

## The Epidemiology of Injuries and Accidents in Children Under one Year of Age, during (2009-2016) in Hamadan Province, Iran

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### Abstract

#### Background

Injuries and accidents are the first cause of death in the first 5 years of children life in the world; the present study was conducted to investigate the extent and distribution of accidents in the infants under one year in Hamadan Province, Iran.

**Materials and Methods:** This cross-sectional descriptive-analytic study was carried out using of data of injuries and accidents related to children under one year for Hamadan province in seven years period from March 2009 to March 2016. In this study we used data according national injuries and accidents recorded program. The data were analyzed using descriptive statistics as well as analytical statistics including the Chi-square test. Data were analyzed using Stata software version 12.

**Results:** In this 7 year periods, 3,200 accidents were registered among children under one year. The highest occurrence of accidents was in the spring 1,029 (31.15% of cases). 1,890 (59.1%) of accidents occurred in the urban area and only 429 (13.4%) of them were in rural area. In total, car accidents (53.4%), trauma (12.6%) and fall from altitude (8.8%) had most frequency from all accidents. There was a significant difference between gender and place of accident with type of accident ( $P < 0.001$ ).

#### Conclusion

Car accident, trauma and fall were most common types of accident among under one year children. Accident among children can be controlled by improvement in planning and design results in safer homes, leisure areas and motor vehicles as well as increasing the awareness of parents for the risk of accidents in a variety of settings.

**Key Words:** Accident, Children, Epidemiology, Injury, Trauma.

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## 1- INTRODUCTION

The accidents are generally considered as the occurrence of emerging and sudden phenomenon (1). Epidemiologic studies have shown that the accidents are the main problems which associated with the health of human societies (2). In most countries of the world, injuries and accidents are the main causes of death and disability. The trauma caused by accidents would be have the second cause of disability in developing countries and will be the third leading cause of death and handicap throughout the world in 2020, about 12% of burden of diseases is related to trauma resulting from accidents (3).

Nowadays, accidents are considered as a pandemic problem not only on the road, but also in the home, school, and sports fields and recreation centers, workshops, etc. Therefore accidents include dangers such as, organ defects, disability, and mortality especially for kids and adolescent that could menace health for everyone without any serious and applied planning (4). Studies reveal that injuries and accidents are the first cause of death in the first 5 years of children life in the world. More than 95 percent of injuries in children occur in developing countries with low and medium income level (5). Investigations show that children and adolescents are the most vulnerable groups against the risks of accidents. Due to physiological limitations, the process of growth and behavioral characteristics (experience, need to test, exploration, adventure and risky behaviors) provide the accident conditions for this group, which along with other environmental factors such as low level of environment safety as well as supervision and care of children by parents led to more serious and more dangerous forms (6). Each year millions of children lose their life due to preventable accidents. Burnings, poisoning, falls and trauma (accidents) are four main causes of child mortality. Accidents are the 50%

cause of all deaths among children, and one of each six kids admitted to a children's hospital emergency department are related to accidents (7). After the control of malnutrition and diarrheal diseases, respiratory infections and the progress of vaccination, control and eradication of many other infectious diseases, it is seemed to similar to many developed countries accidents in Iran, be the main cause of death, even at the age under one year (8). In many countries of the world, accidents are considered as the main factor of death in children. In the United States, accidents are the main cause of death in ages 1 to 18 years and it is estimated that each year more than 50 billion dollars waste because of this cause (9). In India, in children less than 18 years, 10 to 15% of the death, and 20 to 30 % of hospitalized patients created by injury from accidents. In Japan, also the accidents are the first cause of mortality of children from 1960 to present. Children are vulnerable due to the limitation of the risk recognition (10). Therefore, accidents are one of the main health problems that always threaten the health of children (11).

Regarding to the importance of the subject and the lack of adequate studies in this area, the present study was conducted to investigate the extent and distribution of accidents in the infants under one year in Hamadan Province, Iran.

## 2- MATERIALS AND METHODS

The present study is a cross-sectional study (descriptive – analytic). In this study used the recorded data of injuries and accidents related to children under one year old (young children between the ages of 1 month and 12 months) in a seven years periods from March 2009 to March 2016 in Hamadan Province, Iran (**Figure.1**). In this study, all injuries and accidents including all victims referred to treatment services centers of any private or governmental hospitals in the province, or

were moved by 115 to emergency hospital and therapeutic actions were studied. In this study according national injuries and accidents recorded program, we used the information of the report of the 115 emergency care form and the patient's medicine history that has been completed by the nurse and the physician in order to extract the required information.

