



Epidemiology of traumas resulting in injury and death in Mazandaran hospitals in 2014

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ABSTRACT

Traumas are one of problems of medical community and they can lead to irreversible injuries and incur heavy costs on the society. The present study aims to identify epidemiologic aspects of traumas in 2014. this is an analytic-descriptive study and has been conducted on those who referred to emergencies of Mazandaran hospitals in the first six months of the year 2014. Information was gathered from convenient files as checklists of disease management center, interviews and observation. Data was analyzed in SPSS 17 via inferential and descriptive statistics (Chi square tests). results indicated that there was a significant relationship between traumas leading to injury or death of those who referred to the hospitals under study and the type of trauma ($P < 0.001$), age of emergency personnel ($P < 0.001$), education of emergency personnel ($P < 0.001$), work experience of emergency personnel ($P < 0.001$), presence of specialist in emergency ($P < 0.001$), place of trauma ($P = 0.005$), mortality resulting from traumas ($P = 0.005$) and the way of transferring to hospital ($P < 0.001$). Concerning results of the research, men and youths were subject to traumas resulting in injury or death compared to women and other age groups. The amount of injuries and deaths resulted from accidents can be reduced by increasing information, training principles of safety and using safety devices.

Keywords: epidemiologic, traumas, injury, death.

INTRODUCTION

Traumas are one of the most important health problems in the society and they are considered as the third cause of death after cardiovascular diseases and cancer [1].

Traumas are generally sudden and new events [2, 3] and today trauma is one of main threatening problems of health. Trauma means the injury or the shock experienced by body due to sudden physical injuries that occur violently or accidentally [4]. The causes of trauma are divided into intentional [self mutilation, suicide, murder, quarrel] and unintentional [vehicle accidents, occupational events, drowning] groups [5]. The risk of traumas is very high such that many people face a considerable trauma in their life [6]. Every year, more than 5 million people die from injuries resulted from trauma and million tens of people refer to medical emergency centers due to traumas such as accidents, drowning, falling, burn, poisoning, suicide, and murder. The outcomes resulted from such traumas are losing health or life, costs of rehabilitation and treatment cares, losing income and power of production, spiritual-psychological effects [8]. In addition to traumas resulted in injury, the increasing road accidents [9] is one of the most important health problems that threat human health [2]. The increasing trend of traffic accidents is one of severe problems in general health and the ninth cause of death throughout the world [10] and one of the most important death causes is inability and vehicle damages in the world [11]. According to predictions of WHO up to 2020, traumas resulted from accidents will be the second cause in the world for years that have wasted due to accidents [12]. It is predicted that in 2020, mortality and inability resulted from road injuries are in the third place for common causes of diseases and traumas in the world [13]. Annually, about two million people die from road accidents and 50 million people injury throughout the world [2]. Identification of important causes of accidents and

determination of their intensity are among the most important measures that should be taken in the process of reduction of traumas resulted from road accidents [14]. The increasing avoidable deaths of road accidents may be due to high speed, hurrying for reaching the destination, lack of consideration of driving laws, sleepy driver, and fatigue [15]. Several factors are effective on intensity of injuries such as road width, time of accident, gender of the driver, type of vehicle, type of road, amount of speed and number of vehicles involved in the accident [16]. About 16000 people will die daily due to different types of injuries in the world. Trauma and injuries include 12 percent of total burden of diseases and are the third main cause of death in ages between 1 and 40 years [17]. Generally, the death resulted from road accidents in Iran is higher than that in the world and eastern Mediterranean and it is one of sever problems in our country and Iran is considered among countries that face the highest mortality due to road accidents. Concerning that middle and low ages die mostly due to driving accidents, negative effect of death is inevitable on life expectancy at birth and on economy and society [18]. Based on standard death from road accidents in the world, it has been increased from 19.4 in 1990 to 20.5% in 2010 [19]. The increasing death resulted from road accidents have been seen in Pakistan, Bangladesh, Nepal, and many other developing countries [20]. Results of studies in Iran indicate that among 100000 people, 30 individuals die due to road accidents while this amount has been estimated as 22.6 individuals throughout the world. Among 100 individuals injured in road accidents, 15 individuals will die while this amount is two persons in developed countries [21]. Risk of death resulted from accidents is not the same for men and women. Also, this risk is various in different ages. The risk difference between men and women can associate with their behavioral and physical differences and different encounter with road traffics. Age differences can relate to driving skill and different vulnerability of various ages. In most studies, 18-24 year old men face the risk of the death three times more than other individuals [22]. In the study conducted by Kolak, the most important cause of accident was carelessness and lack of proper safety [23]. The study conducted in the USA indicates that the application of safety belt and increase of fines have been increased as 9.1% due to applying rules and regulations related to safety belt and fines [24]. Also, application of safety hat has been increased from 2% in 2002 to 60% in 2004 and 95% in 2005 due to special laws implemented by the police and educations of the media [25]. Assistance in time of accident is an important factor that can reduce considerably deaths, injuries, and losses [8]. Since no systematic study has been conducted about epidemiology of traumas resulted in death in central cities of Mazandaran, this study aims to identify epidemiology of traumas in the first 6 months of the year 2014.

