

A Study of Road Traffic Accidents in Babylon Province

Sijal Fadhil Farhood Makki Aljoborae* Ameer Kadhim Al Humairi**
College of Medicine , Babylon University
*E-mail : sijalaljoborae@yahoo.com
**E-mail : ameer.alhumairi @yahoo.com



Received 16 April 2014

Accepted 16 June 2014

Abstract:

Road traffic accidents (RTA) are the leading cause of death especially for the young and contribute to a high degree of morbidity and mortality for all ages. Iraq has one of the worst records both locally and internationally. It ranks fourth in the world in terms of highest road traffic accident deaths and the first among Middle Eastern and North African countries. Data on the incidence of RTA in Babylon is limited. In Babylon RTA directly effects society in terms of death, disability, suffering and cost despite the fact that public education, appropriate laws and enforcement, and research programs have been tried to prevent RTA.

This study was conducted to determine the socio-demographic characteristics of road traffic accident victims and to find the proportion of each type of injury among them. It also aims to find out the association between type of injury and the study variables.

A hospital based cross sectional study was conducted in Hillah Teaching General Hospital, from May to of September 2013 (summer) and during November 2013.

This study found that the majority(83%)of victims were male,(76%) came from urban areas and (73%) of the victims were non-governmental employees.

69% of victims were exposed to RTA during the day time and (83%) of these occurred on the main roads.(38%) of the victims presented with multiple injuries with speed accounting for (77%) of the RTAs.

About half of the drivers had no driving permits and over half (59%) of the victims had a history of previous exposure to RTA.

There was a significant association between the type of injury with the prevailing weather condition and also with the cause of accident, also there was a significant association between type of injury and the type of vehicle and cause of the accident.

Key Words: RTA: Road traffic accident , UAE : United Arab Emirates.

الخلاصة:

حوادث المرور على الطرق هي السبب الرئيسي للوفاة خاصة بالنسبة للشباب وتسهم بدرجة عالية من المراضة والوفيات لجميع الاعمار . يعد العراق واحداً من أسوأ سجلات البلدان على حد سواء محلياً ودولياً. فهو في المرتبة الرابعة من حيث وفيات حوادث المرور وهو الأعلى والأول من بين بلدان الشرق الأوسط وشمال أفريقيا.

وتقتصر البيانات المتعلقة بحالات الإصابة (بمديرية المرور في بابل) .وهناك تأثيرات مباشرة يعاني منها أفراد المجتمع نتيجة هذه الحوادث فيما يتعلق بالوفاة ،العجز ، والتكلفة وعلى الرغم من حقيقة أن التعليم العام والقوانين المناسبة والالتزام بهذه القوانين ،وبرامج البحوث حاولت الحد والسيطرة على الحوادث المرورية في المحافظة.

أجريت هذه لدراسة لتحديد الصفات الاجتماعية والديموغرافية لضحايا حوادث المرور في الطريق وإيجاد نسبة كل نوع من إصابة .ويهدف أيضا إلى معرفة الرابطة بين نوع الإصابة ومتغيرات الدراسة.

أجريت دراسة مقطعية في مستشفى الحلة التعليمي العام،من أيار/مايو إلى أيلول/سبتمبر ٢٠١٣ (الصيف) ومن الأول من نوفمبر عام ٢٠١٣ إلى الأول من شهر كانون الأول عام ٢٠١٣ (الشتاء). وأدرجت مجموعة ضحايا ٢٤٤ ضحية.

وجدت هذه الدراسة أن غالبية الضحايا (٨٣ في المائة) كانوا ذكورا،(٧٦ في المائة) جاؤوا من المناطق الحضرية.

وكان هناك ارتباط كبير بين نوع الإصابة وحالة الطقس السائدة، وأيضاً ارتباط بسبب الحادث، كما كان ارتباط كبير بين نوع الإصابة، ونوع المركبة وكان نصف السائقين لا يملكون رخصت قيادة .

Introduction

Road traffic accidents (RTA) are the leading cause of death especially for the young and contribute to a high degree of morbidity and mortality for all ages [1]. A road traffic accident occurs when a vehicle collides with another vehicle, pedestrian, animal, road debris, or other stationary obstruction, such as a tree or utility pole. Traffic collisions may result in injury, death, vehicle damage, and property damage [2].

According to the World Bank, road crashes kill 1.2 million people and cripple or injure more than 10 million others every year. In fact, at current rates, traffic accidents will become the fifth leading cause of death globally by 2030, up from 10th place in 2010. About 90% of disability adjusted life years lost world wide due to RTA occur in developing countries[3].

