Turkish Journal of Geriatrics
2017;20 (2):100-107

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Received: 15/03/2017
Accepted: 01/06/2017

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This study was presented in the 5th conference of the Association of general practice/family medicine of South-East Europe (AGPEM SEE) in 25-28 May, 2017 in Montenegro

Research

EVALUATION OF GERIATRIC PATIENTS ADMITTED TO THE EMERGENCY DEPARTMENT DUE TO A TRAFFIC ACCIDENT

Abstract

Introduction: The aim of this study was to evaluate patients aged 65 years and older who were admitted to hospital due to a traffic accident through the last year retrospectively.

Materials and Methods: The study included 204 elderly patients admitted to the emergency department of Konya Training and Research Hospital due to a traffic accident between 1st November 2014 and 30th October 2015. The socio-demographic characteristics, accident stories, and treatments of these patients were examined. The data were analyzed by statistical tests.

Results: Of the patients, 64.7% (n = 132) were male and 35.3% (n = 72) were female. The traffic accidents occurred most frequently in the spring and summer time ($p < 0.001$). During winter months, the accidents occurred between 06.00 and 11.59 hours at most, but in other seasons they occurred between 12.00 and 17.59 hours more frequently ($p < 0.001$). Of the admitted patients, 4.4% (n = 9) lost their lives and 6.9% (n = 14) were hospitalized at the intensive care unit. While 56.4% (n = 115) of the patients were discharged from the emergency department by recovery, 43.6% (n = 89) of the patients were referred to 17 different clinics. Injuries were sustained to one or more parts of the body in 93.1% (n = 190) of the patients. The patients with head trauma had the highest mortality ($p < 0.001$).

Conclusion: New strategies are needed to prevent traffic accidents and to treat geriatric patients more effectively after a traffic accident.

Key words: Accidents, Traffic; Health services for the Aged; Inpatient; Prognosis

Araştırma

TRAFİK KAZASI SONRASI ACİL SERVİSE BAŞVURAN GERİATRİK HASTALARIN DEĞERLENDİRİLMESİ

Öz

Giriş: Bu çalışmada hastaneye son bir yıl içinde trafik kazası sonrası başvuran altmış beş yaş üstü hastaların retrospektif olarak değerlendirilmesi amaçlanmıştır.

Materyal ve Metod: Çalışmaya Konya Eğitim ve Araştırma Hastanesi acil servisine 01 Kasım 2014–30 Ekim 2015 tarihleri arasında trafik kazası sonrası başvuran 204 yaşlı hasta dahil edildi. Bu hastaların sosyodemografik özellikleri, kaza karakteristikleri ve tedavi süreçleri incelendi. Elde edilen veriler istatistiksel testlerle analiz edildi.

Bulgular: Acil servise başvuran yaşlı hastaların %64.7'si (n=132) erkek ve %35.3'ü (n=72) kadındı. Trafik kazaları en sık ilkbahar ve yaz mevsiminde meydana gelmiştir ($p<0.001$). Kış aylarında en sık sabah 06.00-11.59 saatleri arasında, diğer mevsimlerde öğleden sonra 12.00-17.59 saatleri arasında meydana gelmiştir ($p<0.001$). Servisimize başvuran hastaların %4.4'ü (n=9) hayatını kaybetmiş, %6.9'u (n=14) yoğun bakıma alınmıştır. Hastaların %56.4 (n=115)'i acil servisten şifa ile taburcu edilirken, %43.6'sı (n=89) 17 farklı kliniklere sevk edilmiştir. Hastaların %93.1'inde (n=190) vücudun bir veya birden fazla bölgesinde yaralanma mevcuttu. Mortalitesi en yüksek olan hastalar kafa travması olanlardı ($p<0.001$).

Sonuç: Trafik kazalarını önleme ve kaza sonrası yaşlı hastalara müdahale konusunda yeni stratejilere ihtiyaç olduğunu düşünmekteyiz.