EXPERIMENTAL SECTION

This is an applied, analytic, and descriptive research and it was conducted on injured people who referred to hospitals of central cities of Mazandaran in the first six months of the year 2014. Statistical population of the research includes all those who referred to emergency of hospitals in Sari (Imam Khomeini), Ghaemshahr (Razi) and Babol (Shahid Beheshti). 294 subjects from Imam Hospital (Sari), 983 subjects from Razi hospital (Ghaemshahr) and 675 subjects from Shahid Beheshti hospital (Babol) were studied based on their files. Convenient sampling was used by applying files available in medical document archive. Inclusion criterion was the complete record of patients' specifications in the file. Information related to distribution of trauma was gathered by checklist of disease management centers in medical document archives of hospitals and information related to comparing hospitals was gathered by interview and observation via coworkers with M.S degree in management of treatment and health services. Questionnaire of trauma distribution includes 13 items and information related to age, gender, place, type of injury, type of accident (resulted from driving), condition of patient when discharging from hospital, whether he/she died or not, time of accident, the way of transfer and information related to emergency personnel such as age, education, work experience and presence of specialist in emergency were gathered from checklist of disease management center in medical document archives in mentioned hospitals and information related to comparing hospitals was gathered by interview and observation. Chi square tests and SPSS 17 were used to analyze data.

RESULTS AND DISCUSSION

Concerning results of the research conducted on 1952 injured people who referred to hospitals of Sari, Babol and Ghaemshahr in 2014, 74% of injured individuals were men and 42% of them were 23-37 year old individuals and curve of age distribution of injured individuals skewed severely to young people. 65.9% of accidents resulted in death in Sari hospitals and curve of traumas skewed severely to accidents in Sari city and they have been shown in table 1.

Table 1: determining the relationship between traumas resulted in injuries or death in those who referred to hospitals under study in 2014 and gender of injured persons

Variable	Yes		No		Total		Test result	
Gender	Woman	298	26	232	29	530	27	X ² =3
	Man	846	74	547	71	1393	73	Df= 1 P= 0.04

In order to determine the relationship between gender and incidence of injuries and traumas, Chi square test has been used and based on results seen in table 1, prevalence of traumas resulted in injuries was 74% and 26% in men and women respectively. Such percents have statistically significant difference ($P= 0.04$). In order to determine the relationship between age and incidence of injuries and traumas, Chi square test has been used and based on results seen in table 1, incidence of injuries was 42% and 28% in ages between 23-37 years and ages older than 37 years respectively. Such percents have statistically significant difference ($P= 0.03$).

Table 2: determining the relationship between traumas resulted in injury or death in those who referred to hospitals under study in 2014 and age of injured persons

Variable (injury)		Yes		No		Total		Test result
		Absolute frequency (number)	Relative frequency (percent)	Absolute frequency (number)	Relative frequency (percent)	Absolute frequency (number)	Relative frequency (percent)	
Age group	Younger than 22	344	30	238	30	582	30	$X^2=6$
	Between 23-37 years	482	42	295	37	777	40	$Df=2$
	Older than 37 years	315	28	259	33	574	30	$P=0.03$

in order to determine the relationship between type of trauma and incidence of injuries, Chi square test has been used and based on results of table 3, the highest incidence of traumas resulted from accidents was 49%. Such percent has statistically significant difference ($P= 0.001$)

Table 3: determining the relationship between traumas resulted in injury or death in those who referred to hospitals under study in 2014 and type of event

Variable (injury)		Yes		No		Total		Test result
		Absolute frequency (number)	Relative frequency (percent)	Absolute frequency (number)	Relative frequency (percent)	Absolute frequency (number)	Relative frequency (percent)	
Type of event	Falling	139	7	165	8	304	15	
	Accident	961	49	332	17	1293	66	$X^2=429$
	Burn	11	-	7	-	18	-	$Df=5$
	Drowning	3	-	1	-	3	-	$P=0.001$
	Electric shock	4	-	9	-	13	-	
	Others	43	2	278	14	321	16	