A number of factors contribute to the risk of collision, including vehicle design, speed of operation, road design, road environment, driver skill and/or impairment, and driver behavior. Human factors in vehicle collisions include all factors related to drivers and other road users that may contribute to a collision. Examples include driver behavior, visual and auditory acuity, decision-making ability, and reaction speed [4].

The problem is increasing at a fast rate due to rapid motorization. In addition to other factors, and policy makers need to recognize this problem as a public health crisis and design appropriate policy responses. In the Middle East, the figures are particularly alarming; traffic accidents kill between 17 to 22 people per 100,000 of population every year. Unfortunately research on RTA in the region is limited. For example; a study by Bener of United Arab Emirates RTA reported an alarming increase in RTA injuries and death. Effects of UAE introduction of speed cameras resulted in decreased speed limit violations and

monitoring radar system reduced RTA, injuries and death[5].

Iraq has one of the worst records both locally and internationally. It ranks fourth in the world in terms of highest road traffic accident deaths and the first among Middle Eastern and North African countries [6].

The incidence of RTA and level of severity of casualties resulting from RTA directly affect the financial and human resources of the National Health Service. Babylon where this current study was conducted has a total population of 1,385,783 according to the 2003 estimation [7].

Data on the incidence of RTA in Babylon is likewise limited. In Babylon RTA directly effects society in terms of death, disability, suffering and cost despite the fact that public education, appropriate laws and enforcement, and research programs have been tried to prevent RTA.

Despite progress in recent years from National Traffic Department and Ministry of Health in the collection of data and reporting of RTA, statistics have not been analyzed related to the effect on health systems, or effectiveness of legislation or education programs.

This cross sectional descriptive study aims to determine the incidence of RTA casualties in Babylon Province its distribution characteristics; injury severity and casualty types and puts forward certain recommendations to prevent RTAs.

Materials and Methods

Methodological issues in this study include study location, the study design and the statistical analyses employed to test the study hypotheses.

Study Location

This study was carried out at Al-Hilla teaching Hospital at Babylon Governorate. Out of patients with road traffic accidents admitted to that hospital and those received dead as a result of accidents at the forensic

medical department at the time of data collection, (244) alive and dead patients had been selected and data was collected using a specially designed questionnaire and forensic medical department data.

Study design

The study is a hospital based descriptive cross-sectional study conducted to describe the socio-demographic characteristics of road traffic accident victims , to find the proportion of each type of injury among them and to find the association between type of injury and the study variables including (age , gender, marital status, educational status ,residence , time of accident, site of accident, cause of accident ,weather condition at time of accident, nature of accident , type of vehicle , road condition and driver`s characteristics). It was conducted over a period of five months [four during summer (may, June, July and august) and one during winter (November 2013)].

Study Population:

Road traffic accidents patients admitted at Al-Hilla Teaching Hospital at time of data collection were regarded as the study population. Out of those patients (244) patients had been selected and data was collected using a specially designed questionnaire and forensic medical department data.

Data Collection

Data was collected from all the eligible patients who had given consent to participate by a questionnaire form (Ropemakers Solicitors - Road Traffic Accident Questionnaire) which was prepared to collect information and data about dead patients obtain from forensic medical department.

Study variables

a) Dependent Variable:

The dependent variable for this study was the type of injury.

b) Independent Variables

The independent variables of this study including age , gender, marital status, occupation, educational status ,residence , time of accident, site of accident, cause of accident ,weather condition at time of accident, nature of accident , type of vehicle , road condition and driver`s characteristics

Data Analysis

Statistical analysis was carried out using SPSS version 17. Categorical variables were presented as frequencies and percentages. Continuous variables were presented as (Means \pm SD). Pearson`s chi square (X^2) test and Fisher-exact test were used to find the association between the categorical variables. Independent samples t-test was used to compare means between two groups. A *p*-value of ≤ 0.05 was considered as significant.

Results

This study has been carried out at Al-Hilla teaching hospital. Out of road traffic accident patients admitted to that hospital and those received dead as a result of that accident at forensic medical department at the time of data collection, (244) alive and dead patients had been selected and data was collected using questionnaire. Number of victims of road traffic accident from them full information regarding the all study variables had been obtained equal (207).