Anahtar kelimeler: Kazalar, trafik, geriatrik sağlık hizmetleri, yatan hasta, prognoz

INTRODUCTION

Elderly is defined as being old or showing signs of aging in the dictionary (1). According to the World Health Organization (WHO), the elderly population is defined as people aged 65 and older. According to WHO datas, the proportion of people in the geriatric age group increases steadily over the years. The reasons for this are the improvement in health services and the decrease in the fertility rate (2). Like other countries in the world, the elderly population has increased in Turkey in recent years. While 8.2% of the population in Turkey is elderly, this figure is expected to reach 10.7% by 2023 (3). This rise corresponds to an increase in the participation rate of the elderly population to active life and as a result of this it has also been reported in the literature that the elderly population's emergency department applications have increased over the years. Impairment in some abilities along with aging cause cognitive, sensory, and psychomotor abilities to deteriorate. Moreover, in addition to the above reasons, comorbid diseases like osteoporosis cause the elderly to be more susceptible to trauma. Concurrent disorders may also increase the risk of complications. Although injury severity is typically less in older than younger people, the outcomes are worse in the elderly (3).

A traffic accident is an event involving a vehicle in motion, which can result in death, injury or damage (4,5). As the chronic diseases, physical disabilities, and cognitive disorders are more common in elderly people than in young people, the proportion of elderly people in traffic accidents has increased (6). According to the WHO Global Status Report on Road Safety, which was based on data collected from 178 countries, traffic accidents were the 9th cause of death in 2004; however, they are predicted to rise to 5th place by year 2030 (5). In Turkey, deaths due to traffic accidents are the 2nd cause in the 5–29 age group, the 3rd cause in the 30–44 age group, and the 10th cause of death in the 60 years old and over age group (7,8).

It is important to define the causes of geriatric trauma to prevent injury and decrease morbidity, mortality, and associated costs (9). Geographic variation in trauma patterns may occur, there is limited information available about geriatric trauma in Turkey. Describing these factors may help to guide the development of precautions to limit traumas in the elderly. The aim of this study was to examine the socio-demographic data, accident characteristics, mortalities and morbidities of people aged 65 and older who were admitted to Konya Training and Research Hospital, one of the biggest hospitals in the Central Anatolia Region, due to a traffic accident and to increase awareness about interventions to prevent traffic accidents besides elderly casualties.

MATERIALS AND METHODS

The study was planned as a retrospective descriptive study. It involved people aged 65 years and older who were admitted to the Emergency Department of Konya Training and Research Hospital due to a traffic accident between 1st November 2014 and 30th October 2015 and for whom judicial reports were also prepared. Those who were under 65 years old or had missing data were excluded from the study.

The study was approved by the Ethics Committee of Necmettin Erbakan University Meram Medical Faculty (Approval No: 2016/04). All records of the elderly patients who were admitted to the emergency department of Konya Training and Research Hospital due to a traffic accident in the past year and who met the criteria were obtained from the hospital's automation system and were transferred to a form for each patient. The injury status of each patient was classified as eight anatomical region,: the face, head (except the face), neck, chest, upper extremity, abdomen or pelvis, vertebrae, and lower extremity. The place, time, and season of the accidents and the age, sex, driver status, injury status, morbidity, mortality and prognosis of the patients were recorded.

The SPSS 22.0 software package program (IBM Corp. Armonk, USA) was used for statistical analysis. Descriptive statistics, Kolmogorov–Smirnov and Shapiro–Wilk tests were used to assess the obtained data. The Mann Whitney-U test was used to compare two samples. The chi-square test was used for comparing categorical data. The results

were evaluated at a 95% confidence level and significance was set at $p < 0.05$.

RESULTS

A total of 3441 patients were admitted to the emergency department of Konya Training and Research Hospital due to a traffic accident during the last 1-year period. Of these, 6.40% (n = 220) were 65 years or older in age. Sixteen of 220 patients aged 65 and older were excluded due to missing information. Thus, the study was completed with 204 patients. The mean age of the patients included was 73.31 ± 0.46 years. Of these, 64.7% (n = 132) were male and 35.3% (n = 72) were female. The mean age of women was 72.54 ± 0.72 years and the mean age of the men was 73.73 ± 0.58 years. Of all the patients, 61.3% (n = 125) were between 65.0 and 74.9 years old (young-old) and 38.7% (n = 79) were 75 years or older (old-old). Of the elderly patients who were admitted to the emergency department by traffic accident, 66.2% (n = 135) were the drivers (Table 1).

