


Behavioural and environmental risk factors for household injuries: semistructured interviews with health professionals and mothers in Iran

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To cite: Lael-Monfared E, Rakhshanderou S, Ramezankhani A, *et al*. Behavioural and environmental risk factors for household injuries: semistructured interviews with health professionals and mothers in Iran. *BMJ Paediatrics Open* 2023;**7**:e001762. doi:10.1136/bmjpo-2022-001762

Received 8 November 2022
Accepted 15 January 2023



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ABSTRACT

Background Injuries are increasing global public health problems, causing disability and death among children. This has considerable financial, emotional and social effects on families and society. This study aimed to investigate the behavioural and environmental factors leading to unintentional home injuries and attempts to highlight the pivotal role of mothers' behaviour and performance to provide a safe place for children at home.

Methods The current research is a qualitative study of a directed content analysis type. The data were gathered through semistructured interviews conducted in participants' workplaces, namely universities, research centres and health centres. In some cases, telephone interviews were conducted within 3 months, from February 2021 to May 2021 in Tehran, Iran. The participants were selected through non-probability and purposive sampling. All the recorded interviews and notes were accurately evaluated, and data analysis was performed based on the content analysis. There were 29 interviews in total: 12 interviews with mothers, 9 with treatment and prevention specialists, and 8 with researchers.

Results A total of 66 factors, 6 subcategories and 2 main categories were extracted after analysing the interviews. The main categories included environmental and behavioural factors. The subcategories included house infrastructure, house equipment/furniture, children's equipment/furniture, provision of precarious conditions, access to hazardous substances and appliances, and unsafe arrangement of furniture.

Conclusion Despite the existing obstacles such as the long-term implementation, financial difficulties and overcomplicated policy-making process, health interventions can make it possible for mothers of children under the age of seven to adopt preventive measures through appropriately designed instructions and optimal use of existing facilities.

INTRODUCTION

The term 'injury' has been defined by WHO as exposure to energy of mechanical, radiant, thermal, electrical or chemical kind in amounts exceeding the threshold of physiological tolerance,¹ being largely predictable and preventable on a global scale.² Since

WHAT IS ALREADY KNOWN ON THIS TOPIC

⇒ According to statistics reported by child health centres in Iran, on average, 20.2% of child mortality under the age of five is caused by unintentional injuries.

WHAT THIS STUDY ADDS

- ⇒ Environmental factors predisposing to child injuries include problems with house infrastructure such as no handrail on stairs.
- ⇒ Other environmental factors include unsafe furniture and toys.
- ⇒ The mothers in this study identified a wide variety of behavioural factors which can also predispose to child injuries.

HOW THIS STUDY MIGHT AFFECT RESEARCH, PRACTICE, OR POLICY

- ⇒ In line with the suggestions offered by the participants, regular inspections and making sure that the safety standards are implemented are significant factors in minimising house accidents and injuries.
- ⇒ Our findings can be the springboard for the dissemination of information to encourage policy-makers and lawmakers to pass stricter laws to implement safety standards for the required infrastructure. Passing laws and enforcing the policies and strategies can put into effect the preventive measures to reduce house injuries.

immunity programmes and vaccinations eliminate the threat of infectious diseases such as poliomyelitis, diphtheria and measles, children's health has dramatically changed over the last 50 years. However, one severe public health crisis threatening all children and coming with no vaccination is injury. Child injuries is of the most insidious public health threats¹ classified in the category of intentional and unintentional injuries.³

The injuries arising from road accidents, falling, burning, poisoning and suicide are among the common causes of intentional

and unintentional injuries⁴ in Eastern Mediterranean.⁵ The injuries incur huge costs⁶ in a way that 90% of injury-related financial burden falls on low-income or middle-income countries.⁷ In assessing risks, researchers pay particular attention to child protection services and precarious living conditions with the latter inflicting severe injuries to children.⁷ The WHO reported that 55 039 children under the age of five lost their lives due to injuries in Eastern Mediterranean Region, with nearly 336 271 children in all regions.⁸ Disease and disability are among the primary causes of death among children in Iran. In addition to physical and emotional costs, injuries can take a heavy toll on a country's healthcare system.^{9,10} Based on child healthcare centres, an average 20.2% of deaths under the age of five are due to injuries.¹¹