The Distribution of road traffic accidents Patients by Socio-demographic Characteristics

Table 3.1 show the mean and standard deviation and range of age of all study patients. The mean age was (30.28) and range was (82). Table 3.2 shows the distribution of the road traffic accident patients by socio-demographic variables. Majority (83%) of patients were male, majority (67%) of patients came from the urban area, (52%) of those patients were married and only (17.4%) of patients presented with higher education (n=207).

The Distribution of Road traffic Accident according to driver`s characteristics (n=169)

Table 3.3 shows the distribution of Road traffic accident by driver`s characteristics. (48.5%) of drivers expose to RTA had no driving permit, (58.6%) of them had history of previous exposure to RTA and only (26%) of drivers had history of chronic diseases.

The Distribution of Road traffic Accident Patients by Accident features (n=207)

Table 3.4 shows the distribution of RTA patients by accident characteristics includes time of accident, site of accident, weather condition at time of accident, type of vehicle , road condition , cause of accident , nature of accident and type of injury. Majority (69%) of patients expose to RTA at day time. Majority (83%) of patients expose to RTA at main roads. Majority (74%) of patients expose to RTA at sunny and clear weather. More half of patients expose to car accident. Only (24%) of patients expose to RTA on un paved roads. Majority (77%) of road traffic accident occurred as a result of speed. Majority (57%) of patients presented with collision with other motor vehicle. Majority (37.7%) of patients presented with multiple injuries.

The Mean Difference of age for RTA Patients by type of injury

Table 3.5 shows mean differences of age (in years) by type of injury. There were no significant differences between means of age for both study groups.

The association of type of injury by socio-demographic variables (n=207)

Table 3.6 shows the association of type of injury by socio-demographic variables including (sex, marital status, occupation, educational status and residence). There was no significant association between type of injury and those socio-demographic variables .Majority (89%) of victims were male, (69%) of them came from the urban area, (47%) of them were married and (17%) of them were illiterate.

The association of type of injury by accident characteristics (n=207)

Table 3.7 shows the association of type of injury by accident characteristics including (time of accident, site of accident, cause of accident, weather condition at time of accident, nature of accident, type of vehicle and road condition). There was significant association between type of injury with weather condition, cause of accident and type of vehicle, while there was no significant association between type of

injury and other study variables. Majority (71%) of victims with multiple injures had exposed to accidents at day time, (86%) of them exposed to accidents at the main roads, (89%) of them exposed to accidents due to speed , (62%) of them exposed to accidents at sunny or clear weather, Only (15%) of victims with multiple injures had exposed to rollover accidents, (37%) of them exposed to accidents by motor vehicles and (26%) of them exposed to accidents on un paved roads.

The association of type of injury by driver's characteristics (n=169)

Table 3.8 shows the association of type of injury by driver's characteristics including (driver's License, history of chronic diseases and exposure to previous accidents). There was no significant association between type of injury and driver's characteristics.

Discussion

Worldwide, road traffic accidents lead to death and disability as well as financial costs [8]. This study found that the majority (83%) of victims in Babylon Governorate were male, (67%) came from urban areas , (69%) of victims were exposed to RTA during the day time .Our study concludes that the majority of road traffic accidents in Babylon Governorate were related to human factors, which is in harmony with a 1995 study using British and American crash reports as data, that found that 57% of crashes were due solely to driver factors. The rest being due to combined roadway and driver factors 27%, 6% to combined vehicle and driver factors, 3% solely to roadway factors, 3% to combined roadway, driver, and vehicle factors, 2% solely to vehicle factors, and 1% to combined roadway and vehicle factors[9]. The site of road traffic accidents in Babylon was considered in this study. The study found that the majority (83%) of victims were exposed to accidents on the main roads. International studies point out that, a site that does not look dangerous may have a high crash frequency. This is, in part, because if drivers perceive a site as hazardous, they take more care. Accidents may be more

likely to happen when hazardous road or traffic conditions are not obvious at a glance, or where the conditions are too complicated for the limited human mind to perceive and react in the time and distance available [10].

The victims who presented with multiple injuries accounted for (37.7%). In Babylon Governorate the main focus upon arrival of RTA victims is sustaining life through rapid and effective treatment of injuries. Most of the Middle Eastern region has insufficient medical coverage, weak insurance systems, poorly designed and equipped emergency services, and a lack of qualified paramedics [11]. "In some countries, over 80 percent of deaths occur before the casualty reaches the hospital, compared with averages of 50 to 60 percent in North America and Western Europe," said Koegler. "Emergency response – from call to dispatch to the quality and equipment of ambulatory care – is important to ensure that the emergency services can reach accidents and transport and treat casualties to hospitals effectively and expeditiously [12].

