ROAD TRAFFIC ACCIDENTS CASUALTIES IN THE NORTH OF JORDAN: AN EPIDEMIOLOGICAL STUDY

Ali M. Shotar, MD, PhD
Department of Legal Medicine, Toxicology and Forensic science,
School of Medicine, Jordan University of Science and Technology (JUST)
Sukaina A. Alzyoud, PhD
Department of Community and Mental Health Nursing,
Faculty of Nursing, The Hashemite University
Jamal Obeidat
Forensic Medicine Teaching Center, Irbid,
Affiliate to Jordan University of Science and Technology
Khalid A. Alhawamdeh, RN, MPH
Department of Community and Mental Health Nursing,
Faculty of Nursing, The Hashemite University

Abstract

Road Traffic Accidents are considered to be one of the leading causes of death and injuries worldwide. In recent years as many as 50 million people are injured or disabled by road traffic accidents every year. Road traffic accidents impose a burden on countries by costing up to 4% of their Gross National Product. Therefore, the purpose of this study was to determine the prevalence of injuries resulted from road traffic accidents in the North region of Jordan in the years 2003 – 2007. A retrospective design was used to review all RTA incident report located at the Northern Forensic Medicine Teaching Center. Reports were reviewed for age, gender, accident detailed report (such as, date, cause, geographical location, injuries).

A total of 7918 accidents were reported between the years 2003 to 2007. Male Jordanians were more involved in traffic accidents than females. Almost one third (31.8%) of accidents occurred during the weekend. Running over pedestrian accounted for (70.9%) of all reported accidents. In addition, (49%) of run over incidents were among children, adolescents, and young adults. Wounds, fractures, and pain were the most prevalent consequences of road traffic accidents. This study is the first critical step towards establishing a base line data of road traffic accidents injuries in Jordan. Reviewing and evaluating existing policies of traffic safety would be

the next logical step. Additionally, establishing a team of health care and other professionals to work on developing new traffic safety polices to ensure road safety.

Keywords: Injuries; Traffic Accidents; Jordan; Road.

Introduction

Road traffic accidents (RTA) are one of the leading causes of violence and injuries worldwide. Over 1.2 million people die each year as a result of road traffic accidents all over the world, and between 20 and 50 million suffer non-fatal injuries (United Nations UN, 2007; World Bank, 2007; Peden, Scurfield, & Sleet, 2004). In most regions of the world the epidemic of road traffic injuries is still increasing. Accordingly, the WHO has reported that low and middle income countries have higher road traffic death rates (21.5 and 19.5 per 100,000 population, respectively) than high-income countries (10.3 per 100,000). Moreover, Over 90% of the fatalities on the roads worldwide occur in low-income and middle-income countries (WHO, 2009). Road traffic injuries affect all age groups but its impact has consistently shown to mostly affect people aged 5 to 44 years (Peden et al., 2004). The WHO predict that road traffic injuries will rise to become the fifth leading cause of death by 2030 (Peden et al., 2004).

The problem of RTAs is still persisting and represents a threat to the Jordanian society and people in general. It is considered one of the five leading causes of death in Jordan (Peden et al., 2004; Al-Masaeid, 2009). The number of RTAs has increased from 43.343 accident/thousand with 612 fatalities in 1998, to 110.630 accident/thousand with 992 fatalities and 17.969 injuries in 2007 (Public Safety Directorate, 2010). Most recently the numbers for last year (2009) are still alarming since RTAs resulted in 676 deaths, 15662 injuries, and a cost of 258 JD million (≈ 364 million in US$) (Public Safety Directorate, 2010).

Jordan is located in the Middle East region, with an area of 90 thousand sq. km and a population of about 5.8 million people (Public Safety Directorate, 2010). The problem of RTAs started to appear as a serious and urgent pressing issue in the mid-1980s (Public Safety Directorate, Amman, Jordan, 2010; Jadaan, 1989). In 2007, traffic accidents were considered the second leading cause of death in Jordan (Al-Masaeid, 2009). During the last two decades, the number of accidents increased from 15884 accidents in 1987 to 122793 accidents in 2009 (Public Safety Directorate, Amman, Jordan, 2010). Although the previous data provide an alarming and pressing problem of injuries resulted from RTAs in Jordan, no studies were reported that examine the impact of RTAs on health in Jordan. Therefore, the current

study aims at examining the impact of RTAs on the health of Jordanian living in Irbid Governorate for the period 2003 to 2007.

Methodology

Design, materials, and setting

A retrospective study was conducted at the Forensic Medicine Teaching Center of North of Jordan. The study was approved by the IRB committee of Jordan University of Science and Technology. Medical Examiner Records of all road traffic accidents reports concerning injuries that have been reported to the Northern Forensic Medicine Teaching Center for the period 2003 – 2007 were studied. Other injuries due to assault, sports injuries, falls from heights, gunshot injuries were excluded. In addition, all reports of RTA deaths were excluded from this study. Deaths were not included in this report as our purpose was only the resulted injuries of RTA. However, a separate study looking at RTA deaths is being conducted by the researchers. Factors studied included, age of the victim, gender, occupation, results of RTA, body part affected, outcome of the accident, and health consequences of these injuries. Data from the records of the center were recorded on a special form designed by the authors. Study subjects consisted of all the road traffic accident reports during the above-mentioned time period.