Studies show that home can be a significant place for injury. In the analysis of child injuries, this was proven right. This is because children, especially preschool children, spend most of their time at home.^{12–14} The WHO and the UNICEF set out child injuries as an important priority for the global public health and communities' development.¹⁵ Identification of preventive measures, dealing with the way humans interact with their surroundings, seems crucial in proper management of injuries.³ Different behavioural patterns can also increase the possibility of injuries.⁶ Therefore, effective interventions should be made to prevent injuries and accidents for this vulnerable subgroup. Basically, human behaviour is a complex phenomenon determined by individual, behavioural and environmental factors. Identifying individual and environmental determinants and designing appropriate programmes considering the explored factors are instances of such interventions.²

Most research has been done quantitatively and the prevalence has been investigated have been less studied. To discover these reasons, the best research method is to conduct a qualitative research. Therefore, this study attempts to represent a wide range of viewpoints from experts and families on behavioural and environmental determinants influencing home injuries among preschoolers. The findings of such studies can provide the valuable basis for effective preventive programmes and interventions.

METHODS

Study design

The present study is a qualitative research of the type of guided content analysis, being one of the most effective methods for extracting the experiences and views of individuals and groups on a specific subject or phenomenon.¹⁶

Study setting and participants

In this study, we considered the views of professionals specialising in prevention, treatment and research (six health education experts, two epidemiologists, two paediatricians, five nurses, two healthcare experts) as well as

mothers as subgroup. The participants were selected through non-probability and purposive sampling method with maximum variation (age, education level, people's experiences, income level and job status).

The inclusion criterion for researchers was that their field of research was in line with children's accidents and incidents, also for treatment and prevention specialists, paediatricians, healthcare workers with experience, and nurses who had experience working in the accident department or children's department. In the case of mothers, the entry criterion was to have at least 1 child under 7 years old. A total of 29 people, including 12 mothers, 9 treatment and prevention experts, and 8 experts in the field of research were interviewed. The time of the interview session and the place of the interview were set in the best and most convenient way for the participants.

Data collection

This study consisted of 29 participants. The data were collected through semistructured interviews from February 2021 to May 2021. The interviewer was an experienced researcher in conducting qualitative studies. Interviews were conducted at people's workplaces, universities, research centres, health centres and in some cases, telephone interview was conducted in Tehran. Guide questions were prepared based on the environmental and behavioural determinants, whose content validity was checked by the research team, and in the interview session, it started with demographic questions (age, occupation, education, etc). Then, it continued with more comprehensive questions about domestic incidents (table 1). Each interview lasted 20–40 min. After the interviews were transcribed, they were sent to the participants and were approved. The research team confirmed data saturation by conducting 26 interviews. However, for further confirmation, three additional interviews were conducted, but no new data were found, so the interview process was stopped.

Data analysis

In this study, Granheim and Lundman method was used to analyse the research data.¹⁷

Step 1: data preparation, including verbatim transcription of interviews.

Step 2: deciding on the unit of analysis.

Step 3: classification.

Step 4: Coding test in text samples.

Step 5: Coding all the text.

Step 6: Coding stability.

Step 7: drawing conclusions from coded data.

Trustworthiness

Dependability, transferability, credibility and confirmability used to ensure the validity and reliability of the current study (Guba and Lincoln's assessment method). The data were reviewed by two independent individuals for confirmation of dependability. For transferability,

Table 1 The guide to the interview questions addressed to mothers and experts

Mothers' interview questions	
The entry questions: Age: Education: Number of Children: Which child is under 7:	
Main questions	Follow-up questions
What's your definition of home injuries to children under 7?	Can you name some possible cases of home injuries?
In your opinion, why does a home injury (falling, burning, poisoning, etc) happen to a child under seven? What factors lead to such house injuries?	What precautionary measures can we do to prevent home injuries? What factors can lead to accidents that are not linked to our behaviour? In other words, they are beyond our control.
In your view, why are some children particularly prone to home injuries and others are not?	Have your children ever been injured at home? What happened? Why did it happen?
As the last question, would you like to touch on a point that I did not ask?	
Experts' interview questions	
Main questions	Follow-up questions
What's your definition of home injuries to children under 7?	Can you name some possible cases of home injuries?
In your opinion, why does a home injury (falling, burning, poisoning, etc) happen to a child under seven? What factors lead to such home injuries?	What precautionary measures can a mother do to prevent home injuries? What factors can lead to accidents that are not linked to mothers' behaviour? In other words, such accidents are beyond mothers' control.
In your view, why are some children particularly prone to home injuries and others are not?	
As the last question, would you like to touch on a point that I did not ask?	

the research team provided a detailed description of the participants and the overall analysis. To ensure credibility, the researchers spent a lot of time conducting the interviews and analysing the data. Confirmability were maintained by returning the codes extracted from the interviews to the participants and receiving their views.¹⁸

Patient and public involvement

Patients or people were not involved in the design, conduct and reporting or the publication programs. The results will be available to all employees and participants through our usual channels of communication.

