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Evaluation of forensic autopsies performed on fatal traffic accidents in İzmir

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Abstract

The frequency of fatal traffic accidents in our country is still one of the important social problems. Identifying the problems is the first step of the solution phase. Therefore, in our study; demographic data about deaths due to traffic accidents, the types of injuries that caused death, and effects of alcohol and/or narcotic substances on the accident were evaluated. In İzmir province, in a three-year period between January 2015 and January 2018, the cases that were in The Council of Forensic Medicine İzmir Group Presidency UYAP (National Judiciary Informatics System) system archive, sent by the prosecutor for autopsy due to a traffic accident were analyzed and evaluated retrospectively. And autopsies of the cases were performed in The Council of Forensic Medicine İzmir Group Presidency Morgue Specialization Department. Information about the cases such as age, gender, event date (season/day), event time (hours), whether there is an in-vehicle/non-vehicle traffic accident, whether the case is a driver/passenger, crime scene (location), whether the case has an alcohol/narcotic substance effect, whether there is a history of hospital treatment, and the exact cause of death were included in the study. The data obtained were analyzed with the SPSS 18.0 statistical program. The number of deaths due to traffic accidents at İzmir Forensic Medicine Institute between 2015 and 2018 was 1044, and the majority of them were male (81.7%, n=853) and the average age was 44.7±20.9. Traffic accidents in our study occur more frequently on intercity roads (52.9% n=552), most frequently between 19:00-00:00 (25.6%) and in summer (June-July-August: 31.4%). It was observed that more than half of the cases (55.6%) died at the scene (no hospitalization) and alcohol was detected in toxicological examination in 20.9%. In our study, it was determined that deaths mostly occurred as a result of head injuries. The demographic data of the study are generally compatible with the literature. Increasing traffic controls especially in summer, making traffic fines more effective, psychotechnical evaluation for drivers who repeatedly violate traffic rules, presenting visual educational messages to all age groups with appropriate communication tools (media, advertising, school, internet, etc.) are our solution suggestions to reduce the number of deaths due to traffic accidents.

Keywords: Traffic accidents, forensic medicine, autopsy

Introduction

While the number of people who die in traffic accidents worldwide is estimated to be around 1.2 million statistically, the number of injured can reach up to 50 million [1]. Traffic accidents occurring on highways impose large costs on country and on urban economies. It is estimated that the cost of traffic accidents occurring in a year in low and middle income countries is 1-2% of the gross national product [2]. While traffic accidents rank eighth among the most

common causes of death, it is expected to rank fifth by 2030 if emergency measures are not taken. Although they own 54% of the world's vehicles, 90% of deaths are in low and middle income countries and the highest number of deaths is in the African region. This suggests that the risk is higher in countries with low socioeconomic status [3]. Even in high-income countries, people with lower socioeconomic backgrounds have been reported to be more likely to be involved in traffic accidents. People between the ages of 15-44 account for 48% of traffic accident deaths. In terms of gender, three quarters of deaths are male [4].

Our country ranks 10th among countries with the highest number of deaths due to traffic accidents [5]. Accidents are affected by a combination of human, road and environmental factors. Pedestrians, cyclists, and motorcyclists are the most vulnerable

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populations contributing to the mortality rate [6,7]. The most important factor affecting the mortality in traffic accidents is the speed of the vehicle. For example, when the speed of the vehicle is 20 km/h, the mortality risk is 5%, this rate increases to 85% when the speed is 85 km/h [8].

A total of 1 million 168 thousand 144 traffic accidents occurred in our country's road network in 2019. While 993 thousand 248 of these accidents cause financial loss, 174 thousand 896 of them are traffic accidents with injury and death [9]. As a result of these 174 thousand 896 traffic accidents in Turkey in 2019, 2 thousand 524 people died at the accident site and 2 thousand 949 people died within 30 days after they were injured and transferred to health institutions [9]. In addition, studies have shown that the mortality rate of pedestrians and cyclists in traffic accidents is higher than drivers and passengers [8,10]. And also, it has been reported that the risk of exposure to non-vehicle traffic accidents is higher in children and elderly age groups [11].

In this study, it is aimed to contribute to the statistics of our country by examining deaths due to traffic accidents, which are among the most common cases in forensic medicine practices.

Materials and Methods

The study was conducted with the approval of the İzmir Katip Çelebi University Non-Interventional Research Ethics Committee on 26.09.2018 and protocol number 2018/257.

Dead examination reports and autopsy reports of the cases who lost their lives as a result of in-vehicle and non-vehicle traffic accident which was sent by the prosecutor for autopsy in a three-year period between January 2015 and January 2018 in İzmir was reviewed retrospectively. And autopsies of the cases were performed at the The Council of Forensic Medicine İzmir Group Presidency Morgue Specialization Department.