Driver age as a demographic factor in RTA was considered in the study. The mean age of RTA in Babylon Governorate was 30 years. Worldwide studies point out, although young people tend to have good reaction times, disproportionately more young male drivers feature in accidents [13], with researchers observing that many exhibit behaviors and attitudes to risk that can place them in more hazardous situations than other road users [14]. This is reflected by actuaries when they set insurance rates for different age groups, partly based on their age, sex, and choice of vehicle. Older drivers with slower reactions might be expected to be involved in more accidents, but this has not been the case as they tend to drive less and, apparently, more cautiously [15]. Attempts to impose traffic policies can be complicated by local circumstances and driver behavior. In 1969 Leeming warned that there is a balance to be struck when "improving" the safety of a road [16].

About half of the drivers involved in RTA in Babylon Governorate had no driving permits and over half (58.6%) of the victims had a

history of previous exposure to RTA. Crash: This phase centers on preventing injury during a crash using human and vehicle elements, such as restraints – in the form of safety belts and airbags – and vehicle technologies, including impact bars and increasingly digital technologies. More cars in the Middle Eastern region need to have these systems installed, as this can help foster safe driving practices and decrease the number of crashes [17].

In Babylon Governorate there was a significant association between the type of injury with the prevailing weather condition and also with the cause of accident; also there was a significant association between type of injury and the type of vehicle. In Australia traveling too fast for the prevailing weather conditions or above the posted speed limit [18] is a factor in about 40 percent of road deaths. The RTA also says speeding increases the risk of a crash and its severity [19].

In Babylon Governorate speed accounts for (77%) of the RTAs as the study pointed out. A recent U.S. research on traffic speed in 1998 [20] points out that the risk of having a crash is increased both for vehicles traveling slower than the average speed, and for those traveling above the average speed. In addition the risk of being injured increases exponentially with speeds much faster than the median speed as does the severity/lethality of a crash [21].

In the United Kingdom the contributory factor report in the official British road traffic accident statistics show for 2006, that "exceeding speed limit" was a contributory factor in 5% of all casualty crashes (14% of all fatal crashes), and that "traveling too fast for conditions" was a contributory factor in 11% of all casualty crashes (18% of all fatal crashes) [22].

Regarding the educational level of RTA victims in Babylon Governorate as a socio demographic factor was considered in our study. There was no significant association with type of injury incurred by victims, but it is a fact that both education and awareness can have a significant impact in reducing crashes. In many Middle Eastern countries,

over 70 percent of accidents result from driver error or negligence, sometimes due to inadequate driver education [23].

Other factors dealt with in international studies include vehicle standards that may also play a major role in preventing accidents given the significance of lighting, braking, and handling, along with other active and passive safety systems. This is yet another primary concern in the region. One study observed that the introduction of improved brakes resulted in more aggressive driving,[24] and another argued that compulsory seat belt laws have not been accompanied by a clearly attributed fall in overall fatalities[25].Other factors not found in our study was drunk driving and intended or staged crashes that involves a party who hopes to crash a vehicle in order to submit lucrative claims to an insurance company [26].

Conclusion

The study concludes that in Babylon Province,male drivers who have a mean age of 30 years were responsible for the majority of road traffic accidents occurring on the main roads during the daytime.Speed was the main cause of RTAs despite the fact that these accidents occurred during clear and sunny weather. Such variables as (cause of accident, prevailing weather condition and type of vehicle) have a significant association with the type of injury.

Recommendations

A strategy that rests on a number of factors is recommended including:improvement of the local road infrastructure including the design, construction, operation, and maintenance of roads and bridges to the highest standards for road safety.Urban and transport planning that deals with basics such as safety considerations and the impact of public transportation during the design of urban communities.

Vehicles on the roads of Babylon Governorate should be monitored through adopting and implementing policies to ensure high standards for vehicle quality and performance .Finally but not less in

importance, more emphasis on the use of the media to raise awareness of road safety, and provide safe driving and first aid training programs. Further, traffic safety education needs to start at the kindergarten level and needs to be an integral part of all curricula of schools and universities.

