

Original Article

Epidemiological Study of Mortality Caused by Road Accidents in the Intensive Care Unit of Besat Educational-Medical Hospital in Hamadan

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ARTICLE INFO

ABSTRACT

Received 24.07.2020
Revised 11.08.2020
Accepted 15.09.2020
Published 20.09.2020

Key words:

Mortality;
Epidemiology;
Road accidents;
Intensive care unit

Introduction: Road accidents are one of the causes of death and it's important to investigate the epidemiological indicators in this context. In this regard, this study aimed to determine the epidemiological causes of road accident mortality in the intensive care unit of Besat Educational-medical Hospital in Hamadan during Nowruz Holidays 2018.

Material and Methods: In this descriptive cross-sectional study, data of the patients died for 13 days in Nowruz Holidays in the intensive care unit of Besat Hospital in Hamadan, by census method, was extracted from the medical records of patients by using a checklist from a researcher-made questionnaire. Data were analyzed by Fisher's exact test and SPSS 21 software.

Results: Of the 28 Patient admitted to the intensive care unit, 16 patients died. Most deaths were in the third decade of life, among single men, with a self-employment job, with diploma education level or cycle education level, with more than 10 days of hospitalization and in the night shift. Based on the results, most of the dead persons were rider (81.25%), suffered head trauma (50%), with head surgery (56.25%), without any underlying illness (93.75%) and without successful experience of cardiopulmonary resuscitation (87.5%). There were no statistically significant differences between the variables and mortality rate (P value $> 0/05$).

Conclusion: Young single men with low level of education are a wide range of road accidents victims. Therefore, it seems it's necessary to reduce mortality from these accidents, health planning such as traffic culture training and driving rules, by using social media, should focus on learning and improving the level of community awareness, especially in this group of people.

Introduction

Death is the complete and irreversible interruption of vital functions of the body that can occur as a result of illness or injury. One of the most common causes of trauma in the world is traffic accidents and road accidents (1). Road accidents are the most common cause of death among young people in industrialized countries, and in developing countries, 65% of deaths and 90% of disabilities are caused by this problem (2). By definition, an accident is a disaster that a moving vehicle, alone, or a

moving motor vehicle, collides with another agent, such as one or more vehicles, pedestrians, animals, or stationary objects, and ultimately lead to financial and human losses (3). Traffic accidents in Iran with an annual incidence of 32 cases per 100,000 people, is the second leading cause of death, the first leading cause of lost years of life due to premature death and the most common cause of injury (4). Traffic injuries are about 13% to 31% of all injured patients referred to the hospital and about 40% of

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those admitted to the intensive care unit (5). The intensive care unit includes all the critical care of the patient's life, that in this ward, patients with acute life-threatening illnesses are cared under the supervision of the most skilled personnel with advanced equipment and facilities (6). Among the different wards of the hospital, the highest mortality rate is related to the intensive care unit, and this ward is one of the most expensive wards in the hospital, and as the number of patients staying in this ward increases, costs are also rising (7). Traffic accidents in Iran are the second leading cause of death in terms of the number of victims, and more than a third of the country's hospital beds are allocated to victims of these accidents, which this rate increases during certain times of the year, such as the Nowruz Holidays (8,9). During the holidays, and especially during the Nowruz Holidays, the risk of accidents and consequently, the resulting deaths increase due to the high traffic of vehicles. Motor vehicle accidents are the leading cause of death among adolescents and young adults worldwide. The accidents kill 1.24 million people a year and injure 20 to 50 million others, three-quarters of all deaths in developing countries and men constitute 80% of this statistics (10). Review of Previous studies have shown that many researchers inside and outside Iran have focused on the subject of road accidents. For example; in the study of Ditsuwan et al, the highest mortality rate due to road accidents was obtained in both men and women in the age group of 15-29 years (11). Reddy et al in their study found that half of all fatal road accidents occurred in the 40-40 age group and 92% of them were male (12). Rezaei et al showed that the costs of road accidents are three general categories: direct costs (hospital and rehabilitation costs) 48.53%, indirect costs (loss of individual ability as a producer) 34.2% and intangible costs (grief) 17.27% (13). Also, Malekifar et al showed that the mortality rate was higher in men, married people, illiterate people, with a self-employment job and with head injuries. And the final

cause of death was head injury (14). Due to the effectiveness of road accidents on the death toll of large numbers of people, identifying the causes of death and examining them is one of the most effective strategies to reduce mortality. Therefore, the present study was conducted to investigate the epidemiological deaths due to road accidents in the intensive care unit of Besat Educational-medical hospital in Hamadan.

