

## Effect of a Home Safety Supervisory Program on Occurrence of Childhood Injuries: A Cluster Randomized Controlled Trial

ANICE GEORGE,<sup>1</sup> RENU G,<sup>2</sup> SHEELA SHETTY<sup>1</sup>

From <sup>1</sup>Manipal College of Nursing, Manipal Academy of Higher Education (MAHE), Manipal, Karnataka; <sup>2</sup>Crescent College of Nursing, Kannur, Kerala.

Correspondence to: Dr Anice George, Dean, Manipal College of Nursing, MAHE, Manipal, Karnataka, India.

anice.george@manipal.edu

Received: July 10, 2020; Initial review: September 22, 2020; Accepted: February 16, 2021.

**Objectives:** To evaluate the effect of home safety supervisory program on improvement in childhood safety, self-reported home hazard of caregivers, and caregivers' supervisory attitude.

**Design:** Randomized controlled trial.

**Setting and Subject:** Caregivers of children between 2 to 5 years of age residing in selected villages in Karnataka.

**Intervention:** Intervention group was administered Home safety supervisory program (HSSP), whereas the control group received teaching on child care.

**Results:** The intervention group had a significant reduction in the frequency of childhood injuries when compared with the control

group [MD (95% CI) 8.96 vs 3.37], after the administration of Home safety supervisory program. There was a significant difference in the mean baseline scores of caregivers self-reported home hazard practices between the two groups ( $P < 0.001$ ), and improvement in the supervisory attitudes of caregivers in the intervention group ( $P < 0.001$ ).

**Conclusion:** Appropriate and effective home hazard reduction teaching reduces home injuries in children. The improved awareness of caregivers in child safety, and child supervision emphasizes the importance of this program.

**Keywords:** Adult supervision, Home hazard, Injuries, Prevention.

**Trial registration:** CTRI/2018/04/019386

**Published online:** February 19, 2021; **PII:** S097475591600294

Injuries at home constitute a significant number of childhood injuries, as children spend longer period of time in the home and also due to the many hazards that may be present [1,2]. The common injuries for younger children typically occurring at home are burns [3], falls [4] and poisoning [2,3,5,6].

Children those who are left unsupervised or inadequately supervised may come across with physical, mental, or social negative outcomes [7,8]. Lack of supervision has been associated with unintentional childhood injuries ranging from minor to ones with fatal severity. In cases of inadequate supervision, multiple factors interact with each other to either increase or decrease the risk of injury among children [8,9].

In India, unintentional injuries which are preventable, is a major public health problem that disproportionately affects children. The data on childhood injury in the hospital and emergency departments are very poorly maintained and the broader portion of iceberg of issues is not reported [10].

Unintentional injuries in children are a combined and interrelated product of human behavior, environment and other demographic factors. We planned to develop and

implement an intervention and evaluate the effect of a home safety supervisory program (HSSP) on caregivers of children below 5 years of age, on childhood supervisory practices.

### METHODS

After clearance from the institutional ethical committee, a cluster randomized controlled trial was conducted to assess the effectiveness of HSSP in 10 villages in Udupi district, Karnataka.

Cluster randomization technique was used, wherein villages were considered as clusters and houses in the village as cluster units. A random allocation was carried out at the level of selection of villages to the intervention and control group. Individual houses or selection of cluster units were done by an external person who was not involved in the study. Selection of the villages was done using probability proportional to size. In EPI methodology, which is carried out after creating a cumulative list of community population and selecting systematic sample of clusters with a random start [11]. After identifying the villages, a randomization process was done to select the villages to the experimental and control group. This was done using tossing of coin. The villages

were randomized into intervention group (5 cluster) and control group (5 cluster). From each cluster, 13 cluster units (houses) consisting of children between the age group of 2 to 5 years were selected. Home safety supervisory program was administered to intervention group cluster and the control group received teaching on child care. **Fig. 1** shows the CONSORT flow chart of participant selection.

The sample size in the RCT is based on comparison of means which was calculated on the basis of pilot study finding. A total of 130 families were included in the study (65 each in intervention and control group) who met the following inclusion criteria: Houses consisting of at least one child belonging to the age group of 2 to 5 years, caregivers of children (2 to 5 years) who can read, write and understand English or Kannada (local language) and caregivers who care for the children for at least 6-8 hours a day.

A demographic proforma was used to collect basic information about the child and caregiver, age and gender of the child, birth order, and type of family. Risk behavior assessment questionnaire is a self-prepared 20-item questionnaire to collect information from the caregivers regarding events of injury in the past three months among their children.

