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Behavioral and Environmental Risk Factors for Injuries at Home: Semi-structured Interviews with Health Professionals and Mothers in Iran

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Behavioral and Environmental Risk Factors for Injuries at Home: Semi-structured Interviews with Health Professionals and Mothers in Iran

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ABSTRACT

Background: Injuries are growing global public health problems, causing disability and death among children, which has considerable financial, emotional and social effects on families and society as a whole. This study aims at investigating the behavioral and environmental factors leading to unintentional injuries in the home and attempts to highlight pivotal role of mothers' behavior and performance to provide a safe place for children at home.

Methods: A qualitative research method was used. The data was gathered through semi-structured interviews conducted in participants' workplaces namely universities, research centers, health centers, and in some cases through telephone in three months from February 2021 to May 2021 in Tehran, Iran. The participants were selected through non-probability and purposive sampling. All of 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 cure and prevention specialists, and 8 with researchers.

Results: 66 codes, 6 subcategories and 2 main categories were extracted after analyzing the interviews. The main categories included environmental and behavioral factors. The subcategories included house infrastructure, house equipment/furniture, child'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 long-term implementation, financial difficulties, and overcomplicated policymaking 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.

1. INTRODUCTION

The term ‘injury’ has been defined by World Health Organization (WHO) as exposure to energy of mechanical, radiant, thermal, electrical, or chemical kind in amounts that exceed the threshold of physiological tolerance [1], which is largely predictable and preventable on a global scale [2]. Since immunity programs and vaccinations eliminate the threat of infectious diseases such as poliomyelitis, diphtheria, and measles, children’s health has dramatically changed during the last 50 years. However, one severe public health crisis that threatens all children and comes with no vaccination is injury. Child injuries are of the most insidious public health threats [1] classified as intentional and unintentional injuries [3]. Those arising from road accidents, falling, burning, poisoning, and suicide are among the common causes of intentional and unintentional injuries [4]. Eastern Mediterranean [5]. The injuries will incur huge costs [6] in a way that 90% of injury-related financial burden falls on low-income or middle-income countries [7]. According to global estimates in 2017, about 4.5 million people lost their lives due to injuries, which is 3267 disability-adjusted life year (DALY) out of 100,000. Almost 90% of injury-related mortalities happen in low-income and middle-income countries [2, 8]. 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 [9]. 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 [10, 11]. Socioeconomic factors can increase the risk of injuries among children in various ways. Poor families, for instance, cannot provide proper care and attention or afford safety equipment [12]. Based on child healthcare centers, on average 20.2% of deaths under the age of five are due to injuries [13].

The majority of injuries happen to infants at home [14, 15]. Studies show that the home can be a significant place for injury. In the analysis of child's injuries, the home is an important place for injuries, because children, especially preschool children, spend most of their time at home [16-18]. The WHO and the UNICEF set out child injuries as an important priority for the global public health and communities' development[19]. Some studies show that falling is the most common cause of injuries among children, with burning among preschoolers as the second main cause [20]. Some studies point to some improvements made to safety standards of houses. For example, smoke detectors can reduce fatalities to half in case of house fires [21]. Another successful story, which can considerably reduce death rate among children due to falling, has been a health education program called “Children Can’t Fly” developed by the New York City Department of Health to reduce the high incidence of child mortality due to falls from windows [22]. Identification of preventive measures, which deals with the way humans interact with their surroundings, seems crucial in proper management of injuries [3]. Different behavioral patterns can also increase the possibility of injuries [6]. Therefore, effective interventions should be made to prevent injuries and accidents for this vulnerable sub-group. Basically, human behavior is a complex phenomenon determined by individual, behavioral, and environmental factors.

Identifying individual and environmental determinants and designing appropriate programs considering explored factors are instances of such interventions. [2].