Material and Methods

This is descriptive cross-sectional and retrospective study, in it, the epidemiological causes of death due to road accidents in hospitalized patients in the intensive care unit of Besat Educational-Medical Hospital in Hamadan city from March 21 to April 2 in 2018 year, were investigated. The research community included all hospitalized injured persons due to road accidents in the intensive care unit of Besat Hospital in Hamadan city and the research samples consisted of all dead persons due to these accidents who were hospitalized in this hospital and ward. A researcher-made checklist was used to collect information. The checklist included information such as age, gender, marital status, job, level of education, status of being a pedestrian or rider during the accident, trauma location, type of surgery, history of other diseases, number of cardiopulmonary resuscitation, number of hospitalization days in the intensive care unit, time of cardiopulmonary resuscitation and time of death. The validity of the checklist content has been confirmed by 10 faculty members of Hamadan University of Medical Sciences. Considering that the sampling method was by census method, 28 patients were hospitalized due to road accidents in the intensive care unit of Besat Hospital in Hamadan, in the period of March 21 to April 2 in 2018 year that 16 people of them had the criterion of entering the study and in fact they were our samples that we checked their medical files. Criteria of entering the study included: die due to

road accidents and hospitalization in the intensive care unit in the period time of March 21 to April 2 in 2018 year. the criteria for leaving the study included: the cause of death of the person other than road accidents and incomplete data recorded in the medical records of patients. Method of data collection: After the approval of this research plan in the Student Research Committee and obtaining the code of ethics from the Ethics Committee of Hamadan University of Medical Sciences with number IR.UMSHA.REC.1397.675, by presenting a letter of introduction from the research deputy to the hospital management and obtaining the necessary licenses from the security unit and nursing office of Besat Hospital in Hamedan city, referring to the use of the information contained in the files

archived in the medical records unit, referred to this unit and the necessary information was collected from the files of the patients admitted during that period. Data analysis was performed by descriptive statistical test (Fisher's exact test) and SPSS software version 21.

Results

For statistical analysis we used Fisher's exact test to examine the association between the variables of study with mortality rate and we found that there are no statistically significant differences between them and so that in the whole of conditions P value > 0/05 (table number 1).

Table 1. Statistical analysis to investigation of statistical differences between the variables of study with mortality rate in the patients admitted to the intensive care unit.

Variable	Fisher's exact test	df	P value
Age	1.277	2	0/544
Gender	1.819	3	0/642
Marriage status	0.347	2	0/866
Job	1.545	3	0/731
Level of education	4.799	4	0/266
Being pedestrain or rider during accident	4.611	4	0/291
Number of hospitalization days	1.319	5	0/978
Body region injured	1.515	3	0/372
Type of surgery	0/335	2	0/845
Underlying diseases	6.598	4	0/146
Number of successful CPR*	3.781	5	0/561
CPR* shift	3.667	4	0/521
Time of death	3.704	5	0/572

* Cardiopulmonary Resuscitation

The total number of patients admitted to the intensive care unit of Besat Hospital in Hamadan city in Nowruz Holidays was 28, and 16 of them died. Thus, the mortality rate of this ward, was 57.14%.

The present study found that the highest number of deaths due to road accidents was 25% in the age group of 21 to 30 years and the age group of 60 to 80 years didn't have mortality. From 16 dead persons, male

mortality rate was 81.25%, that it was more common than women. Based on the results, of the 16 deaths, mortality in single casualties was 56.25%, that it was more common than married injuries. In this study, the highest number of deaths due to road accidents was 56.25% in self-employed patients and 37.5% in unemployed patients. In this study, it was found that the death rate from road accident was 37.5% in patients

with a diploma degree and 31.25% in patients with cycle education level. Also, the highest number of deaths with a frequency of 13 people and mortality rate

81.25% is related to people who were rider during the accident (Table number 2).

Table 2. Frequency of deaths due to road accident in the patients admitted to the intensive care unit in terms of demographic variables.

Demographic variable	Frequency	Percent
" Age (year) "		
0-10	2	12.5
11-20	3	18.75
21-30	4	25
31-40	2	12.5
41-50	3	18.75
51-60	1	6.25
61-70	0	0
71-80	0	0
81-90	1	6.25
" Gender "		
Male	13	81.25
Female	3	18.75
" Marriage status "		
Single	9	56.25
Married	7	43.75
" Job "		
Self-employment job	9	56.25
Unemployed	6	37.5
Employee	1	6.25
" Level of education "		
Illiterate	4	25
Primary education level	1	6.25
Cycle education level	5	31.25
Diploma education level	6	37.5
Bachelor's degree or higher	0	0
" Status of being a pedestrain or rider "		
Rider	13	81.25
Pedestrain	3	18.75