In order to determine the relationship between deaths resulted from traumas and injuries and place of trauma, Chi square was used and based on results of table 4, the most deaths (10 persons) associated with road accidents. Such percents have statistically significant difference ($P<0.005$)

Table 4: determining the relationship between deaths resulted from traumas in Sari city in 2014 and place of trauma

Variable (death)		Yes		No		Total		Test result
		Absolute frequency (number)	Relative frequency (percent)	Absolute frequency (number)	Relative frequency (percent)	Absolute frequency (number)	Relative frequency (percent)	
place of trauma	House	310	15	-	-	310	15	$X^2=429$
	Work place	166	8	-	-	166	8	$Df=5$
	Public places	971	49.5	9	0.5	980	50	$P=0.001$
	Road	394	21.5	10	0.5	404	22	
	Others	92	4	-	-	92	4	

Based on table 5, Chi square test has been used to compare number of deaths of injured people in terms of how to transfer the injured into the hospital. Such percents have statistically significant difference ($P<0.001$).

Table 5: comparing number of deaths resulted from injuries in injured people in 2014 in terms of how to transfer to hospital

Variable (injury)		Yes		No		Total		Test result
		Absolute frequency (number)	Relative frequency (percent)	Absolute frequency (number)	Relative frequency (percent)	Absolute frequency (number)	Relative frequency (percent)	
Way of transfer	Companions	1155	60	6	0.4	1161	60.4	X ² =6 Df=1
	115	742	38	13	0.6	755	39.6	P<0.01

This study was conducted on 1952 injured individuals who referred to hospitals of Sari, Babol and Ghaemshahr in the first six months of the year 2014 and results indicated that most of participants (59%) in the study did not have traumas resulting in death and they injured in public places and most of them injured due to accidents. Also, majority of participants (29%) injured due to car or motorcycle accidents. Results showed that there was a significant relationship between age and incidence of injuries and accidents. What is remarkable in the results is frequency distribution of injured or dead people in terms of age that suggests young people aged between 23 and 27 years old are the main victims of driving accidents in Mazandaran. In the study done in Thailand, 70% of mortality related to driving accidents associated with 10-39 year old individuals (26). The highest mortality in the study of Zhou et al was reported about 18-30 year old people (27). In the study conducted by Nolte and McKee, avoidable death associated strongly with the age (28). The highest statistics related to road mortality associated with 16-20 year old individuals from 1995 to 2005 (29). Studies showed that the highest number of traumas (whether alive or dead) related to 20-30 year old individuals (30). In the study done by Palmea in Canada, the highest mortality associated with 15-24 year old individuals followed by 65 year old people (14) and in the study conducted by Jones et al in England, 17% of injuries and deaths related to 15-29 year old individuals (31). Results of the study of Cha et al showed that rate of traumas in individuals younger than 30 years is higher than others (32). The study done in Spain in 2007 showed that 27.7% of all traumas occurred from 1990 to 2000 related to 31-39 year old individuals (33). In the study of Farooqui et al in India in 2013, most injured individuals were between 30 and 39 years old (34). Another study showed that in older ages, reduction of cognitive ability or sight defects are occurred and they increase the time required for response. As a result, occurrence of traumas resulted in injury or accident increases in elderly (35). Parker et al found a significant relationship between age and intentional violations and showed that percent of intentional mistakes was higher in old drivers (36). Coben et al reported in their studies that 62% of accidents were occurred by individuals older than 30 years old (37). Young drivers take a high level of risk in driving due to high risk taking, optimistic judgment, and exaggeration in their driving capabilities. Therefore, they are subject to the risk of accident and make more mistakes in driving (38). Age group of victims is one of important features of traumas. Unlike other diseases, victims of trauma are among young age groups of the society such that 50% of deaths resulted from trauma are 15-44 year old individuals in the world (39, 40). What is remarkable among research results is that frequency distribution of injury is based on age which suggests that 23-27 year old individuals are the main victims of driving accidents in the province and most of injured individuals are those who are young and middle aged. Therefore, in terms of age group of the population, the injuries are increased statistically in this age group. Results indicated that there was statistically significant difference between gender and incidence of injuries. Concerning research results, 74% of injured individuals were men and in the study conducted by Pires et al, it was evident that the highest rate of avoidable death associated with men (41). In the research done by Rhodes et al, men had more severe and higher number of accidents than women and mortality of men in accidents was twice in ages between 16 and 20 years old and between 21-24 years old (42). In another study done in Taiwan, most injured individuals were men, single, employed, motorcyclist and 33 years old (43). Also, Nolte and McKee stated that in 2002 and 2003 avoidable death in men and women reduced by 17% and 4% respectively (44). In the study conducted by Burcin, the amount of avoidable mortality in men and women reduced by 40% and 38% respectively (45). Generally, since most women are housewives in our society (due to socio-economical and cultural context) and men are more present in daily activities and use vehicles more than women, the men are more subject to the risk of trauma which explains the increasing amount of trauma in men. Results indicated that there was a significant relationship between type of trauma and incidence of injuries. In the research conducted by Montell et al, most of injuries in Italy were resulted from motorcyclists (46). In addition, in the research done by Vlahoianni et al, motorcyclists were one of the most vulnerable users of transport system (47). In the research of Olofsson et al, majority of accidents were occurred by motorcyclists (48). In the research of Lin et al, the probable death of motorcyclists per mile is 34 times higher than other individuals who use other vehicles (49). In the research conducted by Shibata et al, risky factors of mortality were reported based on motorcycles (50) in Hong Kong, 70% of mortality occurs for pedestrians and in Korea, the mortality is 50%. In contrast, 50% of mortalities associate with motorcycles in China, Malaysia and Thailand and mortality of pedestrians is 10-15% (51). In the study conducted in Singapore, 60 year old pedestrians are 4 times more probable to be victims of traffic traumas (52). Iem et al showed in their study that among 4333 traumas resulted in death in building industry of Korea in 1997-2004, falling from elevation (2283 cases) (52.7%), collapse of structure (417 cases) (9.6%), striking with objects (374 cases) (8.6%),