In fact, it is necessary to design and implement health education and promotion interventions to reduce children's home injuries. The theoretical frameworks and models set our general perspective on a topic and clarify people's views on what activities should be done, which provide a framework to address health problems, design, implementation, and evaluation of programs, and experts - especially health education and health promotion professionals - need to have a deep understanding from the educational and ecological determinants of the subject for planning. The PRECEDE-PROCEED model is the result of over 40 years of research by Dr. Lawrence Green and his teammates[23]. This model investigates and analyzes the contributing factors to change of behavior in enhancing health over time [24, 25]. The PRECEDE-PROCEED Model involves two common components and eight stages, and directs planning and developing health interventions by taking into account epidemiology, health education, behavioral science, and health management [26]. This model can be broadly divided into planning (PRECEDE, phases 1-4) and evaluation (phases 5-8) [27]. The PRECEDE component specifically focuses on identifying health problems and investigating the predisposing factors as well as the frameworks to account for health behavior. This component consists of social evaluation, epidemiological evaluation, genetics, behavior and environment, educational and ecological evaluation to identify the predisposing, reinforcing and enabling factors, official evaluation, and policy making [26]. The PROCEED component is specified by 4 stages in implementation, intervention evaluation, and the effect of intervention on determining factors of behavior [24, 25]. Therefore, this study has attempted to represent a wide range of experts and families' viewpoints about behavioral and environmental determinants that influences home injuries among preschoolers. The findings of such studies can provide the valuable basis for effective preventive programs and interventions.

2.METHODS

▪ **Study design**

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

▪ **Study setting and participants**

In this study, we considered the views of professionals specializing in prevention, treatment, and research (health education experts, epidemiologists, pediatricians, nurses, healthcare experts) as well as mothers sub-group.

The entry criteria for researchers was that their field of research was in line with children 's accidents and incidents, and for treatment and prevention specialists, pediatricians, health care workers with experience and nurses who had experience working in the accident and accident department or children 's department. In the case of mothers, the entry criterion was to have at least one 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. Data were collected through semi-structured 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 centers, health centers and in some cases by phone in Tehran. Guide questions were prepared based on the fourth phase of the ask-proceed model, i.e. ecological educational diagnosis, whose content validity was checked by the research team, and in the interview session, it started with demographic questions (age, occupation, education, etc.) and then continued with more complete questions about domestic incidents (Table 1). Each interview lasted 20 to 40 minutes. After the interviews were transcribed, they were sent to the participants and approved. The research team confirmed data saturation by conducting 26 interviews. However, for further confirmation, 3 additional interviews were conducted, but no new data were found, so the interview process was stopped.

Table 1 – The guide to 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 house injuries to children under 7?	Can you name some possible cases of house injuries?
In your opinion, why does a house 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 house injuries? What factors can lead to accidents that are not linked to our behavior? In other words, they are beyond our control.
In your view, why are some children particularly prone to house 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 house injuries to children under 7?	Can you name some possible cases of house injuries?
In your opinion, why does a house injury (falling, burning, poisoning, etc.) happen to a child under seven? What factors lead to such house injuries?	What precautionary measures can a mother do to prevent house injuries? What factors can lead to accidents that are not linked to mothers' behavior? In other words, such accidents are beyond mothers' control.
In your view, why are some children particularly prone to house injuries and others are not?	

As the last question, would you like to touch on a point that I did not ask?	
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▪ Patient and public involvement

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

3. 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, when 7 of them were housewives and 5 employees. The group of mothers were all highly educated. 9 experts in the field of clinical and prevention and 8 experts in the field of research. After analyzing the interviews 66 codes, 6 subcategories and 2 main categories were extracted. The main categories included environmental determinants or factors and behavioral factors. The subcategories included house infrastructure, house equipment/furniture, child’s equipment/furniture, provision of precarious conditions, access to hazardous substances and appliances, and unsafe arrangement of furniture. Figure 1 shows the output results.

