

## ORIGINAL ARTICLE

# Risk Factors Causing Unintentional Home Injuries in Children Under 5 Years of Age Presenting to Emergency Department of Ziauddin University Hospital

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## ABSTRACT

**Objective:** To determine the predisposing factors contributing to unintentional home injuries in children under 5 years of age presenting to Emergency department of Ziauddin medical university and hospital, Karachi

**Place and duration of study:** The study is conducted at Department of Emergency, Ziauddin Medical University and Hospital, Karachi And the duration of study is 13th October 2019 To 12th April 2020. It is a cross-sectional study design having 200 patients, in which non-probability consecutive sampling technique is used.

**Material and Method:** There were 200 patients in total with Injuries that happened at home environment. Mothers participated in an interview. After each child received the recommended care, data were gathered. Calculated descriptive statistics were used. Stratification was used to manage effect modifiers. The chi-square test was used after stratification. P-values lower than 0.05 were regarded as significant.

**Results:** There were 46% male and 54% female patients. Mean age was 35.02±13.79 months. Most of the children were injured >3 times in last one month. 57% patients were found with injury due to falling down while most of the injuries (32.5%) were occurred at stairs. In our study, 39% of children caused injury due to lack of care, 11.5% due to availability of hazardous material and 49.5% due to unsafe home environment.

**Practical implications:** From the standpoint of injury prevention, this study suggests that the risk of non-fatal injury in children under the age of five is complicated and multidimensional, and that effective prevention measures must target numerous components. To effectively increase children's comprehension of the safety issue and lower their risk of hazard, health care providers, parents, or both should design alternative strategic teaching methods.

**Conclusion:** Most prevalent cause of injury was falling down. 39% children injured due to lack of care, 11.5% due to availability of hazardous material and 49.5% due to unsafe home environment.

**Keywords:** Unintentional Home injuries, Children, predisposing factors, falling down, Injuries

## INTRODUCTION

The leading cause of mortality and morbidity in children is unintentional injuries<sup>1</sup>.

Approximately 80% (3.9 million) of the 5 million deaths caused by injuries each year (or injuries) are unintentional injuries<sup>2</sup>. Injuries were the cause of 364,824 children deaths in 2015, according to the most recent World Health Organization (WHO) data source<sup>3</sup>. Children under the age of 5 experience the majority of unintentional injuries in and around the house, where they spend the majority of their time<sup>4</sup>.

Living in an unsafe home environment (28.70%), not taking care of oneself (12.61%), and the availability of hazardous materials (5.65%)<sup>5</sup> are among the risk factors associated with home injuries. According to a study conducted in 14 European nations, mothers' incapacity to provide constant care for their children poses the biggest barrier to the adoption of preventative measures, followed by a lack of understanding of the variables that contribute to accidents<sup>6</sup>. The risk of unintended injury to young children in the home might be decreased through parental supervision<sup>7</sup>.

Children are also more likely to sustain more severe injuries because of their physical immaturity and smaller size. Children also bear a heavier weight of injury since they have more years of potential handicap ahead of them. The majority of the research examined here indicate that male children are more likely to sustain injuries. Male children are more impulsive and take more risks than female children, which may be the cause of this<sup>8</sup>. Additionally, culturally speaking, boys are given somewhat more freedom to explore their surroundings while girls from middle-income countries are more likely to sustain burn injuries<sup>9,10,11</sup>.

In houses, unintended fall deaths are most common<sup>12</sup>. Falls are the most frequent injury-related reason for emergency room

visits; those at higher risk include children under the age of 18 and people over the age of 65<sup>13</sup>.

To ensure a secure environment for our kids while lowering the frequency and seriousness of injuries in children, prevention initiatives should be adopted. Numerous research have been conducted to suggest efficient methods to reduce injuries in children<sup>14</sup>. It is crucial to establish the evidence-based epidemiology, risk factors, preventative measures, and role of the various stakeholders in avoiding childhood injuries for such a significant public health concern. We intend to give pertinent recommendations for the prevention of unintentional injuries and the adoption of preventive measures at the community as well as national level through the identification and assessment of the local risk factor profile<sup>15</sup>.

This study reveals that, from the perspective of injury prevention, the risk of non-fatal injury in children under the age of five is complex and multifaceted, and that successful preventative methods must focus on a wide range of factors. Alternative strategic teaching approaches should be developed by healthcare professionals, parents, or both in order to effectively raise children's understanding of the safety issue and reduce their risk of hazard.