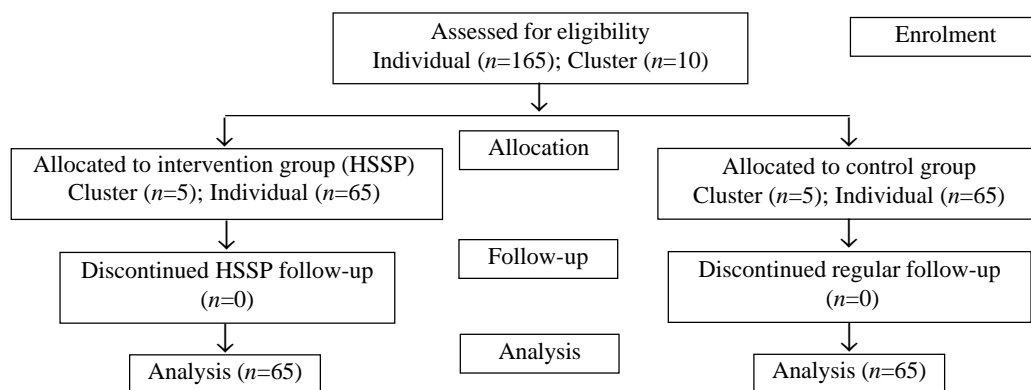
A home hazard assessment self-report questionnaire was in the local language used to assess the presence of home injury hazards as reported by caregivers during a personal interview. This questionnaire was prepared by the researcher and established validity and reliability. It consisted of 27 items categorized under following areas: burns, cut/injury, fall, drowning, suffocation/choking and poisoning. A higher score indicates more hazards at home that can cause injury to the child. Observed home hazard (OHH) inventory was used by the researcher to

personally observe the home hazards in the house which was researcher developed instrument based on the practices in the local area. Caregiver supervisory attitudes (CSA) is a five-point Likert scale 25-item questionnaire to assess the caregiver’s child supervision practices. All the instruments underwent validity and reliability studies. The tools were later translated to local language and retranslation was done to make sure the accuracy. The schematic representation of the study is shown in **Fig. 2**.

The home safety supervisory program for caregivers (HSSP) is the intervention developed for caregivers of children aged 2 to 5 years in intervention group. The program consisted of a video on ‘Safe home; Safe child,’ a poster on ‘Safe home; Safe child’ and an individual home visit. Health teaching on care of children between 2 to 5 years of age was administered to the caregivers in the control group. The contents of the health teaching included nutritional needs, hygienic needs, safety needs and normal growth and development.

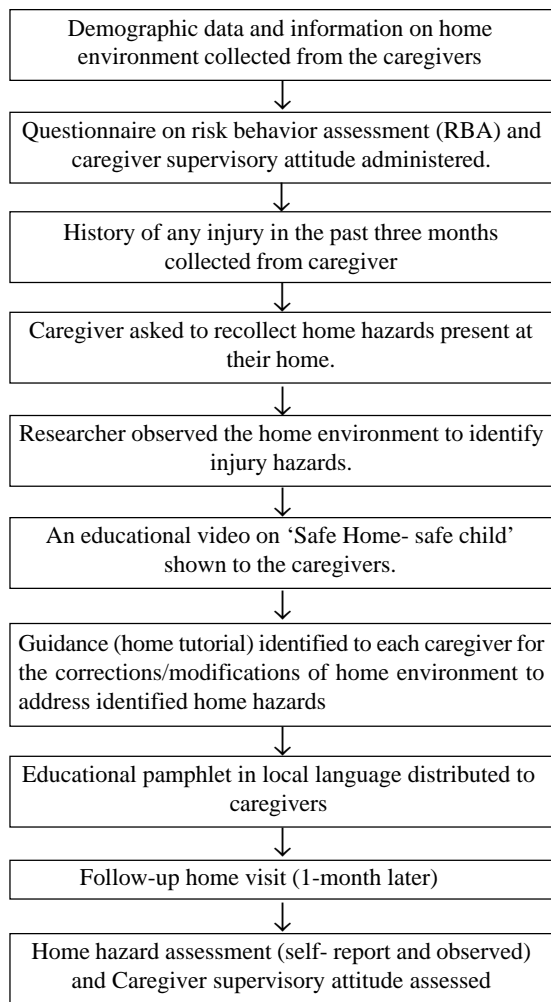
**RESULTS**

The sociodemographic characteristics of 130 enrolled children depicts that most (41.6%) of the children in intervention group were in the age group of 3 to <4 whereas 43.1% of children in the control group belonged to 2 to <3 years of age. Most of the children were first born in both the intervention and control groups (53.8% and 49.2%, respectively). In both the groups, the number of siblings for the indexed child was 1 to 3 (52.3% in intervention and 58.4% in control group). **Table I** shows the baseline characteristics of the children. **Table II** shows the distribution of childhood injuries in previous three months (baseline) and during one month follow-up in both the groups.



