Original Article

One Decade of Unnatural Deaths in Yazd Province: 2003-2013

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Abstract

Introduction: Death is defined as the permanent loss of all signs of life at any time after birth (Irrevocable disappearance of all vital signs after birth). Unnatural deaths seem to be either suspicious or unexpected. Deaths that occur suddenly and their causes need to be investigated, are termed unnatural deaths. According to the death certificate contents of Ministry of Health and Forensics, if the cause of death is unnatural, the corpse will be submitted to the forensic medicine departments in 19 cases in order to determine the death cause and to issue the burial permit.

Material & Methods: In this descriptive study, the data were extracted from unnatural death cases in the province of Yazd during 2003 to 2013 recorded by Yazd Forensic Medicine.

Results: During 2003 -2013, 5552 cases of unnatural deaths were recorded by the Forensic Medicine of Yazd, out of which 4373 cases of unnatural deaths were caused by road traffic accidents (outside and inside the city), 89 deaths from electrocution, 439 deaths from poisoning, 72 deaths from drowning, 129 deaths from asphyxia (by carbon monoxide), 56 deaths from work incidents, and 394 deaths from burns. The group of males aged 20-29 years allocated the highest number of unnatural deaths to themselves.

Conclusion: Road traffic accidents are the second leading cause of unnatural deaths in Iran. The number of unnatural death incidents in men is more than women indicating that men are more exposed to risk factors than women, though regarding the deaths due to the burns, women are exposed to the high risk factors.

Keywords: Epidemiology; Forensic medicine; Unnatural death

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Introduction

The unnatural deaths trend in Tehran in 1992 according to 5028 corps that had been delivered to the forensic medicine just in the first six months of the year was as the following: suicide (2.1%), criminal death (2.7%), natural death (22.3%), job incidents (0.1%), drug abuse (1.3%), sudden death (42%), war (25.1%) , the rest: 4.3% [4].

Forensic Medicine Organization in Yazd in accordance with its national guidelines and organizational missions tries to diagnose the causes of death and to identify the corps. The unnatural deaths in Yazd Province were extracted from the delivered cases for the first time during 2003 to 2013 and their trend in those years was investigated. In fact, the present study intended to describe the characteristics of such deaths over those years.

Materials and Methods

In this descriptive study, the data were extracted from unnatural death cases in Yazd within 2003-2013 recorded by Yazd Forensic Medicine. As a matter of fact, the data were extracted from the cases using a checklist. Among 19 cases referred to the forensics, only 7 unnatural deaths were investigated. Only one death was reported resulting from exercising during the studied years which was not valid to be studied by the researchers. Some unnatural deaths that had not occurred in Yazd Province were not involved in the study. The checklist intended to collect demographic variables (such as age, gender, address, occupation, identity, education, and marital status, date of death, type and cause of death).

Death definition and recognition are different from the perspectives of different cultures and religions and death time diagnosis is raised as an important moral challenge [1]. Death is defined as the permanent loss of all signs of life at any time after birth (irrevocable disappearance of all vital signs after birth) [2].

Deaths are normally divided into two groups. First: natural deaths (non-suspicious), which comprises natural and unexpected deaths whose causes are known without any doubt or suspicion. Second: unnatural(suspicious) deaths that occur unexpectedly, which their cause and quality often need to be clarified [3].

According to the death certificate contents of Ministry of Health and Forensics, if the cause of death is unnatural, the corpse will be submitted to the forensic medicine departments in 19 cases in order to determine the death cause and issue the burial permit.

The most important unnatural deaths are caused by accidents, suffocation with carbon monoxide, murder, suicide, quarrel, firearms and cold weapons, work-related incidents, flood, earthquake, poisoning, drowning, electrocution, drug abuse, maternal death, death during exercising, burns, etc. According to the State Civil Registration, 367,539 people died in 2012 [4], and according to the State Forensic Medicine report in the same year, only about 19089 people died due to traffic accidents, 2026 people died because of burns and 697 people lost their lives due to carbon monoxide poisoning [5].

In case of unnatural deaths all doctors are required to deliver the corpse to the forensics.

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Medicine of Yazd, out of which 4373 cases were caused by road traffic accidents (outside and inside the city), 89 deaths by electrocution, 439 deaths by poisoning, 72 deaths by drowning, 129 deaths by asphyxia (by carbon monoxide), 56 deaths by work incidents, and 394 deaths by burns. Table (1) displays the frequency of the studied unnatural deaths during 2003 to 2013. The highest rates of unnatural deaths were allocated to accidents, poisonings, burns, suffocations, electrocutions, and drowning, respectively.