According to the findings of this study, the site of head injury with 50% was the highest

and the site of pelvic injury with 6.25%, was the lowest mortality rate and the highest

mortality rate was in patients with head surgery with 56.25%. According to the results, 93.75% of those who died had no history of underlying disease, and only 6.25% of them had a history of underlying disease (hypertension). Also according to the results of the present study, the highest mortality rate was in patients who never had a successful history of cardiopulmonary resuscitation (Table number 3). The study showed that the highest number of deaths due to road accidents in patients with a

hospital stay duration of more than 10 days was 43.75% and the lowest mortality rate was in patients with a hospital stay duration of 7 to 9 days. Other findings of the study: higher mortality rate was in night shifts with 56.25% and lower mortality rate in morning shifts with 18.75% and in this study the highest number of deaths (50% of them) due to road accidents was between 20 to 24 hours (Table number 4).

Table 3. Frequency of deaths due to road accident in the patients admitted to the intensive care unit in terms of clinical variables.

Clinical variable	Frequency	Percent
" Body region injured "		
Head	8	50
Chest	2	12.5
Abdomen	3	18.75
Pelvic	1	6.25
Lower limb	2	12.5
" Type of surgery "		
Head	9	56.25
Chest	2	12.5
Spinal	3	18.75
Vascular surgery	2	12.5
" Underlying diseases "		
Yes	1	6.25
No	15	93.75
" Number of successful CPR* "		
Not	14	87.5
Once	2	12.5

* Cardiopulmonary Resuscitation

Table 4. Frequency of deaths due to road accident in the patients admitted to the intensive care unit in terms of time variables.

Time variable	Frequency	Percent
" Number of hospitalization days "		
1-3	4	25
4-6	4	25

7-9	1	6.25
Above 10	7	43.75
" CPR* shift "		
Morning	3	18.75
Evening	4	25
Night	9	56.25
" Time of death "		
8-12	0	0
12-14	0	0
14-18	2	12.5
18-20	3	18.75
20-24	8	50
24-6	2	12.5
6-8	1	6.25

* *Cardiopulmonary Resuscitation*

Discussion

According to the results of present study, the mortality rate in the intensive care unit was 57.14%. In this regard, Izadi et al in their study showed that the death rate due to road accidents in Kermanshah was 52.3 cases per 100,000 people, and Hashemi et al in a study in Khuzestan, reported the rate of deaths due to road accidents at 28.8 cases per 100,000 people (15,16). According to the opinion of researchers, the reason for these differences in the mortality rate due to road accidents is the cultural differences in the society, the climatic differences of the research community, the volume of the sample studied, the time of studies and also the short period of time and high traffic during Nowruz Holidays. According to the results of the present study, the age group of 21 to 30 years with 25% had the highest number of deaths among all age groups, that this finding with the findings of study conducted by Reddy et al in 2014 in India, which showed that the highest mortality rate is in the age group of 21-40 years, is aligned (12). This may be due to the fact that young people are more at risk of traffic accidents due to forced labor and more effort and

expectation from them, and can also be due to not paying attention to the rules and regulations of driving in this age group. Also, 81/25% of the dead persons were men, which is consistent with the findings of study of Entezami et al that showed that

the highest number of deaths due to road accidents were men with 80%, is aligned (17). Researchers believe that the reason for this may be the greater presence of men in society, their greater activity in high-risk jobs such as driving and the conventional culture of driving more in men than women in Iranian society. According to the results of the present study, most of the dead mean 56.25% of them are single, which is not consistent with the results of Davoodi's study in Lorestan with 65.94% of married deaths due to road accidents and Taravatmanesh in Sistan and Baluchestan and 58.43% in married people (18,19). Researchers believe that the reason for this difference can be the time period under review, longer the number of single people in the city who have access to motor vehicles, more observance of driving rules in married people, the younger age and the lack of observance of driving rules by single

people. Another finding of this study is that the number of deaths with a self-employment job is high. It is not consistent with the findings of the study of Abbasi et al, that showed employees had the highest number of deaths due to road accidents by 33.1% (20). Researchers believe that this may be due to low levels of education, limited study time of present study and an increased risk of accidents due to limited travel during the holidays. According to the results of the present study, most of the deaths (37.5% of them) were with a diploma education level and in the next level, 31.25% of them had a cycle education level. In this regard, findings of study of Malekifar et al, in Kermanshah showed that the highest mortality rate is in people with primary education and also, results of study of Davoodi et al, in Lorestan showed that the highest mortality rate is among illiterate people, that these results are inconsistent with the results of the present study (14,18). The reasons for this can be attributed to the fact that as a result of lack of adequate literacy, accuracy and attention to traffic issues and the recommendations of the relevant authorities are reduced, and this can play a significant role in accidents. This study found that 81.25% of the dead persons were rider. The reason for this difference can be related to the time period under review, because during Nowruz Holidays, more traffic accidents occur on intercity roads and during trips of Nowruz Holidays, and since the number of pedestrian crossings on suburban roads is less, so the number of dead persons it is also less. Another result of the present study was that the highest number of deaths due to road accidents died more than 10 days after hospitalization. That this result is inconsistent with the results of study of Entezami et al in 2010, which showed the highest number of deaths was in the first 24 hours of hospitalization (17). Also Merrera et al, in a study in 2005, Showed that mortality rates in the early hours of hospitalization were high, which this result is not consistent with the present study (21). Among the causes of this issue, we can mention the

