DOI: 10.21276/sjmps.2017.3.10

Saudi Journal of Medical and Pharmaceutical Sciences
Scholars Middle East Publishers
Dubai, United Arab Emirates
Website: http://scholarsmepub.com/

ISSN 2413-4929 (Print)
ISSN 2413-4910 (Online)

Original Research Article

Assessment of Type and Severity of Road Traffic Accident Injuries among Omani Young Adults

Havagiray R. Chitme[1*], Ammar Al Kashmiri[2], Fatma Musallam Al Amri[1], Alla Khalid Haidar[1], Abraar Mohammed Al Ajmi[1], Yumna Ahmed Al Saiari[1] and Laila Said Al Mahri[1]

[1]Department of Pharmacy, Oman Medical College, Baushar Campus, Muscat – Sultanate of Oman
[2]Department of Accident and Emergency, Khoula Hospital, Muscat- Sultanate of Oman

***Corresponding Author:**
Havagiray R. Chitme
Email: hrchitme@gmail.com

Abstract: It was carried out to evaluate and assess types of injuries in road traffic accident and their severity reported to one of the tertiary care hospital through cross sectional systemic prospective and retrospective study. Present study was carried out among 302 road traffic accident cases of young adult age. Collection of data includes interviewing the patient and review of medical records. Non-fatal injuries with severity such as abbreviated injury score (AIS); Glasgow coma score (GCS); revised trauma score (RTS) were considered in this study. Study indicates that 74.83% of victims were male and there is a significant ($p<0.01$) association between AIS and male gender. Most of the accident injuries were mild in nature and 99% of victims were having abrasion in urethra. The mean severity of injuries as computed by AIS was 13.2±0.106, GCS was 14.25±0.085 and RTS was 7.89±0.234. 37.45% of accident injuries were in group from 18 to 24 years. There is a significant ($p<0.05$) correlation between days of admission into ICU as well as in timing of accident. We conclude that it is important for planning and execution authorities to design and develop strategies and plans to minimise injuries in chest wall and thoracic vasculature to avoid future complications in young adults.
Keywords: Road traffic accident injury; young adults; injury types; injury severity; Oman, non-fatal injury

INTRODUCTION

The Global Status Report by WHO predicted that, by 2030, fatalities from road accidents is predicted to raise one of the major causes of death and will be doubled in Oman. Currently, Oman is ranked top fourth in GCC countries and 57th globally with respect to the incidence of road traffic crashes and associated injuries and deaths [1]. The Oman statistics - 2009 indicates that the road traffic accidents (RTA) were 2.67 per 1000 population, 34% of total injuries and 16.2% of total deaths [2].

Patients with traffic injuries comprised between 13% and 31% of all attendees were related to injuries in hospitals; in some countries 48% of beds were occupied in surgical wards and were also most frequently occupying operation theatres and ICUs [3]. 11437 injuries are being estimated in 2011 due to 5494 accidents and each injury is expected to reduce almost 5 years of working manpower [4]. Cumulative effect could be approximately loss of 55000 working years due to road traffic accidents injuries (RTI). In-patient morbidity in hospitals of ministry of health, Oman due to external causes in 2011 was 17527, of which RTAs and RTI victims comprised of 5760 patients, 3662 of whom were of the ages between 1–40 years [5]. 143 deaths of total 202 were recorded as in-patient deaths in MOH institutions, of which 107 due to RTAs were below 40 years.

Currently, RTIs are one of the major health concern challenging the development and progression of every country. Sultanate of Oman has recorded highest rates of RTA associated fatalities with around 3 deaths per 10000 people [5]. Young drivers are likely to have 5 to 10 times more RTIs compared to safest age group drivers [6] and it has been reported for more than 30 years [7]. It is well known that wearing a seat belt while driving is a safe practice and is compulsory in Oman. Royal Oman Police (ROP) makes spot checks on wearing seat belt on front seat but rear seat is being ignored [8]. Traffic-related injuries counts for more than 75% of admissions in emergency department of hospitals and costing at least 2% of Oman's gross national product every year. It has also lead to over occupancy of beds in hospitals and draining National resources and the society is paying high price in extending medical care to crash victims at large [9].

The main goal of this study was to analyze the pattern of injuries due to road traffic accidents in young adults in a tertiary care hospital to delineate the injured organs and their extent of injuries. This study will help in understanding sufferings of most productive age

group of Oman due to road traffic accident injuries. Present study promotes understanding types, severity and complications of road accident injuries in young adult Omani population. We documented the most common organ system injured and correlated to day, time, and duration of stay in hospital in various departments. Therefore, it brings awareness on seriousness of road accident injuries and makes authorities to think on remedial for this problem. It also provides good feedback to physicians, nurses and other working in Oman, GCC and other countries as it is the first kind of study in itself.

Main purpose of the study was to observe the type of injuries and consequences due to road traffic accidents in 302 patients reported to Khoula hospital from June 2015 to May 2016 among young-adult population. Specific objectives were to analyze organ specific, types and severity of accident injuries by using abbreviated injury scale (AIS); Glasgow coma score (GCS); Revised trauma score (RTS) and duration of stay in various departments of hospital with respect to types of RTIs.