This study has some of the limitations when we asked mothers about child injuries they might have forgotten or lied of being marked as irresponsible, major limitations is the less sample size therefore more stratified study with larger sample size is needed to enforce in future. The study is being conducted in urban areas so the results might not be applicable for large populations.

## MATERIAL AND METHODS

The study is conducted at Department of Emergency, Ziauddin Medical University and Hospital, Karachi And the duration of study is 13th October 2019 To 12th April 2020.

It is a cross sectional study design having sample size of 200 Children. The sampling technique we have used in this study is the non-probability consecutive sampling. Children having age 8 months to 5years,belong to any gender, injured in home premises and their mothers are agree to participate in a study are included in this study design.Children having age less than 8 months and more than 5 years, critically ill, Injured outside the home environment i.e school, road, playing area are excluded in this investigative study.

After approval of study from College of Physicians & Surgeons of Pakistan, informed consent of patients are taken and interviews are conducted from the mothers of affected children who have visited the emergency department of Ziauddin Hospital karachi. Other demographic and outcome variables are noted by the researcher.

Data is extracted and interpreted with the help of SPSS version 20. Mean and standard deviation of all the extracted data has been calculated.Frequency and percentage values of qualitative variables are measured like gender, education level, marital status, occupation, type and place of injury. Effect modifiers like, gender, education, socioeconomic status are controlled with the help of data stratification,The chi-square test is applied on different strata and p-value of < 0.05 is considered as significant.

**RESULT**

Total 200 children of either gender with age 8 months to 5 years meeting inclusion criteria of study were evaluated to determine the predisposing factors contributing to unintentional home injuries in children under 5 years of age.

Descriptive statistics were calculated using SPSS version 20. Stratification was done and post stratification chi square test was applied to observe the effect of modifiers on outcome. P value ≤0.05 was considered as significant. Among 200 children, 46% were male and 54% were female as presented in Table-01.

Among 200 mothers, 96% were married and 4% were divorced/ widowed while most of the mothers (26.5%) have primary education and 14% of mothers were employed. The detailed frequency distribution of mother martial status, education level and occupation are presented in Table-01.

Out of 200 children, most (57%) were found with injury due to falling down while most of the injuries (32.5%) were occurred at stairs. The detailed frequency distributions of injury type and injury place are presented in Table-02. In our study, 39% of children caused injury due to lack of care, 11.5% due to availability of hazardous material and 49.5% due to unsafe home environment as presented in Table-02

The results showed significant association of injury reason with child age (p=0.038), injury type (p=0.000) and injury place (p=0.000) while no significant association was found with gender

(p=0.286), mother age(p=0.407), number of children (p=0.255), number of preschool children (p=0.630), marital status (p=0.052), mother education level (p=0.904), occupation(p=0.376), socio economic status (p=0.901), housing type (p=0.542), presence at home (p=0.941) and child injury in past one month (p=0.544). The detailed results of associations are presented from Table-17 to Table-02.

Table 1: incidental variables In frequency and percentage.

Variables	N=220	Frequency and percentage
Percentage of patients according to age groups	< 36 months	54%
	>36 months	46%
Frequency and percentage of patients according to mother age groups	<25 years	47(23.5%)
	25-30 years	79(39.5%)
	>30 years	74(37%)
Frequency distribution of gender	Males	92(46%)
	Females	108(54%)
Frequency distribution of mother martial status	Married	192(96%)
	Divorced/ Widowed	8(4%)
Frequency distribution of mother education level	No education	33 (16.5)
	Primary	53 (26.5)
	Matric	50 (25)
	Intermediate	41 (20.5)
	Graduate	13 (6.5)
	Post Graduate	10(5)
Variables	N=220	Frequency and percentage
Frequency distribution of occupation	Employee	28 (14)
	Housewife	172 (86)
Frequency distribution of presence at home	The continued presence	82 (41)
	4 hours of absence	44 (22)
	8 hours of absence	60 (30)
	> 8 hours of absence	14 (7)
Frequency distribution of child injury in past one month	YES	54 (27)
	NO	146 (73)
Frequency distribution of injury type	Falling down	114 (57)
	Poisoning	21 (10.5)
	Burns	10 (5)
	Penetrating trauma	14 (7)
	Assaulted by other child	15 (7.5)
	Foreign body ingestion	18 (9)
	Drowning	5 (2.5)
	Other	3 (1.5)
Frequency distribution of injury place	Room	49 (24.5)
	Kitchen	42 (21)
	Stairs	65 (32.5)
	Bathroom	10 (5)
	Yard	11 (5.5)
	Parking	9 (4.5)
	Other	14 (7)
Frequency distribution of reason	Lack of care	78 (39)
	Availability of hazardous material	23 (11.5)
	Unsafe home environment	99 (49.5)

