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Domestic Injuries among Children Under 7 Years of Age in Iran; The Baseline Results from the Iranian First Registry

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ABSTRACT

Objective: To investigate epidemiological aspects of injuries among Iranian children under 7 years of age using obtained data from a national registry.
Methods: Injury data were derived from a national-based injury supervision system during 2000–2002. This registry involved all of home-related injuries for children less than 7 years of age that treated in health or emergency centers. The study population included 25% of Iranian people. The descriptive statistical methods were used for representing the distribution of the variables like age, sex, injury mechanisms, types of injuries, etc. Data were presented as mean ± SD and proportions as appropriate.
Results: Of the total 307,064 domestic injuries registered during 2000–2002, 77,500 cases (25.2%) were children. 70% of these children (54581 cases) were in age group of 1-5 years.
The large fraction (58.8%) of injuries among children under 7 years of age went back to burn injuries. Cuts and lacerations were at the second level with 17.4%. 51% of injuries had contact with hot liquids. Of all children under 7 years of age injuries, 282 died, 86 were disabled, while the rest improved or being under treatment when recording data.
Conclusion: Injuries, particularly burns (especially those who had contact with hot liquids that led into scald), are major public health problem that children under 7 years of age encounter. Therefore, it seems necessary to provide adequate plans to promote children under 7 years of age safety issues.

Keywords: Injuries; Children; Accidents; Burns; Domestic injuries.

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Introduction

One of the most significant health problems during childhood are accidents [1]. Injuries have imposed different kinds of burdens depending on whether the country is developed or developing [2]. From total injuries in 2010, 1-19 years old age group unintentional injuries comprise 12% of mortalities. In 1-4 and 15-19 age groups the proportionate mortality increases from 12.6% to 28.8% respectively. In Iran injuries rate was the highest among 0–4 years children and lowest among the elderly (60 years or over) [3]. Unintentional injuries for children are attributed to the first rank of mortalities and hospitalization in most industrialized countries such as Canada and the U.S [4]. Most of these injuries happen at home. Despite the fact that, injuries are not considered as the leading cause of mortalities in the world wide , but they represent a major cause of years of life lost and productivity, especially in young people [5]. Home environment plays a great role in injuries occurrence. Home is a place that inside which half of the injuries happens to the young children. Preschoolers spend most of their time at home and are more prone to damages compared with school-aged children [6, 7]. Hence, traffic and environment related injuries are examined; occurring injuries at home have remained neglected. It is clear that Iran is a middle-income country like many countries however some preventive policies are not applied [8]. The aim of the current study was to investigate epidemiological aspects of injuries among Iranian children under 7 years of age using obtained data from a national registry.

Materials and Methods

Study Population

Data were obtained from a national-based injury super intendance system and belonged to the period of 2000–2002. Home-related injuries being treated in health or emergency centers were registered in the structured prepared questionnaire. Also, a hierarchical database system was designed to gather data from all over the country. Gathered data from 31 Iranian universities of medical sciences who were responsible for both medical education and health services were utilized in the present investigation. Unfortunately, some universities started their program with just a part of their population. The study population consisted 25% of the Iranian population. At first, the registry was made in order to map the epidemiology of national home-related injuries. In this research eight variables were selected to determine injury patterns, i.e., age and gender, the occurrence location of injury at home, injury mechanisms, type of injury, injured part of body, location of reporting the victims and the outcome of injury. For more detail information about materials and methods of this study please refer to [9-11].

Statistical Analysis

To analyze collected data, we used Stata statistical software package (Version 11.0). We used both descriptive and inferential statistics methods to analyze the data. Frequency tables were produced. In order to estimate the study population is what fraction of the country population used the averages of two national population censuses conducted in 1996 and 2006. To assess predictors of mortality, the Chi-square test was used. Finally, through multivariate analysis, a binary logistic regression was applied the standards of model development and assessment were considered. The study was conducted based on the ethical codes of the Ministry of Health and Medical Education of Iran as detailed earlier studies [9-11].

