Research Article

Prevalence and behavioral risk factors associated with road traffic accidents among medical students of Arabian Gulf University in Bahrain

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Abstract

Background: Road traffic accidents are ranked by the World Health Organization as the 10th leading cause of death globally. An estimated 1.3 million people were killed annually in car crashes and as many as 50 million were injured in 2011. Road injuries are the second leading cause of death among people aged 20–24 years, particularly males.

Objective: To raise awareness about road traffic accidents and their causes and consequences among medical students in Arabian Gulf University (AGU) in Bahrain.

Materials and Methods: A retrospective cross-sectional study was conducted in AGU, Bahrain, in the period between 22 September and 3 October, 2013. Medical students of AGU aged 20–24 years who drove in Bahrain during the period (January 2011–December 2012) were chosen. A total of 200 students were selected. A questionnaire was used to collect the demographic and driving behavior data for each participant. The data were entered and analyzed using SPSS program, version 18.

Results: Most of the students (73.4%) were involved in an accident during 2011. The most important leading cause of accidents was the other driver (48.1%). The majority of the students (42.3%) experienced both physical and psychological injuries. The data showed that driving at excess speed when in a hurry, crossing red traffic lights, and wearing seatbelts are statistically significant behavioral factors.

Conclusion: The prevalence of road traffic accidents is very high among medical students in AGU. The study revealed that the major cause of these accidents is attributed to the other driver. Of these accidents, 31.7% resulted in injuries; most of which were combined (physical and psychological).

KEY WORDS: Prevalence, risk factors, road traffic accidents, medical students, Bahrain

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Introduction

Road traffic accidents are unintended, unfortunate collision of one motor vehicle with another, a stationary object, or a person, resulting in injuries, death, or loss of property.[1] These accidents occur on a daily basis and several studies have shown that in every 30 second a person is killed due to a road accident.[2] The range and severity of injuries caused by road accidents are enormous. Each year, these accidents

cost the global community about 518 billion dollars.[3] Thus, the reduction of accidents and their consequences are of great importance to humanity.

Traffic accidents are a complex phenomenon arising due to a variety of factors involved, including roadways and their environment, drivers' behavior, and vehicle aspects. University students in Bahrain represent an important sector of the community that is at a higher risk of sustaining road traffic accidents.[4]

Road traffic accidents—ranked by the World Health Organization in 2011 as the 10th leading cause of death globally—now comprise a momentous constituent of the international burden.[5] According to what Murthy[6] mentioned in 2011, an estimated 1.3 million people were killed annually in car crashes and as many as 50 million were injured.

Unfortunately, if the current circumstances continue, World Health Organization predicted that road traffic accidents will become the fifth leading cause of death by 2030.[7] The World Health Organization stated in the released report on *Youth and Road Safety* in 2007 that road injuries are the second leading cause of death among people aged 20–24 years, particularly males.[7] This might create an economic hardship for a family due to loss of its earners.

Trauma from road traffic accidents can be classified into facial, head, spinal cord, chest, abdomen, pelvic, genitourinary, extremity, and soft tissue traumas.[8] Fractures are the most common injuries treated at Salmaniya Medical Complex, which represented 46.76% of the total injuries, followed by intracranial injuries that accounted for 29.76% in the period 1996–2001.[9] Unfortunately, the indicated incidence of injuries treated was increased by 42.5%. The severity of the injuries increased as well. Slight injuries increased by 27.2%, whereas cases with serious injuries that were admitted to the hospital rose by 18.8%.[9]

Gulf countries are listed among the nations with the worst traffic accidents and fatality rates,[10] which indicates the urge to explore the reasons beyond causalities.

In Bahrain, the total number of road traffic accidents has increased dramatically since 2001. The data provided by the General Directorate of Traffic, Bahrain, for 2010 revealed an increase from 38,153 accidents in 2001 to 82,479 accidents in 2010.[11] From a total of 2145 drivers' at fault, 459 were between the ages 20 and 24 years, and men constituted approximately 80.17%. That is very compatible with the global data provided by the World Health Organization, emphasizing that the calculated proportion showing 21% of all people who were involved in an accident in 2010 were within 20–24 years.[11]

Drivers' behavioral impairment is an important component of road traffic accidents. Driving at excess speeds accounted for 5.68% from total causes of injury accidents in Bahrain, whereas being sleepy or tired accounted for 0.29%, crossing red traffic lights 8.7%, and not wearing seat belt resulted in 2.3% of these injuries. Using mobile phones is also a major contributor of road traffic crashes as well as injuries.[11] Besides, there are other major contributories that are listed as major causes of accidents, and they are related to roads, weather, and others. Moving off without precaution, swerving, stopping suddenly, and losing control before the accident occurs are all major factors in crashes, deaths, and serious injuries.[11]

Our research reviewed road traffic accidents among medical students who drive, discussing various important aspects, including the students' behavior before and while driving, the prevalence of road traffic accidents and injuries, the causes of such accidents, and the types of injuries.

