ATILLA SENIH MAYDA, Ph.D.
E-mail: atillasenihmayda@duzce.edu.tr
MUAMMER YILMAZ
E-mail: muammery76@mynet.com
FILIZ BOLU
E-mail: drfiliz@yahoo.com
Public Health Department
Düzce University, Medical Faculty
Konuralp Yerleşkesi, 81620 Düzce, Turkey
MUSTAFA USLU, Ph.D.
E-mail: mustafauslu74@hotmail.com
Orthopaedics and Traumatology Department
Düzce University, Medical Faculty
Konuralp Yerleşkesi, 81620 Düzce, Turkey
NURAY YEŞILDAL, Ph.D.
E-mail: nryyesildal@hotmail.com
Public Health Department
Düzce University, Medical Faculty
Konuralp Yerleşkesi, 81620 Düzce, Turkey

Safety and Security of Traffic
Preliminary Communication
Submitted: Aug. 1, 2013
Approved: May 21, 2014

MORTALITY RATES OF TRAUMATIC TRAFFIC ACCIDENT PATIENTS AT THE UNIVERSITY HOSPITAL

ABSTRACT

The aim of the study is to estimate hospitalization and mortality rates in patients admitted to the University Hospital due to traffic accidents, and to determine the mean cost of the applicants in the hospital due to traffic accident. In this retrospective study data were obtained from the records of a university research and practice hospital. There were 802 patients admitted to emergency and other outpatient clinics of the University Hospital because of traffic accidents throughout the year 2012. Out of these patients, 166 (20.7%) were hospitalized, and the annual mortality rate was 0.87%. The total cost was 322,545.2 euro and 402.2 euro per patient. Road traffic accident detection reports covered only the numbers of fatal injuries and injuries that happened at the scene of accidents. Determination of the number of the dead and wounded with overall mortality rate would be supposed to reveal the magnitude of public health problem caused by traffic accidents.

KEY WORDS

road traffic accidents; mortality rate; University Hospital

1. INTRODUCTION

Worldwide, 1.3 million people die and 20-50 million are injured each year due to traffic accidents. According to the World Health Organization (WHO) data collected from 178 countries, the traffic accidents are the ninth most common cause of death among all age groups, and the third most common cause of death for those between the age of 5 and 44. Unless effective precautions are put into practice, traffic accidents are predicted to become the fifth most common cause of all casualties in 2030 with the number of 2.4 million casualties per year, as result of insufficient road safety strategies and land usage plans and the rapidly increasing number of vehicles in traffic. The same report also reveals that over 90% of the traffic-related mortalities are reported from nations with low or moderate incomes despite having only 48% of the world's total vehicles. Although the mortality rates of traffic accidents have shown a tendency to decrease within the last 20 years in developed countries, it is still the major cause of death, injury and disability [1]. These data show that traffic accidents are an important problem worldwide.

Traffic accidents are also a major public health problem in Turkey. The number of traffic accidents and related injuries increase daily. In Turkey, the incidence of people involved in a traffic accident with injury or death was 91 per ten thousand in 1985 (population: 60 million, death + injury = 54,535), 182 per ten thousand in 1995 (population: 66 million, death + injury = 120,323), and 295 per ten thousand in 2010 (popula-

tion: 73 million, death and injury = 215,541). Despite the increase in the number of traffic accidents and the number of people injured in these accidents in Turkey between 2002 and 2011, the total number of deaths, the number of deaths per hundred thousand vehicles and the number of deaths per hundred thousand has decreased, especially after 2007. The rate of traffic accident involvement among the population has nearly doubled. Increase in the number of people injured and involved in traffic accidents makes the information of the outcome of the injured important [2]. The frequency rates reported here are related not only to the complaints or symptoms as in regular diseases, but directly to the frequency of injuries and deaths. As compared to diseases or disease groups, traffic accidents are much more severe and common health problem [3].