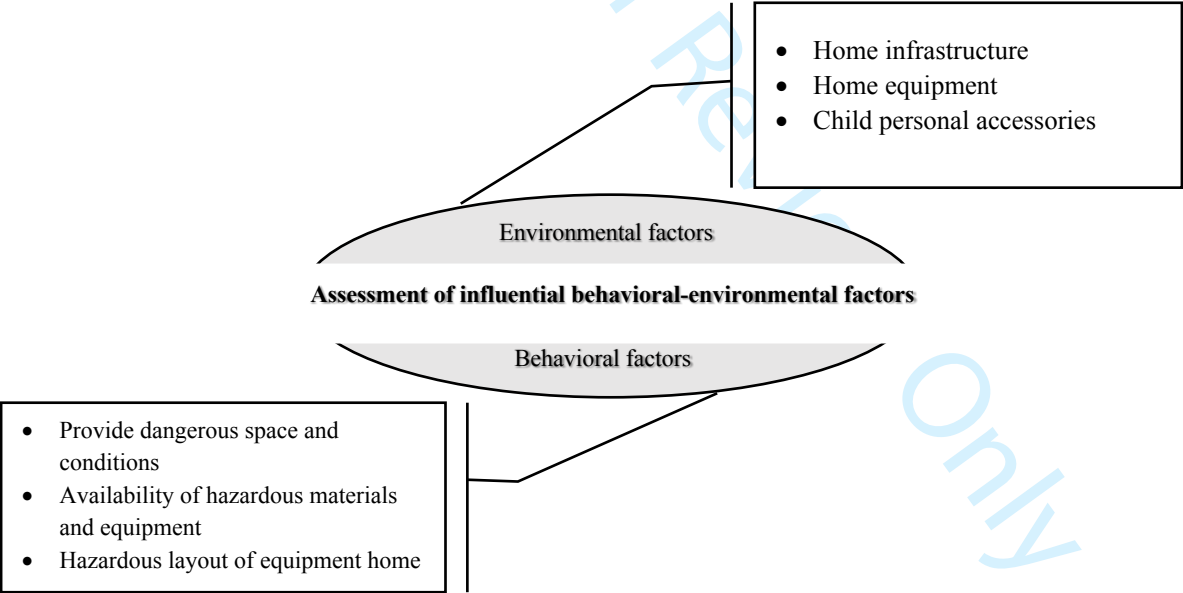


Figure 1- Classification of environmental and behavioral factors for domestic injuries

Environmental Determinants

The environmental factors included house infrastructure, house equipment/furniture, and child’s equipment/furniture (Table 2).

Table 2 – Environmental factors and codes

Category	Subcategories	Codes
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, and no separate door for staircase
	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, and no easy access to house safety equipment
	Child's equipment/furniture	Unsafe and nonstandard toys, inappropriateness of toys for particular age groups, unsafe and low quality of some child's furniture such as bed, dangerous toys leading to injuries, reasonably-priced toys but with no attraction, and toys with dangerous small parts and pieces

House infrastructure: Most of the participants believe that house 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. It's as if you are taken to the land of monsters and they tell you to live there now. 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. The cabinets 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).

Child'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. If so, they must be tightly screwed so that children cannot remove them. Or small parts and pieces must not be used in making toys" (P#22, a health educator expert).

□ Behavioral Determinants

The behavioral factors included house provision of precarious conditions, access to hazardous substances and appliances, and unsafe arrangement of furniture (Table 3).

Table 3 – Behavioral Factors and Codes		
Category	Subcategories	Codes
Behavioral 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 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 breastfeeding, child’s presence in the kitchen in times of cooking, choosing unsafe and unsuitable toys
	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, and nylon containers which can cause suffocation
	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 / fire place, TV set, or mirror and candle holder set, putting a piece of clothing hanging on top of the kitchen counter or table

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).

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.

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“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 pediatrician).

Unsafe arrangement of furniture: The participants also contend that the arrangement of furniture can sometimes cause accidents that are the 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).

