were assessed based on the eligibility criteria before enrollment. If a household had more than one child between 12 and 59 months of age, the caregiver was asked to select one as the index child to assess for the presence of home injury hazards [18].

Assessment checklist

An observational checklist was administered to identify the hazards by areas of the home. The checklist areas included the kitchen, bath area, living/sleeping area, courtyard/rooftop, and the outdoors immediately surrounding the home [12,17].

Interventions

There were two intervention tools: 1) educational pamphlet and 2) tutorial. Development of these tools were described previously [12,18]. Both the pamphlet and the tutorial contained the information on injury hazards for children under 5 years of age that were commonly found in the homes of the study population along with the description of some strategies on reducing or eliminating those hazards. There was team of three female research assistants (RAs) who were trained to administer the pamphlet and guide the tutorial. The senior research assistant supervised the team. Caregiver in each household was approached by female research assistant. The purpose of the study was explained to caregiver of each household and written informed consent was taken who agreed to participate in the study. The study investigators used to assess the implementation of intervention by regular field visits initially until they were satisfied after which they did random field visits.

The pamphlet was designed in a format not requiring the presence of a health practitioner for understanding or use. It is colorful, attractive and easy to read with context relevant pictorial and is in local language. It focused on highlighting common injury hazards at homes, categorized by household area (living room, kitchen, etc.) as well as by mechanism of injuries when the hazards are not specific to area (such as poisoning and burns) with the goal of promoting hazard reduction with relevant suggestions. The RA encouraged the caregiver to read it and share it with caregivers in the home. The time to read pamphlet was around 10 minutes.

In contrast, the tutorial was an interactive tool that allowed a trained data collector to provide home injury hazard information and prevention ideas with the child's caregiver. The tutorial guide has two components; injury hazard identification and safety tips for those hazards. The RA trained in delivering this tutorial, worked with the child caregiver in each room in the home to identify specific examples of safety or hazards by asking specific questions such as "Where are the matches, lighters and household cleaners? "Can your child reach them?". After which the RA discussed with the participants inexpensive and potentially simple ways in which identified risks could be altered. The tutorial took approximately 30 minutes per home.

One of the two neighborhoods was conveniently received an educational pamphlet and the other received the tutorial. We conducted a baseline assessment of households' injury hazards and then implemented the intervention. After six months, we conducted short-term follow-up to assess the reduction in hazards. The original plan was to conclude the study after the short-term follow-up phase, therefore educational pamphlets were distributed to the tutorial neighborhood at the conclusion of the study for a handy reference.

However, the research team was able to secure additional funds and decided to conduct a long-term assessment of the intervention. After two years, we went back to the neighborhoods for long-