RESULTS

Characteristic of participants

In this study, 29 participants' views were examined: 12 mothers, 8 researchers and 9 treatment and prevention experts. The average age of mothers was 31±4.48, where

7 of them were housewives and 5 employees. The group of mothers were all highly educated. Also, there were nine experts in the field of clinical prevention and eight experts in the field of research. After analysing the interviews, 66 factors, 6 subcategories and 2 main categories were extracted. The main categories included environmental determinants or behavioural factors. The subcategories included house infrastructure, house equipment/furniture, children's equipment/furniture, provision of precarious conditions, access to hazardous substances and appliances, and unsafe arrangement of furniture. **Figure 1** shows the output results.

Environmental determinants

The environmental factors included house infrastructure, house equipment/furniture, and children's equipment/furniture (tables 2-4).

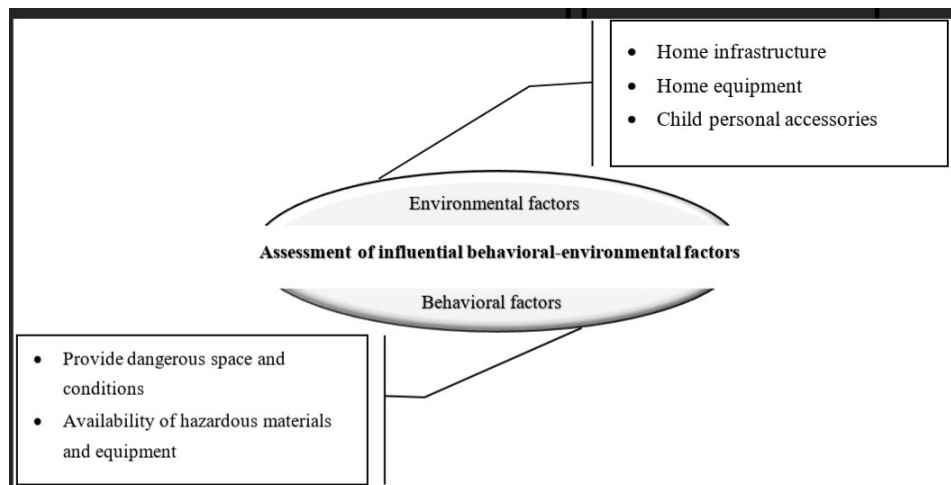


Figure 1 Classification of environmental and behavioural factors for domestic injuries.

Table 2 Environmental factors (house infrastructure)

Environmental factors	House infrastructure	
		Accessible position of sockets. Slippery stairs, pointed stairs. Lack of handrail, windows and balcony. Furniture with sharp points. No window guards for the third floor and beyond. Existence of stairs inside the house. Small houses and apartments. Unsafe architecture plan of the house. No child-friendly plan of the house. Child safety matters, substandard stairs. The effect of the quality of the living space. Absence of smoke detectors. No separate door for staircase.

House infrastructure

Most of the participants believe that household injuries are more likely when children's preferences and features are not considered in the architectural plan of the house.

“Accidents might have to do with the environment as it is not properly designed. The design in most buildings are not child-friendly. The designers had only adults in mind. Children can't adjust themselves to living in such living spaces” (P#27, an epidemiologist).

House equipment/furniture

Most of the participants reported that lack of safe furniture or kitchen utensils can contribute to lots of accidents.

“Kitchens are not safe. It's only mothers who should keep children away from them. Unsafe furniture, equipment, and home appliances can easily turn home—a haven of peace—into an unsafe place” (P#17, an epidemiologist).

Children's equipment/furniture

Lack of meticulous attention to children's toys and furniture in terms of safety can contribute to accidents and injuries.

“All safety standards must be met to make toys as safe as possible. For example, small batteries must not be used in toys. Or small parts and pieces must not be used in making toys” (P#22, a health educator expert).

Table 3 Environmental factors (house equipment/furniture)

Environmental factors	House equipment/furniture	
		Poorly designed or manufactured furniture and equipment. Unsafe kitchens and utensils. Unsafe heating and cooling systems. Unsafe furniture, low-quality safety equipment. No easy access to house safety equipment.

Table 4 Environmental factors (child's equipment/furniture)

Environmental factors	Children's equipment/furniture	
		Unsafe and non-standard toys. Inappropriateness of toys for particular age groups. Unsafe and low quality of some children's furniture such as bed. Dangerous toys leading to injuries. Reasonably priced toys but with no attraction. Toys with dangerous small parts and pieces.