This information is usually will be extracted by medical document expert from the patient record and will enter to the national injuries and accidents country software. These- information are fulfilled by hospitals and transported periodically (the end of each season) to deputy of health and collected relevant information from all counties for each year. In Hamadan province, these information obtained from 26 hospitals from 9 counties. Regarding the quality assurance of the data, it should be noted that experts were trained about this program as well as manual injury registration is available.

The corresponding check list containing some variables such as full name, age, gender, region, type and place of accident, month and year of accident, outcome of accident. Nowadays registries of injured patients referred to the hospitals are being registered in all of provinces. The validity of these tools is approved according to the planning by the owners of the process and conformity with the content of national program.

Collected data were taken from deputy of health, and were analyzed using the descriptive statistics including charts and tables of frequency, as well as the analytical statistics including the Chi-square test to determine the relationship between gender, type and place of accident variables. Statistical significant level was considered less than 0.05 in the all steps of study. The data were analyzed using Stata software version-12.

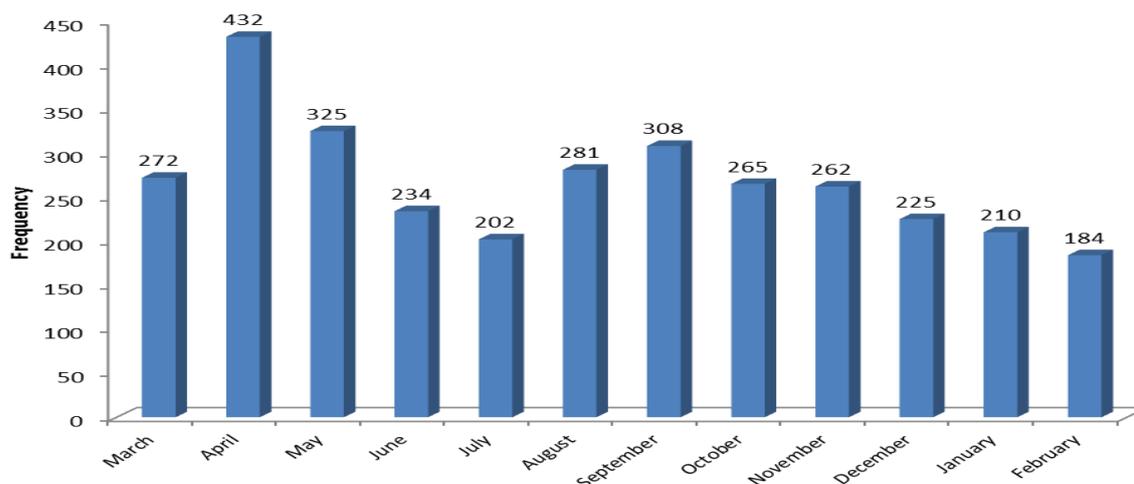
### 3- RESULTS

The total number of recorded accidents in children under one year was 3,200 patients in the province's hospitals in 2009-2015. Result showed that 2,369(74%) of injured patients were boys. The greatest occurrence of accident is observed in April with 432 (13.2%) and the lowest in February with 184 (5.8%). In general, the highest occurrence of accidents was in the spring (32.15% of cases) and lowest in winter (19.3% of cases) (**Figure.1**).

As shown in the **Table.1**, 1,890 (59.1%) of accidents occurred in the urban area and only 429(13.4%) of them were in rural area. The greatest places were in the roads and highways 1,423 (44.4%), also, 23% of the cases were domestic accidents. Frequencies of victims according type of accident based on gender and place of the accident were shown in **Table.2**.

In total, car accidents 1,709 (53.4%), trauma 403 (12.6%) and fall from altitude 281 (8.8%) had most frequency. There was a significant difference between gender and type of accident ( $P<0.001$ ), so that the car accidents, motorcycle accidents and hit by a hard object were the most common accidents among boys, while in girls car accidents; trauma and fall were most frequent. In urban areas, car accidents, trauma and fall were most frequent, and in rural areas trauma, fall and motorcycle accidents had the most frequent ( $P<0.001$ ).