severe injuries inflicted on people during the accidents. Since the study period is Nowruz Holidays and there is a large volume of trips on these holidays and the speed of vehicles on suburban roads is much higher than intra-city roads so the amount and severity of accidents on these roads is higher. In this study, 50% of deaths were due to head trauma and 18.75% of them were due to abdominal trauma. This finding is consistent with the results of Ghadiriasl's study in Qazvin city, Erfanpoor's study in Khorasan Razavi city, and with the results of several foreign studies including Honnugar's study in 2011 in India, Kanchan's study in 2012 in India and Kumar's study in 2008 in India, with the most common head injury (22,23,24,25,26). Causes include severe damage to these areas, failure to use protective equipment such as helmets and hypersensitivity of brain tissue. According to the findings of the present study, the highest frequency of surgery performed on the injured was head surgery (56.25%) and spine surgery (18.75%) that these results aren't consistent with the results of Faux's study in 2015. That showed the highest mortality rate was in patients with vascular surgery (27). The frequency of head surgery patients is justifiable by the type of injury caused by the accident. This study showed that; of the 16 dead, only one of them had underlying diseases (he had hypertension), which this result isn't consistent with the result of study of Lau et al in 1995 In Singapore, that showed most of the deaths due to road accidents had underlying diseases (28). However, due to the deteriorating condition of the injured, the history may not be fully recorded. According to the results of present study, 87.5% of the injured experienced only one cardiopulmonary resuscitation which was not successful, and 12.5% of them experienced a successful pulmonary resuscitation once. According to the opinion of researchers, the cause of death of patients after once cardiopulmonary resuscitation can be the severity and stage of the disease, ignorance and insufficient information of treatment

personnel and lack of medical and care facilities that can be improved this important issue with proper management and proper use of resources and equipment. According to the results of the present study, the highest frequency of cardiopulmonary resuscitation was in night shifts (56.25%) and evening shifts with 25% and as a result, the highest frequency of death hours is related to these shifts. In this regard, the cause can be the physiological changes of the body during the night hours, overwork of the wards and low number of personnel in the night shift. In connection with this sub-objective, no similar study was found by the researcher.

Limitations

Considering that the data of this study was based on the information reported from the files of patient, due to inadequacy of files information from the client's underlying diseases; more information was obtained through experiments attached to the files of patient. Due to the illegality of a number of reports in the files, the ambiguities were resolved by matching the nursing reports and medical prescriptions. Due to insufficient information on the mechanism of the injury, pre-hospital emergency triage forms were used. Also due to this fact that there is only one hospital in the Hamadan city as a center for trauma and road accidents, so in this study only one hospital was used for research (Besat Educational-medical Hospital).

Conclusion

Considering that most of the deaths caused by these accidents occur in young people, it is felt that special attention should be paid to young people, especially young married men with low levels of education and income, because these people are more at risk in the road accidents. Due to the increase in road accidents, deaths and their consequences, by raising the level of awareness, careful implementation of traffic laws, as well as the rapid referral of patients at risk and providing quality

services and emergency and medical cares, traffic culture training and driving rules, increase road quality and cars safety can prevent the increase mortality of road accidents. However, there is lack of specialized centers related to risk factors for this type of accident including trauma special clinics and response centers for client's question visiting medical-health centers in Hamadan city.

It seems necessary to complete, send and review statistics related to all provinces of the country in the form of national plans of the Ministry of Health to monitor, evaluation and planning for injured people due to accidents, because an important point that is sometimes neglected is suitable education for all members of society in various ways such as social media in the field of familiarity with risk factors, symptoms, lifestyle modification, complications and costs. Considering the high per capita of vehicles and the growing use of them and the high traffic congestion on the country's roads, the implementation of traffic laws is one of the most important reasons for reducing traffic accidents and their consequences.

Conflicts of Authors

There is no conflict of interest between the authors.

Acknowledgment

Hereby, the authors of the article express their gratitude to the esteemed vice for Researches of the University, the esteemed officials of the Student Research Committee and the esteemed director of Besat Hospital in Hamadan city.

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