

The Factors Related to Tehran Province Traffic Accident Mortalities in 2011, a Descriptive Study

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Abstract: High social and economic cost of road accidents is the most important subjects for scientific studies in the world. This study was cross-sectional. This study has been designated and implemented in order to examine the situation of fatal accidents in 2011. This study was conducted on mortalities caused by traffic accidents in Tehran province during 2011. The information forms pertaining to traffic accident mortalities maintained by Forensic Medicine Organization were used to collect the data. The collected data were analyzed using SPSS ver. 16 afterwards. 82 percent of the traffic incidents mortalities were males and 18 percent were females. Winter showed the lowest rates of traffic accidents and mortalities. The highest rate of mortalities 26% was related to people between 20 and 29 years old. There are many conclusions obtained from this research, but the most important was the high proportion of traffic accidents in Tehran province during 2011, the number of mortalities in Tehran is still high.

Key words: Accidents • Vehicle • Traffic injury

INTRODUCTION

Traffic accidents are a major health problem in developed and under development countries [1, 2] and are known as the main reason for disabilities and mortalities all around the world [3].

It is estimated that 1.2 million people worldwide lose their lives each year in traffic accidents and 50 million people get injured [4]. The number of injuries and mortalities in traffic accidents are disproportionately high in the countries with lower income, while there only exist 40% of all vehicles in those countries; and the forecasts show that traffic accidents would be the second cause of disabilities in developing countries [5] and third rank cause of mortalities and injuries worldwide by 2020 [6].

A high rate of serious traffic accidents also have been reported in region in recent years [7]. For example, in some countries like United Arab Emirates, the mortalities caused by motor vehicles are higher than industrial countries of North America and Europe [8].

The traffic accidents are being considered the most prevalent causes of disability [9] and the second rank cause of mortalities in Iran [10]. Roudsari et al. showed that 50% of mortalities caused by trauma for under 15 years old people have happened in traffic accidents [11], also the study done by Kadkhodai in Tehran showed that 6552 cases out of 7200 cases of face bone fractures hospitalized in a training hospital [91% of total cases] were caused by traffic incidents [12].

Iran has been facing a near 10 percent increase in number of mortalities and injuries caused by driving accidents over recent years; and the studies show the rate of 30 on 100,000 people for mortalities in year 2000, which is one of the highest rates traffic accident of mortalities among all the countries, this rate is also high in comparison to east Mediterranean region as well [13].

Therefore, considering the importance of this issue, this study has been designated and implemented in order to examine the situation of fatal accidents in Tehran province in 2011.

METHODS AND MATERIAL

This was a study of cross-sectional type. The target population was all mortality cases caused by traffic accidents in 2011. A check list was used to gather traffic accident mortality cases data from the forensic headquarters. The forensic data forms include the data regarding deceased person in which the result of person's situation at the very scene, during transportation to hospital and after being hospitalized in the clinic are recorded in case the person dies of injuries. Some variables including age, sex, education, death location, how the accident happened, type of the vehicle used by deceased person, type of other vehicle, accident location, deceased person's job ... etc have been examined in this study. The collected data were analyzed using SPSS ver. 16 afterwards.

RESULTS

Totally 23249 people lost their lives in traffic accidents in Iran at 2011 and 2273 cases happen in Tehran (10%).

The results show a 4.1 percent increase of urban and suburban mortalities at Iranian year of 2010-2011 in comparison to 2009-2010 (15737 fatalities at 2009-2010 changed to 16382 fatalities at 2010-2011) this rate has been decreased 2.4% in Tehran at the same period (from 873 to 853).

The injury cases caused by driving incidents in the country have totally grown about 6 percent in 2010-2011 relative to 2009-2010 (from 295179 to 312745 cases); this rate was a 4.4% increase for Tehran province (increased from 37740 cases to 39404 cases).

Table 1 shows the demographic data for deceased people. As we can see, the highest rate of mortalities include the 20 to 40 years old group and lower 20 years old group have the lowest mortality rate (Table 1).

82 percent of total mortalities were men and the rest were women (18%), in other words the male to female ratio was about 4.5 to 1.

Examining the frequencies among education levels showed that 80 percent of fatality cases included people with a high school diploma or lower education, which had the highest rate; and deceased people with university degrees had the lowest rate.