MATERIAL AND METHODS

Study Design

Present cross-sectional study was carried out among age group of 18-45 years reported to Khoula hospital due to RTI. Details of patients reported to hospital due to RTI was obtained from accident & emergency department. Data sheet developed to carry out the present study was based on earlier studies [10]. The information on demography, age, type of injury, timing of crash, injured organ, and length of hospital stay, GCS, AIS and RTS of patients were collected on a data sheet.

Criteria of Inclusion and Exclusion

The criteria of inclusion of cases were those who have a RTI of population from 18 to 45 years of age and reported to Khoula hospital during the study period June 2015 to May 2016. Considering 7500 RTIs in this age group per annum, 50% probability with a margin of error 5% and confidence interval of 95% the sample size computed to be 275. Therefore we considered 302 cases of those who were able to answer the questionnaire and agreed to involve in the study. Those cases that died in at the site of accident or while on the way to the hospital due to injuries were excluded from the study.

Injury Details

The detailed injuries and their severity were recorded and later classified according to GCS [11], AIS [12], and International statistical classification of diseases and related health problems version 10 (ICD-10) [13] of each case. These details of injuries were recorded by scholars with an assistance of hospital staff posted in respective departments attending the particular case.

Abbreviated Injury Scale (AIS) Total Score

Total AIS score was recorded in numerical as 1 for abrasion and mildly severe; 2, laceration and moderately severe; 3, hemorrhage and serious; 4, open fracture and severe; 5 for contusion and considered to be critical and 6 for excessive blood loss and patient is unsurvivable. To calculate severity we considered injuries occurring in thoracic vasculature, chest wall, lung, heart, diaphragm, spleen, liver, abdominal vasculature, kidney, ureter, bladder and urethra [14].

Glasgow Coma Score (GCS)

It was computed by consideration of best eye, verbal and motor responses. Best eye responses were recorded numerically as 1 for not opening eyes; 2 for opening eyes to pain; 3 for opening the eyes to verbal command; and 4 for opening the eyes spontaneously. Whereas, best verbal responses were noted in a scale of 1 to 5 where 1 for non-verbal responses; 2 for incomprehensible sounds; 3 for inappropriate words; 4 for confused and 5 for oriented. The motor responses were also recorded numerically as 1 for no responses; 2 for extension in response to pain; 3 for flexion in response to pain; 4 for withdrawal of motor in response to pain; 5 for localized pain and 6 for obeying the command.

Total Revised Trauma Score (RTS)

It was calculated by using the formula RTS = [(0.2908) Respiration Rate + (0.7326) Systolic Blood Pressure + (0.9368) Glasgow Coma Score].

Duration of Stay in Hospital

Details of duration of stay of accident victims in emergency department, Intensive care unit, in-patient ward were counted and considered to calculate total duration of hospital stay.

Medical Ethics

The identity of the participant and findings is treated with highest possible degree of confidentiality. Participants were clearly explained the purpose of the study and their consent to collect information from case file was sought prior to their inclusion. Participation in this study was voluntary and participants were having the right to withdraw at any period of the investigation. Team members along with a medical staff belonged to the respective hospital collected the data. Permission from Khoula Hospital ethics committee was taken to carry out the study.

Statistical Analysis

Each case was given a case number and the information collected in this study was entered directly into SPSS version 23 and analyzed by using descriptive statistics such as mean and standard deviation for