Results showed that some notable events were high percentage of motorcycle accidents in boys versus girls, high number of car accidents in urban areas and snake and scorpion bites, animal bites and burnings in rural areas compared to urban areas. As shown in **Figure.2**, from total of injured cases in 33 (0.01%) cases lead to death, that 18 (54.5%) of them were related to car accidents.



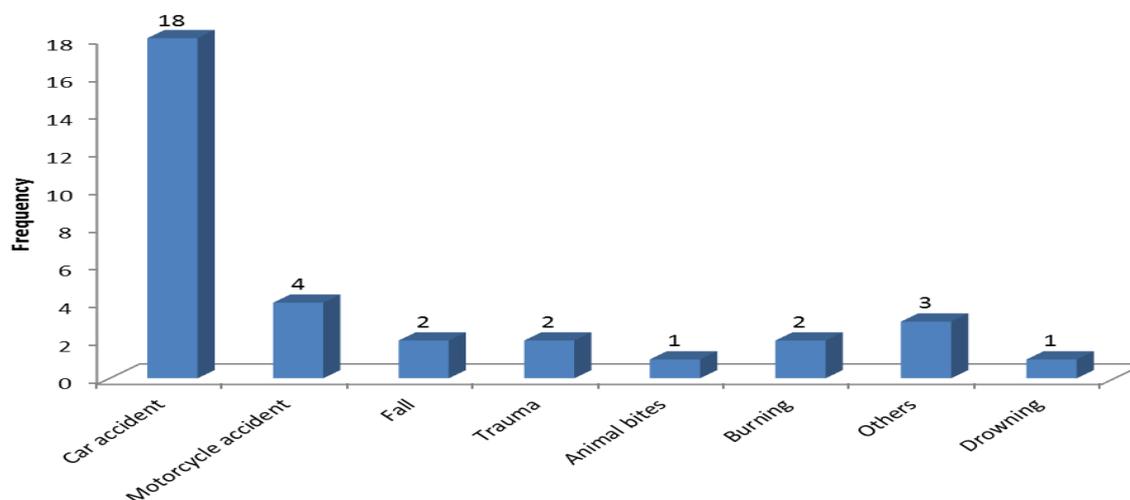
**Fig.1:** The frequency occurrence of accidents and injuries in children under one year in terms of month in Hamadan province (2009-2015)

**Table-1:** The frequency distribution of injured children under one year old referred to emergency wards of the province in terms of season and place of accident

Variables		Frequency	Percent
Location of accident	Urban	1890	59.1
	Rural	429	13.4
	Out of rural and urban	881	27.5
	Road and highway	1423	44.4
	House	735	23
	Public places	112	3.7
Place of accident	Sport fields	36	11
	Alley and street	529	16.5
	Workplace of parent	188	5.9
	Unknown	77	2.4
	Others	100	3.2

**Table 2:** The frequency distribution of injured children admitted to hospital emergency wards in terms of the type of accident based on gender and place of the accident

Variables	Place of accident, N (%)			Gender, N (%)		Total
	Out of rural and urban	Rural area	Urban area	Female	Male	
Electric shock	2(0.2)	3(0.7)	20(1.1)	4(0.5)	21(0.9)	25(0.8)
Snake/scorpion bites	1(0.1)	9(2.2)	10(0.5)	2(0.2)	18(0.8)	20(0.6)
Animal bites	0(0)	4 (1)	10 (0.5)	2(0.2)	12(0.5)	14(0.4)
Burning	4(0.4)	25 (6)	42 (2.2)	32(3.9)	39(1.6)	71(2.2)
Fall	8 (0.9)	71 (17)	201 (10.7)	84(10.1)	196(8.3)	281(8.8)
Trauma	36 (4)	106(25.4)	261 (13.8)	128(15.4)	275(11.6)	403(12.6)
Motorcycle accident	38 (4.3)	50 (12)	201 (10.7)	26(3.1)	263(11.1)	289(9)
Car accident	752 (85.5)	81 (14.6)	882 (46.8)	441(53.1)	1265(53.48)	1709(53.4)
Others	40(4.5)	88 (21.1)	259 (13.7)	111(13.4)	276(11.7)	387(12.1)
P-value	<0.001			<0.001		-



