The Reasons of Death among Children and Adolescents in Lorestan Province, West of Iran, from 2007 to 2014

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ABSTRACT

Background: The UNESCO, in the case of children's rights, has stressed that a child has a right to live in the best possible condition of health and hygiene as well as a safe and un-risky environment. Evaluation of the reasons for the death and mortality of children and adolescents can prevent similar deaths. The aim of this study was to evaluate the reasons of mortality among children and adolescents in Lorestan province.

Methods: This cross-sectional study was conducted on children and adolescents (younger than 18 years old) in Lorestan province, west of Iran, in the period of 2007-2014 in Lorestan Legal Medicine Research Center. The demographic data of dead individuals, including age, sex and cause of death, were studied. The main reasons of death were classified in four main groups of trauma, asphyxia, poisoning, and miscellaneous causes (including physiological disease, infant insufficiency, cancer, and unknown cause). The data was analysed by the SPSS software (version 17). P value <0.05 was considered statistically significant.

Results: In the period of 2007 to 2014, 1115 children died in Lorestan province, consisting of 634 (56.8%) boys and 481 (44.2%) girls. The highest mortality rate was observed in 15 to 18 year age group (n= 395, 35.4%). The most prevalent reasons of death were different types of trauma (65.3%), asphyxia (18%), miscellaneous causes (10.8%) and poisoning (5.8%).

Conclusion: The outbreak of death and mortality in children and adolescents following trauma and accidents in our country seems significant in relation to the developing countries and few of the neighbouring countries. Considering the ability to carry out the preventative measures in this field, instantaneous policy making is needed in order to eliminate the present defects in the security provision to this group of society.

►*Implication for health policy/practice/research/medical education: The Reasons of Death among Children and Adolescents*

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1. Introduction:

The World Health Organization and the convention of the rights of the child generally consider up to 18 years of age as a child (1, 2). Many investigations have been carried out in the case of criminal issues, the abuses to children, and their related rights and needs, since this group of society can be a determining factor for the comprehensive health of the society. On the other hand, death and mortality are not among the essential indexes of health in a society. The UNESCO, in the case of children's rights, has stressed that a child has a right to live in the best possible condition of health and hygiene as well as a safe and un-risky environment (3).

It has been demonstrated through the studies carried out on the reason of death and mortality in children that trauma is one of the essential factors for the death and the permanent immobility of children, and it seems that its considerable portion can be prevented (4, 5). Based on the statistics of the developed countries, the nonessential injuries lead to the death and simultaneously form, the major reason of death and mortality in children. Nevertheless, more that 90% of these injuries can be prevented and are controllable (6). Traditionally, infectious diseases in children were the essential factor of death and mortality in the non-industrial countries where with the efforts of the sectional and global hygienic organizations gradually the infectious diseases were controlled. Presently, the accidents are regarded as the main reason of death and mortality in the children in the developing countries (7). In the years 1950 to 1971, the accidents and injuries in the industrial countries were the factor for 40 to 50% of children death and mortality, though during the same period, these factors led to less than 10% death in the developing countries (8).

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From 1971 to 1981 in Europe, North America, Australia and Oceania, the death and mortality due to disasters and accidents in children is gaining a reducing trend (9). More precisely, in other researches, it was determined that the death and mortality due to disasters and accidents in children settled in the eastern European during the years 1970 to 1988 reduced more than 50% (10). Comparing the increase of death and mortality in the Western Europe, Asia and Latin America, especially in the developing countries it has become intense (11). It seems that there exists a nil relationship between the death and mortality from the accidents in children aged 1 to 4 years and the economic condition of a country where they are living. However, the same issue in the groups aged 5 to 14 years has a significant inverse relationship with the economic status (12).

Traffic accidents and incidents have a prime position in the unnatural death and mortality in children. In countries including the neighbours of Iran, sequence and pattern of distribution for death and mortality is deferent, based on; continental conditions, and social-cultural status. In different years and decades changes have occurred in the outbreak reason for death and mortality of children (13). Therefore, investigating the death and mortality status in different locations and time periods seems necessary. The aim of this study was to evaluate the reasons of mortality among children and adolescents in Lorestan province, west of Iran.