Table 1. Sociodemographic characteristics of patients and characteristics of traffic accidents

	%	n
Age		
65–74.9 years	61.3	125
75 years and over	38.7	79
Sex		
Female	35.3	72
Male	64.7	132
Driver	66.2	135
Not driver	33.8	69
Accident location		
City center	82.3	168
Outside the city	17.7	36
Mortality	4.4	9
Intensive care unit hospitalization	6.9	14

When the accident occurring time were examined, it was found that 3.9% (n = 8) occurred between 00.00 and 05.59 hours, 28.4% (n = 58) occurred between 06.00 and 11.59 hours, 40.7% (n = 83) occurred between 12.00 and 17.59, and 27.0% (n = 55) occurred between 18.00 and 23.59 hours (Figure 1). Seasonally, 13.7% (n = 28) of the accidents occurred in winter, 31.4% (n = 64) occurred in spring, 29.90% (n = 61) occurred in summer, and 25.0% (n = 51) occurred in autumn. There was a significant difference between the seasons ($p < 0.001$) (Figure 2). However, there was no significant relationship between the seasons and mortality ($p = 0.422$). When time and season are evaluated together, accidents occurred most frequently between 06.00 and 11.59 hours during winter months, but between 12.00 and 17.59 hours in other seasons. There was a statistically significant difference between the seasons and time ($p < 0.001$).

While 5.9% (n = 12) of the patients had no injuries at any part of the body, 93.1% (n = 190) had an injury at one or more parts of the body. Analysis of trauma sites revealed that 35.3% (n = 73) of the patients had a chest injury, 34.8% (n = 71) had a lower extremity injury, 31.4% (n = 64) had a facial injury, 30.9% (n = 63) had a head injury (excluding the face), 25.5% (n = 52) had an upper extremity injury, 6.9% (n = 14) had an abdominal or pelvic injury, 5.9% (n = 12) had a neck injury, and 5.9% (n = 12) had a spinal injury (Table 2).

Table 2. Classification of patients according by trauma site (n = 204)*

Body area	n	%
No lesion	14	6.9
Face	64	31.4
Head	63	30.9
Neck	12	5.9
Upper extremity	75	35.3
Chest	52	25.5
Abdomen or pelvis	14	6.9
Vertebrae	12	5.9
Lower extremity	71	34.8

* Some patients had multiple sites of trauma.

Of the patients aged 65 years and older, 4.4% (n = 9) were dead when they were accepted to the emergency department.

Six point nine percent (n = 14) were hospitalized in the intensive care unit. There was no significant relationship between age and the intensive care unit hospitalization rates (p = 0.167). In total, 43.6% (n = 89) of the patients were referred to 17 different clinics. Of them, 16.7% (n = 34) were referred to the orthopedics, 8.3% (n = 17) were referred to the neurochirurgie, 5.4% (n = 11) were referred to the thoracic surgery department, and 2.5% (n = 5) were referred to the chest diseases department. In total, 56.4% (n = 115) of the patients were discharged from the emergency department by recovery (Table 3).

There wasn't any relationship between age and mortality (p = 0.346). The mortality rate was 12.7% (n = 8) in the patients with head trauma (p < 0.001). Among accidents, 82.4% (n = 168) occurred in the city center and 17.6% (n = 36) occurred outside the city.

The neck trauma rate was higher (13.9%) in traffic accidents which occurred out of the city than the accidents (4.2%) that occurred at the city center (p = 0.040).