It worth mentioning that because in Jordan is considered a medico-legal case and once it is reported to any medical center (institute) the staff is mandated to report the incident to police authorities. In this case the authorities must refer and report the case to the medical examiner which is represented by the forensic medicine center. According to the Jordanian system these cases should be reported to the forensic medicine center for two reasons. These reasons are judicial decisions and compensation reasons. It is worth mentioning that by Jordan penal code it is punishable by law if not reported to both authority and subsequently to the forensic medicine center. In addition, the nature of RTA injuries considered an emergency case seen by the nearest medical facility and as the case in Jordan which have very few equipped facilities to deal with RTAs the cases do not follow any standard scaling such as AIS Scale or ISS scoring.

Data Analysis

The Statistical Package for the Social Science (SPSS) version 17 was used to assist with data analysis. Data analysis began with preparatory activities such as the treatment of missing data, identification of outliers, and other such data cleaning tasks. A detailed descriptive analysis of all quantitative data was performed, involving the summarization of data and the use of inferential data analytic techniques. Analysis of frequency (Chi-

square test) was used to determine the relationship between study variables. When parametric assumptions were met, correlation coefficient was utilized to determine the relationship between variables measured on ratio or interval scales.

Results

A total of 7,918 injured victims were examined by the medical examiners in the North Region during the period of 2003 - 2007. Injured persons age ranged from 4 months to 97 years; the mean age of injured persons was 3.37 years (SD = 1.950), about 39.2% (n = 3104) were between the ages of 1 to 19 while 43.3% (n = 3421) were between 20 to 50years of age. Male victims were more than females (male = 75.5%, n = 5977, female = 23.3%, n = 1847).Almost two-third 64.1% (n = 5076) of accidents happened in the weekdays, 68.5% (n = 5426) in the city areas. Seventy percent (n = 5615) of injuries were a result of run over type of traffic accident. Victims were mainly treated in the Emergency Room (64.8%, n = 5130), or hospitalized (26.5%, n = 2097). Almost two-third (59.4%, n = 4705) of victims had missed at least 1 to 7 days of work as a result of their accident injury.

The results showed that the most frequent resulted injuries of RTA were wounds (23.3%, n = 1848), and fractures (19.4%, n = 1540). Only 3.7% (n = 294) were disabled as a result of RTA. Based on the Pearson Chi-Square results ($\chi^2 = 73.273$, $p \sim 0.0001$), there was a significant association between victims age and disability prevalence. Spearman's Rank Correlation showed that there was a significant negative correlation between victim's age and disability ($r = -0.025$, $P \sim 0.03$). This correlation indicates the younger the age the more likely to get disabled. Moreover, there was a significant association between victims injured body part and disability. The results showed that there was a significant correlation was found between disability and injuries of the head ($r = 0.029$, $p \sim 0.01$), neck ($r = -0.024$, $p \sim 0.03$), back ($r = 0.025$, $p \sim 0.02$), upper limbs ($r = 0.026$, $p \sim 0.02$), and lower limbs ($r = 0.104$, $p \sim 0.0001$). Additionally, there was a significant correlation between victims age and the head ($r = 0.035$, $p \sim 0.002$), neck ($r = - 0.034$, $p \sim 0.003$), face ($r = 0.067$, $p \sim 0.0001$), chest ($r = - 0.041$, $p \sim 0.0001$), back ($r = - 0.029$, $p \sim 0.011$), upper limbs ($r = - 0.047$, $p \sim 0.0001$), and lower limbs ($r = 0.045$, $p \sim 0.001$) injuries.

Discussion

Although a number of studies have been conducted on the epidemiology of RTAs in Jordan and other countries (including studies in countries where the cultural and geographical issues are similar to Jordan), to our knowledge this study represents the initial description of RTA injury in

Jordan. The results outlined in the previous section not only identify specific types RTAs resulted injuries in Jordan, but also highlight priority areas for injury prevention strategies for children and adolescents in Jordan and indicate where efforts to strengthen care programs may best be targeted. Coordinated multi-disciplinary efforts are needed to address the large number of children and adolescents at risk on the roads, 39.2% % of the injuries recorded.

In general, our findings are consistent with prior published research on RTAs injury in low- and middle-income countries (Al-Masaeid, 2009; Public Safety Directorate, 2010, Hammad, 2010). In exploring the patterns of trauma seen at the emergency ward of the busiest trauma center in Cameroon's during the year 2007, nearly 60% of the injuries were due to road traffic accidents which males comprised 71% of those injured (Juillard et al., 2010). The predominance of males in this study is echoed both globally and in other studies from Jordan and other low-and middle-income countries, as well. [10,7,11,12] The literature suggests that pedestrians are highly represented in most reports of RTA (Jadaan, 1989; Bener et al., 2010; WHO,2002; John et al., 2008).These results are consistence with the current study were both children and adolescents who represents pedestrians in Jordan were the most involved group in RTAs injuries. Pedestrians in Jordan often use the streets and paved roads for walking, and thus come into close approximation to motor vehicles, which increase the likelihood of being involved in RTA and injured. Another reason may pertain to the fact that when walking in the street children and adolescents were not being fully supervised, watched, and protected by their parents. If this is the reason this may indicate negligence of the welfare of minors which represent a serious problem that need to be studied in future studies.