2. Materials and Methods:

This descriptive cross-sectional study was conducted on children younger than 18 years, in Lorestan province, west of Iran, in period of 2007-2014 in Lorestan Legal Medicine Research Center. Demographic data of the passed-away individuals, including age, sex, and cause of death, were recorded from the patients' files. The samples were divided into four age groups as follows: little than 5, 5-10, 10-15, and 15-18 years old. Cause of death was confirmed by a medical forensic physician. When the main

cause of death was unknown, the cause was labeled as "unknown death".

The main reasons of death were classified in four main groups of trauma, asphyxia, poisoning, and miscellaneous causes (including physiological disease, infant insufficiency, cancer, and unknown cause). There were cases of fall, electricity shock, thunderstruck, burn, snake bite, earthquake, and shooting injuries in the trauma group. In the asphyxia group, there were cases of drowning, hanging, and milk aspiration, and in the poisoning group, cases of drug poisoning and gas poisoning were observed.

The data was analysed using Chi-square Test and the SPSS software (version 17). P value <0.05 was considered statistically significant level.

3. Results:

In the period of 2007 to 2014, 1115 children died in Lorestan province, consisting of 634 (56.8%) boys and 481 (44.2 %) girls. The highest mortality rate was observed in the 15 to 18 year age group (n= 395, 35.4 %), followed by those aged under 5 years (n= 346, 31 %), aged 10 to 15 years (n= 190, 17 %), and age group of 5 to 10 years (n= 184, 16.5 %) respectively.

The most common cause of death in four main groups were trauma in 729 patients (65.3%), asphyxia in 201 cases (18%), miscellaneous causes in 120 cases (10.8%) and poisoning in 65 cases (5.8 %). In the trauma group, traffic accidents with 580 cases (52%) comprised the highest frequency, and snakebite with 1 case (0.1%) was a rare cause of death. The most common cause of asphyxia was hanging (n=97, 8.7%) and drowning (n=59, 5.3%). Most of the miscellaneous deaths were related to the deaths due to physiological diseases (n=45.4%). Only the death of 35 children (3.1%) was due to unknown origins. In the poisoning group, 33 cases (3%) had occurred due to drug abuse.

There were significant differences between the causes of death among the age groups (p<0.05). The following were mainly found in the 15 to 18 years age group: accidents (n=17, 1.5%), hanging (n=76, 6.8%), poisoning (n=17, 1.5%), and drowning (n=19, 1.7%).

Bullet dying was mostly observed in the age group of 15 to 18 years (n=22, 2%). Cancer was the cause of death only in 2 cases (0.2%) in the age group of 15 to 18 years. There was no significant difference between the sexes regarding the cause of death (p=0.1). Death due to physiological disease was seen mainly in the age group of under 5 years (n=25, 2.2%). The frequency distribution of causes of death in all the age groups is listed in table 1.

4. Discussion:

In the period of 2007 to 2014, 1115 children died in the Lorestan province, consisting of 634 (56.8%) boys and 481 (44.2%) girls. The highest mortality rate was observed in the 15 to 18 year age group (n=395, 35.4 %). The most prevalent reasons of death were different types of trauma (65.3%), asphyxia (18%), miscellaneous causes (10.8%), and poisoning (5.8%).

Penden *et al*, evaluated that the death and mortality due to injuries and accidents is twice higher in boys than girls (14). Similarly, in the United Arab Emirates, Bener reported higher death and mortality in boys rather than girls (15).

In the studies carried out in Iran, the share of boys was 59.7%, and in another case, 62% was reported (16, 17). Also, in Pakistan and Turkey, the relationship of mortality boys due to unnatural factors and accidents was reported higher as compared to girls (18, 19). In this study, trauma with 65.3% was the significant reason of death and mortality in children and adolescents.