Table 2: Frequency Reasons

Variables	N=200	Injury reasons			Total	P-value
Frequency of injury reason according to gender		Lack of care	Availability of hazardous material	Unsafe home environment		
	Male	31 (33.7)	10 (10.9)	51 (55.4)	92	0.286
	Female	47 (43.5)	13 (12)	48 (44.4)	108	
According to mother age	<25 years	23 (48.9)	5 (10.6)	19 (40.4)	47	
	25-30 years	29 (36.7)	7 (8.9)	43 (54.4)	79	
	>30 years	26 (35.1)	11 (14.9)	37 (50)	74	
Frequency of injury reason according to mother martial status	Married	75 (39.1)	20 (10.4)	97 (50.5)	192	0.052
	Divorced/ Widowed	3 (37.5)	3 (37.5)	2 (25)	8	
Variables	N=200	Injury reasons			Total	P-value
Frequency of injury reason according to mother education level		Lack of care	Availability of hazardous material	Unsafe home environment	200	
	No education	10 (30.3)	4 (12.1)	19 (57.6)	33	0.904
	Primary	21 (39.6)	6 (11.3)	26 (49.1)	53	
	Matric	18 (36)	5 (10)	27 (54)	50	
	Intermediate	19 (46.3)	4 (9.8)	18 (43.9)	41	
	Graduate	5 (38.5)	3 (23.1)	5 (38.5)	13	
	Post Graduate	5 (50)	1 (10)	4 (40)	10	
Frequency of injury reason according to occupation	Employee	12 (42.9)	5 (17.9)	11 (39.3)	28	0.376
	Housewife	66 (38.4)	18 (10.5)	88 (51.2)	172	
Frequency of injury reason according to presence at home	The continued presence	31 (37.8)	9 (11)	42 (51.2)	82	0.941
	4 hours of absence	15 (34.1)	5 (11.4)	24 (54.5)	44	
	8 hours of absence	27 (45)	7 (11.7)	26 (43.3)	60	

	> 8 hours of absence	5 (35.7)	2 (14.3)	7 (50)	14		
Frequency of injury reason according to child injury in past one month	YES	22 (40.7)	4 (7.4)	28 (51.9)	54	0.544	
	NO	56 (38.4)	19 (13)	71 (48.6)	146		
Variables	N=200	Injury reasons			Total	P-value	
Frequency of injury reason according to injury type		Lack of care	Availability of hazardous material	Unsafe home environment		0.000	
		Falling down	2 (1.8)	77 (67.5)	114		
		Poisoning	15 (71.4)	1 (4.8)	5 (23.8)		21
		Burns	2 (20)	4 (40)	4 (40)		10
		Penetrating trauma	9 (64.3)	4 (28.6)	1 (7.1)		14
		Assaulted by other child	7 (46.7)	1 (6.7)	7 (46.7)		15
		Foreign body ingestion	7 (38.9)	8 (44.4)	3 (16.7)		18
		Drowning	3 (60)	2 (40)	0 (0)		5
		Other	0 (0)	1 (33.3)	2 (66.7)		3
Frequency of injury reason according to injury place		Room	29 (59.2)	0 (0)	20 (40.8)	49	0.000
		Kitchen	20 (47.6)	11 (26.2)	11 (26.2)	42	
		Stairs	7 (10.8)	7 (10.8)	51 (78.5)	65	
		Bathroom	6 (60)	2 (20)	2 (20)	10	
		Yard	6 (54.5)	0 (0)	5 (45.5)	11	
		Parking	8 (88.9)	0 (0)	1 (11.1)	9	
		Other	2 (14.3)	3 (21.4)	9 (64.3)	14	

## DISCUSSION

Accidental childhood injuries included road traffic injuries, burns, drowning, poisonings and falls. These are the emerging issues nowadays everywhere. In every year approximately, 875,000 children are expired on earth<sup>16</sup>. This study is evaluating the predisposing factors causing accidental home injuries in children less than 5 years of age presenting to Emergency Department.

As per the study findings, the most common home injury mechanisms included burning, falling, ingesting poison, eating items, choking, and biting. Gender did not affect the occurrence of home injuries. Children under 5 years of age are at high risk of home injuries because they spend more time at home than older kids do and because of their physical development stage, children under the age of five are more likely to sustain injuries at home<sup>17</sup>. The prevalence of non-fatal injuries among children under 5 of age has also been shown in other studies<sup>18</sup>.