Results

Of all the 307,064 domestic injuries registered during the years 2000–2002, 77,500 cases (25.2%) were children, 70% of these children (54581 cases) had 1-5 years old. Mean age of children less than 7 years of age group was 3.09±1.70 years, with a median age of 3 years. Among the studied children, 56.6% were boys and 43.4% were girls. In total, 65.4% of domestic injuries in the children below 7 years, occurred in the sitting room or the bedroom, 15.7% in the kitchen, 14.8% in the yard or garden, and rest happened in other parts of the home, including the stable, bathroom, stairs, or storehouse, or on the roof. In 22930 cases (30.5%), the lower extremities, in 3341 cases upper extremities (4.4%) were injured. 2046 cases (2.7%) had multiple traumas and in remaining cases other organs were damaged. Regarding the injury mechanism, 50.9% of all children less than 7 years were injured by hot liquids. Comparisons of injury mechanisms along with age group are given in Table 1. The majority (58.8%) of injuries among children less than 7 years of age were burn wounds, while cuts and lacerations (17.4%) were placed in the second rank (Table 2). Of total injuries, 45.9% were reported by the first level of health care system, 28.0% by secondary health centers and 26.1% by hospitals. Of all injured children under 7 years, 282 died and 86 were disabled, while the rest improved or went under the treatment at the time of report. Multivariate analysis showed that age group, injury mechanism and injured anatomical part were the predictors of mortality. On bivariate analysis, children <1 years of age had the highest likelihood of mortality compared with those who were less than 1-5 year or 6 years. From the multivariate analysis, adjusted odds ratios are shown in Table 3.

Discussion

Injuries are regarded to be the main cause of death and undesirable incidents in childhood [5, 12]. Injuries have tremendous effects on childhood's

Table 1. Distribution of injury mechanisms among the children less than 7 years of age injury victims in Iran compared for the three age groups

Injury mechanism	<1 years	1-5 years	6 years[a]	Total	Percent for total
Unintentional					
Hot liquids	9843	26720	2956	39519	50.9
Collision with sharp objects	805	6652	1546	9003	11.6
Falls	659	5206	1030	6895	8.9
Overthrown (fall at the same level)	486	4853	1077	6416	8.3
Contact with hot objects & Exposure to fire	1646	3808	414	5868	7.6
Collision with hard objects	433	3308	641	4382	5.6
Using drugs or poison	497	1931	103	2531	3.3
Others	340	1961	405	2706	3.5
Intentional					
Violence & Suicide	23	142	33	198	0.3
Total	14732	54581	8205	77518	100

[a]from 6.00.00 (year.month.day) to 6.11.29; [b]Because the classification is based on the National Registry and the number of cases registered under this classification so it should be considered in children.

Table 2. Types of injuries among the children less than 7 years of age trauma victims in Iran

Types of Injury	<1 years	1-5 years	6 years[a]	Total	Percent for total
Amputation	21	96	24	141	0.2
Bleeding	15	122	29	166	0.2
Brain trauma	112	407	58	577	0.7
Bumping	325	1564	257	2146	2.8
Burn	11545	30642	3391	45578	58.8
Contusion	169	986	202	1357	1.7
Cuts and lacerations	1046	10154	2249	13449	17.4
Eye injury	21	182	38	241	0.3
Fractures	386	3,699	888	4,973	6.4
Multiple	11	61	8	80	0.1
Poisoning	542	2175	139	2856	3.7
Suffocation	70	143	21	234	0.3
Crush injuries	373	3788	797	4958	6.4
Others	94	562	104	762	1.0
Total	14732	54581	8205	77518	100

[a]from 6.00.00 (year.month.day) to 6.11.29

health including emotional morbidity and mortality as well as high economic burden [13] In the present investigation, children included 25.2% of all registered injuries; also, 25% of the total Iranian population consisted of children less than 7 years. The incidence of injuries in children below 7 years was same as the other groups. In a study by Fardiazar *et al*. about domestic injuries and suicide among women in reproductive age in Iran, it was shown that the incidence of injuries was the highest among children less than 7 years [9].

All around the world, one of the main causes of mortality, hospitalization and disability are unintentional injuries of children. Unintentional injuries are main reason of mortalities in Iran, but non-fatal types that happen at home have not been investigated yet [14]. In our study it was depicted that most injuries lead in to mortalities and disabilities that is in agreement with other studies that illustrates a high vulnerability of preschool children. In a similar way, injuries are the leading cause of mortalities among children with 1 to 14 years of age in the developed countries [15] .In this study the incidence of injuries were found to be higher in 1-5 years age group of children less than 7 years of age. This is in line with previous overall and injury-specific studies [16, 17]. It is perhaps due to the fact that kids at this age (1 year) begin to walk and have no sense of dangers. More serious injuries, that include 66% of total injuries, happen at homes [8]. A hypothesis behind high rate of injuries in children at home is that they spend a considerable amount of time at home at this age. As a result, they are at higher risk of home injuries [18]. It is expected that as children grow to have age between 1- 2 years the rate of accidents at home approximates its climax because children begin to move and their growth will be faster , then the rate will slowly decrease due to the lower presence at home [19]. In study of Tse *et al*. it was noted that 68 % of home burns occurred in the living room while 17% happened in the bathroom and in the kitchen there were only 11.5%, that these results are in the line with that our study about 65% occurrence of domestic injuries in the living room