Table 3. Classification of patients according to referral status (n = 204)

	%	n
No referral	56.4	115
Orthopedics	16.6	34
Brain surgery	8.2	17
Chest surgery	5.3	11
Pulmonology	2.5	5
Plastic surgery	1.5	3
Cardiology	1.0	2
Reanimation	1.0	2
Nephrology	1.0	2
Ophthalmology	1.0	2
Ear, nose, and throat	1.0	2
Urology	1.0	2
General surgery	1.0	2
Internal medicine	0.5	1
Infectious diseases	0.5	1
Hematology	0.5	1
PMR	0.5	1
Neurology	0.5	1
Total	100	204

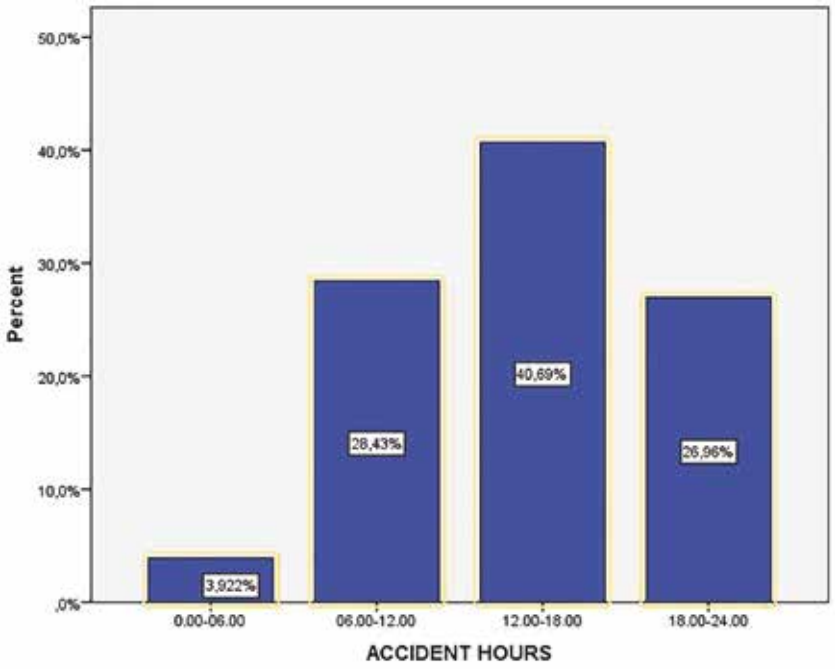

Figure 1. Distribution of traffic accidents by time of day

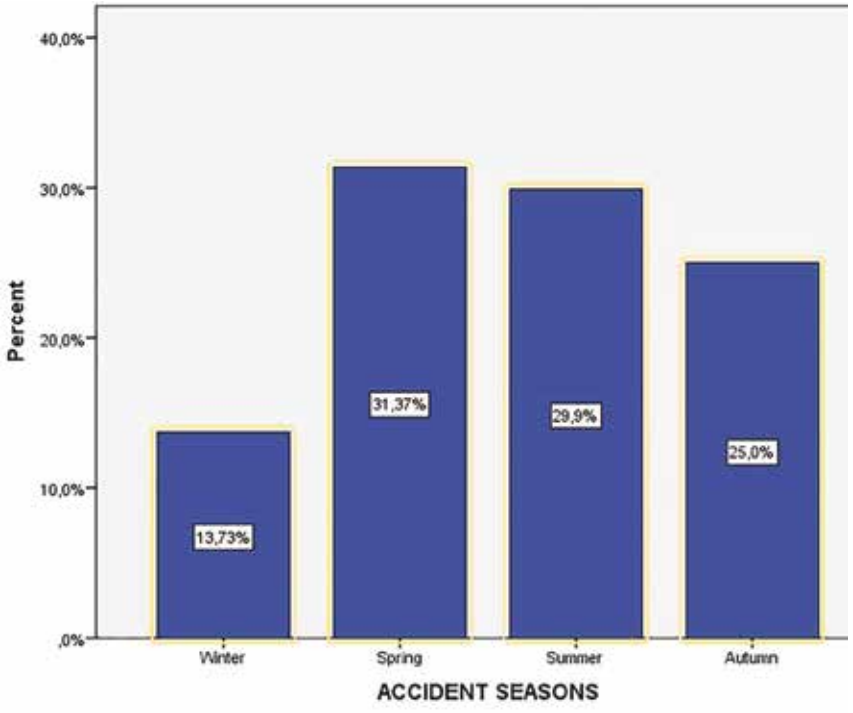

Figure 2. Distribution of traffic accidents by season

DISCUSSION

In this study, the rate of geriatric patients who were admitted to the emergency department due to a traffic accident was 6.40% of all traffic accident diagnosed patients for last 1-year period. This rate varies between 3.9% to 25.2% in different studies (2, 9-16). As the elderly people proportion is increasing all over the world, the rate of elderly people injured in traffic accidents is correspondingly on the rise.