Materials and Methods

A cross-sectional study was conducted to determine the prevalence of road traffic accidents and injuries among AGU medical students who drove in Bahrain in 2011–2012.

Table 1: Demographic and driving characteristics among medical students of Arabian Gulf University who drove in Bahrain during 2011–2012

Variable	Number (%)
Gender	
Male	107 (53.5)
Female	93 (46.5)
Year of study	
Year 3	50 (25)
Year 4	50 (25)
Year 5	50 (25)
Year 6	50 (25)
Age	
20	44 (22)
21	48 (24)
22	39 (19.5)
23	43 (21.5)
24	26 (13)
Type of car	
Saloon	165 (82.5)
Sports car	24 (12)
Others	11 (5.5)
Driving license*	
Yes	195 (98)
No	4 (2)
Driving hours**	
1 hour	63 (32.1)
More than 1 hour	133 (67.9)
Car checking	
Daily	8 (4)
Weekly	9 (4.5)
Monthly	58 (29)
Annually	83 (41.5)
Never	11 (5.5)
Others	31 (15.5)

*Total 199; **total 196.

Table 2: Prevalence, incidence, and causes of road traffic accidents among medical students of AGU who drove in Bahrain during 2011–2012

Variable	Yes, number (%)	No, number (%)	Total
Were you involved in a car accident previously?	124 (62)	76 (38)	200
Were you involved in a car accident in 2011?	91 (73.4)	33 (26.6)	124
Were you the cause of the accident(s)?	35 (42.7)	47 (57.3)	82
Was the other driver the cause of the accident(s)?	39 (48.1)	42 (51.9)	81
Was the road the cause of the accident(s)?	12 (14.6)	70 (85.4)	82
Was the weather the cause of the accident(s)?	2 (2.4)	80 (97.6)	82
Was your car the cause of the accident(s)?	4 (4.9)	78 (95.1)	82
Were the other vehicles the cause of the accident(s)?	8 (9.8)	74 (90.2)	82
Were there other factors that cause the accident(s)?	10 (12.3)	71 (87.7)	81

The inclusion criteria were as follow:

1. Males and females studying in Arabian Gulf University (AGU)
2. Bahraini or non-Bahraini
3. Aged 20–24 years
4. Drove during January 2011–December 2012

The exclusion criteria were as follow:

1. Aged >24 years or <20 years
2. Those who did not drive during January 2011–December 2012

A convenient sample of 200 students was selected, 50 students from each year. Years 1 and 2 students were not included as year 1 students are not within the medical field yet, and year 2 students did not meet with the age criteria.

Students from years 3, 4, 5, and 6 were given a questionnaire to fill out regarding their driving experience in the year 2011–2012.

A questionnaire was designed to be self-filled by the participants using closed-ended and open-ended questions. The Likert-type scale was used for some of the closed-ended questions. The questions are well-worded to avoid ambiguity and were pretested in a pilot study before the main survey. The questionnaire comprised the following:

1. Introductory statement about the purpose of the questionnaire and a thanking message to the participant
2. Demographic questions to collect relevant information about the participants
3. Investigations about the previous accidents
4. Assessment of driver's behavior before driving
5. Assessment of driver's behavior during driving

After filling the questionnaires and entering the data to the computer, they were checked manually. Any coding errors, invalid codes, and improper data entry were checked and corrected. The data collected were analyzed using Statistical Package for Social Science (SPSS), version 18.