striking with vehicles in workshops (355 cases) (8.2%), being stuck among objects (122 cases) (2.8%), firing (82 cases) (1.9%), falling on balanced surface (62 cases) (1.4%), explosion (33 cases) (0.8%) were the main reasons of occupational traumas resulting in death in building industry (53). Other studies indicated that burning includes 5-12% of all traumas throughout the world (54). It seems that lack of safety of building workers, carelessness and lack of safety principles in houses are the main causes of such traumas. In one hand, lack of consideration of driving regulations via drivers and lack of consideration of traffic rules via public inside the city on the other hand and lack of paying attention to traffic signs inside the city, traffic lights, lack of consideration of the speed and safety regulation via motorcyclists, lack of using safety hat via most of people increase traffic traumas. Results showed that there was a statistically significant difference between mortality resulted from traumas and the place of trauma. The study of Lin et al showed that the mistakes of motorcyclists in suburban roads are 25% higher than intra-city roads (49). In the study conducted by Sylvain, the amount of traumas in low density areas was higher than high density areas (55). In the study done in Canada, the amount of accidents and mortality is 5 times higher in rural roads than urban roads (56). Also, results of the study of Wong in Hong Kong and Chi et al in Taiwan suggest that falling from elevation is one of the most important causes of trauma in work environments (57, 58). Results of the research of Chien et al in Taiwan showed that 82% of all burnings have occurred in houses and it was true in all ages (59). It seems that mortality resulted from road accidents, unsafe roads, unallowable speed, and not paying attention to traffic regulations and other traumas result from carelessness and lack of safety. Results indicated that there was a significant relationship between mortalities of injured individuals in terms of the way of transferring the injured to the hospital and in most cases (60%), injured individuals were referred to hospitals via their companions. The study conducted by Aslam in Karachi reported that the highest time interval between trauma occurrence and admission was 0-1 hour. 50.8 % of traumatized patients were transferred to the hospital via ambulance (60). According to WHO, only 50-75% of all accidents resulted in severe injuries in Iran have been transferred via ambulance and it is similar to the conducted studies while this percent is higher than 75% in countries such as America, France and Canada (61). According to the study conducted by Mangas et al in Hong Kong, ten minute reduction for transfer of the injured to the hospital had a significant relationship with one third reduction of mortality in highways and roads (62). It is apparent that the contribution of emergency was low in serving people. On the other hand, the assistance and humanistic feeling of public have helped rescuers.

CONCLUSION

Results showed that since men are more subject to traumas resulted in injury or death than women and young people, it is suggested that the amount of injuries and death resulted from accidents is reduced by presenting proper strategies and preparing culture in all grounds such as increasing individual information, training safety principles to public, taking care of vulnerable groups, using safety devices.

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