Although the common accepted definition of "Dead" is one who dies at the time of the accident or within 30 days following the accident, there are countries that use different definitions. This definition includes different times that vary from seven days to a year. Therefore, no rational comparison can be made between different countries. People who are injured in traffic accidents are followed up for seven days in the Netherlands and Latvia, thirty days in Germany, Austria, Belgium, Finland, Spain, Sweden, Switzerland, Iceland and Japan, and for an indefinite period in Korea and Hungary. Therefore, the deaths observed during hospital stay following traffic accidents and even after discharge are reflected in the statistics of traffic accidents [4, 5].

In Turkey, 1,053,346 traffic accidents were observed in 2009 and 1,228,928 were observed in 2011 [2]. During the 10-year period between 2002 and 2011, the number of accidents increased from 439,958 to 1,228,928. Despite this increase, the number of deaths decreased from 4,169 to 3,835 [2]. In 2012, there were 1,296,636 traffic accidents observed, 3,750 people died, and 268,102 people were injured [6]. There is no available data on the number of deaths among the people injured.

According to the distribution of traffic accidents in cities, the statistics in 2011 show that Istanbul, Ankara and Antalya were the first three cities on the list of traffic accident frequencies, with 13,887, 10,318, and 6,037 accidents, respectively. In Düzce, where this study was conducted, 898 accidents were reported in 2011, 20 people died and 1,725 people were injured [2]. According to police records, 19 people died and 1,585 were injured due to traffic accidents in the urban area of the Düzce in 2012 (6).

In Turkey, Road Traffic Accident Statistics are collected and published as reviews by the Turkish Statistical Institute (TSI) from data received by the General Directorate of Security (EGM) and the Gendarmerie General Command, in accordance with the Road Traffic Act No. 2918 [7]. These reviews only reflect the current status of events. Those who die while being transported to the hospital, during or after hospitalization are not included in the data pertaining to deaths due to traffic accidents by the TSI. The number of deaths and injuries mentioned above are obtained from the Traffic Accident Detection Records. The number of deaths and injuries obtained from these reports refer to the time of the accident. Since traffic accident-related deaths may be observed even 30 days after the accident, it is not possible to accurately assess the number of deaths due to traffic accidents in Turkey based on the traffic accident detection reports [8]. The mortality rates should be calculated for those who are injured.

The aim of this study was to calculate the mortality rates of people who were admitted to hospitals due to traffic accidents, and to evaluate the extent of the difference between the number of deaths caused by traffic accidents and the reports that reveal the death status at the time of the accident.

2. MATERIALS AND METHODS

The scope and samples of this descriptive study included the records of 802 patients that were admitted to the University Hospital due to traffic accidents. The records were obtained from the Information Technologies Department of the hospital.

The patient variables of this study included gender, age, department of admission, unit of hospitalization, diagnoses, departments of consultation requests, examination results and the health care costs. The diagnoses had been recorded according to ICD 10.

The SPSS statistical package program was used for the analysis of the data (SPSS® v13). Differences in the quantitative data between groups were evaluated by the chi-square test. Differences in the qualitative data between groups were evaluated by the significance test between means and variance analysis was used if the number of groups was more than two. A p value of <0.05 was accepted as the limit of statistical significance in all tests.

3. RESULTS

A total of 802 patients were admitted to the emergency unit and other clinics of the study center due to "traffic accidents" in 2012. A hundred and sixty six (20.7%) of them were hospitalized. *Table 1* includes the age and gender distribution of these patients. Of the patients 551 (68.7%) were male and 251 (31.3%) were female. There were 111 patients (13.8%) in the 25-29 age group, 102 patients (12.7%) in the 34-39 age group and 93 patients (11.6%) in the 20-24 age group. The distribution of gender according to the age

Table 1 - Patients per age and gender groups due to traffic accident in the University Hospital in 2012.