Results

Of the 200 participants, 107 (53.5%) were males and 93(46.5%) were females. They were equally distributed between second, third, fourth, fifth, and sixth years; 50 (25%)

Table 3: Driver's behavior during driving among medical students of Arabian Gulf University who drove in Bahrain during 2011–2012

Driver's behaviors during driving	Yes, number (%)	No, number (%)
Tending to pass other cars	91 (45.5)	109 (54.5)
Enjoying the feeling of speed	84 (42)	116 (58)
Getting impatient with slower drivers	112 (56)	88 (44)
Driving through a stop sign without slowing	32 (16)	168 (84)
Enjoying racing with other drivers	41 (20.5)	159 (79.5)
Driving slowly when the weather is rainy or foggy	129 (64.5)	71 (35.5)
Tending to pass other cars when there is a traffic jam	61 (30.5)	139 (69.5)
Driving while being sleepy or tired	77 (38.5)	123 (61.5)
Using the mobile phone while driving	98 (49)	102 (51)
Crossing red traffic lights when in a hurry	34 (17)	166 (83)
Checking the mirrors	158 (79)	42 (21)
Driving at high speeds when in a hurry	116 (58)	84 (42)
Driving at high speeds when not in a hurry	48 (24)	152 (76)
Listening to loud music	79 (39.5)	121 (60.5)
Paying more attention when driving at night	107 (53.5)	93 (46.5)
Total	200	

Table 4: The relation between drivers' behavior during driving and prevalence of road traffic accident among medical students of Arabian Gulf University who drove in Bahrain during 2011–2012

Variable	Were you involved in a car accident?		*P*-value
	Yes (%)	No (%)	
Driving at high speed			
I drive at high speeds when I am in a hurry			**0.003**
Yes	82 (70.7)	34 (29.3)	
No	42 (50.0)	42 (50.0)	
I drive at high speeds when I am not in a hurry			0.148
Yes	34 (70.8)	14 (29.2)	
No	90 (59.2)	62 (40.8)	
I enjoy racing with other drivers			0.834
Yes	26 (63.4)	15 (36.6)	
No	98 (61.6)	61 (38.4)	
I enjoy the feeling of speed			0.247
Yes	56 (66.7)	28 (33.3)	
No	68 (58.6)	48 (41.4)	
Driving while sleepy or tired			
I drive while sleepy or tired			0.115
Yes	53 (68.8)	24 (31.2)	
No	71 (57.7)	52 (42.3)	
Crossing red traffic light			
I drive through a stop sign without slowing			**0.04**
Yes	25 (78.1)	7 (21.9)	
No	99 (58.9)	69 (41.1)	
When I am in a hurry I cross red traffic lights			**0.022**
Yes	27 (79.4)	7 (20.6)	
No	97 (58.4)	69 (41.6)	
Wearing seatbelt and using mobile phone			
I fasten the seatbelt			**0.006**
Yes	69 (54.8)	57 (45.2)	
No	55 (74.3)	19 (25.7)	
I use the mobile phone while driving			**0.016**
Yes	69 (70.4)	29 (29.6)	
No	55 (53.9)	47 (46.1)	
Precautions			
I often get impatient with slower drivers and attempt to bypass them			0.181
Yes	74 (66.1)	38 (33.9)	
No	50 (56.8)	38 (43.9)	
I pay more attention when I drive at night			**0.032**
Yes	59 (55.1)	48 (44.9)	
No	65 (69.9)	28 (30.1)	

Statistically significant values are indicated in bold.

for each. The age group selected was 20–24 years, majority of them (24%) were 21 years old. Most of them had a saloon car (165, 82.5%), and 24 (12%) had a sports car. Surprisingly, four (2%) of them were driving while not having a driving license. When asked about driving hours, 133 (67.9%) of them were driving more than 1 h per day. When participants were asked about how often they check their car, we found that 83 (41.5%) of them check it annually and 11 (5.5%) of them never check their car [Table 1].

Majority of the students (124, 62%) stated that they had an accident previously, of which 91 (73.4%) were involved in an accident during 2011. The leading cause of accidents in the participants' opinion was the other driver (48.1%), whereas the driver as a cause came in the second place (42.7%). The participants stated road (14.6%), weather (2.4%), car (4.9%), other vehicles (9.8%), and some other factors (12.3%) to be the least causes of accidents [Table 2].

When asked about the injuries, around one-third of the participants (31.7%) who had met with road traffic accident(s) stated that they were injured. When they were asked about the type, 8 (30.7%) of them had a physical injury, 7 (26.9%) had a psychological injury, and 11 (42.4%) experienced both

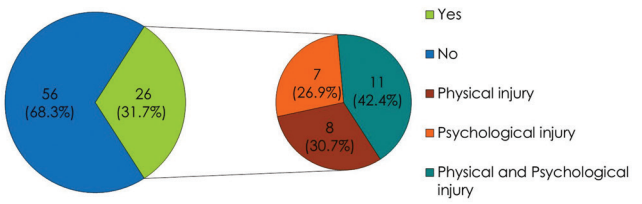

Figure 1: Incidence and types of injuries resulted from road traffic accidents among medical students of Arabian Gulf University who drove during 2011–2012.

types of injuries [Figure 1]. The results also showed that three (13%) of the injuries caused a chronic disability.