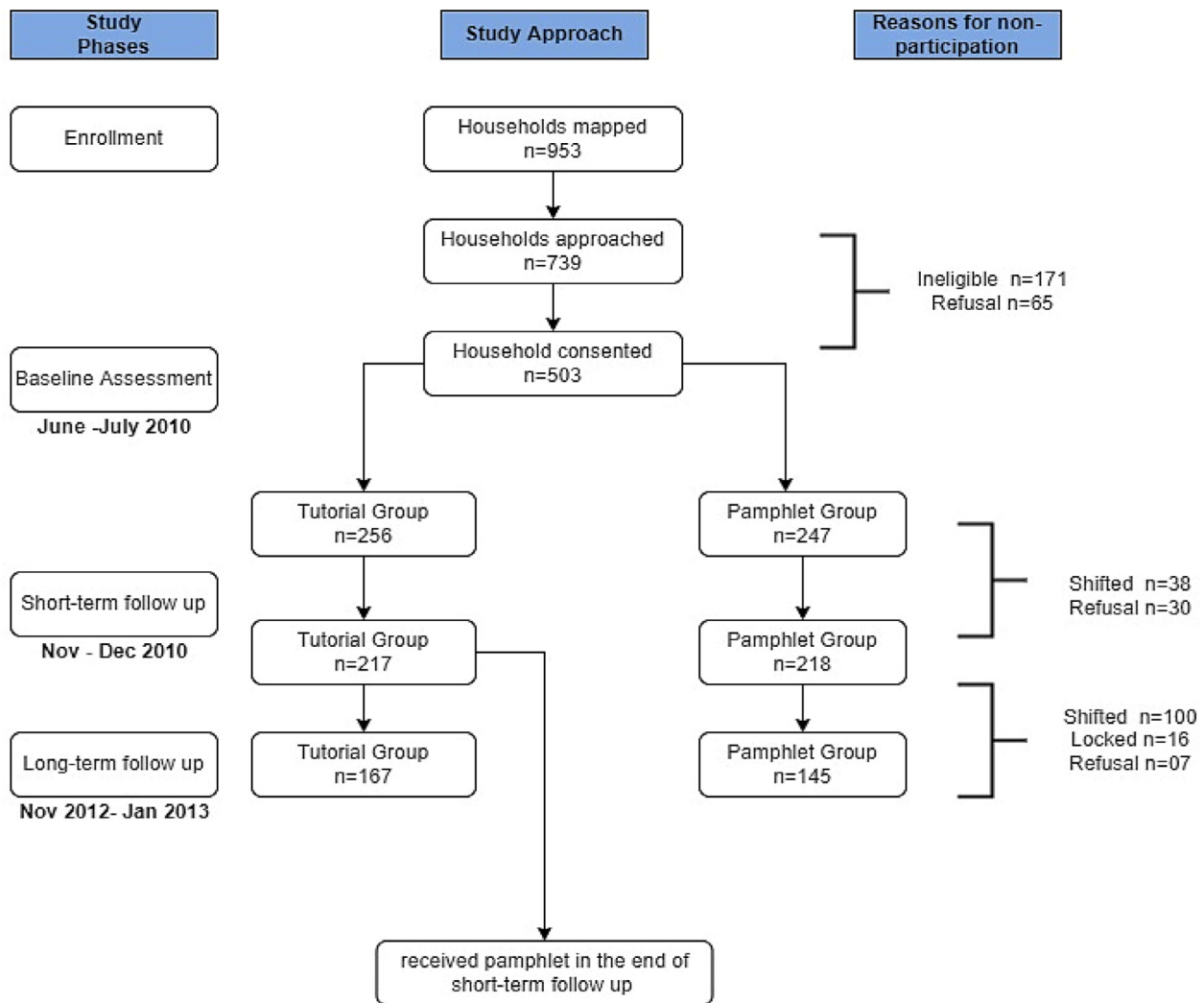


Fig. 1. Flow chart of the study phases.

term follow up of hazards in neighborhood that received only an educational pamphlet and in neighborhood that received both a tutorial and a pamphlet.

Outcome

The main outcome of this study was the reduction in home injury hazards for children under 5 years of age. We used 24 unintentional home-based injury hazards and classified them into six types of injury: falls, burns, poisoning, drowning, cut injuries, and choking.

Sample size

The sample size was explained in detail in our previous publication from our study [6,11].

The sample size was 247 in the pamphlet group and 256 households in the tutorial group at the time of intervention implementation. In the short-term follow-up, the number of households in the pamphlet group was 218 and in the tutorial group was 217. In the long-term follow-up, the number of households was 145 in the pamphlet only group and 167 in the tutorial and pamphlet group (Fig. 1).

Approval for this study was obtained from the Ethical Review Committee of the Aga Khan University (Pakistan) and the Insti-

tutional Review Board of the Johns Hopkins Bloomberg School of Public Health (USA).

Statistical analysis

All data were entered and analyzed using SPSS (Statistical Package for the Social Sciences) version-19 [19].

The covariates included in the study were child's age and gender, relationship of the respondent with the child, respondent's age, and respondent's education level. Sociodemographic variables were compared between pamphlet-only versus tutorial and pamphlet groups. Frequency and percentages were reported for the presence of injury related hazards at three phases of follow-up.

The percentage of injury hazards was represented by bar charts by aggregating types of injuries into six groups in three phases: falls, burns, poisonings, drownings, lacerations, and chokings.