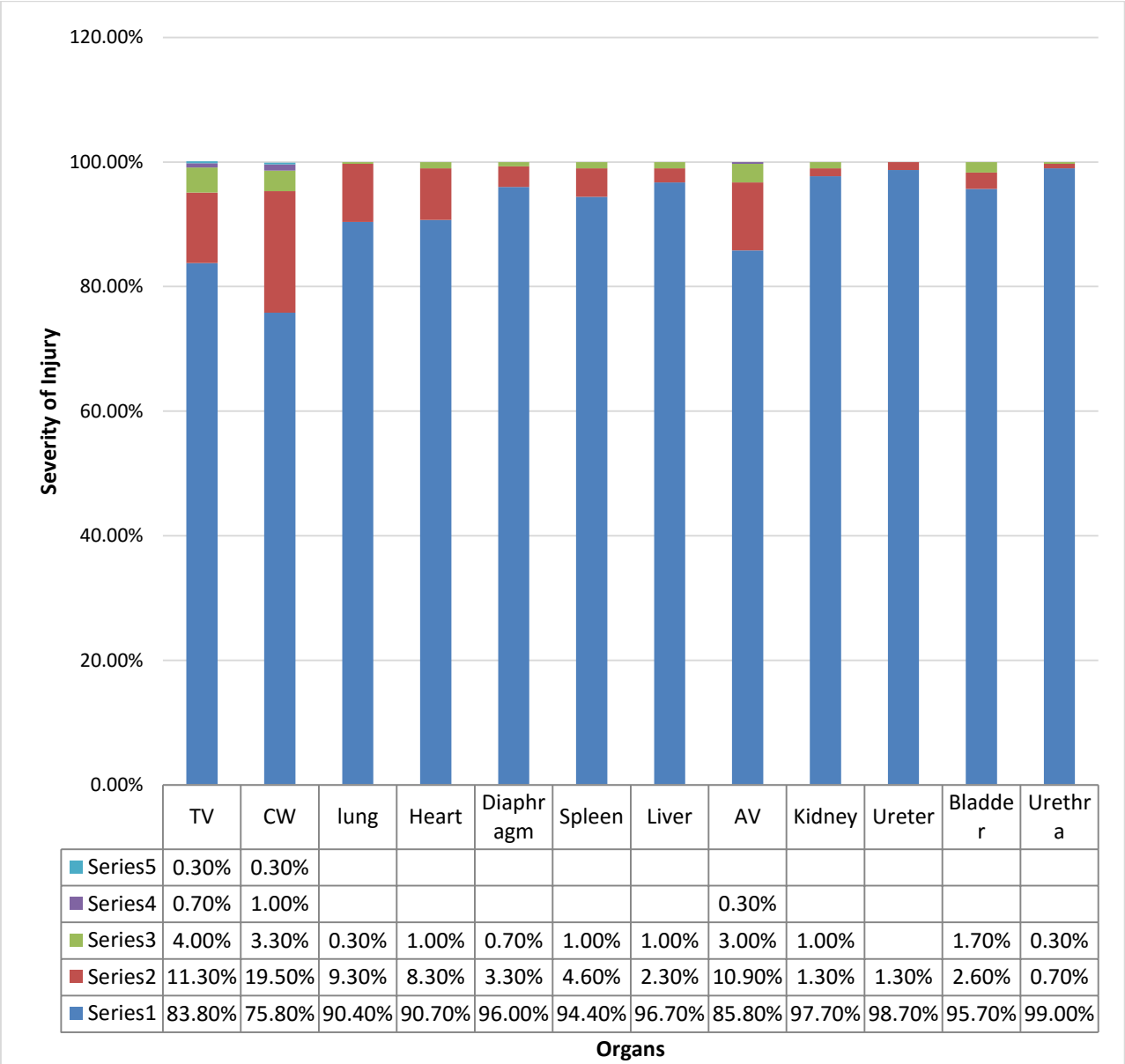
continuous numerical data and percentage-frequency distribution was used for categorical data. Kruskal Wallis test was used to compare and analyze the severity of the injuries. In order to estimate the true relationship between the patient's characteristics and injury we used multiple logistic regression analysis. Results with p-value less than 0.05 were considered as statistically significant.

RESULT

As mentioned in methodology, detailed inofrmation on type and severity of injuries in thoracic vasculature, chest wall, lung, heart, diaphragm, spleen, liver, abdominal vasculature, kidney, ureter, bladder and urethra were recorded in detail. However, only significant results are presented in this article and discussed.

Frequency of Types and Severity of Injuries in Respective Organs

Results presented in Fig. 1 shows that 99% of victims are having abrasion in urethra. Most of the accident injuries are mild and abrasion in nature. It has been observed that thoracic vasculature and chest wall injuries are varying from mild to critical level of severity compared to other type and severity. However, significant number of cases was mild to moderate involving thoracic vasculature and chest wall regions of body.



	TV	CW	lung	Heart	Diaphragm	Spleen	Liver	AV	Kidney	Ureter	Bladder	Urethra
Series5	0.30%	0.30%										
Series4	0.70%	1.00%						0.30%				
Series3	4.00%	3.30%	0.30%	1.00%	0.70%	1.00%	1.00%	3.00%	1.00%		1.70%	0.30%
Series2	11.30%	19.50%	9.30%	8.30%	3.30%	4.60%	2.30%	10.90%	1.30%	1.30%	2.60%	0.70%
Series1	83.80%	75.80%	90.40%	90.70%	96.00%	94.40%	96.70%	85.80%	97.70%	98.70%	95.70%	99.00%

Fig-1: Frequency of Type and Severity of Injuries in Respective Organs

Series 1: abrasion and mildly severe; Series 2: laceration and moderately severe; Series 3: hemorrhage and serious; Series 4; open fracture and severe; Series 5: contusion and considered to be critical.

Severity Score of Road Traffic Accident Injuries

The severity of injuries was computed by abbreviated injury score, GCS and RTS. The mean AIS were 13.2 ± 0.106, GCS was 14.25 ± 0.085 and RTS was 7.89 ± 0.234. These severity scores shows that road traffic accident injured victims are almost normal to mild. However, multiple regression analysis runs to predict AIS from time, gender, age, year and day. Day added statistically significantly ($p < 0.01$) to the prediction, It is important to mention here that there is no correlation between GCS and RTS severity of injuries and other factors such as time, gender, age and day. (Fig. 2)