The decreasing trend in deaths over the years was investigated as the crude death rate per one hundred thousand people. The total population of Yazd province and its districts were provided by the Civil Status Registry and the death trends were evaluated according to the population. The study data were analyzed using SPSS software, version 22.0.0.0, IBM Company.

Results

Since 2003 to 2013, 5552 cases of unnatural deaths were recorded by the Forensic

Table 1: The frequency of unnatural death by year

	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	Total
Traffic accident	429	368	428	509	443	429	400	410	368	319	270	4373
Electrocution	5	5	12	9	8	9	10	8	14	4	5	89
Burns	50	32	39	25	25	34	46	33	55	25	30	394
Poisoning	14	25	52	47	49	44	49	46	47	35	31	439
Drowning	7	3	13	2	2	7	6	4	9	8	11	72
Asphyxia	3	14	7	22	14	11	13	11	15	6	13	129
Work Accident	2	8	5	1	0	0	3	1	7	14	15	56
Total	510	455	556	615	541	534	527	513	515	411	375	5552

The highest rate of deaths was reported to be associated with the traffic accidents.

Table 2: Results of age analysis by the type of unnatural deaths

	Traffic accident	Electrocution	Burns	Poisoning	Drowning	Asphyxia	Work Accident
Age average	36	29.4	32.6	32	16	29	33

The highest rate of death was associated with the age group of 20-29 years old.

Table 3: Results of gender analysis by the type of unnatural deaths (%)

		Traffic accident	Electrocution	Burns	Poisoning	Drowning	Asphyxia	Work Accident	Total
Gender	Male	78.57	94.4	53.3	90.43	83.33	74.42	98.21	78.13
	Female	21.43	4.5	45.69	8.66	16.67	22.48	1.79	21.64
	Unknown	0	1.1	1.01	0.91	0	3.1	0	0.23
Total (%)		100	100	100	100	100	100	100	100

The death percentage was held to be higher within males than females.

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Table 4: Results of death place by the type of unnatural deaths (%)

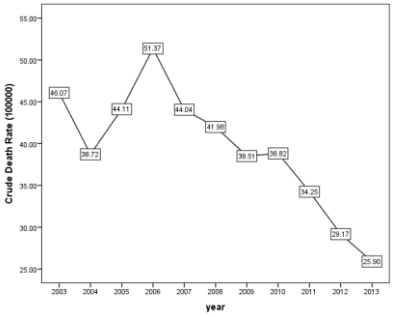
		Traffic accident	Electrocution	Burns	Poisoning	Drowning	Asphyxia	Work Accident	Total
Place of death in	Scene	53.51	0	2.03	2.51	18.06	9.30	0	42.94
	Transferring	6.43	0	0	0	0	0	0	5.06
	Hospital	39.01	43.82	79.7	36.9	45.83	31.01	50	41.83
	Home	0.89	21.35	6.09	43.51	8.33	51.16	1.79	6.23
	Work Place	0	28.09	0	0	0	0	44.64	0.9
	Other	0	5.62	0	15.03	27.78	0	3.57	1.87
	Unknown	0.16	1.12	12.18	2.05	0	8.53	0	1.17
Total (%)		100	100	100	100	100	100	100	100

Most of the deaths occurred at the scene.

Table 5: The rate of crude death in one hundred thousand inhabitants caused by unnatural deaths in Yazd Province during 2003 - 2013

	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Poisoning	1.503	2.630	5.359	4.744	4.871	4.306	4.718	4.355	4.374	3.2	2.974
Electrocution	0.43	0.526	1.237	0.908	0.795	0.881	0.963	0.757	1.303	0.366	0.48
Burns	5.369	3.367	4.019	2.523	2.485	3.327	4.429	3.125	5.119	2.286	2.878
Drowning	0.752	0.316	1.34	0.202	0.199	0.685	0.578	0.397	0.838	0.731	1.055
Asphyxia	0.322	1.473	0.721	2.22	1.392	1.076	1.252	1.042	1.396	0.549	1.247
Work Accident	0.215	0.842	0.515	0	0.099	0	0.289	0.095	0.652	1.28	1.439

Diagram 1: Crude death rate in one hundred thousand inhabitants caused by accidents in Yazd province during 2003 -2013



in electrocutions workers by 50.56%; in burns housewives by 40.1%, in poisonings freelance