Age groups	Gender				Total	
	Male		Female			
	Number	%	Number	%	Number	%*
0-4	4	28.6	10	71.4	14	1.7
5-9	25	65.8	13	34.2	38	4.7
10-14	14	60.9	9	39.1	23	2.9
15-19	68	78.2	19	21.8	87	10.8
20-24	66	71.0	27	29.7	93	11.6
25-29	78	70.3	33	29.7	111	13.8
30-34	55	65.5	29	34.5	84	10.5
35-39	81	79.4	21	20.6	102	12.7
40-44	30	55.6	24	44.4	54	6.7
45-49	38	73.1	14	26.9	52	6.5
50-54	28	65.1	15	34.9	43	5.4
55-59	22	68.8	10	31.3	32	4.0
60-64	20	60.6	13	39.4	33	4.1
65 - over	22	61.1	14	38.9	36	4.5
Total	551	68.7	251	31.3	802	100.0

**Column percentage, x^2=27.42, p=0.011*

groups was found to be similar (x^2=27.42, p=0.011). While the rate of males in the 0-4 age group was 28.6%, the rate for males was higher than for females in other age groups.

The mean age of 802 traffic accident patients admitted to the emergency room and other departments was 33.6±0.6 (mean ± SD). The mean age was 33.3±0.7 among men and 34.2±1.1 among women. The mean age according to gender was not found to be different (t=-0.69, p=0.49). The mean age in the outpatient group which included 636 patients was 33.3±0.6, and it was 34.7±1.4 in the hospitalized group which included 166 patients. The means of the groups were found similar (t=-0.96, p=0.34).

The distribution of health insurance among patients was as follows: Turkish National Health Insurance: "SSK": 508 (63.3%), "Bag-Kur": 73 (9.1%)," E.S.": 68 (8.5%), Green Card (given by government to very low income families or ones unable to work): 55 (6.9%) and others: 98 (12.2%).

Seven of the 802 admitted patients died. The mortality rate was 0.087%. The mortality rate among the hospitalized patients was 3.0%. The addresses of the patients who died were Düzce in 4, Sakarya in 1, Erzurum in 1 and abroad in 1. These 7 patients were all first admitted to the Emergency Unit. *Table 2* shows features of the patients who died. Six of these patients were male (85.7%), two were (28.6%) younger than 18 years of age and one was (14.3%) older than 65 years of age. Two of these patients were recorded as "dead" before they were even admitted to the Emergency Unit. Two of the remaining five patients lost their lives in the Pediatrics Intensive Care Unit, two in the Reanimation Unit (Intensive Care), and one in the Chest Surgery Unit. The expression "dead" was used on the first admission for two patients. In the remaining five patients, the duration between admission and recorded death was between five minutes and thirteen days.

The total number of hospital records for the 802 patients was 1,857, out of which 1,594 were for outpatients and 263 were for hospitalized patients. In 2012, the number of repeat hospital visits of outpatients ranged from one to 37 with a mean of 1.9±0.09 (mean±standard deviation). This range for hospitalized patients was from one to six with a mean of 1.5±0.07 (mean±standard deviation).

Table 3 shows the units of admission into the hospital. The most frequent departments of admission were the adult emergency unit: 794 times (42.8%), the orthopaedic clinics: 562 times (30.3%)] and the orthopaedic and traumatology Unit: 134 times (7.2%).

Table 4 shows the diagnoses of the traffic accident patients at admission in 2012. A total of 2,258 diagnoses were made for the patients admitted to the Düzce University Hospital. The most frequent diagnoses were: V49.6: injury in a traffic accident due to presence in the vehicle: 551 (24,4%), S82.2: tibial shaft fracture: 171 (7.6%), Z04.1: post-accidental examination and follow-up: 152 (6,7%), M79.9: soft tissue injury, undefined: 100 (4,4%), V79.9: traffic accident injury including bus passenger, undefined (any one): 80 (3.5%), femur fracture: 68 (3.0%)].