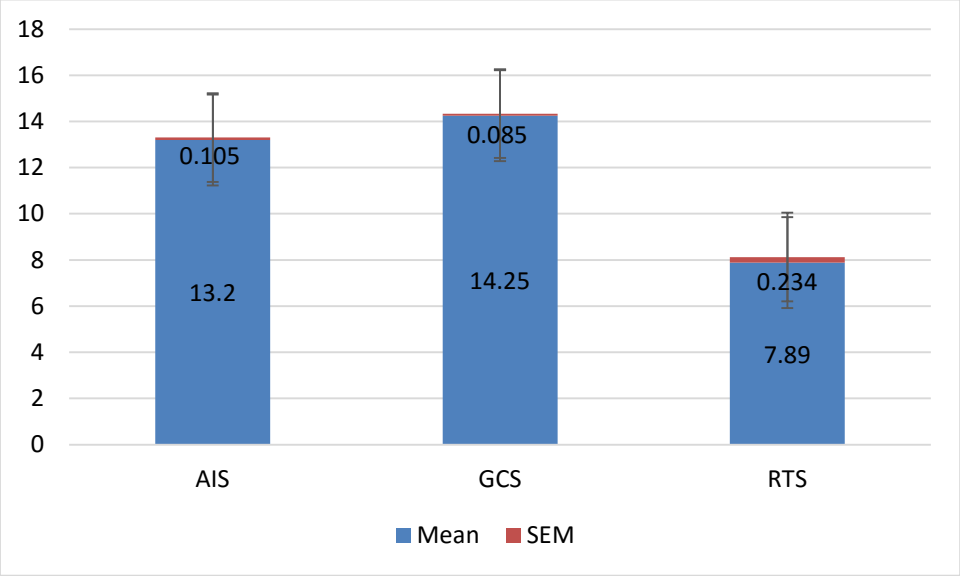


Fig-2: Average Severity Score of Road Traffic Accident Injuries

A multiple regression was run to predict AIS from time, gender, age, year and day. Day added statistically significantly to the prediction, $p < .01$

Comparison of Age Group and Severity of Injuries

Results presented in table 1 are only for statistically significant ($p<0.05$) relationship existing between chest wall injury and age at 5% significant level with a likelihood relationship of 0.965. Highest number of injuries (113) was noted in early adulthood (18-24 yrs) followed by 90 of young adult (25-32 yrs) compared to 45 and 54 of settling adulthood (33-38) and midlife transition age (39-45 yrs) respectively. These results indicates that victims of early adulthood age group i.e. 18-24 years are more susceptible to chest wall injuries with mild to moderate level of severity compared to other age groups. Injuries of other organs and their severity have not been seen to have any correlation with age of drivers therefore results are not given. The mean age of population was 28.87 ± 0.46 years.

Table-1: Comparison of Adult Young Group and Severity of Road Traffic Accident Chest Wall Injuries

Severity of Chest Wall Injury	Early Adulthood (18-24 years)	Young Adult (25-32 years)	Settling Adulthood (33-38 years)	Midlife Transition (39-45 years)	Total
Abrasion and mildly severe	92	66	32	39	229
Laceration and moderately severe	19	20	9	11	59
Hemorrhage and serious	1	4	1	4	10
Open fracture and severe	1	0	2	0	3
Contusion and critical	0	0	1	0	1
Total	113	90	45	54	302

Pearson Chi-Square analysis rejects the null hypothesis and conclude that there is a statistically significant *($p<0.05$) relationship between Chest Wall injury and age at 5% significant level with a likelihood relationship of 0.965.

Comparison of Duration of Hospital Stay, Trauma Score and Time of accident

The Pearson Chi-Square analysis rejects the null hypothesis and conclude that $\chi(1) = 225.118$, $p = 0.021$ there is a statistically significant ($p<0.05$) relation

between days of admission into ICU and timing of accident, that is especially accidents happening in afternoon, evening and night. Similarly, Kruskal Wallis test showed a significant ($p<0.05$) difference in severity accident injuries of RTS ($\chi^2 = 41.488$, $p = 0.01$); Duration of hospital stay in emergency department (DED) ($\chi^2 = 74.639$, $p = 0.001$); in ICU (DICU) ($\chi^2 = 54.053$, $p = 0.001$); in in-patient (DIP) ($\chi^2 = 37.38$, $p = 0.03$); and total duration of stay in hospital (DHS) ($\chi^2 = 41.974$, $p = 0.009$) and on different timings of the days of accident in terms of 24 hrs. Results in table 2 shows that majority of cases were in the evening and stayed in emergency department for 1 day only. Accidents happened in the evening (16-21 hrs) and night (21-24 hrs) were taken to ICU but they were discharged from ICU on the same day of reporting. Similarly, injured cases in accidents in the evening and night were hospitalized as in-patient for 1-3 days followed by 4-7 days. In total, 88% of the patients were in the hospital for a period of 1 to 10 days in various departments for the treatment of accident injuries. Of the 88% of patients stayed in hospital for 1-10 days 29% of the accidents were in the evening and 17% of the accidents were in the night. The average time of accident injuries were 12.63 ± 0.433 in 24 hrs scales.