When the students were asked about their driving behavior during driving, around half of them—91 (45.5%), 84 (42%), and 112 (56%)—answered that they tend to pass other cars, enjoy the feeling of speed, and get impatient with slower drivers on the roads, respectively, yet only 32 (16%) of them drove through a stop sign without slowing down. The majority of them stated that they do not enjoy racing with other drivers (159, 79.5%), tend to drive slowly when the weather is rainy or foggy (129, 64.5%), and avoid passing other cars when there is a traffic jam (139, 69.5%). When they were asked about driving while being sleepy or tired and using their mobile phones, 77 (38.5%) and 98 (49%) of them answered that they do so. Furthermore, majority of them reported that they avoid crossing red traffic lights when they are in a hurry (166, 83%), and check the mirrors (158, 79%). However, more than half of them (116, 58%) tend to drive at high speeds when they are in a hurry. Interestingly, 121 (60.5%) of them told that do not listen to loud music while driving and 107 (53.5%) told that they pay more attention while driving at night [Table 3].

The data showed that driving at excess speed when in a hurry, crossing red traffic lights, wearing seatbelts, using mobile phones, and paying more attention while driving at night are statistically significant behavioral factors associated with road traffic accidents among the participants [Table 4].

Discussion

Our data concerning the prevalence of road traffic accidents among medical students aged 20–24 years in AGU who drove in Bahrain during 2011–2012 showed that 124 (62%) of them had a car accident previously, corresponding to the data provided by the General Directorate of Traffic, Bahrain.[11] For that reason, medical students do have a high prevalence of road traffic accidents as it was indicated in the national and international data.

Our data also showed that 26 students (31.7%) were injured in previous accidents and the majority of them (16) were men, which is similar to international figures.[11]

A recent study conducted in America in February 2013 revealed that truck drivers were assigned as the main cause in 25% of car collusions versus 60.2% for other car drivers.[12] This is compatible with the results of our study that showed that 48.1% of car accidents were attributed to the other driver(s) in comparison to 42.7% at fault. The same study[12] stated that the remaining causes of accidents such as the vehicle itself (5.3%), weather (4.4%) , and roadway (5.1%) are approximately similar to our findings, which are 4.9%, 2.4%, and 14.6% for the vehicle itself, weather, and roadway, respectively.

In regard to the injuries resulting from the road traffic accidents, World Health Organization stated that as many as 50 million people are injured annually worldwide.[13] The organization also showed that road traffic injuries will shift from the ninth position to the third one of the most common diseases and injuries affecting the life between 1990 and 2020. Our results showed that 26 (31.7%) of the students were injured due to road traffic accidents, and 3 (13%) of them had a permanent disability. Two important results in our research showed that 8 (30.7%) of the subjects had a physical injury whereas 11 (42.4%) experienced physical as well as psychological injuries. The head is the most vulnerable part of the body to be fatally injured in road traffic accidents[14]; the result of a research conducted in Aligarh in India that surprisingly corresponds to what we found as five (26.3%) of the medical students had an injury to the head. It is ranked as the third most common pattern of injuries after injuries to the upper limbs (42.1%) and those of the soft tissues (36.8%).

Another important component of road traffic accidents within our study was the driver's behavior during driving; we found a positive correlation between the driver's attitude and the prevalence of road traffic accidents. The results were overall similar to the data collected by General Directorate of Traffic, Bahrain, in 2010, which showed the proportion of causes contributing to the accidents.[11]

According to that study, those who drive at high speed (accounting for 5.68%) and tend to cross red traffic lights (accounting for 8.7%) are more likely to have car accidents. Similarly, our study fully supports that as 70.7% of students drive at excess speed when they are in a hurry and 79.4% tend to cross red traffic lights.

The General Directorate of Traffic, Bahrain, provided that those who do not wear seatbelts (2.3%) and use mobile phones are also more likely to have car accidents[11]; likewise, our study stated that 74.3% and 70.4% of the students do so and therefore were involved in car accidents.

Conclusion

The prevalence of road traffic accidents is very high among medical students in AGU. The study revealed that the major cause of these accidents is attributed to the other driver. It was found that 31.7% of these accidents resulted in injuries; most of which were combined (physical and psychological).

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