4. DISCUSSION

All around the world over 200 families mourn the death of their children due to injuries every day [28]. 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 because 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 other stuff, and unsafe behavior 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 behavior to guaranteeing house safety. The obstacles to implementing the aforementioned 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 awareness raising, financial support, and family and society participation [29]. 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 [14]. In another study, the findings showed that living in rented accommodations with limited possibility of renovations and changes constitute the main obstacle to preventing accidents and injuries. In addition, responsible parents should teach appropriate safety measures to their children [30]. One study pointed to the physical-environmental level as a contributing factor to house injuries such as jerrybuilt houses and absence of smoke detectors [30]. Other scholars warned against some possible sources of danger such as easy access to unsafe electrical sockets, hanging electrical wires, nonstandard and unsafe furniture, small stuff (for example, 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 [28]. 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, 31]. According to one study, only one in every ten families kept hazardous substances in locked cabinets [22]. Another report revealed that 97% of families left their prescribed medicine unattended [32], which is a telltale 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 [33]. 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 minimize the risk of injuries through behavioral 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.

5. CONCLUSION

Despite the existing obstacles such as long-term implementation, financial difficulties, and overcomplicated policymaking 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 behavioral 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.

- **What is already known on this topic**
 - Experience injuries in their home environments because most injuries happen to children at home.
 - According to statistics reported by child health centers in Iran, on average 20.2% of child mortality under the age of five is caused by unintentional injuries.
- **What this study adds**
 - This study investigating the factors leading to house injuries and attempts to highlight mothers' pivotal role to provide a safe place for children at home.
 - It is hoped can prevent or minimize house injuries and a culture for children's health and welfare is established.
 - Investigating the factors leading to house injuries provide a promising opportunity to deliver home safety modifications.
 - The extracted factors in this study include a wide variety of factors in three main categories: behavioral and environmental factors.
- **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 minimizing house accidents and injuries.
 - Our findings can be the springboard for the dissemination of information to encourage policymakers 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.

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- **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). By highlighting the purpose of the study prior to the interview, the interviewer made an effort to establish a good relationship with the participants. The participants were reassured about the confidentiality of their names and the reason for their inclusion in the study.
- **Provenance and peer review:** Not commissioned; externally peer reviewed.
- **Data availability statement:** Data are available upon reasonable request. Data are available from the corresponding author.

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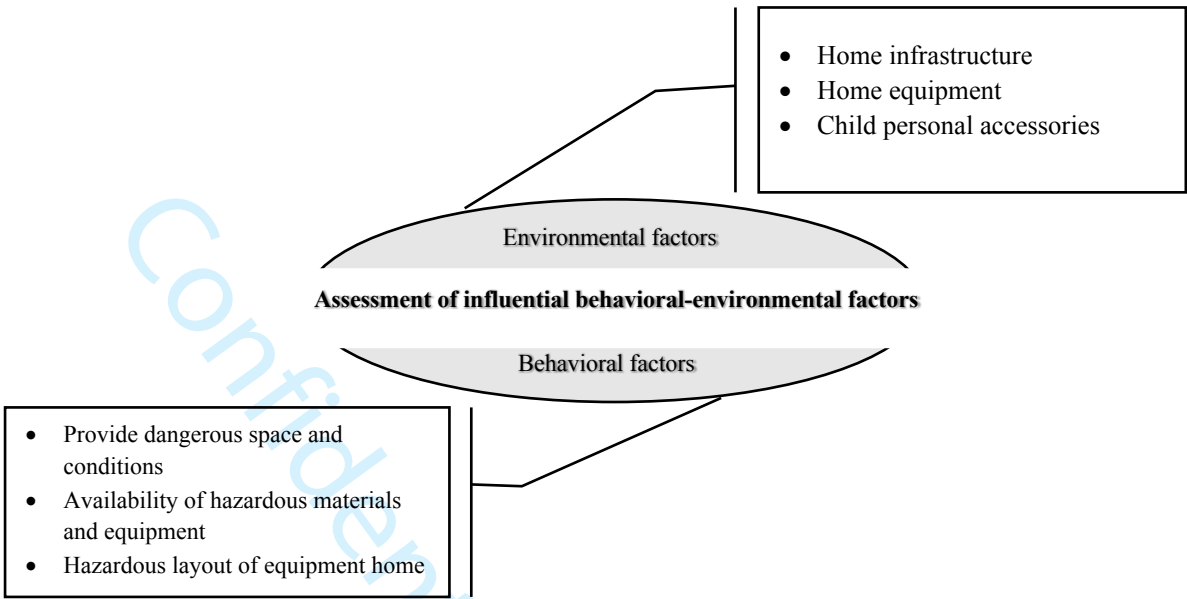