Table-2: Comparison of Duration of Hospital Stay, Trauma Score and Time of accident

		Midnight (24 - 1 hrs)	Wee hours (1-4 hrs)	Dawn (4-6 hrs)	Morning (6-9 hrs)	Mid Morning (9-12 hrs)	Noon (12-13 hrs)	After Noon (14-16 hrs)	Evening (16-21 hrs)	Night (21-24 hrs)	Total
Total Revised Trauma Score#	4	0	1	0	0	0	1	0	0	0	2
	5	0	0	0	0	0	0	0	0	1	1
	6	1	0	0	0	1	0	0	0	0	2
	7	1	5	0	2	5	3	1	6	4	27
	8	15	38	17	13	21	23	20	77	45	269
	>8	0	0	0	0	0	1	0	0	0	1
Total		17	44	17	15	27	28	21	83	50	302
Duration of Stay at Emergency Department#	0	9	15	4	5	4	13	8	31	25	114
	1	4	27	13	10	22	13	13	52	24	178
	2	2	2	0	0	0	1	0	0	0	5
	3	0	0	0	0	0	1	0	0	1	2
	4	1	0	0	0	0	0	0	0	0	1
	5	1	0	0	0	1	0	0	0	0	2
Total		17	44	17	15	27	28	21	83	50	302
Duration of Stay at ICU*#	0	14	37	16	14	22	23	20	77	45	268
	1 - 3	3	4	1	1	3	3	1	3	2	21
	4 - 6	0	3	0	0	0	2	0	3	2	10
	10	0	0	0	0	1	0	0	0	1	2
	20	0	0	0	0	1	0	0	0	0	1
Total		17	44	17	15	27	28	21	83	50	302
Duration of Stay as In-Patient#	0	2	12	4	5	4	5	7	14	12	65
	1 - 3	8	17	8	7	16	12	9	44	21	142
	4 - 7	5	9	5	2	5	8	4	21	12	71
	8 - 14	2	3	0	1	1	1	0	4	3	15
	15-21	0	2	0	0	0	2	1	0	2	7
	>21	0	1	0	0	1	0	0	0	0	1
Total		17	44	17	15	27	28	21	83	50	302
Total Duration of Hospital Stay#	0	1	4	0	2	1	3	0	2	1	14
	1 - 10	14	35	17	13	23	22	20	77	45	266
	11-20	2	4	0	0	2	2	0	4	2	16
	21-30	0	0	0	0	0	1	1	0	1	3
	>30	0	1	0	0	1	0	0	0	1	3
Total		17	44	17	15	27	28	21	83	50	302

Pearson Chi-Square analysis rejects the null hypothesis and conclude that $\chi(1) = 225.118$, $p = 0.021$ there is a statistically significant *($p<0.05$) association between days of admission into ICU and timing of accident, that is especially accidents happening in afternoon, evening and night.

[#]Kruskal Wallis test showed a significant ($p<0.05$) difference in severity accident injuries of RTS ($\chi^2 = 41.488$, $p = 0.01$); DED ($\chi^2 = 74.639$, $p = 0.001$); DICU ($\chi^2 = 54.053$, $p = 0.001$); DIP ($\chi^2 = 37.38$, $p = 0.03$); DHS ($\chi^2 = 41.974$, $p = 0.009$) and on different timings of the days of accident in terms of 24 hrs, with a mean rank injury severity as given below;

RTS: 128.63, 148.79, **176.50, 176.50, 176.50, 176.50, 176.50, 176.50, 176.50, 157.72**, 120.50, 147.95, 168.88, 125.67, 133.33, 112.50, 125.69, 119.93, 160.76, **174.53**, 139.45, 166.57, 151.62, **176.50.**

DED: 148.75, **194.91**, 137.14, 120.07**, 174.30**, 75.75, **203.50**, 163.40, 120.07, 138.61, **190.23, 190.23**, 109.03**, 203.50**, **203.50, 174.30, 196.55**, 125.63, 92.26, 130.50, 123.86, 112.54, **183.26,** 143.38.

DICU: **171.31, 160.79, 146.82, 155.21, 149.00**, 134.50, 134.50, 134.50, 134.50, 134.50, **189.14, 149.09**, 143.03, **197.46**, 134.50, **166.25, 193.52,** 144.17, 142.29, 134.50, 134.50, 134.50, 134.50, 143.03.

DIP: 178.09, 122.65, **175.23**, 111.86, 140.75, 146.19, 92.25, 93.30, 179.29, 123.28, 147.64, 129.09, **191.53, 174.25**, 139.94, **197.60, 179.86, 170.43**, 120.95, 145.41, 115.09, 136.64**, 189.84**, 103.76.

DHS: 177.78, 145.62, **171.32**, 109.07, 146.10, 124.50, 113.25, 102.60, **170.00**, 116.44, 165.14, 141.59, **180.82**, **193.96, 154.78, 199.75, 183.02, 163.13**, 106.26, 138.09, 108.68, 122.89**, 192.14**, 101.97

Comparison of Day of Accident and Types and Severity of Road Traffic Accident Injuries

A Kruskal Wallis test showed a statistically significant ($p<0.05$) difference in severity accident injuries of CW and AIS between the different days of accident, $\chi^2(2) = 16.54$ and 14.915, $p = 0.011$ and 0.021, with a mean rank injury severity of highest on monday of 175.65, sunday, 163.14 and lowest on friday, 127.34. The average day of accidents is 3.57 ± 0.118 day.