The increase in mortality due to traffic accidents is undoubtedly a major health problem in this group. It is stated that the most important factors affecting mortality due to a traffic accident in the geriatric period are comorbid diseases and reduced physiological reserve (17). In a study that compared the results of traffic accidents in young and elderly people, the mortality rate was significantly higher (15.5%) in elderly casualties than in young casualties (8.8%) (12). In similar studies conducted in the literature, this rate has been found to be 8.8% (18), 10.1% (9), 16.9% (1), and 27.8% in elderly (15). In our study, the mortality rate in the elderly patients who were admitted to the emergency department due to a traffic accident was 4.4%, slightly less than the other studies.

Other factors affecting mortality are whether the casualty was a pedestrian or a driver, and vehicle characteristics if the casualty was a driver. In a study conducted in Turkey, it was reported that 44.1% of elderly casualties were pedestrians (2). In a similar study conducted in Iran, 40.5% of elderly casualties were pedestrians, 22.1% were car occupants, 19.1% were motorcyclists, and 7.7% were bicyclists. The mortality rates were highest in the pedestrians and motorcycle/bicycle users among these (10). In a study conducted in Turkey, it was determined that mortality rates did not change as a result in vehicle and out of vehicle traffic accidents (18). Although elderly pedestrians represent 13% of the population in Australia, they comprise 36% of pedestrian deaths and 15% of serious injuries (12,16). However, it was reported in the United States that deaths due to traffic accidents occur as a result of motor vehicle collisions instead of pedestrians (12). In a study conducted in Saudi Arabia, the mortality rate in pedestrians was found to be statistically significantly higher among elderly people, while the mortality rate in other vehicle traffic accidents did not differ between young and elderly people (13). In our study, interestingly, 66.2% of the elderly patients were drivers, which is a very high rate compared to other available studies.

In the literature, intensive care unit hospitalization rates ranged from 1.6% to 11.9% (12,15,19). In our study, the intensive care unit hospitalization rate was 6.9% in the casualties, compatible with the literature.

In our study, when we looked at the trauma sites in the body, 35.3% of the patients had a chest injury, 34.8% had a lower extremity injury, 31.4% had a facial injury, 30.9% had a head injury (except the face), 25.5% had an upper extremity injury, 6.9% (n = 14) had an abdominal or pelvic injury, 5.9% had a neck injury, and 5.9% had a spine injury. In another study, it was found that 23.4% had a chest injury, 22.9% had a head and neck injury, 21.6% had an extremity or pelvic injury, 8.1% had an abdominal or pelvic injury, and 5.4% had a facial injury (12). In a study performed in Iran, it was reported that trauma occurred most frequently in the head and neck region (24.9%), lower extremities (20.1%), and upper extremities (18.1%). In a study performed in Bolu, it was reported that trauma occurred most frequently in the head region, facial area, and upper extremities (10,20).

Mortality and morbidity rates also vary with injury site. In our study, while the mortality rate was 12.7% in those with head trauma, it was 0.7% in those without head trauma. Similarly, in two different studies conducted in Bursa, the mortality rate was significantly higher in those with head trauma (18.2%) than in those with other traumas (21,22). This is due to the fact that the probability of brain stem and brain damage is increased after head trauma. Unlike these reports, in a study conducted in Singapore it was found that morbidity and mortality rates were higher in those with chest trauma than in those with other traumas. However, in this study, the motorcycle accident rate was low in elderly casualties and thus it was not included in the statistical calculations (12).

In our study, of the traffic accidents, 82.4% (n = 168) occurred in the city center and 17.6% (n = 36) occurred outside the city. While the incidence of neck trauma was 13.9% in traffic accidents that occurred outside the city, it was 4.2% in traffic accidents that occurred in the city center. It may be an influencing factor that mild cases were treated without the need of a referral in district hospitals and severe cases were referred to our hospital. In a study performed in Germany, it was found that injuries in intercity roads are more frequent (23). This may be due to the fact that the speed limit is higher outside the city.