Table 2 shows some variables related to traffic accident mortalities in Tehran province. Regarding the relation between number of mortalities and seasons of the

Table 1: Data for traffic accident mortalities in Tehran province at 2011

	Absolute frequency	Relative frequency [%]
Age		
1-19	322	14.2
20-39	922	40.6
40-59	566	24.9
60 and over	463	20.4
Sex		
Male	1856	82
Female	417	18
Education		
Illiterate	385	17
High school or lower	1429	63
University	159	7
Unknown	300	13

Table 2: The factors related to traffic accident mortality rates in Tehran province – 2011

	Absolute frequency	Relative frequency [%]
Season		
Spring	539	24
Summer	654	29
Autumn	619	27
Winter	461	20
Ultimate reason of death		
Several fractures	968	42.6
Head injury	1033	45.4
Bleeding- head injury- several fractures	194	8.5
Other	78	3.5
Death location		
Accident scene	1036	46.3
Hospital	1115	49.8
On the way to hospital	71	3.2
Home	15	0.7
Unknown	36	1.6
Status at the accident		
pedestrian	1009	44.4
Driver	726	31.9
Occupant	461	20.3
Unknown	77	3.4
Vehicle type		
pedestrian	1004	44.17
Sedan	477	20.99
Mini-bus	14	0.62
Autobus	40	1.76
Van	71	3.12
Truck and trailer	52	2.29
Motorcycle	525	23.1
Ambulance	2	0.1
Tractor	2	0.7
Bicycle	16	3.08
Unknown	70	
Road type		
Urban	1391	61
Suburban	798	35
Rural and domestic	84	4

Table 3: Relation between collision type variable and deceased person status 2011 Tehran province

Collision type	Deceased person status				Total
	Driver	Pedestrian	Occupant	Unknown	
Vehicles colliding	524	2	292	54	872
Vehicle colliding with pedestrian	0	1007	0	0	1007
Collision with fixed object	108	0	70	3	181
Overturn	75	0	79	3	157
Downfall	9	0	13	9	31
Catching fire	4	0	12	9	25
Total	720	1009	466	78	2273

year, it was found that the highest frequency of mortalities has happened in summer (29%) and the lowest frequency has happened in winter (20%) (Table 2).

The examination of ultimate reason of death shows that, several fractures and head injuries were the reasons of death in 88 percent of the cases.

Also the death location data showed that 46.3 percent of mortalities occurred at accident scene and 49.8 percent occurred at the hospitals.

Regarding the status of deceased person at the time of accident, it was found out that pedestrian are the most vulnerable group which consist 44.4 percent of total mortalities of traffic accidents in Tehran province.

Examination of vehicle types has shown that motorcycle drivers are at the second rank after pedestrian. They consist 23.1 percent of mortalities. Also Sedan car drivers were the most suffered people in 20.99 percent of the cases.

Regarding the type of the roads, 61 percent of deaths happened on urban roads and 4 percent on rural and dirt roads.

Examination of type of collision and status of deceased person showed that vehicle colliding with pedestrian, vehicle colliding together, Collision with fixed object and vehicle overturn were four most prevalent traffic incidents in Tehran province respectively [Table 3].

DISCUSSIONS

The traffic injuries are on the rise each year and this study shows that the number of male victims is about 4 times more than females who die in traffic incidents. The study conducted by Ferrando showed that men are consisting 62 percent of mortalities in traffic incidents [14].

In a study in India [15] and two separate studies in Turkey have shown that more than 70 percent of incidents were related to men [16, 17]. In Thailand, the number of male who got injured or died because of traffic accidents is 4 to 5 times more than women [18]. It's obvious that

studies in many countries have shown higher rates of injury for men rather than women, but also there has been lots of research on the reasons of this issue which are mainly dangerous behavior of men while driving or crossing the roads.

The average age for injured people in this study is 40 years with deviation of 20.5 for 20-39 years old group which had the highest frequency of mortalities. The average age in Turkish study was 33.11 years with deviation of 16.7 years [19]. Roudsari et al. has reported the average age of 31 years with deviation of 18 years [20]. Also the study done by Wang in china has indicated that 85 percent of driving incidents are created by people between 21 and 45 years old [21]. Ramano et al. confirms that 3 people die each day in Mozambique because of driving incidents. Most of the victims are between 25 and 38 years old while the victims between 16 and 24 will consist the second rank group [22].

Since the people of youth age group are suffering the most from driving accidents; providing adequate trainings for different age groups, a stringent approach to approving driving licenses, using supervisory strategies especially concentrating on high risk age groups can effectively help with decreasing mortalities in several age groups.

The highest frequency of mortalities was pertaining to pedestrian and motorcycle drivers in our presented study. Wells et al. showed that motorcycles lack of visibility, the size of motorbike and the ability of motorcycle to move on the unexpected locations in traffic flow are among the most prevalent causes of this fact [23].

A study by Bernard in Trinidad and Tobago has shown that pedestrian, car occupants and drivers altogether consist 93 percent of fatalities and 94 percent of all injuries, while 42 percent of all mortalities and 34 percent of injuries are done to pedestrian only [24].