A total of 520 consultations were requested for 802 patients. Among these, 287 (55.2%) were com-

Table 2 - Some characteristics of the patients 'who died' due to traffic accident in the University Hospital in 2012

Age	Gender	First admission date	Death registration date	Location	Diagnosis
39	Male	21 March Hour 07.00	21 March Hour 07.00	Emergency department	V87 Undefined traffic accident
58	Male	30 May Hour 15.47	30 May Hour 15.47	Emergency department	V49.6 Undefined by a traffic accident injury in a car crash
56	Male	11 November Hour 14.54	19 November Hour 16.30	Chest surgery department	V09.2 Pedestrian injury, J93 Pneumothorax, J96 Breath shortness, S27.2 Traumatic heumopneumothorax
11	Male	23 September Hour 14:56	23 September Hour 16.10	Pediatric intensive care unit	V09.2 Pedestrian injury, S72 Femoral fracture, G93.6 Brain oedema, V09.3 Pedestrian injury, undefined traffic accident
15	Male	21 August Hour 23.17	21 August Hour 23.22	Pediatric intensive care unit	I62.0 Acute subdural hemorrhage (non-traumatic), V09.3 Pedestrian injury,
67	Male	8 October Hour 02.10	12 October Hour 02.18	Reanimation and intensive care unit	V49.6 Undefined by a traffic accident injury in a car crash, I48 Atrial fibrillation and flutter, J96.9 Breath shortness, J94.2 Heumotohorax, S82.3 Distal tibia fracture, S82.2 Tibia shaft fracture, S82.1 proximal tibia fracture, N17.8 Acute renal failure
47	Male	10 July Hour 14.45	23 July Hour 13.38	Reanimation and intensive care unit	V59.5 Traffic accident injury, J96 Breath shortness, S36.51 Colon injury, V09.3 Pedestrian injury

Table 3 - Departments admitting patients due to traffic accident in the University Hospital in 2012

Unit	Number	%
Emergency (Adult)	794	42.8
Orthopaedics and traumatology outpatient clinic	562	30.3
Orthopaedics and traumatology department	134	7.2
Plastic and aesthetic surgery outpatient clinic	116	6.2
Neurosurgery outpatient clinic	39	2.1
Neurosurgery department	28	1.5
Plastic and aesthetic surgery department	21	1.1
Chest surgery outpatient clinic	21	1.1
Ophthalmology outpatient clinic	20	1.1
Intensive care unit	18	1.0
Other	104	5.6
Total	1,857	100,0

pleted, 223 (42.9%) were rejected, and 10 (1.9%) were indicated as "follow-up".

The mean hospital cost for 1,460 admissions was 47.4±1.5 (mean±standard deviation) euros. The mean cost of hospitalized for 261 patients was 970.5±89.4 euros. The mean costs of the outpatients and hospitalized patients were different ($t=24.3$, $p<0.001$). The total billing was 322,545.2 euros. This relates to 402.2 euros per patient for 802 patients.

4. DISCUSSION AND CONCLUSION

In this study, the total mortality rate of patients admitted to hospitals due to traffic accidents was found

Table 4 - Diagnoses of the patients due to traffic accident in the University Hospital in 2012

Diagnosis	N	%
V49.6 Undefined by a traffic accident injury in a car crash	551	24.4
S82.2 Tibia shaft fracture	171	7.6
Z04.1 Observation and examination of the patient after traffic accident	152	6.7
M79.9 Soft tissue disorders, undefined	100	4.4
V79.9 Injury due to traffic accident in a bus, undefined	80	3.5
S72 Femur fracture	68	3.0
S72.3 Femur shaft fracture	49	2.2
S82.0 Patella fracture	39	1.7
S82.1 Proximal tibia fracture	35	1.6
S02.6 Mandibular fracture	31	1.4
S52.5 Distal radius fracture	26	1.2
S42.0 Clavicle fracture	25	1.1
S91.3 Open foot soft tissue injury	24	1.1
R51 Head pain	24	1.1
S42.3 Humerus shaft fracture	23	1.0
S32.4 Acetabulum fracture	21	0.9
S29.9 Chest injury, undefined	20	0.9
S42.2 Proximal humerus fracture	19	0.8
H01.0 Blepharitis	15	0.7
Others	785	34.7
Total	2,258	100.0