The Generalized Estimating Equation (GEE) for binary outcome with logit link function was used to identify factors related with different types of injury hazards. Exchangeable correlation coefficient structure was used to account for clustering in the data due to three different phases. The model was also adjusted for socio-demographic variables of respondent and child because of their potential role as confounders. Crude and adjusted incidence rate ratios (IRRs) and corresponding 95% confidence intervals (CIs) were

Table 1
Baseline sociodemographic characteristics of the study participants by groups.

| Variables | Neighborhood 1 (n=145) n [%] | Neighborhood 2 (n=167) n [%] |
|---|------------------------------------|------------------------------------|
| Study phase | Short-term to long-term | |
| Child Gender | | |
| Female | 80 [55.7%] | 93 [55.7%] |
| Male | 65 [44.3%] | 74 [44.3%] |
| Child age (in months) | 55.47 ± 16.14* | 49.59 ± 14.99* |
| Respondent age (in years) | | |
| 18-29 Years | 54 [37.2%] | 65 [38.9%] |
| 30-39 Years | 67 [46.2%] | 77 [46.1%] |
| 40 Years & above | 24 [16.6%] | 25 [15%] |
| | 30.84 ± 5.76* | 31.39 ± 5.45* |
| Relationship of respondent with child | | |
| Mother | 120 [82.8%] | 130 [77.8%] |
| Other (Fathers, Grandparents, and other Siblings) | 25 [17.2%] | 37 [22.2%] |
| Respondent Education | | |
| No formal education but can read | 5 [3.4%] | 15 [9%] |
| Up to 5 Years | 11 [7.6%] | 27 [16.2%] |
| 6 to 8 Years | 15 [10.3%] | 19 [11.4%] |
| 9 to 10 Years | 34 [23.4%] | 44 [26.3%] |
| 11 to 12 Years | 53 [36.6%] | 35 [21%] |
| >12 Years | 27 [18.6%] | 27 [16.2%] |
| Duration of living in the current residential area | | |
| 1-3 Years | 25 [17.2%] | 25 [15.0%] |
| 4-6 Years | 25 [17.2%] | 34 [20.4%] |
| >6 Years | 95 [65.5%] | 108 [64.7%] |

* Mean±SD

reported for each type of injury-related hazard from short-term to long-term follow-up.

Results

The results include 145 households in neighborhood with only pamphlet and 167 households in neighborhood with tutorial and pamphlet group.

Overall, the two groups had a comparable demographic, except for education level of respondents (Table 1). Respondents in pamphlet group had a higher education level (78.6% of respondents had 9 years of education or more) than in tutorial and pamphlet group (63.5% of respondents had 9 years of education or more). The mean age of respondents in intervention group one was 30.8 years old, comparable with 31.4 years in intervention group two. Most of the respondents in both groups were mothers (82.8% in pamphlet and 77.8% in tutorial and pamphlet group). In terms of child characteristics, in both groups, slightly more than half were males (55.7% each). The mean age of the index child in intervention group one was 55.47 months (SD=16.4) and was 49.59 months (SD=14.99) in intervention group two.

Hazards were high during the baseline phase and decreased in the short-term follow-up period; however, some injury-related hazards increased during the long-term follow-up phase, including falls among the pamphlet-only group and burns and poisonings among both intervention groups. There was a decreasing trend of injury hazards for drowning, cut injuries (lacerations), and choking for both interventions over all three phases (Fig. 1).

Choking had the lowest and burning had the highest proportions of injury hazard in both groups. The proportion of injury hazard of falls, drowning, cut injuries and chokings were higher in intervention group one when compared with intervention group two. On the other hand, injury hazards of burns and poisoning were higher in intervention group two (Table 2).

We assessed 24 minor and six major injury-related hazards by intervention status, taking the pamphlet group as reference both