**Fig.2:** The frequency cause of death in injured children in Hamadan province, Iran (2009-2015)

#### 4- DISCUSSION

The Children's health promotion is one of the most important indicators of the health programs in a given community and it is recommended that prevention of adverse outcomes in children requires to the observance of safety tips. Damages during childhood and adolescence are considered as the controversial issue in developing countries (12). Children are not able to understand the potential risks around them and they are more vulnerable for many risks. Accidental injuries are unexpected phenomenon in children under one year because they are unable and protected by close observation. But in practice, we encounter with contradictory results. In the United States in 2000, the highest rate of death of accidents was observed children under one year (13). The results of our study showed that the total number of accidents in children under one year was 3,200 cases during the studied period. In Scotland, the cause of 55% of all referral cases and 38% of all admitted in emergency department were injuries in children under one year

(14). The results of our study showed that the prevalence of accidents was 74% in males and 26% in females. These results could be due to a sense of curiosity, stimulation, further activities and difference of behavioral patterns of boys compared to girls. Our study showed that there was significant difference of type of accident between gender. The most cause of injuries in males were car accident, trauma and motorcycle accident respectively while in females, car accident, trauma and fall were most cause of injuries respectively. Also in urban areas, car accident, trauma and fall and rural areas, trauma, fall and motorcycle accident were the most form of injuries. Most of injuries have been occurred at home and school was fall, bone fracture, head trauma, cutting, burns and car accidents (12).

The previous published study in Canada found that in infants under one year most cause of injuries were fall (61%) aspiration of solid materials (6.6%) and Burns (5.8%) respectively (15). In a study by Sasan and colleagues in Mashhad- Iran, the most common incidents were fall, aspiration of

foreign materials, cutting and burns respectively (16). Totally sixth lethal injury was fall but in our study, the third cause of injury was fall (8.8%), after car accidents (53.4%) and trauma (12.6%). In the studies were conducted by Sasan, Poorahmadi, and Warrington and their colleagues, the percentage of accidents were related to fall from altitude were 13.2%, 4% and 22% respectively (16-18). The investigation of died and hospitalized cases related to injury in children under 4 years in California showed that fall is the main cause of incidents in all ages and its rate is two times greater than second cause of incidents, poisoning (19).

The results of our study showed that 53.4% of the occurred injuries in children were related to driving accidents, while the results of ALSPAC and Maddox studies show that driving accidents in children under one year are not prevalent (20). In the study by Nikoei moghaddam and colleagues, the prevalence of driving incidents was 10.8% in children under one year in Kerman (7). The present study showed that 33 cases of injury lead to death that out of them, 18 cases (54.4%) were related to car accidents. In the study by Brock and colleagues, this proportion was 4% and in the study by Namakin and colleagues was 8.3%. The results of our study showed that 59.1% of the accidents occurred in the urban areas and only 13.4% were in the rural areas that this finding was similar to the study by Bayat and colleagues (17). This difference may be due to more use of the equipment and facilities in urban areas compared to rural areas, also in urban areas, people tend to more refer to the emergency departments due to accidents, and therefore accidents more register in the urban areas in compared to rural areas. The most of the place of

incident was in the road and highway with 44.4% of cases, which may be due to a lack of parental awareness in the field of how to properly take care, when driving on the roads and highways and the lack of necessary actions in these places. Also 23% of incidents were related to domestic events. In this study, the highest occurrence of incidents was related to the spring season (32.15%) and the lowest was related to the winter season (19.3%). As the children's activities are in the outside of home, especially in the spring due to appropriate conditions of air, children are in the free and exciting spaces and then the probability of incidents increase in children, while in the cold winter season, parent can keep them under observation, because the range of children's activities become closer.

#### **4-1. Limitations of the study**

The main limitation of present study was underreporting of accidents. Some injuries cases that treated in home or health centers as well as the injuries led to death at the place of accident would not be reported carefully

#### **5. CONCLUSION**

In all societies, children are the most vulnerable individuals against incidents. The children's health promotion is one of the most important indicators of the health level in a community and prevention of incident in children requires the observance of safety tips. Children are not able to understand the risks around them and are more vulnerable against many risks. The results of this study showed that the highest level of incidents is related to traffic and domestic incidents in children under one year in this province, especially in boys and urban dwellers. These findings indicate that these groups of

children are in the risk of incident. In order to decrease the prevalence of mentioned incidents, parent must be taught in the field of the prevention of traffic and domestic incidents. Therefore, education of families for the risk of accidents in a variety of settings and related preventive actions is the most important and the best method of prevention and after that safety of children's equipment and surroundings should be considered.

## 6- CONFLICT OF INTEREST

The study had no conflict of interest for authors.

## 7- ACKNOWLEDGMENTS

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