Table 3. Adjusted odds ratios for injury death predictors derived from logistic regression analysis

Death predictors	OR [95% CI]		*p*-value
	Reference group		
Injury mechanism			
Unintentional			
Collision with sharp objects			
Hot liquids	2.1	0.8 – 5.3	0.130
Falls	2.9	1.1 – 7.4	0.027
Overthrown (fall at the same level)	1.1	0.4 – 3.3	0.841
Contact with hot objects & Exposure to fire	0.7	0.2 – 2.7	0.594
Collision with hard objects	2.9	1.1 – 8.1	0.038
Using drugs or poison	0.3	0.1 – 1.1	0.065
Others	7.9	3.0 – 20.9	<0.0001
Intentional			
Violence & Suicide	9.8	2.8 – 34.4	<0.0001
Age group			
<1 **years**			
1-5 years	0.7	0.5 – 1.0	0.046
6 **years**[a]	0.5	0.3 – 0.8	0.008
Body part			
Body			
Brain	5.0	2.0 – 12.6	0.001
Ear	Not observed	-	-
Eye	Not observed	-	-
Face	0.02	0.0 – 0.1	<0.0001
Foot	0.02	0.0 – 0.04	<0.0001
Foot Fingers	0.1	0.02 – 1.1	0.058
Genital Organs	1.6	0.6 – 4.6	0.362
Hand	0.02	0.01 – 0.05	<0.0001
Hand Fingers	Not observed	-	-
Head	0.5	0.3 – 0.8	0.003
Internal Organs	2.4	1.4 – 4.1	0.001
Mouth	0.1	0.01 – 0.7	0.025
Multiple trauma	2.2	1.5 – 3.1	<0.0001
Neck	0.4	0.1 – 1.4	0.171

[a]from 6.00.00 (year.month.day) to 6.11.29

when compared with other parts of the house in the children less than 7 years group [20]. It seems that happening crowding and home situation is greatly effective on the risk rate in children [21]. Despite being neglected, the highest risky groups in terms of burns are babies, small child and preschoolers [22]. In our study, burn wounds followed by cuts and lacerations had the highest rate of injuries among children less than 7 years of age in all age groups and included 58% of trauma victims in Iran .Our findings are in agreement with other Iranian studies about home injuries, Mohammadi *et al*. study showed that totally, 79723 unintentional home-related injuries were reported in Iran, with at first, burns (49%) and then lacerations/cuts by sharp instruments (30%) [8] Conventional types of injuries are burns which the most severe types are often seen in the both acute and chronic diseases [23]. Children burns lead to increase in hospitalization rate compared with other injuries that imposes high costs to society [24]. The most risky group in terms of burns are children due to their exuberance, curiosity and their less understanding of dangers in order to have accurate and timely response. Children less than 7 years (0-4 years) are vulnerable group for hot water [25]. Our study results showed that more than half of injuries (51%) happened with hot liquids compared with other injures among children less than 7 years. The most common cause of burn injuries are demonstrated to be happened by hot liquids in childhood. Contact with hot coffee, hot water or food inside pots and pans was the main cause of scald injuries among children [26, 27]. Throughout the last three decades, Iran had significant achievements in promotion of public health status specifically in terms of mother-child health criteria, vaccination programs and more accessibility to healthy water. These achievements are gained by population growth control programs, prevention of infectious diseases and developments in health system [28]. Due to the fact that, children safety and its promotion is less focused it needs special attention to prevent children domestic injuries.

In conclusion, domestic safety is an important

issue when talking about children less than 7 years of age safety. Burns compromise the greatest bulk of injuries in this age group. Of all types of burns, scalds are greatly important. Regarding cooking and food serving customs inside homes and the way that children are cared it seems that children safety is promotable through adequate plans and planned interventions.

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