References

1. "WHO | World report on road traffic injury prevention".
2. "The 2009 Statistical Abstract: Motor Vehicle Accidents and Fatalities".
- 3.United Nations General Assembly Verbatim Report meeting 86 session 57 Global road safety crisis page 2 on 22 May 2003.
- 4.Ray Fuller; Jorge A. Santos (2002).Human Factors for Highway Engineers.Emerald.p. 15. ISBN 978-0080434124.
- 5.Bener A. Al-SadigM.etal(1998).Road traffic accidents in the United Arab Emirates:Trends ,morbidity and mortality during 1997-1998.Accid.Anal.Prev. Jul;34(4):465-76.
- 6."WHO Disease and injury country estimates". World Health Organization.2004.
- 7."Babil Governorate Profile" Reports, Maps and Assessments of Iraq's Governorates from the UN Joint Analysis and Policy Unit.
8. "World report on road traffic injury prevention". World Health Organization 2004.
- 9.Harry Lum& Jerry A. Reagan (Winter 1995). "Interactive Highway Safety Design Model: Accident Predictive Module". Public Roads Magazine.
- 10.Ray Fuller; Jorge A. Santos (2002).Human Factors for Highway Engineers.Emerald.p. 15. ISBN 978-0080434124.
- 11."Safety First: the SSV/SRV cars". AROnline. Keith Adams.
- 12.Broughton & Walter (February 2007). "Trends in Fatal Car Accidents: Analyses of data". Project Report PPR172 (Transport Research Laboratory).
- 13.Thew, Rosemary (2006). "Royal Society for the Prevention of Accidents Conference Proceedings" (PDF).Driving Standards

Agency. "Most at risk are young males between 17 and 25 years".

14.The Good, the Bad and the Talented: Young Drivers' Perspectives on Good Driving and Learning to Drive (PDF) (Road Safety Research Report No. 74 ed.). Transport Research Laboratory. January 2007.

15."forecasting older driver's accident rates". Department for Transport.

Jump up ^ Adams, John (1982). "The efficacy of seat belt legislation" (PDF). SAE Transactions.

16.Leeming, J.J. (1969). Road Accidents: Prevent or Punish?.Cassell.ISBN 0-304-93213-2.

17.United Nations General Assembly 006-bk04Verbatim Report meeting 38 session 60 page 6 on 26 October 2005.

18. "Speeding research". NSW Roads and Traffic Authority.Dornstein, Ken. "Accidentally, on Purpose: The Making of a Personal Injury Underworld in America." Palgrave Macmillan, 1998, p.3.

19. "Synthesis of Safety Research Related to Speed and Speed Limits". U.S. Department of Transportation.

20."Synthesis of Safety Research Related to Speed and Speed Limits". U.S. Department of Transportation.

21. "The biggest killer on our roads". NSW Roads and Traffic Authority.

22. "Road Casualties Great Britain: 2006" (PDF). UK Department for Transport.Archived from the original on 2008-04-13.

23"WHO Disease and injury country estimates". World Health Organization. 2004.

24.Sagberg, Fosser, &Saetermo (1997). An investigation of behavioral adaptation to airbags and antilock brakes among taxi drivers (29 ed.). Accident Analysis and Prevention. pp. 293–302.

25. "Road Safety in Canada" (PDF). Transport Canada. p.17.

26.Michael R. Lascher, Edward Powers. "The economics and politics of choice no-fault insurance."Springer, 2001.

Table 3.1: Mean ± SD of age of all study cases

Variable	Mean ±SD	Range
Age (years)	30.28 ± 17.43	1-83

Table 3.2 shows the distribution of RTA patients by socio-demographic characteristics

Socio-demographic characteristics	Frequency (%)
Gender (n=244)	
Male	202 (83%)
Female	42 (17%)
Residence (n=244)	
Urban	164 (67%)
Rural	80 (33%)
Marital status (n=244)	
Married	127 (52%)
Un married	98 (40.2%)
Divorce	9 (3.7%)
Widow	10 (4.1%)

Educational level (n=207)	
Illiterate	34 (16.4%)
Primary	60 (29%)
Secondary	77 (37.2%)
Higher education	36 (17.4%)

Table 3.3 shows the distribution of accidents by driver's characteristics (n=169)

Driver's characteristics	Frequency (%)
Driver's license	
Present	87 (51.5%)
Absent	82 (48.5%)
History of previous accidents	
Present	99 (58.6%)
Absent	70 (41.4%)
History of chronic diseases	
Present	44 (26%)
Absent	125 (74%)

Table 3.4 shows the distribution of RTA patients by accident characteristics (n=207)