with (adjusted) and without (crude) socio-demographic variables from short-term to long-term follow-up. At the multivariable level (adjusted), the injury hazards which performed significantly better for the tutorial group were walker present/used (IRR_a=0.24; 95% CI: 0.08, 0.71) with 76% reduction at long-term follow-up; open buckets of water present in the courtyard (IRR_a=0.45; 95% CI: 0.85, 0.98) with 55% reduction at long-term follow-up; uncovered vat/pool of water (IRR_a=0.46; 95% CI: 0.76, 0.94) with 54% reduction at long-term follow-up; iron within reach of child (IRR_a=0.56; 95% CI: 0.33, 0.78) with 44% reduction at long-term follow-up; water heater within reach of child (IRR_a=0.58; 95% CI: 0.32, 0.91) with 42% reduction at long-term follow-up; shampoos/soap within reach of child (IRR_a=0.53; 95% CI: 0.44, 0.77) with 47% reduction at long-term follow-up; medicine within reach of child (IRR_a=0.70; 95% CI: 0.44, 0.98) with 30% reduction at long-term follow-up; and breakable objects within reach of child (IRR_a=0.62; 95% CI: 0.39, 0.99) with 38% reduction at long-term follow-up. On the other hand, the injury hazards which performed significantly better for the pamphlet group were burns (IRR_a=1.61; 95% CI: 1.14, 2.30) with 161% increase for the tutorial group at long-term follow-up and non-labelled chemical fluid containers (IRR_a=1.75; 95% CI: 1.24, 2.46) with 175% increase for the tutorial group at long-term follow-up. No significant reductions or increases were observed in the remaining injury hazards (Table 3).

Discussion

This study provides insight into changes in injury hazards within the home environment of children under the age of 5 years after having received community-based educational interventions on injury prevention in Karachi, Pakistan. At the long-term follow-up, the injury hazards for falls, burns, drowning and poisoning reduced in the households that received both the in-home tutorial and the educational pamphlet.

It is possible that the combination of in-home tutorials and education pamphlets helped to increase the spread of injury pre-

Table 2

Percentage distribution of presence of different injury hazards by intervention status in the long-term follow-up assessment phase.

| Types of Injury Hazards | Intervention group 1 [n=145] n [%] | Intervention group 2 [n=167] n [%] |
|--|---------------------------------------|---------------------------------------|
| Falls | 45% | 44% |
| Walker present/used | 17 [11.7] | 19 [11.4] |
| Accessible rooftop without railing | 59 [40.7] | 65 [38.9] |
| Drowning | 24% | 13% |
| Open bucket of water inside the house | 7 [4.8] | 4 [2.4] |
| Open buckets of water present in the courtyard | 7 [4.8] | 4 [2.4] |
| Uncovered vat/pool of water | 30 [20.7] | 19 [11.4] |
| Burns | 92.4% | 98.6% |
| Stove within reach of the child | 133 [91.7] | 138 [82.6] |
| Matches within reach | 101 [69.7] | 112 [67.1] |
| Open fire within reach | 84 [57.9] | 99 [59.3] |
| Iron within reach of the child | 64 [44.1] | 75 [44.9] |
| Overloaded Outlets | 11 [7.6] | 22 [13.2] |
| Frayed/loose cords within reach of child | 14[9.7%] | 24[14.4%] |
| Water heater within reach of child | 16[11%] | 11[6.6%] |
| Poisoning | 72% | 89% |
| Non labeled of fluids containers | 73 [50.3] | 98 [58.7] |
| Cleaning supplies within reach | 6 [4.1] | 6 [3.6] |
| Shampoos/soap within reach | 73 [50.3] | 67 [40.1] |
| Medicines within reach of the child | 37 [25.5] | 34 [20.4] |
| Cut injuries | 79% | 77% |
| Breakable objects within reach of the child | 38 [26.2] | 26 [15.6] |
| Knives within reach | 89 [61.4] | 98 [58.7] |
| Fan/sharp object within reach | 30 [20.7] | 44 [26.3] |
| Are any structures with sharp/hard protruding components | 23 [15.9] | 46 [27.5] |
| Bed/furniture or wall have any sharp corners within reach of the child | 50 [34.5] | 59 [35.3] |
| Television or any item placed on a trolley with wheels without locks | 18 [12.4] | 23 [13.8] |
| Chokings | 6% | 5% |
| Any small choking hazards within reach of the child | 9 [6.2] | 7 [4.2] |
| Any of the child's toys too small (choking hazard), pointed, or sharp | 9 [6.2] | 8 [4.8] |

Table 3

Crude and adjusted incidence risk ratio (95% CI) of presence of injury hazards by intervention status from short-term to long-term follow-up phase.