Figure 1- Classification of environmental and behavioral factors for domestic injuries

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Behavioral and Environmental Risk Factors for Injuries at Home: Semi-structured Interviews with Health Professionals and Mothers in Iran

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Behavioural and Environmental Risk Factors for Household Injuries: Semi-structured Interviews with Health Professionals and Mothers in Iran

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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 aims at investigating 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: A qualitative research method was used. The data was gathered through semi-structured interviews conducted in participants' workplaces, namely universities, research centres, and health centres. In some cases, telephone interviews were conducted within three 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 policymaking 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.

1. INTRODUCTION

The term 'injury' has been defined by World Health Organization (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 immunity programs 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 threats [1] 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 injuries [4]. Eastern Mediterranean [5]. The injuries incur huge costs [6] 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 sub-group. Basically, human behaviour is a complex phenomenon determined by individual, behavioural, and environmental factors. Identifying individual and environmental determinants and designing appropriate programs considering the explored factors are instances of such interventions. [2].

In fact, it is necessary to design and implement health education and promotion interventions to reduce children's home injuries. The theoretical frameworks and models display an overview of the topic and clarify people's views on what activities should be done, providing a framework to address health problems, design, implement, and evaluate programs. Experts - especially health education and health promotion professionals - need to have a deep understanding of the educational and ecological determinants of the subject for planning. The PRECEDE-PROCEED model is the result of over 40 years of research by Dr. Lawrence Green and his teammates [16]. This model investigates and analyses the contributing factors in the change of behaviour in enhancing health over time [17, 18]. The

PRECEDE-PROCEED Model involves two common components and eight stages. Also, it directs planning and developing health interventions by taking into account epidemiology, health education, behavioural science, and health management [19]. This model can be broadly divided into planning (PRECEDE, phases 1-4) and evaluation (phases 5-8) [20]. The PRECEDE component specifically focuses on identifying health problems and investigating the predisposing factors as well as the frameworks accounting for health behaviour. This component consists of social evaluation, epidemiological evaluation, genetics, behavioural, environmental, educational and ecological evaluation to identify the predisposing, reinforcing, and enabling factors, official evaluation, and policy making [19]. The PROCEED component is specified by 4 stages: Implementation, intervention, evaluation, and the effect of intervention on determining the factors of behaviour [17, 18]. 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 programs and interventions.

2.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.

▪ **Study setting and participants**

In this study, we considered the views of professionals specializing in prevention, treatment, and research (health education experts, epidemiologists, paediatricians, nurses, healthcare experts) as well as mothers as sub-group.

The entry 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 one 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 semi-structured 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 fourth phase of the ask-proceed model, i.e. ecological educational diagnosis, 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 to 40 minutes. 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, 3 additional interviews were conducted, but no new data were found, so the interview process was stopped.

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?	

▪ 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.

3. 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, where 7 of them were housewives and 5 employees. The group of mothers were all highly educated. Also, there were 9 experts in the field of clinical prevention and 8 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.