Behavioural determinants

The behavioural factors included house provision of precarious conditions, access to hazardous substances and appliances, and unsafe arrangement of furniture (tables 5–7).

Provision of precarious conditions

Most of the specialists and mothers attribute the accidents and injuries to measures and steps ignored, and consequently, the house turns into a minefield of accidents.

“At this age when parents are not around, children are in danger of accidents and injuries. However, when parents are around, they can directly or indirectly manage everything in a way that children's self-confidence and independence are not undermined” (P#12, a mother).

Table 5 Behavioural factors (provision of precarious conditions)

Behavioural factors	Provision of precarious conditions	
		Not smoothing the sharp points. Not using guards for windows, stairs and balcony. Absence of fixed coverings on slippery floors. Not using socket guards. Unsafe swimming pools. Not fixing or changing broken sockets. Unsafe bathrooms. Reckless use of similar dishes for both food and hazardous substances. Leaving the child alone. Leaving the child alone with other children. Visibility of electrical wires. Not fixing precarious appliances firmly into a position. Home appliances plugged in when not in use such as an iron or a recharger. Child's presence while cooking, placing a chair or sofa near the window or balcony. Lack of parents' direct or indirect supervision. Putting children in high places. Using the front burners on the stove. Not fixing the rugs and carpets to the floor by means of brakes or heavy furniture. Not using a second lock for apartment doors. Gas valve being open when parents are away. Absence of child locks for cabinet doors. Leaving the balcony and apartment door open. Visible electrical wires on the floor. Having hot drinks while breast feeding, child's presence in the kitchen in times of cooking. Choosing unsafe and unsuitable toys.

Table 6 Behavioural factors (access to hazardous substances and appliances)

Behavioural factors	Access to hazardous substances and appliances	Easy access to medicine. Accessing sharp objects. Leaving small objects around the house. Easy access to inflammable substances and matches. Pots of hot water or hot food on the floor. And access to threads, ropes, plastics. Nylon containers which can cause suffocation.
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Access to hazardous substances and appliances

The participants asserted that visibility and accessibility of hazardous substances and appliances could pave the way for a lot of preventable accidents and injuries.

“We witness lots of cases of poisoning, most of which are unintentional and medicine-related. Some families recklessly make it easy for children to reach medicine and cause such injuries” (P#20, a paediatrician).

Unsafe arrangement of furniture

The participants also contend that the arrangement of furniture can sometimes cause accidents as a result of a reckless disregard for safety.

“It’s possible to prevent some of the accidents, for example, the fall of some decorative objects from the wall. Once a kid kicked the ball and it hit the clock on the wall. The clock fell on the face of one of the kids and left him with cuts and bruises. Thank Goodness for that. Something worse could have happened” (P#2, a mother).

DISCUSSION

This study aimed to investigate the behavioural and environmental factors leading to unintentional home injuries and attempts to highlight the pivotal role of mothers’ behaviour and performance to provide a safe place for children at home. All around the world, over 200 families mourn the death of their children due to injuries every day.¹⁹ This is a critical issue in desperate need of preventive measures.² Children usually fall prey to adults’ recklessness and mistakes. At times, accidents happen

Table 7 Behavioural factors (unsafe arrangement of furniture)

Behavioural factors	Unsafe arrangement of furniture	Placing washing liquids on the lower shelves of the cabinet. Keeping hazardous substances such as insect repellents with high visibility. Furniture arrangement and ornaments in precarious positions. Placing children’s equipment in high places. Inappropriate arrangement of furniture. Lack of guards in front of heater/fireplace, TV set, or mirror and candle holder set. Putting a piece of clothing hanging on top of the kitchen counter or table.
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as a result of parents’ lack of awareness, recklessness or ignorance.

In this study, we witnessed the extraction of some factors such as unsafe infrastructure, lack of safety in home appliances, children’s toys and unsafe behaviours undermining house safety and contributing to accidents.