| Presence of Hazards | Phases of the assessment | |
|--|---------------------------------|----------------------|
| | Short-term to long term (n=312) | |
| | *Crude IRR 95% CI | #Adjusted IRR 95% CI |
| Falls | 1.15 [0.84 -1.59] | 1.19 [0.85 -1.65] |
| Walker present/used | 0.69 [0.4 -0.94] | 0.24 [0.08 -0.71] |
| Accessible rooftop without railing | 1.09 [0.79 -1.51] | 1.12 [0.8 -1.57] |
| Drowning | 0.94 [0.65 -1.34] | 1.19 [0.85 -1.65] |
| Open bucket of water | 1.48 [0.93 -2.36] | 1.28 [0.78 -2.08] |
| Open buckets of water present in the courtyard | 0.49 [0.79 -0.93] | 0.45 [0.85 -0.98] |
| Uncovered vat/pool of water | 0.74 [0.46 -0.98] | 0.46 [0.76 -0.94] |
| Burns | 1.01 [0.67 -1.53] | 1.61 [1.14 -2.3] |
| Stove within reach of child | 1.11 [0.81 -1.53] | 1.24 [0.86 -1.78] |
| Matches within reach of child | 1.2 [0.87 -1.64] | 1.28 [0.9 -1.83] |
| Open fire within reach of child | 1.07 [0.77 -1.48] | 1.24 [0.87 -1.77] |
| Iron within reach of child | 0.69 [0.52 -0.89] | 0.56 [0.33 -0.78] |
| Overloaded outlets | 1.43 [0.91 -2.25] | 1.32 [0.83 -2.09] |
| Frayed/loose cords within reach of child | 1.36 [0.82 -2.25] | 1.3 [0.77 -2.17] |
| Water heater within reach of child | 0.48 [0.37 -0.91] | 0.58 [0.32 -0.91] |
| Poisoning | 1.11 [0.75 -1.66] | 0.58 [0.43 -0.91] |
| Non-labelled chemical fluid containers | 1.65 [1.19 -2.29] | 1.75 [1.24 -2.46] |
| Cleaning supplies within reach of child | 1.46 [0.84 -2.51] | 1.36 [0.77 -2.4] |
| Shampoos/soap within reach of child | 0.51 [0.72 -0.9] | 0.53 [0.44 -0.77] |
| Medicines within reach of child | 0.73 [0.47 -0.91] | 0.7 [0.44 -0.98] |
| Cut injuries | 0.93 [0.61 -1.4] | 0.89 [0.57 -1.38] |
| Breakable objects within reach of child | 0.66 [0.42 -0.99] | 0.62 [0.39 -0.99] |
| Knives within reach of child | 1.11 [0.8 -1.54] | 1.3 [0.91 -1.88] |
| Fans/sharp objects within reach of child | 1.28 [0.91 -1.8] | 1.3 [0.91 -1.86] |
| Structures with sharp/hard protruding components | 1.32 [0.95 -1.84] | 1.11 [0.79 -1.58] |
| Television or any item with wheels without locks | 1.41 [1.01 -1.98] | 1.32 [0.93 -1.87] |
| Bed/furniture or wall with sharp corners within reach of child | 1.43 [1.08 -1.83] | 1.32 [0.93 -1.87] |
| Choking | 1.39 [0.73 -2.67] | 1.27 [0.67 -2.41] |
| Small choking hazards within reach of child | 1.06 [0.52 -2.2] | 1.06 [0.53 -2.13] |
| Small, pointed, or sharp toys within reach of child | 1.64 [0.8 -3.38] | 1.48 [0.71 -3.05] |

Table notes: The educational pamphlet group is taken as the reference group.

* Unadjusted incidence risk ratio (IRR) (Crude).

Adjusted incidence risk ratio (IRR) (Child age, child gender, relationship with child, respondent age, respondent gender, respondent education).

vention information to a wider range of audiences among family and community members. The respondents may have shared the educational pamphlet and content of the in-home tutorial with other members of the family, which may have resulted in a combined effort to reduce injury hazards for children. Moreover, one-on-one in-home tutorial discussions may have stimulated greater interest in the respondents to act on the injury prevention information. Other studies have also suggested that disseminating injury prevention using more than one approach and involving a wide range of community members is more effective than relying on one method or only educating parents [20]. These studies have suggested that injury prevention information should reach all stakeholders, including schools, child healthcare providers, city authorities, community mobilizers, the environment, building regularity agencies, media, legal and child rights activists, along with parents and caregivers [21–26]. One of the methods to provide injury prevention information [27] to parents and caregivers is to make the best use of Lady Health Visitors (LHVs) [28]. They provide a wide range of services to both urban and rural populations, including basic nursing care, maternal and child health services, and community worker training [29]. These LHVs can serve as a sustainable model for reducing home injuries by providing a comprehensive home injury education along with an information package.