*HSP-Home safety supervisory program*

**Fig. 1** CONSORT flow chart of the study.



**Fig. 2** Schematic representation of the study description.

The children in the intervention group showed a significant reduction in the injury pattern when compared with those that of control group ( $P=0.02$ ). A significant change was observed in the mean scores of home safety

**Table I** Baseline Sociodemographic Characteristics of Children and Caregivers in the Two Groups

Variables	Intervention group (n=65)	Control group (n=65)
Age (y) <sup>a</sup>	3.3 (0.89)	3.3 (0.97)
Male	36 (55)	31 (47)
Nuclear family	42 (64)	47 (72)
Caregiver mother	52 (80)	50 (76)
Caregiver age (y) <sup>a</sup>	33.5 (10.5)	34.2 (11.3)

Values no. (%) or <sup>a</sup>mean (SD).

practices of caregivers in the intervention group whereas only minimal change was seen in the mean scores of home safety practices of caregivers in the control group. A significant difference in the mean follow-up scores of caregivers self-reported home hazard practices between the intervention and control group was noted. At the same time, no significant difference was found in the mean baseline and follow-up comparison of control groups.

The intervention with HSSP was an effective method to reduce the home hazard practices as reported by the caregivers as the mean difference observed from the baseline to follow-up in the intervention group (6.48) was higher as compared to that in the control group (0.18). A significant improvement was found in the mean difference of caregivers' supervisory attitude scores within the intervention group from baseline to follow-up. At the same time, no significant difference was found in the mean baseline and follow-up comparison of control groups.

**DISCUSSION**

Many published studies reported that the majority of injures occurs for children between the age of one to four years [12,13]. In this study the mean age of children experiencing home injuries was 3.3 years.

**Table II** Injuries Among Children in Intervention and Control Groups at Baseline and Follow-up

Childhood injury	Intervention group (n=65)		Control group (n=65)	
	Baseline	Follow-up	Baseline	Follow-up
Childhood injuries <sup>a,c</sup>	43.2 (3.22)	34.2 (2.27)	44.4 (4.22)	41.1 (3.36)
Burns	3.1 (1.88, 4.32)	0	4.6 (3.38, 5.82)	1.5 (0.28, 2.72)
Fall	21.5 (20.3, 22.7)	9.2 (7.98, 10.4)	18.518.6 (17.3, 19.7)	15.4 (14.2, 16.6)
Cut/injury <sup>b</sup>	12.3 (11.1, 13.5)	4.6 (3.38, 5.82)	9.29.3 (7.98, 10.4)	10.8 (9.58, 12.0)
Suffocation/choking	1.5 (0.28, 2.72)	0	0	0
Poisoning	0	0	1.5 (0.28, 2.72)	0

Value in median (IQR) except <sup>a</sup>mean (SD). <sup>b</sup>Comparison of mean difference between the intervention and control groups,  $P=0.02$ ; <sup>c</sup>For comparison of childhood injuries at baseline and follow-up in intervention group,  $P<0.001$  and for control group,  $P=0.38$ .

**WHAT IS ALREADY KNOWN?**

- Children below five years are prone for injury. They spend maximum time at home. Caregivers are responsible for the supervision of children.

**WHAT THIS STUDY ADDS?**

- The present study evaluated the effectiveness of a home supervisory program. This study also identified the attitudes of caregivers after the intervention.

Interventions for caregivers are very effective in reducing the injuries among children [14]. There are two different strategies in interventions. They are active and passive. One of the active strategy is training [15-16]. Injuries among children at home can be maximally reduced by giving training or education for caregivers [17]. The results of the present study revealed that such an intervention had a significant reduction in the overall injury status of children.

An educational program in combination with the distribution of a barrier or playpen was found to have a significant decrease in burns injury among children post intervention [18]. There is evidence that caregiver supervision may reduce the risk and severity of childhood injuries [19] and protect children who have injury risk factors [9].

An educational intervention was found to have improved the home safety practices of families with young children with significant increase in the percentage of homes deemed 'safe' after the fall intervention counseling [16,20]. The findings of a systematic review reported that parenting interventions, provided within the home using multi-faceted interventions may be effective in reducing child injury [21,22].

As the injury history in the study was collected retrospectively, there might be variations while reporting by the caregivers. There could be observer bias in the present study as the observed home hazard safety practices was assessed by the researcher.

The external validity of the study can be improved by increasing the sample size and representation of sample. A follow up of one year will make sure the retention of practices.

The intervention in the study aimed at increasing the caregivers awareness about home injuries and various home safety practices, which in turn contributes to the overall health and wellbeing of the children. Further the study emphasizes that the intervention should be directed towards the caregivers to have the change in the behaviour of children and themselves and also to improve

the home environment. Surveillance of childhood injury and caregiver awareness would help to bring down the unintentional injuries among children.