In a similar study conducted in Sivas, traffic accidents occurred most frequently in the summer (44.7%), autumn (26.9%), spring (14.2%) and winter (14.2%) (24). In another study conducted in Sivas, it was emphasized that traffic accidents increased significantly in frequency during the summer months and that more care should be taken in the summer (24). In our study, traffic accidents occurred most frequently in the spring, followed by summer, then autumn, and then winter. No significant relationship between the seasons and mortality was found in our study. However, it was determined in similar studies carried out in Iran and Diyarbakir that the rate of fatal traffic accidents was higher during the summer months (25,26).

In the present study, it was determined that traffic accidents occurred most frequently between 12.00 and 17.59 (40.7%) hours, followed by between 06.00 and 11.59 (28.4%), and between 18.00 and 23.59 (27%) hours. In a study performed in Iran, it was reported that there has been a steady increase in fatal accidents between 15.59 and 00.00. While deaths were more frequent between 20.00 and 23.59 and between 00.00 and 03.59 during the spring and summer months, they were more frequent between 12.00 and 15.59 during the autumn and winter months (25).

Although this study has strengths such as being conducted in one of the largest and most frequently referred to hospitals in the Central Anatolia Region, a limitation is the lack of information due to incomplete filling of patient information forms and judicial reports. The fact that we do not pay attention to records, which is a general problem in our country, limits the ability to reach more detailed conclusions. One of the implications of this study is how important it is for patient records to be taken properly.

In conclusion, the rate of elderly people injured in traffic accidents is increasing along with the increasing geriatric populations all over the world. Mortality and morbidity rates due to traffic accidents are higher in elderly people than in young people. In addition to diminished hearing and sight in elderly people, slowed motion and reactions increase the risk of traffic accidents.

The results of our study support the reassessment of driver adequacy, especially in groups over 65 years old. It is necessary to increase road safety measures for elderly people and to develop early and effective intervention strategies after a traffic accident. We think that new strategies are needed to prevent traffic accidents and to treat elderly patients after a traffic accident.

REFERENCES

1. Beğer T, Yavuzer H. Ageing and Its Epidemiology. Journal of Clinical Development 2012;25(3):1-3. (in Turkish).

2. Eser M, Keten A, İçme F, Kılınç İ, Keten HS. Investigation of traffic accidents in geriatric age group. Turkish Journal of Geriatrics 2013;16(3):277-80. (in Turkish).

3. Elderly Statistics 2015. Turkish Statistical Institute. [Internet] Available at: http://www.tuik.gov.tr/IcerikGetir.do?istab_id=265. Accessed on December 19, 2016. (in Turkish).

4. Kara H, Bayir A, Ak A, Akinci M, Tufekci N, Degirmenci S et al. Trauma in elderly patients evaluated in a hospital emergency department in Konya, Turkey: a retrospective study. Clin Interv Aging 2014;9:17-21. doi: 10.2147/CIA.S56542.

5. Sungur İ, Akdur R, Piyal B. Analysis of Traffic Accidents in Turkey. Ankara Medical Journal 2014;14(3):114-24. (in Turkish).

6. Altay B, Çavuşoğlu F, Çal A. Health perception and quality of life of the elderly and factors affecting health related quality of life. TAF Prev Med Bull 2016;15(3):181-9. (in Turkish).

7. Fehminaz T, Özcebe H. Road traffic accidents in Turkey. STED. 2006;15(11):192-200. (in Turkish).

8. Işık AF, Demirel B, Şenol E. Are The Reported Causes Of Death. Turkish Clinics J Foren Med 2004;1(1):1-11. (in Turkish).

9. Atilla Ö, Çalıkan F, Aksay E, Doğan T, Eyler Y, Akın Ş. Clinical Factors in Geriatric Blunt Trauma. Tr J Emerg Med. 2012;12(3):123–128.