The job status analysis demonstrated that in traffic accident deaths, freelance jobs by 31.47%,

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decade of 2000 leading to the death of 27759 people. According to Yazd Forensics statistics, 428 victims of the accidents in 2005 belonged to Yazd Province. The highest rate of accidents leading to death in Yazd Province occurred in 2006. According to a study conducted by Falahzade, 3.9% of the traffic accidents in Yazd Province in 2004 have resulted in death [8]. The highest rate of traffic accidents leading to death belonged (78.5%) to men. The ratio of male to female in the present study was 3.66 to 1. The ratio is 7.2 to 1 in India [9]. In total, the surveys during eleven years revealed head injury (68.28%), fractures (16.10%), and internal bleeding(9.6%) as the main causes of deaths due to accidents which are slightly higher than those of Khuzestan province during 2006-2010 (46.84%) [10]. unfortunately, more than half of the victims have lost their lives at the scene of accidents demonstrating the severity of accidents and injuries or arriving late to the health centers. With regard to the rate of crude death per one hundred thousand people, the rate is decreasing for the deaths caused by traffic accidents which have reduced from 51.37 per 100000 people in 2006 to 25.9 per 100000 people in 2013. In the US, the rate has been reported to be 26 per 100000[11].

Eighty nine electrocutions occurred during 2003 to 2013 mainly due to low voltage electricity (72.73%). Teenagers and young adults (10-39) have been electrocuted, as well. The highest rate of electrocution belonged to males (94.4%). In Turkey, the average age of electrocution was reported as 20 years [12]. Since March 1999 to September 2000, 129 deaths caused by electrocution have been registered in the State Forensic Medicine [13]. In 2013, the number was jobs by 47.15 %, in drowning children by 27.78%, in asphyxia workers by 28.68%, and in work-related incidents workers by 67%, have been allocated the highest rate of death.

The educational level analysis revealed that in all types of the studied deaths, 25.3% of the deaths belonged to people with elementary educational level, 22.75% to people with middle school level, and 20.88% to illiterate people. Moreover, the marital status analysis showed that in all types of the studied deaths, the highest rate of death was related to the singles (60.46%).

Death cause analysis showed that, head injury by 68.28%, in electrocutions low voltage electricity by 72.73%; in burns the second type of burn by 86.8%, in poisonings drug intoxication by 91.12%, in drowning death in the swimming pool by 75%, in asphyxia carbon monoxide by 73.44%, and in work-related incidents debris removal by 51.79%, allocated the highest rate of death to themselves.

Discussion

According to the findings of the present study, the highest rate of unnatural deaths belonged to the deaths caused by traffic accidents (78.7%) within 2003 -2013. The highest rate of death was related to the 20-29- year-olds (25.7%), though the rate of death in the elderly (9.6%) seemed to be extremely high indicating that this group is at risk. In Lancaster, US study, 85% of deaths in infants younger than one year old were caused by the traffic accidents [6]. The average age of these victims shows that the country loses its young workforce. According to Dr. Shojaee, the head of State Forensics in the scientific conference on traffic in 2011 in Kerman [7], the highest rate of traffic accidents occurred in 2005 in the first

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women [18]. In a study conducted in Ardebil, the average rate of death in men and women was respectively 1.86 and 0.88 persons per 100000 people in a year [19], while in the current study; the average was reported over 2 per 100000 people in Yazd Province. In a study carried out in 12 Mediterranean countries, the death due to burn was reported as 5-37 %[20].

According to the findings of Forensic Medicine on the deaths caused by poisoning in Iran in 2001, 900 poisonings in country led to death. The highest rate belonged to the age group of 21-30 years old and the most common cause of death was reported to be intravenous injection of drug [21]. In the present study, the highest rate of death due to poisoning belonged to men (more than 90%) and drug abuse (91.12%), whereas in Sudan, 50% of the deaths were resulted from drug abuse [22], and in China, 13.8% of the death were caused by drug poisoning [23]. During 11 years of study, 7% of the unnatural deaths in Yazd were resulted from poisonings.

Most of the deaths have occurred at home (43.51%), and in the current study, like the previous ones, the highest rate of deaths was related to the youth aged 20-29 years old. In addition, 2.73% of the poisonings were resulted from the consumption of agricultural pesticides and the rest of the poisonings were caused by the use of alcohol, food, pharmaceutical compounds and toxic gases.