The cases that were available in the The Council of Forensic Medicine İzmir Group Presidency UYAP (National Judiciary Informatics System) system archive, autopsied and reported with the allegation of a traffic accident were listed and their registration numbers were determined. Considering the information recorded in the death examination report prepared by the prosecutor's office, the data collected such as; demographic data (age, gender), event date (season/day), event time (hours), crime scene (location), whether there is an in-vehicle/non-vehicle traffic accident, whether the case is a driver/passenger, whether the case has an alcohol/narcotic substance effect, information on vehicle safety/protective measures, whether there is a history of hospital treatment, and the exact cause of death in the case where autopsy was carried out with the allegation of a traffic accident included in the study. The data obtained were transferred to the forms prepared for this study.

The data obtained were transferred to the SPSS 18.0 (Statistical Package for Social Science) program. Chi Square Test was used for statistical analysis of the data. Results were evaluated at 95% confidence interval. P values less than 0.05 were considered "statistically significant".

Results

A total of 1044 cases that were autopsied after death due to a traffic accident at the İzmir Forensic Medicine Institute in a three-year period between January 2015 and January 2018 in İzmir were evaluated. Of the total 1044 cases, 853 (81.7%) were men and 191 (18.3%) were women. Their mean age was 44.7 ± 20.9 (1-97) years.

Looking at the distribution by years and gender, there were 288 men, 63 women in 2015; 250 men, 50 women in 2016; 315 men and 78 women in 2017. The highest number of deaths due to traffic accidents were seen in 2017. Deaths as a result of traffic accidents occurred mostly in summer with 329 (31.5%) cases, and at least in spring with 179 (17.1%) cases. Most of the cases were seen in June-July-August (31.4%). The highest number of cases occurred in July, with 118 (11.3%) and the least number of cases in January, with 52 (5%).

It was determined that deaths due to traffic accidents included in the study were mostly on Sunday (17.9%) and Monday (15.4%), and at least on Wednesday (11.8%). Looking at its distribution during the day; 163 (15.6%) deaths between 01:00-06:59, 193 (18.6%) deaths between 07:00-12:59, 242 (23.1%) deaths between 13:00-18:59, 267 (25.6%) deaths between 19:00-00:59 and 179 (17.1%) deaths with unknown accident due to traffic accident has been seen (Figure 1).

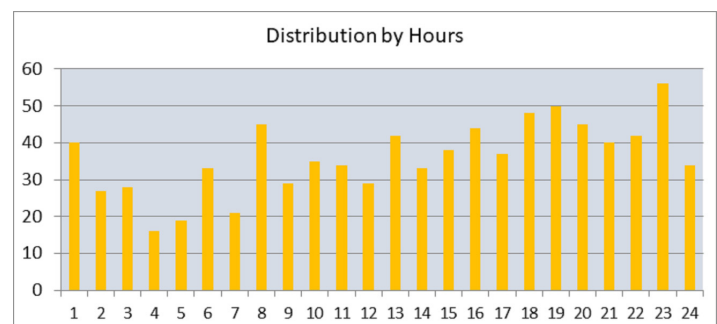


Figure 1. Number of deaths due to traffic accidents distribution by hours.

Of the 1044 cases in the study group, 535 (58%) died as a result of an in-vehicle traffic accident, 382 (42%) non-vehicle accident. 432 (41%) of deaths due to traffic accidents are drivers, 144 (14%) are passengers, 468 (45%) are pedestrians. The accident site was within the city at 40.6% and outside the city at 52.9%. While there was no additional substance use in 720 (69%) of the deaths, 181 (17.3%) had alcohol, 30 (2.9%) had drug use, and 17 (1.6%) had both alcohol and drug use.

As a result of traffic accidents, more than half of the cases, 576 (55.2%), died at the scene; 262 (25.1%) in the same day; 89 (8.5%) in 1 week; 75 (7.2%) in 1 month; 34 (3.3%) died in the hospital after more than 1 month. 72% of the deaths were due to multiple system injuries, 22% to single system injuries, 2% to non-traumatic causes (natural complications), 2% to thermal asphyxia, and 2% to other causes.

Of the 1044 cases who died as a result of a traffic accident, 156 (14.9%) died due to head injuries. Head injuries were found to be the most common injury area causing death in pedestrians,

drivers and passengers. Multiple system injuries that cause the most death are head+chest+abdominal injuries in 246 (23.6%) cases. Secondly, 127 (12.2%) cases with chest+abdominal injuries. (Figure 2).

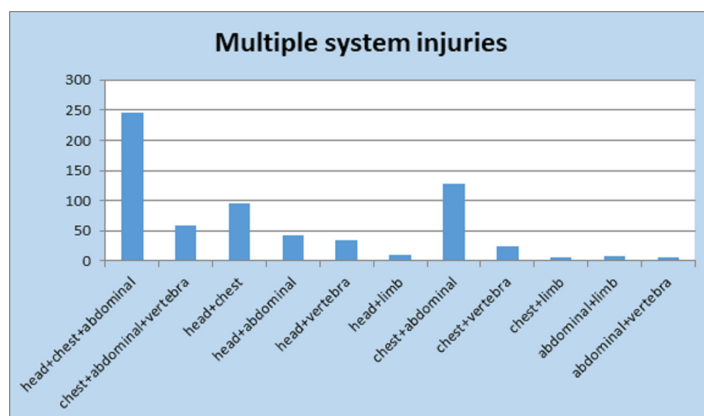


Figure 2. Number of traffic accident fatalities with multiple system injuries by body regions.