to be 8.7/1,000, and 3.0% for patients that were hospitalized. In a study conducted in 2006 in Ankara, it was reported that out of the total of 1,346 traffic accident-related injury cases that were taken to the emergency units and pediatric emergency units, 2.9% died [9]. In a study conducted of over 1,300 patients at the Cumhuriyet University Hospital Emergency Unit, it was reported that 3.1% died, 21 patients died at different clinics and 15 died in the emergency department [10]. In this study, the mortality rate in patients admitted to our hospital due to traffic accidents was found to be lower than that observed in the studies of Ankara or Sivas [9, 10].

According to the EGM data for Düzce a total of 19 people had died and 1,585 people were injured in traffic accidents [6]. These numbers reflect the Traffic Accident Detection records taken after the accident. In the number of deaths caused by traffic accidents in 2012 would be 26 not 19 by just adding the hospital data acquired for this study. It was observed that in the same city, there are four inpatient treatment institutions serving as hospitals, which increases the total sum by 36.8%. When the mortality rates obtained from 802 patients of our study were multiplied by 1,585 [6] the total number of injuries in the city, it was understood that about 14 deaths more can be further added to the number of deaths at the time of the accident. With this, it was understood that the number of deaths due to traffic accidents in this city was 73.7% higher than the number reported by the Accident Detection Records. People injured in the traffic accidents were taken to the nearest hospital, and in this case, it is estimated that the mortality rates would not be affected by the hospitals they were taken to.

A total of 3,750 deaths were observed in Turkey in 2012. According to the Accident Detection Records, the number of injuries was 268,102 [6]. When compared to similar studies [9, 10], the mortality rates in this study were lower, and it is estimated that 2,332 patients injured in traffic accidents may have died. This means that the actual number of deaths may be 6,082 with a 62.2% increase. In many countries, the deaths within 30 days following traffic accidents are accepted to be related to the accident, and the death rates are 15% higher [11].

Furthermore, if the 8.7/1,000 mortality rate in this study is applied to the data in Turkey, the mortality rate increases to 223.7/10,000 from 137.9/10,000 [2]. In this study, 85.7% of the patients who died were male, two were (28.6%) younger than 18 years of age, one was (14.3%) older than 65 years of age. In a study, similar to this study, the patients involved in traffic accidents who were taken to hospitals were found to be commonly males in the young age group [9]. In another study, patients were found to be commonly male and in the advanced age group [10]. In this study, two of the patients died within the first minutes in the emergency unit and in case of the remain-

ing five, the duration between first admission and time of death was between 5 minutes and 13 days. In a study conducted in Ankara, 21 (53.8%) of the deaths were observed in the subsequent day of the traffic accident, 8 of them (20.5%) were observed between the 1st and the 7th day and 10 of them (25.7%) were observed between the 8th and the 30th day [9]. The average number of admission to out-patient facilities by traffic accident patients was 1.9 times, with 37 times being the maximum and this average was found to be 1.5 times with a maximum of 6 times for hospitalized patients. This shows that treatment after traffic accidents is not performed just once, but repeatedly. The most frequent departments of admission due to traffic accidents with the complaints of "traffic accident injury from presence in a vehicle", "tibia shaft fracture", "soft tissue injury" and "femur fracture" were the adult emergency unit and the orthopaedic and traumatology clinics. The most frequently found injuries in the Sivas study were head-neck and extremity injuries where 54.2% of patients were discharged after treatment in the emergency unit, 8.5% were hospitalized in the orthopaedics unit and 8.2% were hospitalized in the neurosurgery unit [10]. In another study, the most frequent bone fractures were of the femur, tibia and/or fibula, vertebra and radius [12]. In all three studies, the main problems were orthopaedic ones and the departments of treatment were similar.