In Pakistan, 1320 children below 15 years were evaluated during 1993 to 1996, where, among the cases leading to death, 67% was due to the accidents with motor vehicles and 18% aroused from the drowning. In the study, toxification was not the significant reason for the death and mortality (18). In United Arab Emirates, from 1995 to 1980, the cases of death and mortality arising from the disaster and accidents in the children aged 0 to 14 were investigated, and in the boys and girls groups the head and neck injuries sequentially by 59% and 53.8%

Table 1: Frequency distribution of causes of death in the age groups

Cause of death	Age group	<5	5-10	10-15	15-18
Trauma	Accidents	186	124	116	174
	Fall	10	2	2	7
	Electric shock	7	4	1	8
	Burn	4	1	0	4
	Snake bite	0	0	0	1
	Bullet shoot	5	8	8	22
	Thunderstruck	0	0	0	4
	Earthquake	8	9	5	2
Asphyxia	Hanging	0	4	16	76
	Drowning	36	8	16	19
	Gas chocking	7	4	5	5
	Strangulation	1	0	1	2
	Milk aspiration	3	0	0	0
Poisoning	Poisoning	8	1	6	17
	Drug abuse	2	2	5	24
Miscellaneous	Heart arrest	0	0	0	6
	Physiological disease	25	10	4	6
	Respiratory infections	6	1	1	1
	Preterm infant	17	0	0	0
	Seizure	4	1	1	0
	Cancer	0	0	0	2
	Unknown	16	4	5	10

formed the most widespread reason of death, the majority of which were related to the road accidents. Drowning with 16.5% in girls and 15.2% in boys, and burns with 12.1% in girls and 6.2% in boys were placed in the following degrees (20).

In Berner's study on the same age group in the years 1995 up to 2004, the disasters and accidents formed 29.8% of the reasons of death in children, which similar to the earlier study is the most important factor in traffic accidents and varied injuries followed by drowning and burns (15).

Soori *et al*, found that the three main reasons for the death and mortality due to unintentional injuries in children living in the rural areas of Iran are sequentially traffic accidents (27.5%), drowning (17.9%) and burns (12.1%) (16). In Rudsari *et al*, study on the reasons of unintentional injuries

leading to death in children aged under 15 during the years 1999 to 2000 in Tehran referred to the legal medicine, 50% of the deaths were due to motor accidents, 18% from burns, 6% from the crash and 6% due to the toxification (17).

Canturk in Turkey evaluated 1 month to 18 year old children referred to the Istanbul legal medicine in order to determine the reason of death during the years 2000 to 2002. In this study, asphyxia was found as one of the most important factors for the children's death and mortality (19).

In Canturk's study, lack of information about the death scene especially in the drowning factors was mentioned as the main reason for the high level of unrecognized factors. Likewise, the deaths arising from the infant sudden death syndrome due to the lack of decisive proofs in autopsies and lack of suitable history for the determination of the death reason can lead to an increase in the statistics of unrecognized factors in child's autopsy (21).

A significant difference existed in the age distribution of the death reasons in the age groups. The deaths due to trauma and toxification is demonstrated up to a significant level in the age group over 15 years, although the death and mortality due to non-traumatic factors includes the birth defects, respiratory disorders, and infections, and the undiagnosed factors are more found in the age groups.

Among the intentional traumas, 100% of the cases, death were due to a bullet in the groups aged above 15 years. The death and mortality due to the trauma was more observed in the boys in comparison to the girls. Even, in Turkey the significant difference between the death reason in the groups over and below 11 years was reported in a manner that non-traumatic reason and toxification in the age groups below 11 years was more widespread and the death and mortality due to bullet and knife-attacking had occurred more in the age groups above 11 years (19). In the United Arab Emirates, the boys in the age groups over 10 were more subjected to injuries and road accidents in comparison to the girls of the same age. The downfall from a height and the impermeable injuries and burns are considered as the highest reason of death and mortality in children less than 5 years (20). In Pakistan, the highest injuries incurred to girls were below 10 years. However, in boys, 50% of the injury cases occurred before 10 years and around 80% of the total trauma happens in the boys. In this group, the death and mortality due to motor accidents and drowning were widespread in the age groups over 11 years (18).

5. Conclusion:

The trauma and accidents are the most widespread reasons of the death and mortality in the children and adolescents, among the cases referred to the legal medicine. The outbreak of death and mortality in children and adolescents following trauma and accidents in our country seems significant in relation to the developing countries and few of the neighbouring countries. Considering the ability to carry out the preventative measures in this field, instantaneous policy making is needed in order to eliminate the present defects in the security provision to this group of society.

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