*Ethics clearance:* Institutional Ethics Committee of Kasturba Medical College and Kasturba Hospital, Manipal; No. IEC193/2018, dated March, 2018.

*Contributors:* AG: concept and design development, data collection, writing the first draft and consecutive revisions of the manuscript; RG: concept and design development, development of the instruments, preparation and consecutive revisions of the manuscript; SS: data collection, data analysis and preparation and consecutive revisions of the manuscript. All authors approved the final version of manuscript, and are accountable for all aspects related to the study.

*Funding:* Indian Council for Medical Research (ICMR), New Delhi; *Competing interest:* None stated.

**REFERENCES**

1. Mahalakshmy T, Dongre AR, Kalaiselvan G. Epidemiology of childhood injuries in rural Puducherry, South India. *Indian J Pediatr.* 2011;78:821-5.
2. Zia N, Khan UR, Razzak JA, Puvanachandra P, Hyder AA. Understanding unintentional childhood home injuries: Pilot surveillance data from Karachi, Pakistan. *BMC Research Notes.* 2012;5:37.
3. Theurer WM, Bhavsar AK. Prevention of unintentional childhood injury. *American Family Physician.* 2013;87:502-9.
4. Jagnoor J, Bassani DG, Keay L, et al. Unintentional injury deaths among children younger than 5 years of age in India: A nationally representative study. *Injury Prevent.* 2011;17:151-5.
5. Sznajder M, Janvrin MP, Albonico V, et al. Evaluation of the effectiveness of an injury prevention kit delivery for toddlers in four French cities. *Archives de Pediatrie.* 2003;10:510-6.
6. Rai A, Khalil S, Batra P, et al. Electrical injuries in urban children in New Delhi. *Pediatric Emerg Care.* 2013;29:342-5.
7. Aizer A. Home alone: Supervision after school and child behavior. *J Public Econ.* 2004;88:1835-48.
8. Morrongiello BA, Pickett W, Berg RL, et al. Adult supervision and pediatric injuries in the agricultural worksite. *Accident Anal Preven.* 2008;40:1149-56.
9. Schwebel DC, Brezausk CM, Ramey SL, Ramey CT. Interactions between child behavior patterns and parenting:

- implications for children's unintentional injury risk. *J Pediatr Psychol.* 2004;29:93-104.
10. Renu G, George A. Childhood injury an iceberg of phenomenon. *IOSR J Dental and Medical Sciences.* 2014;13:18-23.
  11. Renu G, Kamath A. Community household survey using EPI cluster sampling style. *Indian J Public Health Res Dev.* 2020;10:590-4.
  12. Kypri K, Chalmers DJ, Langley JD, Wright CS. Child injury morbidity in New Zealand, 1987-1996. *J Paediatr Child Hlth.* 2001;37:227-34.
  13. Kypri K, Chalmers, DJ, Langley JD, Wright CS. Child injury mortality in New Zealand 1986-95. *J Paediatr Child Hlth.* 2000;36:431-9.
  14. Abbassinia M BM, Afshari M. Effectiveness of interventions in the prevention of home injuries among children under 5 years of age: A systematic review. *Arch Trauma Res.* 2019;8:190-97.
  15. Simpson JC, Nicholls J. Preventing unintentional childhood injury at home: Injury circumstances and interventions. *Int J Injury Control Safety Prom.* 2012;19:141-51.
  16. King WJ, Klassen TP, LeBlanc J, et al. The effectiveness of a home visit to prevent childhood injury. *Pediatrics.* 2001; 108:382-8.
  17. Morrongiello BA CM, Brison RJ. Identifying predictors of medically-attended injuries to young children: do child or parent behavioural attributes matter? *Injury Prevention.* 2009;15:220-5.
  18. Jetten P, Chamania S, van Tulder M. Evaluation of a community-based prevention program for domestic burns of young children in India. *Burns.* 2011;37:139-44.
  19. Schwebel DC, Brezausk CM. Chronic maternal depression and children's injury risk. *J Pediatr Psychol.* 2008;33:1108-16.
  20. Rehmani R, Leblanc JC. Home visits reduce the number of hazards for childhood home injuries in Karachi, Pakistan: A randomized controlled trial. *Intern J Emer Med.* 2010; 3:333-9.
  21. Kendrick D, Barlow J, Hampshire A, Stewart-Brown S, Polnay L. Parenting interventions and the prevention of unintentional injuries in childhood: Systematic review and meta-analysis. *Child Care Hlth Dev.* 2008;34:682-95.
  22. Barbara A. Morrongiello SH, Melissa Bell, et al. Supervising for home safety program: A randomized controlled trial (RCT) testing community-based group delivery. *J Pediatric Psychol.* 2017;42:768-78.
-