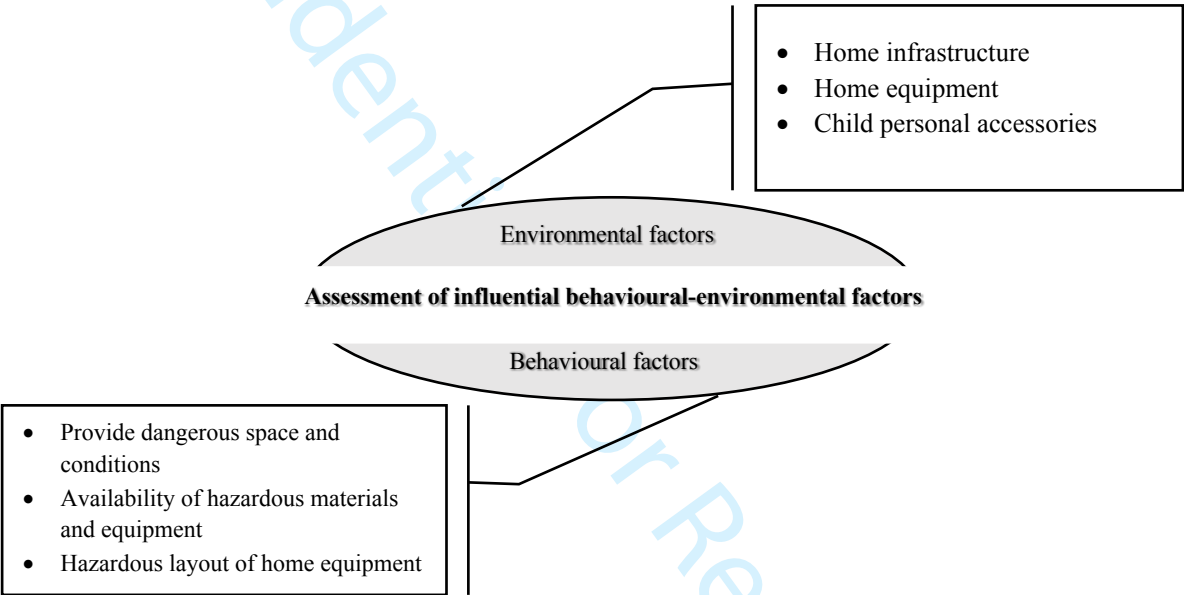


Figure 1- Classification of environmental and behavioural factors for domestic injuries

Environmental Determinants

The environmental factors included house infrastructure, house equipment/furniture, and children’s equipment/furniture (Tables 2,3,4).

Table 2 – Environmental factors (House infrastructure)		
Category	Subcategories	Factors

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.

Table 3 – Environmental factors (House equipment/furniture)

Category	Subcategories	Factors
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)

Category	Subcategories	Factors
Environmental Factors	Children's equipment/furniture	Unsafe and nonstandard 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.

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. It's as if you are taken to the land of monsters and they tell you to live there now. 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.

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“Kitchens are not safe. The cabinets 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. If so, they must be tightly screwed so that children cannot remove them. Or small parts and pieces must not be used in making toys” (P#22, a health educator expert).

❑ Behavioural Determinants

The behavioural factors included house provision of precarious conditions, access to hazardous substances and appliances, and unsafe arrangement of furniture (Tables 5,6,7).

Table 5 – Behavioural Factors (Provision of precarious conditions)

Category	Subcategories	Factors
Behavioral 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 breastfeeding, 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)

Category	Subcategories	Factors
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.

Table 7 – Behavioural Factors (Unsafe arrangement of furniture)

Category	Subcategories	Factors
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.

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).

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 pediatrician).

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).

4. DISCUSSION

All around the world, over 200 families mourn the death of their children due to injuries every day [21]. 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 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 [22]. 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 [23]. 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 [24]. 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 [24]. Other scholars warned against some possible sources of danger such as easy access to unsafe electrical sockets, hanging electrical wires, nonstandard and unsafe furniture, small stuff (for example, 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 [21]. 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, 25]. According to one study, only one in every ten families kept hazardous substances in locked cabinets [26]. Another report revealed that 97% of families left their prescribed medicine unattended [27], which is a telltale 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 [28]. 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 minimize 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.

5. CONCLUSION

Despite the existing obstacles such as long-term implementation, financial difficulties, and overcomplicated policymaking 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.