Child injury prevention requires global attention, but the majority of interventions have been implemented and studied in HICs [30]. According to a policy survey and analysis, HICs have more injury and violence prevention educational and regulatory policies than LMICs [31]. Furthermore, studies from HICs have shown that educational interventions are more effective in preventing injuries when they are combined with legislative changes and regulatory and enforcement strategies [32–35]. However, the effectiveness of educational interventions in injury reduction is debated among injury scholars, policymakers, and regulatory agencies [36]. Previous studies have critiqued and reported some educational intervention factors that proved to be ineffective in reducing injuries [37]. For example, the educational program may not have been adapted to the target group; the content of the

message was too broad without a specific action plan for injury prevention; and the duration of the educational campaign was too short [36,38–41]. Educational content in injury prevention should be small, specific, and concrete, and it should be appropriate to the immediate needs of the learner with a combination of reinforcement strategies [42]. A successful example is the “Play It Safe” campaign conducted in England through mass media (BBC) in combination with home visits with specific injury prevention advice [43]. Injury educational campaigns are more effective when combined with other strategies, such as providing a resource for home modifications, environmental change-facilitation, and improving the overall living condition of the community [44–48].

Previous studies have reported on educational interventions directed at behavior change in parents and children for injury prevention [36,49–53]. Education is also a major part of a widely used framework for injury prevention known as the 5 E’s: engineering, education, encouragement, enforcement, and evaluation [30]. Educational interventions for injury prevention can be effective when combined with other measures such as reinforcement and legislation [54]. However, the largest number of research projects done regarding injury prevention in LMICs have focused on educational interventions as opposed to other prevention strategies, such as law enforcement, environmental modifications, and advocacy [55]. Child injury prevention takes a public health approach due to its wide range of injury types and countermeasures [56]. Multiple interventions, such as environmental changes, safety devices, and supportive home visits, can contribute to a culture of home safety for children [47]. Such interventions are critical since parents in LMICs may not have access to contextually relevant injury prevention information. They also lack access to pediatricians or injury prevention programs required to offer injury prevention education and awareness, as is happening in HICs [57–60]. In LMICs, injury prevention education and advocacy cannot only rely on medical care providers; therefore, it is important to engage multiple stakeholders, such as schools, community health visitors, and local partners, and to mobilize and train them for child injury prevention programs.