The results showed that the majority of injuries were treated in the ER which is consistent with prior studies (Juillard et al., 2010). This can indicate that Jordan has an effective access system for medical facilities. Also, it may indicate the injuries were mainly minor injuries that do not require hospitalization. This can be supported by the fact that only 3.7% of cases were disabled as a result of the RTA. Additionally, study results were consistent with previous reports that accidents were predominantly occurring in urban locations (Vorko-Jović et al., 2006; Hijar et al., 2004).

Conclusion

We conclude that road traffic accidents primarily affect children and adolescents in Jordan. The most prevalent types of injuries among these age groups were head, neck, and upper extremities. Additionally, age was significantly correlated to RTA victim injuries. Jordan faces a serious and

alarming traffic accident problem. Youth (1-19 years of age) are the most exposed and injured group as a result of road traffic accidents I Jordan.

Recommendations:

In recent years, alcohol consumption has been considered an important public health problem. A number of studies had reported the consumption of alcohol by Jordanians (Ethanol, the alcohol used in beverages, is a drug that affects the central nervous system (CNS) and impairs driving skills and co-ordination, increasing risk of deaths and injuries derived from crashes and road accidents. We recommend that more enforcement be implemented on the legal level of alcohol in driver's blood. As was indicated by the results children and adolescents were the main affected group by RTAs therefore, we recommend implementing, enforcing and evaluating seat-belt and child restraint polices in Jordan. Develop and implement prevention programs of child safety on the roads that consists of a series of 'how to protect children on the roads'.

References:

Al-Masaeid, H. (2009). Traffic Accidents in Jordan. Jordan Journal of Civil Engineering, Volume 3, No. 4.

Bener, A., Omar, A.O., Ahmad, A.E., Al-Mulla, F.H., Abdul Rahman, Y.S. (2010). The pattern of traumatic brain injuries: a country undergoing rapid development. *Brain Injury*. 24(2):74-80. doi: 10.3109/02699050903508192.

Department of Injuries, Violence Prevention WHO. (2002). The injury chart book: a graphical overview of the global burden of injuries. World Health Organization, Geneva. available at http://whqlibdoc.who.int/publications/924156220x.pdf

Hammad, F., Eid, H., Jawas, A., Abu-Zidan, F. (2010). Genitourinary injuries following road traffic collisions: a population-based study from the Middle East. *Turkish Journal of Trauma & Emergency Surgery*, 16 (5): 449-452

Hijar, M., Arredondo, A., Carrillo, C., Solorzano, L. (2004). Road traffic injuries in an urban area in Mexico. An epidemiological and cost analysis. *Accident Analysis and Prevention*, 36(1):37-42.

Jadaan, K.S. (1989).The epidemiology of road traffic accidents in Jordan. *Journal of the Royal Society of Health*, 109(4):141-4.

John, I.A., Mohammed, A.Z., Lawoko, S., Nkanta, C.A., Frank-Briggs, A., Nwadiaro, H.C., … Didi, E. (2008). Implementing a hospital based injury surveillance system: a case study in Nigeria. *Medicine, Conflict and Survival*, 24:273–279 doi: 10.1080/13623690802374049.

Juillard, C., Etoundi Mballa, G.A., Biloungа Ndongo, C., Stevens, K.A., Hyder, A.A. (2011). Patterns of Injury and Violence in Yaounde´ Cameroon:

An Analysis of Hospital Data. *World Journal of Surgery*. 35(1):1-8. doi: 10.1007/s00268-010-0825-5.
Peden, M., Scurfield, R., Sleet, D., David Sleet, Mohan D., Hyder, H., Jarawan E., Mathers C. (2004). World Health Organization. World report on road traffic injury prevention. Geneva, Switzerland available at http://www.who.int/violence_injury_prevention/publications/road_traffic
Public Safety Directorate (2010). Summary of Road Traffic Accidents in Jordan. Amman, Jordan. Available at:
http://www.traffic.psd.gov.jo/index.php?option=com
United Nations UN (2007). World population prospects: the 2006 Revision. Highlights. New York, United Nation Population Division.
Vorko-Jović, A., Kern, J., Biloglav, Z. (2006). Risk factors in urban road traffic accidents. *Journal of Safety Research*, 37(1):93-98.
World Bank (2007). World development indicators. Washington, DC, International Bank for Reconstruction and Development.
World Health Organization (2009). *Global Status Report on Road Safety. Geneva, Switzerland*. available at:
whqlibdoc.who.int/publications/2009/9789241563840_eng.pdf