■ What is already known on this topic

- Experience injuries in their home environments because most injuries happen to children at home.
- 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

- The extracted factors in this study include a wide variety of factors in two main categories: behavioural and environmental.
- 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 minimizing house accidents and injuries.
- Our findings can be the springboard for the dissemination of information to encourage policymakers 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.

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- **Contributors:** ELM, MGh, SR, AR, conceived and designed the study. ELM interviews. ELM, MGh, data analysis. ELM, MGh were responsible for the initial drafting, editing of the manuscript, and approved the manuscript for submission. MGh, SR, AR, revised the manuscript. All authors read and approved the final manuscript
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- **Provenance and peer review:** Not commissioned; externally peer reviewed.
- **Data availability statement:** Data are available upon reasonable request. Data are available from the corresponding author.

▪ **6. REFERENCES**

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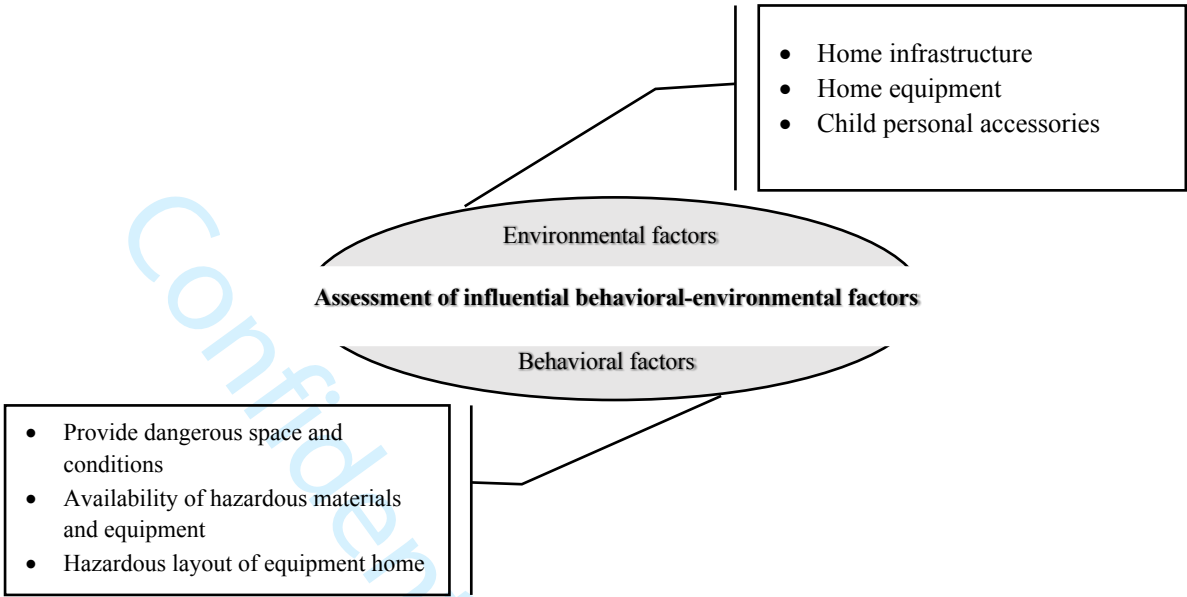


Figure 1- Classification of environmental and behavioral factors for domestic injuries

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Behavioral and Environmental Risk Factors for Injuries at Home: Semi-structured Interviews with Health Professionals and Mothers in Iran

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Behavioural and Environmental Risk Factors for Household Injuries: Semi-structured Interviews with Health Professionals and Mothers in Iran

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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 was gathered through semi-structured interviews conducted in participants' workplaces, namely universities, research centres, and health centres. In some cases, telephone interviews were conducted within three 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 policymaking 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.