Discussion

The distribution of traffic accidents in this study by age, gender, seasons, time of day and accident location shows similar characteristics to the literature. In our study, it was observed that deaths related to traffic accidents mostly affected the young and middle age group and men; mostly occurring on the intercity roads; most frequently in summer and during the day most frequently after the hours of work, towards midnight. In line with our data in similar studies conducted in Iran-Yemen-Romania-America; it was mostly seen in the young and middle age groups, mostly in the male gender (Iran 81.5%, Romania 70%) and most frequently in the summer season. Again, it was observed that fatal traffic accidents were mostly on intercity roads and most frequently as a result of non-vehicle traffic accidents [12-15].

In the 2019 TURKSTAT (Turkey Statistical Institute) data, when the people who died in traffic accidents were examined by gender; it was seen that 76.2% were men, 23.8% were women, and our study was compatible with these data (male 81.7%) [9]. Again, according to 2019 TURKSTAT data, 47.5% of deaths occurred within the city, while 52.5% of the deaths occurred outside the city. In our study, 43% of deaths were within the city and 57% outside the city and it was consistent with the data of our country [9]. In our study, data on whether the case was a passenger/driver could not be reached (44.8%), since it was not specified in the dead examination report in most of the cases. Available data showed that 41% of those who died were drivers and 45% were pedestrians. In international studies (in Yemen and China), it was observed that passengers were injured more frequently than drivers in studies conducted with traffic accident survivors (admitted to hospital) [16]. According to 2020 TURKSTAT data, 42.7% of the people who died in traffic accidents in the road network of our country in 2019 were drivers, 34.1% were passengers and 23.2% were pedestrians. [9]. Based on these data, it was seen that there was more pedestrian deaths in our study than the Turkey data, proportionally. In a study conducted with cases who presented to the emergency department after a traffic accident, it was observed that drivers were injured more than passengers [17]. In the study

by Sungur et al. "Analysis of Traffic Accidents in Turkey "; the most common deaths were in four-wheel drive cars and light vehicle passengers, the second in four-wheel drive cars and light vehicle drivers, and the third in pedestrians [18].

In our study, more than half of the patients died at the scene before reaching the hospital. This can be explained by the fact that fatal accidents occur most frequently on intercity roads and by the delay in ambulance response times in out-of-city locations. 31% of deaths due to traffic accidents occurred under the influence of alcohol-substance use. In the study by Papadodima et al., it was reported that alcohol was detected in 37% of drivers and psychoactive agents in 9% [19]. Despite the administrative arrangements made in the 48th article of the highway traffic law, this is still an important problem. In our study, since 9.2% of the cases did not have a first blood sample, the alcohol-substance effect could not be evaluated.

In our routine practice, in forensic cases; the first blood samples that should be taken and kept at the time of arrival at the hospital are destroyed in a short time and this situation creates difficulties in determining the exact cause of death. In our study, the causes of death were mostly related to more than one part of the body (n: 756, 72.4%). The most common deaths were due to head+thorax+abdominal trauma (n: 246, 23.6%), the second most common was deaths due to isolated head trauma (n: 156, 14.9%), and the third was death due to chest+abdominal trauma (n: 127, 12.2%). Although vertebral and extremity injuries were rarely observed in single system injuries, they were frequently observed in multisystem injuries. When national and international studies were examined, it was seen that there were multiple trauma and the most common injuries to the head area [8,20].

Conclusion

The socioeconomic consequences of traffic accidents and deaths are severe due to the high risk of developing mortality and morbidity and the fact that they are mostly seen in young and middle-aged cases who are active in production. It results in an increase in economic loss and a decrease in labor force and production efficiency.

In terms of compensation and penal sanctions, it is important to determine whether the traffic accidents are under the influence of alcohol or drugs. The first blood sample should be taken from all traffic accidents and all forensic cases that have entered the hospital, and technological devices (deep freezers, etc.) should be provided for long-term storage of samples. However, shortcomings in practical application still exist today.

Injuries and deaths due to traffic accidents can be prevented if necessary precautions are taken. It can be prevented by using effective control mechanisms in traffic (speed control, use of child car seats, safety practices such as seat belts, alcohol control, increasing the frequency of traffic supervision in the summer) and applying existing laws equally to everyone (law enforcement forces in the justice mechanism, standard approach in prosecutor-judge practices) and education (behavior change, making a habit of traffic rules). Starting from primary education, traffic rules should be made organized, systematic and easy to understand for all ages; it should be aimed to become one of the usual habits of the person; and social education should be aimed. In community

education, the effective power of the media should be used (using compulsory educational content in advertisements, giving compulsory broadcasts during the most frequent viewing hours) and risky behavior models such as driving fast or drunk should not be included in the content of TV series and movies.

Conflict of interests

The authors declare that they have no competing interests.

Financial Disclosure

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Ethical approval

Ethics Conset was obtained from Izmir Katip Celebi University.

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