Mean rank injury severity as given below; CW: 163.14, 175.65, 146.24, 149.29, 143.27, 127.34, 136.56. AIS: 167.60, 169.41, 139.30, 144.76, 162.95, 113.27, 147.23

Results depicted in table 3 clearly show that most of the injuries (75.8%) were mild in nature and 19.5% were moderately severe. The AIS score was higher on working days than on weekend and non-working days.

Table-3: Comparison of Day of Accident and Types and Severity of Injuries

		Day							Total
		Sun	**Mon**	**Tues**	**Wed**	**Thurs**	**Fri**	**Sat**	
Chest Wall*	1	43	30	35	31	27	32	30	229
	2	16	19	6	7	4	3	4	59
	3	2	2	2	1	2	0	1	10
	4	1	0	1	1	0	0	0	3
	5	1	0	0	0	0	0	0	1
Total		63	51	44	40	33	35	35	302
Abbreviated Injury Score*	12	30	20	26	22	14	24	18	155
	13	6	9	6	8	6	9	8	52
	14	8	13	5	3	9	2	4	44
	15	9	6	5	4	1	0	3	28
	16	3	1	0	0	1	0	1	6
	17	3	1	0	2	1	0	0	7
	18	1	0	0	1	1	0	0	3
	19	1	0	1	0	0	0	0	2
	20	1	1	0	0	0	0	0	2
	21	0	0	0	0	0	0	1	1
	22	1	0	0	0	0	0	0	1
	25	0	0	1	0	0	0	0	1
Total		63	51	44	40	33	35	35	302

A Kruskal Wallis test showed a statistically significant ($p<0.05$) difference in severity accident injuries of CW and AIS between the different days of accident, $\chi^2(2) = 16.54$ and 14.915, $p = 0.011$ and 0.021, with a mean rank injury severity of highest on day 2 of 175.65, Day 1, 163.14 and lowest on Day 6, 127.34.

Mean rank injury severity as given below;
CW: 163.14, 175.65, 146.24, 149.29, 143.27, 127.34, 136.56
AIS: 167.60, 169.41, 139.30, 144.76, 162.95, 113.27, 147.23

Comparison of Gender and Severity of Injury

Results shown in table 4 indicate that 74.83% of patients were male and 25.16% of the patients were female. Pearson Chi-Square analysis rejects the null hypothesis and conclude that $\chi(1) = 26.532$, there is a statistically significant ($p<0.01$) association between AIS and gender, that is males have more severity of injury than females. However, majority of injuries in both male and female were near normal to mild. Other scores of severity i.e GCS and RTS have not shown any significant relationship.

Table-4: Comparison of Gender and Abbreviated Injury Score

Abbreviated Injury Score	Gender		
	Male	Female	Total
12	122	33	155
13	34	18	52
14	28	16	44
15	26	2	28
16	6	0	6
17	5	2	7
18	1	2	3
19	0	2	2
20	2	0	2
21	1	0	1
22	0	1	1
25	1	0	1
Total	226	76	302

Pearson Chi-Square analysis rejects the null hypothesis and conclude that $\chi(1) = 26.532$, $p = 0.005$ there is a statistically significant **($p<0.01$) association between AIS and gender, that is males have more severity of injury than females.

DISCUSSION

Morbidity and mortality due to RTAs is a serious health concern in most countries including the GCC states [15]. Despite regular awareness campaigns on road safety by various agencies including Royal Oman Police, road traffic injury based studies are very few and with little reliable and reproducible data. Therefore, present study was carried out with an aim to assess type of RTIs and their severity in Khoula hospital to compute context-specific road safety initiative which is relevant and preventable. Present study was a cross sectional systemic prospective and retrospective study. Medical records available at hospital were reviewed and we calculated types of non-fatal injuries with age, gender, time, and day. In this study we used three scales to know the severity of injuries which are abbreviated injury score, Glasgow coma score and revised trauma score [16].

Results of our study shows that most of the accident injuries were mild and 99% of victims were having abrasion in urethra. These are in line with the results published on RTIs and rehabilitation [17]. Recently published studies on road traffic accident injuries among youth shows that 52% of the RTIs were involving head, face and neck; 57.8% of victims had head and neck trauma; 46% were having chest injuries (P<.0001) and 17% were with clavicular injuries (P<.0001) [18]. Results of our study also supports their observation as thoracic vasculature and chest wall injuries were common and varying from mild to critical level of severity.

The mean severity of injuries as computed by AIS was 13.2±0.106, GCS was 14.25±0.085 and RTS was 7.89±0.234. These severity scores shows that road traffic accident injured victims were almost normal to mild. However, multiple regression analysis runs to predict AIS from time, gender, age, year and day. Day added statistically significantly ($p < 0.01$) to the prediction. These results are similar to the Glasgow coma scale of patients injured in road traffic accident in Ethiopia [19]. AIS score of present study supports the results of recent study in which 82% of injuries were mild or moderate injuries with Maximum AIS was <3 [20].

An epidemiological study from Romania shows that the majority of patients reported due to road traffic accident injuries were between the ages of 18 and 29. Head, chest and neck region were the most frequent part of the body get injured in all road users [21]. Similarly, another study reports mean age of patients with road traffic accident injuries was 28.2 years [22]. Results obtained in our study shows a statistically significant ($p<0.05$) relationship existing between chest wall injury and age with a likelihood relationship of 0.965. In line with above studies highest number of injuries was noted in early adulthood followed by young adult [23].