1. INTRODUCTION

The term 'injury' has been defined by World Health Organization (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 immunity programs 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 threats [1] 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 injuries [4]. Eastern Mediterranean [5]. The injuries incur huge costs [6] 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 sub-group. Basically, human behaviour is a complex phenomenon determined by individual, behavioural, and environmental factors. Identifying individual and environmental determinants and designing appropriate programs 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 pre-schoolers. The findings of such studies can provide the valuable basis for effective preventive programs and interventions.

2. METHODS

▪ Study design

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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 specializing in prevention, treatment, and research (6 health education experts, 2 epidemiologists, 2 paediatricians, 5 nurses, 2 healthcare experts) as well as mothers as sub-group. 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 one 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 semi-structured 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 to 40 minutes. 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, 3 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 analyze the research data [17].
- Step1: data preparation, including verbatim transcription of interviews.
- Step2: deciding on the unit of analysis.
- Step3: classification.
- Step4: Coding test in text samples.
- Step5: Coding all the text.

Step6: Coding stability.

Step7: 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, 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 analyzing the data. Confirmability were maintained by returning the codes extracted from the interviews to the participants and receiving their views[18].

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?	

▪ 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.

3. 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 9 experts in the field of clinical prevention and 8 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.

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

Environmental Determinants

The environmental factors included house infrastructure, house equipment/furniture, and children’s equipment/furniture (Tables 2,3,4).

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.

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.
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Table 4 – Environmental factors (Child’s equipment/furniture)

Environmental Factors	Children’s equipment/furniture	Unsafe and nonstandard 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.
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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).

❑ Behavioural Determinants

The behavioural factors included house provision of precarious conditions, access to hazardous substances and appliances, and unsafe arrangement of furniture (Tables 5,6,7).

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.
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- 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 breastfeeding, child’s presence in the kitchen in times of cooking.
 - Choosing unsafe and unsuitable toys.
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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.

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.

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).

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).

4. 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 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, nonstandard and unsafe furniture, small stuff (for example, 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 one study, only one in every ten 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 minimize 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 minimizing house accidents and injuries. Our findings can be the springboard for the dissemination of information to encourage policymakers 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.

5. CONCLUSION

Despite the existing obstacles such as long-term implementation, financial difficulties, and overcomplicated policymaking 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.

■ 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 minimizing house accidents and injuries.
- Our findings can be the springboard for the dissemination of information to encourage policymakers 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.

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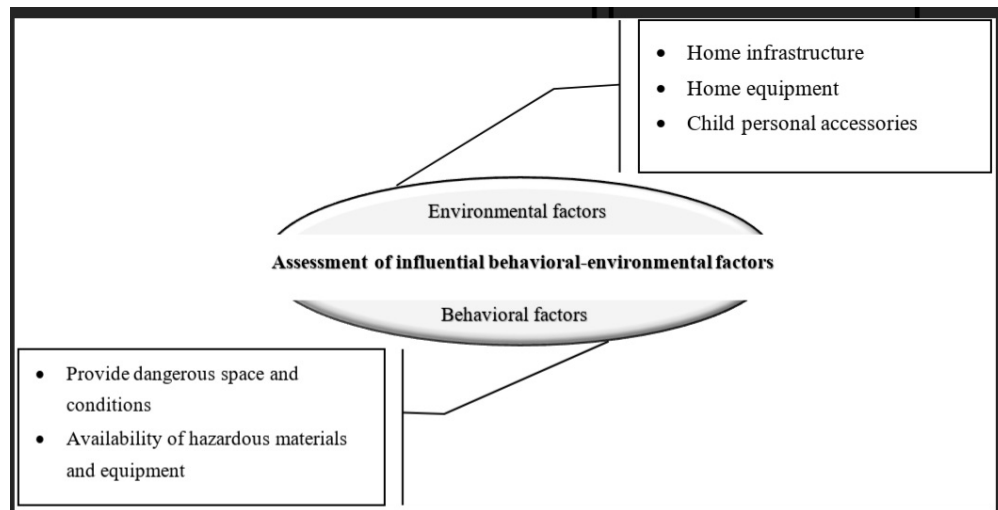
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