The top three health insurance statuses of patients included in this study were Bagkur, E.S, and Green Card. In a study of patients with traffic accident-related injuries in the emergency unit of the university hospital in Izmir, 66.6% of the patients were found not to have health insurance [13]. This study was conducted in Izmir in 2001, and had quite low rates of social insurances. The high rates observed in our study may be due to the widened scope of national health insurance services between now and then.

The mean hospital cost for the 1,460 admissions was 47.4±1.5 (mean±standard deviation) euros. The mean cost of hospitalization for 261 patients was 970.5±89.4 euros. The total billing was 322,545.2 euros. This relates to 402.2 euros per patient for 802 patients. Similar results were obtained in a study conducted in Antalya. This study was conducted on patients injured in motorcycle accidents. The mean treatment costs of the discharged patients, transferred patients and patients who rejected treatment was 53 euros, whereas the mean cost for those who were hospitalized was 853.6 euros. The total health cost of 122 injured patients was 38,507 euros [14]. According to recent estimations on the costs of traffic accidents in the European Union, the cost incurred for each patient who died was €7,000, and the cost referring to each serious injury was €12,000. When considering the European Union as a whole, this cost is several million euros [15].

According to the EGM data regarding traffic accidents, the total material cost of the accidents in 2012 was 464,463,753.3 euros [6]. When the health costs are added to this number, the extent of the economic load will be better understood.

As conclusion, in order to accurately define the number of deaths and injuries, the number of deaths among injuries should also be considered. According to the findings in this study, the patients injured in traffic accidents are admitted to hospitals on the average 1.9 times yearly, and 20.7% are hospitalized on the average 1.5 times yearly. The mean billing for the injured patients was 402.2 euros. In order to accurately determine the number of deaths and injuries related to traffic accidents, a monitoring system should be constructed to determine the accident-related deaths among the injured patients within 30 days following the accidents.

Dr. **ATILLA SENIH MAYDA**
E-mail: atillasenihmayda@duzce.edu.tr
MUAMMER YILMAZ
E-mail: muammery76@mynet.com
FILIZ BOLU
E-mail: drfiliz@yahoo.com
Halk Sagligi A.D.
Düzce Üniversitesi Tip Fakültesi
Konuralp Yerleşkesi, 81620 Düzce, Türkiye
Dr. **MUSTAFA USLU**
E-mail: mustafauslu74@hotmail.com
Ortopedi ve Travmatoloji A.D
Düzce Üniversitesi Tip Fakültesi
Konuralp Yerleşkesi, 81620 Düzce, Türkiye
Dr. **NURAY YEŞILDAL**
E-mail: nryyesildal@hotmail.com
Halk Sagligi A.D.
Düzce Üniversitesi Tip Fakültesi
Konuralp Yerleşkesi, 81620 Düzce, Türkiye

ÖZET

BIR ÜNIVERSITE HASTANESINE TRAFIK KAZASI NEDENIYLE BAŞVURANLARDA MORTALITE HIZI

Bir Üniversite Araştirma Uygulama Hastanesi'ne trafik kazasi nedeniyle başvuranlarda mortalite hizini, yatiş oranini ve trafik kazasi nedeniyle başvuranlarin ortalama maliyetini belirlemektir. Geriye dönük bu çalişmada veriler bir üniversite araştirma ve uygulama hastanesi kayitlarindan alinmiştir. 2012 yili boyunca araştirma ve uygulama hastanesi acil ve diger polikliniklerine trafik kazasi nedeniyle toplam 802 kişi başvurmuştur. Bu hastalarin 166'si (%20.7) hastaneye yatirilmiştir. "Trafik kazasi" nedeniyle başvuran hastalarda bir yillik mortalite hizi %0.87'dir. Toplam kesilen fatura tutari 322 545.2 Euro, hasta başina maliyet ise 402.2 Euro'dur. Trafik kazasi tespit tutanaklarinda sadece kaza aninda meydana gelen ölüm ve yaralanmalar işlenmektedir. Kaza istatistiklerindeki ölü ve yarali sayisinin mortalite hizi ile beraber degerlendirilmesi trafik kazalarinin neden oldugu halk sagligi sorununun büyüklügünü daha iyi ortaya koyacaktir.