10. Tanrıkulu CŞ, Tanrıkulu Y. Trauma Analysis in Geriatric Population: Cross-sectional study. New Medical Journal 2013;30(2):100-4. (in Turkish).

11. Etehad H, Yousefzadeh-Chabok S, Davoudi-Kiakalaye A, Moghadam Dehnadi A, Hemati H, Mohtasham-Amiri Z. Impact of road traffic accidents on the elderly. Arch Gerontol Geriatr 2015;61(3):489-93. (PMID:26321733).

12. Lee WY, Cameron PA, Bailey MJ. Road traffic injuries in the elderly. Emergency Medical Journal 2006;23(1):42-6. (PMID:16381081).

13. Alghnam S, Palta M, Hamedani A, Alkelya M, Remington PL, Durkin MS. Predicting in-hospital death among patients injured in traffic crashes in Saudi Arabia. Injury 2014;45(11):1693-9. (PMID:24950798).

14. Ng W, Fujishima S, Suzuki M, Yamaguchi K, Aoki K, Hori S, Aikawa N. Characteristics of elderly patients presenting to the emergency department with injury. Keio J Med 2002;51(1):11-6. (PMID:11951373).

15. Safih MS, Norton R, Rogers I, Gardener JP, Judson JA: Elderly trauma patients admitted to the intensive care unit are different from the younger population. N Z Med J 1999;112(1098):402-4. (PMID:10606402).

16. Transport Accident Commission (Australia). Older Drivers Available at http://www.tac.vic.gov.au/road-safety (accessed January 2017).

17. Perdue PW, Watts DD, Kaufmann CR, Trask AL. Differences in mortality between elderly and younger adult trauma patients: geriatric status increases risk of delayed death. J Trauma 1998;45(4):805-10. PMID: 9783625

18. Özdoğan M, Ağalar F, Daphan ÇE, Topaloğlu S, Çakmakçı M. Factors affecting mortality and morbidity in geriatric trauma. National Journal of Trauma 1999;5(8):189-93. (in Turkish).

19. Akay S, Akay H, Erkan N. Mortality After Traffic Accidents Of Elderly Age Groups Defined By World Health Organization Categorization. Turkish Journal of Geriatrics 2015;18(3):189-93. (in Turkish).

20. Korkmaz T, Kahramansoy N, Erkol Z, Sarıçil F, Kılıç A. Evaluation of the Forensic Cases Admitted to the Emergency Department and the Forensic Reports. Medical Bulletin of Haseki 2012;50(1):14-20. (in Turkish).

21. Güneytepe Üİ, Akköse Aydın Ş, Gökgöz Ş, Özgüç H, Ocakoğlu G, Aktaş H. Factors Affecting Mortality in Elderly Trauma Cases and Scoring Systems. Journal of Uludag University Faculty of Medicine 2008;34(1):15-9. (in Turkish).

22. Aydın Ş, Bulut M, Fedakar R, Özgürer A, Özdemir F. Trauma in the elderly patients in Bursa. Turkish Journal of Trauma and Emergency Surgery 2006;12(3):230-4. (in Turkish).

23. Ernstberger A, Joeris A, Daigl M, Kiss M, Angerpointner K, Nerlich M, et al. Decrease of morbidity in road traffic accidents in a high income country-an analysis of 24,405 accidents in a 21 year period. Injury 2015;46(4):135-43. (PMID:26542860).

24. Varol O, Eren ŞH, Oğuztürk H, Korkmaz İ, Beydilli İ. The Investigation of the Patients Admitted to the Emergency Department due to a Traffic Accident. Journal of Cumhuriyet University Faculty of Medicine 2006;28(2):55-60. (in Turkish).

25. Heydari ST, Sarikhani Y, Moafian G, Aghabeigi MR, Mahmoodi M, Ghaffarpasand F, et al. Time analysis of fatal traffic accidents in Fars Province of Iran. Chin J Traumatol 2013;16(2):84-8. (PMID:23540895).

26. Gören S, Subaşı M, Tıraşçı Y, Kaya A. Traffic-Related Deaths. Turkish Clinics Journal of Forensic Medicine 2005;2(1):9-13. (in Turkish).