Accident characteristics	Frequency (%)
Time of accident	
Day	142 (69%)
Night	65 (31%)
Site of accident	
Main roads	172 (83%)
Secondary roads	35 (17%)
Type of vehicle	
Car	109 (52.7%)
Lorry or bus	30 (14.5%)
Motorcycle	40 (23.1%)
Other	20 (9.7%)
Weather conditions	
Sunny and clear	153 (74%)
Dusty	27 (13%)
Rainy	19 (9%)
Foggy	8 (4%)
Road condition	
Paved	158 (76%)
Un paved	49 (24%)
Nature of accident	
Collision with other motor vehicle	118 (57%)
Collision with pedestrian	39 (19%)
Rollover	27 (13%)
Collision with fixed object	19 (9%)
Collision with animal	4 (2%)
Cause of accident	
Speed	160 (77%)

Road	18 (9%)
Disregard of road signs	6 (3%)
Alcohol	17 (8%)
Other	4 (2%)
More than one cause	2 (1%)
Type of injury	
Multiple injury	78 (37.7%)
Limb injury	67 (32.4%)
Head injury	48 (23.2%)
Chest injury	9 (4.3%)
Abdominal injury	5 (2.4%)

Table 3.5: The mean differences of age by type of injury(n=207)

Variable	Type	N	Mean ± S.D	t-test	df	P value
Age (in years)	Multiple	78	29.26 ± 17.58	0.529	205	0.597
	Localized	12 9	28.06 ± 14.61			

*p value ≤ 0.05 was significant

**p value ≤ 0.01 was significant

Table 3.6: The association of type of injury by socio-demographic characteristics (n=207)

socio-demographic characteristics	Multiple	localized	χ^2	df	P-value
Gender					
Male	69 (89%)	111 (86%)	0.25	1	0.617
Female	9 (11%)	18 (14%)			
Residence					
Urban	54 (69%)	86 (67%)	0.146	1	0.702
Rural	24 (31%)	43 (33%)			
Marital status					
Married	37 (47%)	69 (54%)	0.713	1	0.399
Single, widow and divorce	41 (53%)	60 (46%)			
Educational level					
Illiterate	13 (17%)	21 (16%)	2.324	3	0.508
Primary	19 (24%)	41 (32%)			

Secondary	29 (37%)	48 (37%)
Higher education	17 (22%)	19 (15%)

*p value ≤ 0.05 was significant

**p value ≤ 0.01 was significant

Table 3.7: The association of type of injury by accident characteristics (n=207)

Accident characteristics	Multiple	localized	χ^2	df	P-value
Time of accident					
Day	55 (71%)	87 (67%)	0.213	1	0.645
Night	23 (29%)	42 (33%)			
Site of accident					
Main roads	67 (86%)	105 (81%)	0.701	1	0.402
Secondary roads	11 (14%)	24 (19%)			
Cause of accident					
Speed	69 (89%)	91 (71%)	8.893	1	0.003**
Other causes	9 (11%)	38 (29%)			
Weather condition					
Sunny or clear	48 (62%)	105 (82%)	3.182	2	0.001**
Rainy	15 (19%)	4 (3%)			
Foggy	4 (5%)	4 (3%)			
Dusty	11 (14%)	16(12%)			
Nature of accident					
Collision with A"	56 (72%)	85 (66%)	3.182	2	0.204
Collision with B"	10 (13%)	29 (22%)			
Rollover	12 (15%)	15 (12%)			
Type of vehicle					
Motor cycle	29 (37%)	19 (15%)	13.75	1	<0.001**^a
Other vehicles	49 (63%)	110 (85%)			
Road conditions					
Unpaved	20 (26%)	29 (23%)	0.269	1	0.604
Paved	58 (74%)	100 (77%)			

*p value ≤ 0.05 was significant

**p value ≤ 0.01 was significant

a- Fisher-exact test.

Table 3.8: The association of type of injury by driver's characteristics(n=169)

Driver's characteristics	Multiple	localized	χ^2	df	P-value
Driver's License					
Absent	32 (46%)	50 (51%)	0.377	1	0.539
Present	38 (54%)	49 (49%)			
History of chronic diseases					
Present	18 (26%)	26 (26%)	0.006	1	0.936
Absent	52 (74%)	73 (74%)			
Exposure to previous accidents					
Present	44 (63%)	55 (56%)	0.901	1	0.343
Absent	26 (37%)	44 (44%)			

*p value ≤ 0.05 was significant

**p value ≤ 0.01 was significant