ANAHTAR KELIMELER

Karayolu Trafik Kazalari; Mortalite Hizi; Üniversite Hastanesi

REFERENCES

[1] World Health Organization [Internet]. *Global Plan for the Decade of Action for Road Safety 2011-2020* [cited 2012 Dec 5]. Available from: http://www.who.int/roadsafety/decade_of_action/plan/plan_english.pdf

[2] Turkish Statistical Institute. *Traffic Accident Statistics Road 2011*. Ankara: Turkish Statistical Institute Printing Division; July 2012.

[3] **Akdur R.** *Evaluation of traffic accidents in Turkey in the light of epidemiological principles* [in Turkish]. Turkish Journal of Transportation and Traffic Safety. 2012 Aug:1-17.

[4] **Akdur R.** *The importance of traffic accidents in the World and in Turkey* [in Turkish]. Turkish Journal of Transportation and Traffic Safety. 2012; Apr:10-15.

[5] T.C. Ministry of Interior, General Directorate of Security, Traffic Services Department. *Traffic Statistical Yearbook 2002*. Ankara: General Directorate of Security Printing Division; 2003.

[6] T.C. Ministry of Interior, General Directorate of Security, Traffic Services Department, Traffic Education and Research Department [Internet]. *Traffic Statistics Bulletin 2012* [cited 2013 Mar 5]. Available from: http://www.trafik.gov.tr/istatistikler/kaza_istatistik/2012.zip

[7] General Directorate of Highways [Internet]. *Road Traffic Act 2918* [cited 2013 Mar 12]. Available from: http://www.kgm.gov.tr/Sayfalar/KGM/SiteTr/Trafik/Kanun-Yonetmelikler.aspx

[8] **Puvanachandra P**, **Hoe C**, **Ozkan T**, **Lajunen T**. *Burden of Road Traffic Injuries in Turkey*. Traffic Injury Prevention. 2012;13:64-75.

[9] **Demirel B**, **Demircan A**, **Akar T**, **Keles A**, **Bildik F**. *What is the Real Number of Deaths due to Traffic Accidents in Our Country?* [in Turkish]. Pamukkale Medical Journal. 2010;3(2):70-76.

[10] **Varol O**, **Eren ŞH**, **Oguztürk H**, **Korkmaz I**, **Beydilli I**. *Investigation of the Patients Who Admitted after Traffic Accident to the Emergency Department* [in Turkish]. Cumhuriyet Medical Journal. 2006;28(2):55-60.

[11] T.C. Ministry of Transport [Internet]. *Traffic Safety Working Group Report*. 9 Transportation Council. [cited 2013 Feb 28]. Available from: http://www.ulastirmasurasi.org/tr/upload/karayolu_ulastirmasi_komisyonu.pdf

[12] **Bilgin NG**, **Mert E**, **Sezgin M**. *Evaluation of the effects of disabilities due to traffic accidents on the quality of life using SF-36 health survey*. Acta Orthop Traumatol Turc. 2012;46(3):168-173.

[13] **Aktaş EO**, **Koçak A**, **Zeyfeoglu Y**, **Solak I**, **Aksu H**. *Properties of the patients presenting to the Emergency Department of Ege University Faculty of Medicine because of Traffic accidents* [Internet, cited 2013 Mar 5]. Available from: http://www.trafik.gov.tr/icerik/bildiriler/pdf/A5-13.pdf

[14] **Gungor F**, **Oktay C**, **Topaktaş Z**, **Akcimen M**. *Analysis of motorcycle accident victims presented to the emergency department*. Ulus Travma Acil Cerrahi Derg. 2009;15(4):390-395.

[15] World Health Organization Regional Office for Europe [Internet]. *Preventing Road Traffic Injury: A Public Health Perspective For Europe. 2004* [cited 2013 Mar 1]. Available from: http://www.traffic.bilkent.edu.tr/who/at_raporu.pdf