The Pearson Chi-Square analysis conclude that there is a statistically significant ($p<0.05$) relation was noted between Days of admission into ICU and timing of accident, that is especially accidents happening in afternoon, evening and night. These results are almost

in line with a recently published study which has reported higher rate of injuries at night with a prevalence ratio of 1.24 [24]. However, our results marginally differs from a study which has reported 24.44% at sunrise and 27.16% at sunset and severity was significantly greater at dawn and sundown than those happening during daylight (P<0.001) [25].

Similarly, Kruskal Wallis test showed a statistically significant (p<0.05) difference in RTS, duration of stay in ED, ICU, in-patient, total duration of stay in hospital and on different timings of the days of accident in terms of 24 hrs. Majority of injury cases were in the evening and stayed in emergency department for 1 day only. Accidents happened in the evening (16-21 hrs) and night (21-24 hrs) were taken to ICU but they were discharged from ICU on the same day of reporting. Similarly, injured cases in accidents in the evening and night were hospitalized as in-patient for 1-3 days followed by 4-7 days. In total, 88% of the patients were in the hospital for a period of 1 to 10 days of these, 29% of the accidents were in the evening and 17% of the accidents were in the night. Duration of stay to recover from accident injuries was higher than 4 to 7 days as reported from Romania[21]. Most of the minor and major injuries were treated symptomatically and discharged similar to the study reporting lower rate of ED treatment of injuries [26]. A study from Dominican Republic shows that maximum number of accident injuries occurred from working days working days i.e. Tuesday to weekend Saturday (Odds Ratio from 1.5 to 2.9) [27]. Results of present study also show that there are real positive relationships between the number of accident and working days. The number of accident increases in working days more than weekend.

Results clearly shows that most of the injuries (75.8%) due to road traffic accident were mild in nature and 19.5% were moderately severe. The AIS score was higher on working days than on weekend and non-working days. A study from India reported that maximum and significant number of accidents recorded on Sundays as well as on Mondays but the least number were seen on Wednesday. Accidents were more often from 8 pm and the second most common was from 4 pm to 8 pm [28]. Similarly, Kruskal Wallis test showed a statistically significant (p<0.05) difference in severity accident injuries of chest wall and AIS between the different days of accident, with a mean rank injury severity of highest on Monday 175.65, Sunday, 163.14 and lowest on Friday, 127.34.

Results indicates that most of the males are affected by accident (74.83%) and 25.16% were female similar to the study in Ethiopia which reported 77.6% of accident victims were male [29]. Our study has shown a statistically significant (p<0.01) association between AIS and gender, that is males have more severity of injury than females. These results are substantiated by report indicating severe injuries in male and delay in rate of recovery from accident injuries [30-31]. However, majority of injuries in both male and female were near normal to mild.

CONCLUSION

Present prospective-retrospective cross-sectional cohort study carried out by involving 302 road traffic accidents in young adult age group indicates that male, 18-24 years age group, working days, afternoon time period of the day, are more prevalent with respect to type and severity of injuries. It is also shown that the maximum number of victims was stayed in hospital for 1-10 days comparatively higher than other studies. Most of the accident injuries were mild in nature and involves urethra. However, thoracic vasculature and chest wall injuries were common and varying from mild to critical level of severity. Therefore, it is important to consider these points while developing strategies and plans to reduce injuries in young adults.

REFERENCES

1. Islam, M. M., & Al Hadhrami, A. Y. (2012). Increased motorization and road traffic accidents in Oman. Journal of Emerging Trends in Economics and Management Sciences, 3(6), 907.
2. Majid, N. H. A., Shuichi, H., & Takagi, N. (2012). Vernacular Wisdom: The basis of formulating compatible living environment in Oman. Procedia-Social and Behavioral Sciences, 68, 637-648.
3. Odero, W., Garner, P., & Zwi, A. (1997). Road traffic injuries in developing countries: a comprehensive review of epidemiological studies. Tropical Medicine & International Health, 2(5), 445-460.
4. Roberts, C., Morgan, A., Smith, R., Settertobulte, W., Samdal, O., & Barnakov-Rasmussen, V. (2004). Young people's health in context. C. Currie (Ed.). World Health Organization Regional Office for Europe.
5. Al-Kharusi, W. (2008). Update on road traffic crashes. Clinical orthopaedics and related research, 466(10), 2457-2464.
6. Williams, A. F. (2003). Teenage drivers: patterns of risk. Journal of safety research, 34(1), 5-15.
7. McIlvenny, S. (2006). Road traffic accidents—a challenging epidemic. Sultan Qaboos Univ Med J, 6(1), 3-5.
8. Power, S. (2013). " A problem from hell": America and the age of genocide. Basic Books.
9. Bingham, C. R., & Shope, J. T. (2007). Casualty crash types for which teens are at excess risk. 51st Annual Proceedings Association for the Advancement of Automotive Medicine, 35, 261-271.
10. Ganveer, G., & Tiwari, R. (2005). Injury pattern among non-fatal road traffic accident cases: a cross-sectional study in Central India. Indian journal of medical sciences, 59(1), 9.