Consistent with the findings of our study, a similar study identified four main themes: home injury and associated hazards, superficial changes inside the house, barriers and facilitators in improving the house quality and conditions. A wide range of strategies were introduced to change the house to make it a safer place for children such as house adjustments and installing safety equipment, removal of dangerous items or limiting children’s access to these sources of danger, and changing behaviour to guarantee house safety. The obstacles to implementing the mentioned strategies were lack of awareness regarding injury management, limited financial resources, surface topography, shoddily constructed houses and not assuming responsibility for injury prevention. The facilitators in improving the house quality and conditions included raising awareness, financial support, and family and society participation.²⁰ In another study, most of the injuries were linked to child’s growth, economic factors and the physical features of the living space. Low-income families typically live in houses where more sources of dangers contributing to accidents exist, such as infrastructure restriction, absence of guards in kitchens, basins, sinks, fireplaces and paraffin stoves, unprotected balconies, and open water reservoirs.²¹ In another study, the findings showed that living in rented accommodations with limited possibility of renovations and changes constitutes the main obstacle to preventing accidents and injuries. In addition, responsible parents should teach appropriate safety measures to their children.²²

One study pointed to the physical–environmental level as a contributing factor to home injuries such as jerry-built houses and absence of smoke detectors.²² Other scholars warned against some possible sources of danger such as easy access to unsafe electrical sockets, hanging electrical wires, non-standard and unsafe furniture, small stuff (eg, coins, buttons, bolts, cotton, paper and nylon containers), medicine, chemical substances, wet kitchen floors, sharp points (of knives, razor, glass and containers), and absence of guards in balconies.¹⁹ The house environment and socioeconomic factors are also found to contribute to injuries such as falling, burning and poisoning.² Furthermore, unsafe buildings and cooking in similar conditions are of main risk factors.^{7 23} According to 1 study, only 1 in every 10 families kept hazardous substances in locked cabinets.²⁴ Another report revealed that 97% of families left their prescribed medicine unattended,²⁵ which is a tell-tale sign of total negligence. A Nepalese study demonstrated that 98% of families have not installed handrails, 80% do not use window guards, and half of the families have not installed a balcony guard.²⁶ Unsafe living space, insufficient



supervision and lack of safety education were also found to be primary determinants.²

Adults' recklessness and mistakes typically take a heavy toll on children. In general, we can assert that houses are usually constructed for adults and are not children friendly, in a way that adjustment to such living spaces is an intractable problem for children. Since accidents can be traced to infrastructure and environment on the one hand, and most of them are irreversible due to families' conditions and facilities on the other hand, it is likely to minimise the risk of injuries through behavioural factors. Mothers' safety interventions in response to preventive measures apparently explain that if safety standards are not adhered to properly and promptly, mild to severe injuries are waiting for children.

One of the strengths of this research study was inviting therapists and specialists to collaborate with an eminent research team to determine the factors leading to injuries more precisely. This study attempted to interview mothers whose children had experienced house injuries. Employing two researchers to analyse and encode the data was another strong point of this study. Only Iranian participants were studied in this research project. Other factors might emerge in relation to house injuries in other countries and continents. In line with the suggestions offered by the participants, regular inspections and making sure that the safety standards are implemented are significant factors in minimising house accidents and injuries. Our findings can be the springboard for the dissemination of information to encourage policy-makers and lawmakers to pass stricter laws to implement safety standards for the required infrastructure. Passing laws and enforcing the policies and strategies can definitely put into effect the preventive measures to reduce house injuries.

CONCLUSION

Despite the existing obstacles such as long-term implementation, financial difficulties and overcomplicated policy-making process, health interventions can make it possible for mothers of children under the age of seven to adopt preventive measures through appropriately designed instructions and optimal use of existing facilities. Although this study identified a wide range of potential environmental and behavioural changes to reduce house injuries among children, the agents of such preventive interventions also need to get involved with the target communities so as to effectively identify the necessary changes related to the local culture.

Acknowledgements This study is part of a PhD Dissertation with the ethical code IR.SBMU.PHNS.REC.1399.068 conducted at Shahid Beheshti Medical University. The research team appreciates all the participants – specialists and families. The authors are also deeply thankful to the reviewers whose comments and suggestions will definitely make a remarkable improvement to the quality of this research paper.

Contributors All authors conceived and designed the study. EL-M interviews. EL-M, MG: data analysis. EL-M and MG were responsible for the initial drafting,

editing of the manuscript and approved the manuscript for submission. MG, SR and AR revised the manuscript. All authors read and approved the final manuscript. MG is responsible for the overall content as the guarantor.

Funding The authors have not declared a specific grant for this research from any funding agency in the public, commercial or not-for-profit sectors.

Competing interests No, there are no competing interests.

Patient and public involvement Patients and/or the public were not involved in the design, or conduct, or reporting, or dissemination plans of this research.

Patient consent for publication Not applicable.

Ethics approval This study is part of a Ph.D. Dissertation on Health Education and Promotion approved by the ethical committee of Shahid Beheshti Medical University (IR.SBMU.PHNS.REC.1399.068). Participants gave informed consent to participate in the study before taking part.

Provenance and peer review Not commissioned; externally peer reviewed.

Data availability statement Data are available upon reasonable request. no data are available.

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