These statistics show the special necessity of taking adequate measures for improving safety of this group of road users. These measures of improving pedestrian safety include physical improvement of safety in the

populated areas near the roads, conducting traffic alleviation programs, restrictions for crossing the roads, constructing bridges and safe crossings for pedestrian and conducting training and promotion programs. Regarding improving safety for motorcyclists, we can mention the necessity of recognizing provinces and areas of high accident rates for motorcyclists and conducting special targeted programs for them such as designing new and safer roads according to motorists requirements – especially in critical areas with high number of accidents, traffic alleviating measures, modifying asphalt shoulders for motorcycle traffic and also improving the motorcycle driving training system, providing more training programs, promote and facilitating cyclists with safety tools like safety helmets and special glowing stickers for motorcyclists.

As mentioned before, about 40 percent of fatal accidents had involved two or more vehicles collision to each other. Vehicle overturn is in the next rank for incident type and caused of mortalities. A set of parallel and coordinated action course should be taken in order to harness, decrease and preserve the losses caused by overturn. These measures include speed management enforcement especially on the roads with high overturn frequencies, improving the arcs geometrically, creating warning and vibrating scratches on the roads' surface, improving and enforcing guardrails, creating safe parking lots and stops for stopping and resting, building service and welfare centers to prevent from driver fatigue, reducing the monotony of roads' environment in long distances, improving driver awareness about consequences of driving while tired and.... These measures must be practiced at a consistent way.

The death location for driving incident victims show that about half the people injured in accidents have dies at the scene and the other half have died after being transported to the hospitals. The death percent inside the hospital has been reported to be 11.6% in Kampala [25]. Some typical reasons for this high fatality rate could include: high severity of accidents, not sufficient number and complete coverage of emergency services and urgency help centers or lack of accurate locating system along the roads, lack of adequate communication infrastructures of timely alarming the accidents and also lack of adequate public awareness regarding how to report the accident to the agencies in charge and how to properly deal with injured people according to

trainings [emergency aids training courses] in driving and traffic incidents and high volume of road traffic to the hospitals.

The share of fatal accidents on the country's freeway network and main roads are higher relative to suburban roads network. One part of the reasons for higher accident numbers in freeways is due to high volume of traffic passing through this type of roads in comparison to other types of the roads, but regardless of this issue, control and supervision on the country's freeways and especially speed control should be at top priority of safety measures to be taken. Regarding relatively high mortalities on the country's main roads considering the ratio of main roads to all the existing roads in the country, also adequate measures have to be set on check list depending on the type of vehicles and accident situations.

As mentioned before, the ultimate reasons of death in driving incidents on suburban roads have been head injuries and several fractures. Although the share of these factors have been decreased due to mandatory usage of helmets and safety belts, but it's necessary to conduct the adequate practical programs in order to improve the helmet and safety belt usage rate amongst road users.

Studying the educational level of driving incidents' mortalities in Tehran province shows that people with lower than high school diploma have the majority of the cases and over 80 percent of victims have education level of under high school diploma or were illiterates. This situation shows that the training efforts must be conducted in the way that this group of people and adequately benefit from them.

The fatality frequencies around the seasons of the year indicate that most of the victims lost their lives in summer time on suburban roads and Persian months of Mordad and Shahrivar [August and September] had the highest number of driving incidents deaths on suburban roads all over the year. On the contrary, the lowest statistics were about winter times especially month of Dey [December-January].

Most of the traffic accidents happen in May and June in Turkey [16]. It seems like one of the reasons of this issue in Iran is increasing frequency of travels at the beginning of school vacations.

Traffic accidents is known the main cause of disability and mortality [26]. We finally remind that: increment of motor vehicles is a contributing factor which has helped the increase of accidents all over the world. Significant growth in the number of vehicles in the

countries with higher income has been observed and this increment has happened for the number of motorcycles and minibuses, while the required training regarding this issue has not been done yet. Therefore, considering the high number of incidents, addressing the issue of training and driving culture would be among the most important factors to reduce the traffic incidents.

ACKNOWLEDGMENTS

This work was financially supported by research grant from Shahed University.