11. Teasdale, G., & Jennett, B. (1974). Assessment of coma and impaired consciousness: a practical scale. The Lancet, 304(7872), 81-84.
12. AAAM, the abbreviated injury scales (AIS) – 1990, 1998 Update Des Plaines, IL: Association for the advancement of automotive medicine.
13. World Health Organization. (2004). International statistical classification of diseases and related health problems (Vol. 1). World Health Organization.
14. Nordfjærn, T., Jørgensen, S., & Rundmo, T. (2012). Cultural and socio-demographic predictors of car accident involvement in Norway, Ghana, Tanzania and Uganda. Safety science, 50(9), 1862-1872.
15. Gopalakrishnan, S. (2012). A public health perspective of road traffic accidents. Journal of family medicine and primary care, 1(2), 144.
16. O'Keefe, G., & Jurkovich, G. J. (2001). Measurement of injury severity and co-morbidity. Injury Control: A guide to research and program evaluation, 32-46.
17. Faux, S. G., Kohler, F., Mozer, R., Klein, L. A., Courtenay, S., D'Amours, S. K., ... & Estell, J. (2015). The ROARI project–Road Accident Acute Rehabilitation Initiative: a randomised clinical trial of two targeted early interventions for road-related trauma. Clinical rehabilitation, 29(7), 639-652.
18. Bumbasirevic, M., Lesic, A., Bumbasirevic, V., Zagorac, S., Milosevic, I., Simic, M., & Markovic-Denic, L. (2014). Severe road traffic injuries and youth: a 4-year analysis for the city of Belgrade. International journal of injury control and safety promotion, 21(4), 313-317.
19. Seid, M., Azazh, A., Enquselassie, F., & Yisma, E. (2015). Injury characteristics and outcome of road traffic accident among victims at Adult Emergency Department of Tikur Anbessa specialized hospital, Addis Ababa, Ethiopia: a prospective hospital based study. BMC emergency medicine, 15(1), 10.
20. Batailler, P., Hours, M., Maza, M., Charnay, P., Tardy, H., Tournier, C., & Javouhey, E. (2014). Health status recovery at one year in children injured in a road accident: A cohort study. Accident Analysis & Prevention, 71, 267-272.
21. Rus Ma, D., Peek-Asa, C., Baragan, E. A., Chereches, R. M., & Mocean, F. (2015). Epidemiology of Road Traffic Injuries Treated in a Large Romanian Emergency Department in Tîrgu-Mureş Between 2009 and 2010. Traffic injury prevention, 16(8), 835-841.
22. Abu-Zidan, F. M., & Eid, H. O. (2015). Factors affecting injury severity of vehicle occupants following road traffic collisions. Injury, 46(1), 136-141.
23. Zangooei Dovom, H., Shafahi, Y., & Zangooei Dovom, M. (2013). Fatal accident distribution by age, gender and head injury, and death probability at accident scene in Mashhad, Iran, 2006–2009. International journal of injury control and safety promotion, 20(2), 121-133.
24. Nóbrega, L. M., Cavalcante, G. M., Lima, M. M., Madruga, R. C., Ramos-Jorge, M. L., & d'Avila, S. (2014). Prevalence of facial trauma and associated factors in victims of road traffic accidents. The American journal of emergency medicine, 32(11), 1382-1386.
25. Lankarani, K. B., Heydari, S. T., Aghabeigi, M. R., Moafian, G., Hoseinzadeh, A., & Vossoughi, M. (2014). The impact of environmental factors on traffic accidents in Iran. Journal of injury and violence research, 6(2), 64.
26. Polinder, S., Haagsma, J., Bos, N., Panneman, M., Wolt, K. K., Brugmans, M., ... & van Beeck, E. (2015). Burden of road traffic injuries: Disability-adjusted life years in relation to hospitalization and the maximum abbreviated injury scale. Accident Analysis & Prevention, 80, 193-200.
27. Puello, A., Bhatti, J., & Salmi, L. R. (2013). Feasibility of road traffic injury surveillance integrating police and health insurance data sets in the Dominican Republic. Revista panamericana de salud publica, 34(1), 41-46.
28. Bayan, P., Bhawalkar, J. S., Jadhav, S. L., & Banerjee, A. (2013). Profile of non-fatal injuries due to road traffic accidents from a industrial town in India. International journal of critical illness and injury science, 3(1), 8.
29. Hailemichael, F., Suleiman, M., & Pauolos, W. (2015). Magnitude and outcomes of road traffic accidents at Hospitals in Wolaita Zone, SNNPR, Ethiopia. BMC research notes, 8(1), 135.
30. Nhac-Vu, H. T., Hours, M., Charnay, P., Chossegros, L., Boisson, D., Luauté, J., ... & Laumon, B. (2011). Predicting self-reported recovery one year after major road traffic accident trauma. Journal of rehabilitation medicine, 43(9), 776-782.
31. Chitme H. R., Al Badri M. M. S., Al Saadi A. H. (2017). Utilization of drugs in patients with road traffic accident injuries. Int J Nutr Pharmacol Neurol Dis,7(1): 8-11.