According to Qiu et al. and Arif et al., children over 24 months of age were more likely to sustain injuries at home<sup>19,20</sup>. Burning, falling, and poisoning are the most frequent mechanisms of harm among preschoolers<sup>19,21,22</sup>. In a study conducted by Arif, no differences in injury risk between the sexes were found<sup>20</sup>. However, the National Child Development study found that the risk is nearly two times higher for male child, Chan et al., however, shown that women child are more likely to sustain injuries at home. According to studies, being the mother's first child and being illiterate were risk factors for injuries at home<sup>23</sup>. Both may result from the fact that moms who are illiterate and first-time mothers are less knowledgeable about handling and caring for a child<sup>24</sup>.

Birth order is a risk factor for home injuries, according to a study done in Egypt. The risk of harm was not affected by birth order, according to Addor et al., while the risk was increased for second- and third-born infants<sup>25</sup>, according to Halawa et al. In addition, they noted that children of highly educated moms have a higher risk of damage than children of illiterate mothers<sup>26</sup>.

Kamal reported that children of less educated parents were at higher risk for injury. Higher frequency of non-fatal home injuries was detected among children of some specific ethnicity with low level of socio-economic living standard, low quality of housing, and low level of mother education level<sup>27</sup>.

In a sample of 200 mothers, 96% were married, 4% were divorced or widowed, and the majority (26.5%) had only an elementary education. Only 14% of the mothers were working. In Table-01 displays the frequency distribution of the mother's marital status, degree of education, and occupation in more detail.

Out of 200 children, the majority (57%) were discovered to have injuries from falls, with stairs accounting for the majority (32.5%) of the injuries. Table-02 displays the frequency distributions for injury type and injury location in more detail. According to Table-02, 39% of children in our study caused injuries owing to carelessness, 11.5% due to the availability of hazardous materials, and 49.5% due to a dangerous home environment.

The findings revealed a significant correlation between injury reason and child age ( $p=0.038$ ), injury type ( $p=0.000$ ), and injury location ( $p=0.000$ ), but not between gender ( $p=0.286$ ), mother age ( $p=0.407$ ), number of children ( $p=0.255$ ), number of preschoolers ( $p=0.630$ ), marital status ( $p=0.052$ ), mother education level ( $p=0.904$ ), mother's occupation ( $p=0.376$ ), socioeconomic status ( $p=0.901$ ), presence at home ( $p=0.941$ ) and child injury in past one month ( $p=0.544$ ).

**Study Limitations:** This study has some of the limitations when we asked mothers about child injuries they might have forgotten or lied of being marked as irresponsible, major limitations is the less sample size therefore more stratified study with larger sample size is needed to enforce in future. The study is being conducted in urban areas so the results might not be applicable for large populations.

## CONCLUSION

The Study reveals that almost most of the children are injured greater than 3 times in previous month, most of the recognizing cause of injury is the falling down of children, and most of the Injuries are taking place at stairs. Further more burning, falling, poisoning, swallowing objects, choking, and biting are the main home injury mechanisms. In our study, 39% of children caused injury due to lack of care, 11.5% due to availability of hazardous material and 49.5% due to unsafe home environment.

## REFERENCES

- Lao Z, Gifford M, Dalal K. Economic cost of childhood unintentional injuries. *Int J Prevent Med.* 2012;3(5):303-12.
- He S, Lunnen JC, Puvanachandra P, Amar S, Zia N, Hyder AA. Global childhood unintentional injury study: multisite surveillance data. *Am J Pub Health.* 2014;104(3):e79-84
- Ong AC, Low SG, Vasanwala FF. Childhood Injuries in Singapore: Can Local Physicians and the Healthcare System Do More to Confront This Public Health Concern? *Int Env Res Pub Health.* 2016;13(7).
- Ablewhite J, Peel I, McDaid L, Hawkins A, Goodenough T, Deave T, et al. Parental perceptions of barriers and facilitators to preventing child unintentional injuries within the home: a qualitative study. *BMC Pub Health.* 2015;15:280.
- Younesian S, Mahfoozpour S, Shad EG, Kariman H, Hatamabadi HR. Unintentional home injury prevention in preschool children; a study of contributing factors. *Emergency.* 2016;4(2):72
- Heydari G, Yousefifard M, Hosseini M, Ramezankhani A, Masjedi M. Comparison of Cigarette Smoking, Knowledge, Attitude and Prediction of Smoking for the Next Five Years and Their Association between Students, Teachers and Clergymen. *Int J Prevent Med.* 2013;4(5):557-64
- Morrongoiello BA, Corbett M, McCourt M, Johnston N. Understanding unintentional injury-risk in young children I. The nature and scope of caregiver supervision of children at home. *J Pediatr psychol.* 2005;31(6):529-39.
- WHO. World Report on Child Injury Prevention: Summary. Geneva: World Health Organisation. 2008