REFERENCE

- Peden, M. and A. Hyder, 2002. Road traffic injuries are a global public health problem. *BMJ*, 324(7346): 1153.
- Peden, M. and T. Toroyan, 2005. Counting road traffic deaths and injuries: poor data should not detract from doing something! .. *Ann Emerg Med*. 46(2): 158-60.
- Garg, N., and A.A. Hyder, 2006. Exploring the relationship between development and road traffic injuries: a case study from India. *Eur J. Public Health*. 16(5): 487-91.
- Peden, M., 2004. The world report on road traffic injury prevention. Geneva, World Health Organization. The fundamentals, pp: 16.
- McIlvenny, S., F. Al Mahrouqi, T. Al Busaidi *et al*. 2004. Rear seat belt use as an indicator of safe road behavior in a rapidly developing country. *J Soc. Promot. Health*, 124(6): 280-3.
- Murray, C.J. and A.D. Lopez, 1997. Alternative projections of mortality and disability by cause 1990-2020: Global Burden of Disease Study. *Lancet*., 349(9064): 1498-504.
- El-Sadig, M., J.N. Norman, O.L. Lloyd, P. Romilly and A. Bener, 2002. Road traffic accidents in the United Arab Emirates: trends of morbidity and mortality during 1977-1998. *Accid Anal Prev*. 34(4): 465-76.
- Abdalla, I.M., 2002. Fatality risk assessment and modeling of driver's responsibility for causing traffic accidents in Dubai. *J. Safety Res*. Winter, 33(4): 483-96.
- Zargar, M., A. Khaji, M. Karbakhsh and M.R. Zarei, 2004. Epidemiology study of facial injuries during a 13 month of trauma registry in Tehran. *Indian J. Med. Sci*. 58(3): 109-14.
- Montazeri, A., 2004. Road-traffic-related mortality in Iran: a descriptive study. *Public Health*, 118(2): 110-3.
- Roudsari, B.S., M. Shadman and M. Ghodsi, 2006. Childhood trauma fatality and resource allocation in injury control programs in a developing country. *BMC Public Health*, 2(6): 117-122.
- Kadkhodaie, M.H., 2006. Three-year review of facial fractures at a teaching hospital in northern Iran. *Br J. Oral Maxillofac Surg*., 44(3): 229-31.
- Akbari, M.E., M. Naghavi and H. Soori, 2006. Epidemiology of deaths from injuries in the Islamic Republic of Iran. *East Mediterr Health J*., 12(3-4): 382-390.
- Ferrando, J., A. Plasencia, I. Ricart, X. Canaleta and M. Segui-Gomez, 2000. Motor-vehicle injury patterns in emergency-department patients in a South-European urban setting. *Annu Proc Assoc Adv Automot Med*., 44: 445-58.
- Ganveer, G.B. and R.R. Tiwari, 2005. Injury pattern among non-fatal road traffic accident cases: across-sectional study in Central India. *Indian J. Med. Sci*. 59(1): 9-12.
- Sozuer, M., C. Yildirim, V. Senol, D. Unalan, M. Nacar and O. Gunay, 2000. Risk factors in traffic accidents.. *Ulus Travma Derg*., 6(4): 237-40.
- Esiyok, B., I. Korkusuz, G. Canturk, H. Alkan, A. Karaman and I. Hanci, 2005. Road traffic accidents and disability: a cross-section study from Turkey. *Disabil Rehabil*., 27(21): 1333-8.
- Suriyawongpaisal, P. and S. Kanchanasut, 2003. Road traffic injuries in Thailand: trends, selected underlying determinants and status of intervention. *Inj Control Saf Promot*. 10(1-2): 95-104.
- Esiyok, B., I. Korkusuz, G. Canturk, H.A. Alkan, A.G. Karaman and I.H. Hanci, 2005. Road traffic accidents and disability: a cross-section study from Turkey. *Disabil Rehabil*., 27(21): 1333-8.
- Roudsari, B.S., K. Sharzei and M. Zargar, 2004. Sex and age distribution in transport-related injuries in Tehran. *Accid Anal Prev*., 36(3): 391-8.
- Wang, Z., and J. Jiang, 2003. An overview of research advances in road traffic trauma in china. *Traffic inj Prev*., 4(1): 9-16.
- Romano, F., H. Nizamo and D. Mapasse, 2003. Road traffic injuries in Mozambique. *Inj Control Saf Promot*., 10(1-2): 63-7.
- Wells, S., B. Mullin, R. Norton, J. Langley, J. Connor, R. Lay-Yee and R. Jackson, 2004. Motorcycle rider conspicuity and crash related injury: case-control study. *BMJ*., 328(7444): 857.

24. St Bernard, G. and W. Matthews, 2003. A contemporary analysis of road traffic crashes, fatalities and injuries in Trinidad and Tobago. *Inj Control Saf Promot.*, 10(1-2): 21-7.
25. Andrews, C., O. Kobusingye and R. Lett, 1999. Road traffic accident injuries in Kampala. *East Afr Med. J.* 76(4): 189-94.
26. Veghari, G.H., M. Sedaghat, S. Maghsodlo, S. Banihashem, P. Moharloe, A. Angizeh *et al.*, 2012. The Trend of seat belt use among drivers in the north of Iran, 2007-2010 An epidemiology study. *World Applied Sciences Journal*, 17(10): 1365-1369.