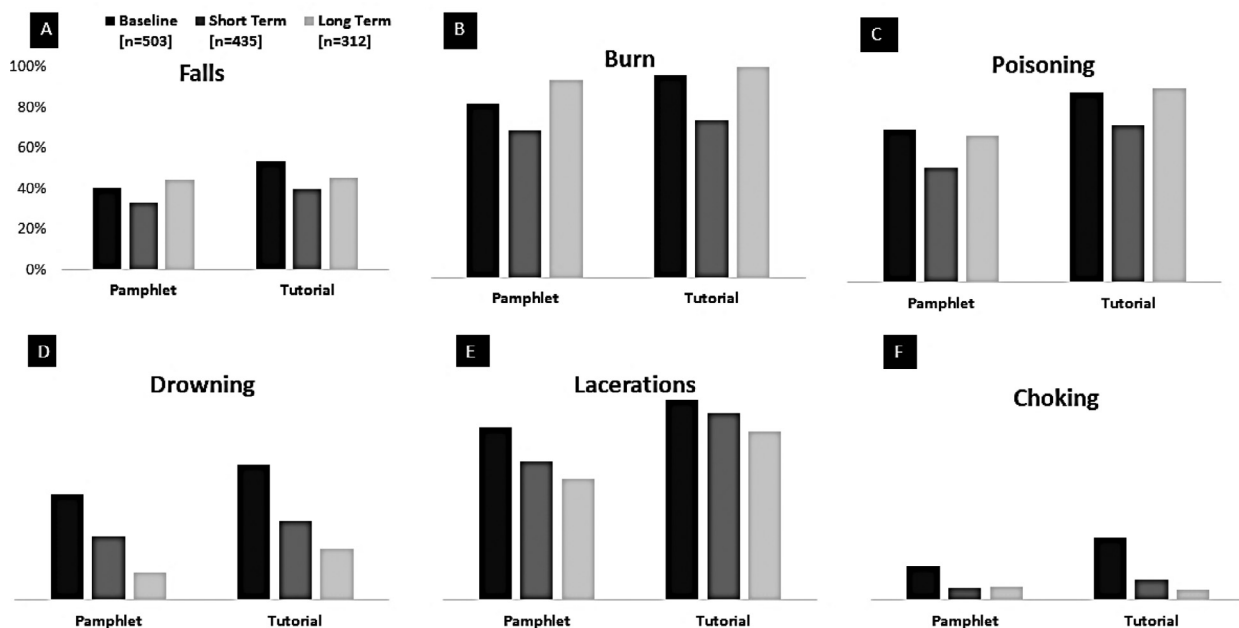


Fig. 2. Aggregate percentage of injury hazards at baseline, short-term, and long-term follow-up.

Strengths of the study

This is one of only a few studies implementing injury prevention information in an LMIC setting. Although there are well-established interventions in high-income settings, delivering them directly in low-income settings may not be appropriate. In this study, we used tailored injury prevention instructions, according to the feasibility and applicability of the injury reduction measures specific to the context of the information recipients. Furthermore, the implementation was carried out in the community setting within the homes, which gave more opportunity for interaction and involvement with the families. Previous studies have mostly occurred in clinical settings where healthcare providers are busy with medical service provisions and patients/visitors are seeking medical services for a specific health issue.

Limitations of the study

Our study had several limitations. First, this follow-up assessment was not a formal evaluation study to assess the effectiveness of the program by cluster randomization. One site was arbitrarily chosen as the intervention group (in-home tutorial) and the other as the control group (education pamphlet). This arbitrary choice may have resulted in the educational level difference between the two groups—in the educational pamphlet group, the mothers had a significantly higher educational level as compared to the in-home tutorial group. Second, in intervention group two, some households may have missed receiving the educational pamphlet. We did not record or monitor the delivery of this material because the distribution of the educational pamphlet was not an intended intervention. Third, there was a long duration gap (two years) between the short-term follow-up and the long-term follow-up assessment. This gap resulted in a high proportion of loss-to-follow-up among study participants as there was house shifting among the residents. The area was a governmental housing society, and the residents were mostly from low-middle income status living on rental agreements. Intervention group one had a 65% loss-to-follow-up, and intervention group two had 59%. Although the research team accounted for loss-to-follow-up within the sample size, we did not expect to lose such high numbers of participants. Lastly, we did not assess injury incidence in this study. Therefore, we are not sure that the intervention had any effect on the number of injury events or on behavioral modification in the recipients. (Fig. 2)

Conclusion

In conclusion, following the implementation of two injury prevention dissemination methods—an in-home tutorial and the distribution of an educational pamphlet—we found that using both strategies together could significantly decrease the presence of home hazards for falls, drownings, burns, poisoning, and cut injuries among children under 5 years of age in a low resource setting. The injury prevention information was tailored to the context of our recipients. These teaching modalities have the potential to be integrated into existing public health interventions. However, integrating this kind of one-to-one injury prevention education can be challenging, especially in a resource-constrained setting. Program implementation must consider training educators and standardizing the delivery alongside logistical and other emerging issues. Future studies can explore effective methods of integrating injury prevention information within the existing public health service delivery system in LMICs. Specifically, a larger community trial can be conducted to compare the effectiveness of injury prevention dissemination methods and should address the limitations identified in this study.

Supplementary material

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Declaration of Competing Interest

The authors declare that they have no competing interests

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Supplementary materials

Supplementary material associated with this article can be found, in the online version, at doi:[10.1016/j.injury.2022.11.062](https://doi.org/10.1016/j.injury.2022.11.062).

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