9. Balan B, Lingam L. Unintentional injuries among children in resource poor settings: where do the fingers point? *Arch Dis Child* 2012;97:35–8.
10. Fatmi Z, Hadden WC, Razzak JA. Incidence, patterns and severity of reported unintentional injuries in Pakistan for persons five years and older: results of the National Health Survey of Pakistan 1990-94. *BMC Public Health* 2007;7:152.
11. Ministry of Home Affairs. Major Cause-wise Medically Certified Deaths by Age Group and Sex according to National List (Based upon Tenth Revision of ICD) in India. Government of India, 2004.
12. Runyan CW, Perkins D, Marshall SW, Johnson RM, Coyne-Beasley T. Unintentional injuries in the home in the United States Part II: morbidity. *Am. J. Prev. Med.* 2005;28:80–7
13. Runyan CW, Casteel C, Perkins D, Black C, Marshall SW. Unintentional injuries in the home in the United States Part I: mortality. *Am. J. Prev. Med.* 2005;28:73–9
14. Towner E, Dowswell T, Jarvis S. Updating the evidence. A systematic review of what works in preventing childhood unintentional injuries: Part 2. *Injury Prevent.* 2001;7(3):249-53
15. Kyu HH, Pinho C, Wagner JA, Brown JC, Bertozzi-Villa A, Charlson FJ, et al. Global and national burden of diseases and injuries among children and adolescents between 1990 and 2013: findings from the Global Burden of Disease 2013 Study. *JAMA Pediatr.* 2016;170(3):267-87.
16. Nagesh N, Julie G, Ann M. Childhood injury report: patterns of unintentional injuries among 0- to 19-year olds in the United States, 2000– 2006. *Fam Community Health* 2008;32(2):189.
17. Noughjah S, Kalhori SRN, Saki. Risk factors of Non-fatal Unintentional Home Injuries among Children under 5 Years Old; a Population-Based Study. *Emergency.* 2017; 5 (1): e6
18. Neghab M, Habibi M, Rajaeefard A, Choobineh A. Home Accidents in Shiraz during a 3-year Period (2000-2002). *J Kermanshah Uni Med Sci.* 2008;11(4).
19. Qiu X, Wacharasin C, Deoisres W, Yu J, Zheng Q. Characteristics and predictors of home injury hazards among toddlers in Wenzhou, China: a community-based cross sectional study. *BMC Pub health.* 2014;14(1):638.
20. Arif AA. The Epidemiology of Unintentional Non-fatal Injuries among Children in the South Plains/Panhandle Region of Texas. *Texas J Rural Health.* 2003;21(2):31-41.
21. Noughjah S, Ghanavatizadeh A, Eskandari N, Daghlavi M. The prevalence of nonfatal home injury and related factors among children referred to Ahvaz health centres, A pilot study *Hakim* 2012;15(3):238-42.
22. Alptekin F, Uskun E, Kisioglu AN, Ozturk M. Unintentional nonfatal home-related injuries in Central Anatolia, Turkey: Frequencies, characteristics, and outcomes. *Injury.* 2008;39(5):535-46.
23. Towner E, Dowswell T, Errington G, Burkes M, Towner J. Injuries in children aged 0-14 years and inequalities, A report prepared for the Health Development Agency. Health Development Agency (NHS), 2005.
24. Chan E, Kim JH, Ng Q, Griffiths S, Lau J. A descriptive study of nonfatal, unintentional home-based injury in urban settings: evidence from Hong Kong. *Asia-Pacific J Pub health/Asia-Pacific Academic Consortium for Public Health.* 2008;20:39-48.
25. Halawa EF, Barakat A, Rizk HII, Moawad EMI. Epidemiology of non-fatal injuries among Egyptian children: a community-based cross-sectional survey. *BMC Pub Health.* 2015;15(1):1.
26. Addor V, Santos-Eggimann B. Population-based incidence of injuries among preschoolers. *Eur J Pediatr.* 1996;155(2):130-5.
27. Kamal NN. Home unintentional non-fatal injury among children under 5 years of age in a rural area, el Minia Governorate, Egypt. *J Comm Health.* 2013;38(5):873-9.