Within this study, 72 cases of drowning have occurred in Yazd province, most of whom were 20-29 years old. The death caused by drowning in the group aged 1-4 years old was significantly higher compared to other age groups which can indicate the families' neglect of their children. Seventy-five percent of the deaths had occurred in 750 cases throughout the country, among which the share of Yazd Province was 5 cases [14]. No difference was observed in regard with the number of married and singles. The rate of crude death resulting from electrocution during the eleven-year study indicates the raging occurrence of death due to electrocution. The highest rate of crude death resulting from electrocution was reported 14 cases in Yazd province in 2011 (1.3 per 100000 people).

In terms of education, the highest rate belonged to the groups of illiterates, middle school, and elementary school, which was reported as 28.09%, 25.84%, and 23.6%, respectively. It seems like that most of the electrocutions have been reported to be due to household low voltage. In Canada, 68% of deaths in children younger than four years were due to electrocution, since they have plugged objects into the outlet [15]. Moreover, 28.09% of the deaths resulted from electrocution have occurred in the workplace, which are not considered as work-related incidents.

The rate of second-degree burns was 86.8%, first-degree burns 0.76%, and third-degree burns 12.44%. Every year, a number of our compatriots burn during "4 Shanbe Soori" Ceremony (firework in the last Wednesday of the year), or due to the gas leakage and explosion at homes, etc., some of whom lose their lives. Most of them are the youth aged 20-29 years old (33.8%). In the studies conducted in Tehran in 2005, the highest rate of burns (61%) belonged to 21-30-year-old males [16]. In a stud conducted in Nagpur in the central India, women constitute 2.74% of burns [17]. Investigating the burns resulted in death in southwest of Iran indicated that the highest rate of burns resulting in death belonged to the young

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economic risk factors in industrial and developing societies [28]. According to the surveys, the total number of reported incidents of death among the workers of Tehran municipality in 2004, was 9 and in 2005 was 6 persons which led to the loss of 67500 working days in 2004 and 45000 working days in 2005 [29]. Given that the total number of workers in these years was about 21,000, it means 43 deaths per one hundred thousand workers in 2004 and 26 deaths per one hundred thousand workers in 2005. This amount was calculated for the total population of Yazd province (1.43 per one hundred thousand populations in 2013), but failure to follow the principles of excavation or unprincipled destruction have led to the highest rate of deaths caused by work accidents (51.79%). The majority of people who died were workers (66.07%) and males (98.21%). Nearly half of the victims died at the scene of accident, who represented a low education level.

Conclusion

Accidents are considered as one of the social issues in our country as well as around the world. The young age group and the most important workforce have unfortunately lost their lives in their youth. Unnatural deaths have occurred in men more than women which can indicate that men are more exposed to risk factors, though regarding the deaths caused by burns, women are highly at risk. Children, due to unfamiliarity with swimming principles or families' carelessness, have been more likely to drown in the pools. Unfortunately, most of the deaths have occurred at the scene which can indicate the severity of injury. In the review of unnatural deaths in Yazd Province, the deaths caused by traffic accidents have the most descending trend, whereas the the agricultural and swimming pools. A 5-year study in Khuzestan indicated that these age groups were at risk. The rate of crude death caused by drowning in Tehran was expressed as 0.7 per 100000 people [24], though in the current study the rate in 2013 was 1 per 100000 people. Given that most often the death from drowning occurs at the scene, it seems that the half-dead or dead bodies of the victims are carried to the hospitals and thus more than 45% of the deaths resulting from drowning occur in the hospitals.

The results of the different studies showed that 11.4% of 237 deaths caused by poisoning that had been referred to Mazandaran Forensic Medicine, were related to asphyxia with carbon monoxide, which correspond with the results of the present study. Indeed, suffocation with carbon monoxide as the silent murderer (73.44%) is still taking the lives of people from different social classes [25]. It seems that failure to follow safety rules and principles at home during the winter as well as the use of gas heaters are regarded as the main reasons of the increased rate of death in country. Furthermore, 19.38% of the deaths were due to the airway obstruction (choking with objects). According to the statistics related to other parts of Iran, carbon monoxide in Tabriz is stated as the main cause of asphyxia. In Australia, 76% of asphyxia caused by carbon monoxide occurred among the drivers [26].

In a study conducted in 23 provinces of Iran in 2003, 156 deaths occurred [27], 3 of which were reported in Yazd Province. The highest rate of death resulted from suffocation was related to the workers (28.68%).

Work accidents are the third leading cause of deaths in the world, which are introduced as one of the most important health, social, and

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deaths resulted from work accidents have an increasing trend.

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