Research Article

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Investigating of Risk Factors Associated with Exposure to Road Traffic Accidents among Drivers, El-Obeid, North Kordofan State, Sudan; A Cross-sectional Study

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Abstract

Background and Objective

Road traffic accidents (RTA) represent a major important public health problem in our country and play a major role in lifelong disabilities as well as high mortality. In Sudan, the rate of road traffic accidents has recently increased for reasons related to excessive speed, and the collapse of most national roads.

Materials and Methods

A cross-sectional descriptive study of all vehicles drivers. It was carried out in February to December 2018, to study of risk factors associated with road traffic accidents. Data were entered and analyzed using the Statistical Package of Social Sciences (SPSS) version (23.0) and Microsoft Excel (2010) software. Chi-square ($\chi 2$) was used to determine whether there is a significant association between different variables. Values were considered to be statistically significant when the p-value obtained was less than (0.05) and assessed strength of correlation using Odd Raito (OR) with 95% confidence intervals (CI).

Results

The study included (296) vehicles drivers, all drivers who were interviewed were male. Majority (87.8%) of them has a driving license and (51%) use a seat belt while driving. Use earphones (MP3) while driving [p= 0.001, OR 22.241; 95% CI (21.896, 22.606)], use cell phone while driving [p= 0.001, OR 21.430; 95% CI (21.182, 21.726)], doping consumption [p= 0.001, OR 21.488; 95% CI (21.194, 21.791)], alcohol drinking [p= 0.001, OR 20.737; 95% CI (20.501, 20.971)], use drugs [p= 0.001, OR 22.241; 95% CI (21.877, 22.631)], suffering from low vision [p= 0.001, OR 20.794.665; 95% CI (20.553, 21.033)] and condition of the brakes[p= 0.052, OR 20.754; 95% CI (20.515, 20.977)] were significantly associated with RTAs.

Conclusion

There is need for accelerate of laws against stimulants consumption and excessive speed among vehicles drivers and motorcyclists during driving by local authorities in order to reduce RTAs.

Background

A road traffic accident (ATA) is defined as an event that leads to injury and/or property damage that includes a motor vehicle in transport and occurs on a traffic road [1]. It is a surprising phenomenon that occurs through the use or operation of vehicles including bicycles and handcarts on the public highways and roads [2]. Also, Road Traffic Accidents can be defined as an accident that occurs on a road or street open to public traffic, leading to one or more persons being killed or injured. According, RTAs are collisions between vehicles, between vehicles and pedestrians, between vehicles and animals, or between vehicles and geographical or architectural obstacles [3]. It may be fatal, resulting in deaths of passengers, drivers or pedestrians, or minor when it is not severe enough as to cause substantial hardship. Accidents occur when a vehicle collides with another vehicle, pedestrian, animal, road debris, or other stationary obstruction, such as a tree or utility pole [2]. In 21st century, road traffic accidents (RTA) are considered as increasing epidemic of non-communicable disease which is neglected and needs special attention to prevent them [4]. Over 65% of accidents occur because of vehicles travelling at overmuch speed and or drivers contumacy traffic signals. Road traffic injuries (RTI) are growing progressively year by year along with advances in technology to improve vehicular speed and efficiency [5]. Road traffic accident cases account for the largest proportion of unintentional injuries, and are increasingly recognized in low-income countries as a major cause of morbidity and mortality, especially in adults below the age of 50. [6].

The major causes of road traffic accidents are: a) Vehicle related factors [2,9]. b) Environment-related factors [2,8]. c) Human related factors [2,9]. d) Driver behavior, road conditions and culture of not adopting safety policies [8]. Also, Shrestha et al (2017) mentioned that the commonest risk factors related to RTA are over speed, driving under influence, not using safety measures such as seat belts, helmets and child restraints. In addition, poorly constructed roads, increased number of vehicles that are poorly maintained, unplanned urbanization and industrialization, motorization, overpopulation and fragile traffic rules were the leading causes of increasing road accidents in the developing countries [4]. Even where the immediate cause of a road accident is attributable to mechanical factor, carelessness in the form of omission to check and maintain the vehicle at the appropriate time would have remotely contributed. Trivial checking and maintenance of the vehicles could avert an imminent accident [2].

The causes of road traffic accidents are multi-factorial. These factors are dividable into driver factors, vehicle factors and roadway factors. Accidents causative factors are a combination of these factors. Driver factors only contribute to about 57% of road traffic accidents and 93% either alone or in combination with other factors [2]. The causes of road crashes can be attributed to human, vehicular, and environmental factors. Besides the environmental factors, geographical conditions and climate change can increase the number of RTCs [7]. Human, vehicular and environmental factors play roles before, during and after a crash event, therefore, RTCs have to be studied in terms of an epidemiological model of agent (person), host (vehicle) and environmental factors (infrastructure and climatic conditions), and analyzed in relation to time, place and person distribution [1] .

Road traffic accidents are related to modifiable determinants, tackling them is not substantially different from tackling other health problems a road traffic crash results from a combination of several factors that include the vehicle type, the road, in terms of poor road infrastructure which include design consistency and pavement surface performance (friction, texture),especially in wet conditions , the third factor is the driver, who is the main factor for the occurrence of an accident [10]. Unsafe and a distracted driving behavior related to driver's psycho-physical conditions, his mental workload, the reduction of the attention threshold and the increase of the perception-reaction time resulting from frequent use of mobile phones while driving, poor road user behavior displayed by drivers in some developing countries may be due to their lack of knowledge about road safety rules and regulations or their general attitude toward road safety matters [11].

Global, road traffic accidents responsible from death and disability as well as financial cost to both society and the individual involved. There is generally increasing incidence, morbidity and mortality rates of road traffic accidents [2]. In most of the developing and developed countries, RTAs are increasing day by day leading to injuries, disabilities and deaths [4]. In the Region of the Americas some 154,089 people died on the road in 2013, about 12% of the world's traffic deaths. A 3% increase in road traffic deaths in the Region, rising from 149,357 deaths in 2010. Road safety legislation is effective only when coupled with effective enforcement; countries reported a need to better enforce these laws. Improving road infrastructure is an effective mechanism for reducing road traffic injuries. Vulnerable road users make up almost half (45%) of all road traffic deaths in the Region [12].

In Sudan, RTAs problem is one of the major health concerns because of the high rate of population growth, the large percentage of young drivers, large number of vehicles, the absence of strict law enforcement and the poor road conditions [13]. The number of vehicles is rapidly increasing and at the same time, the road's widths remain the same as before. Thus, road traffic problems and conjunction are found anywhere. According to the latest WHO data published in 2017, Road Traffic Accidents Deaths in Sudan reached 9882 or 3.69% of total deaths. The age adjusted Death Rate is 35.23 per 100,000 of population; Sudan ranks 27th in the world [8].

Traffic accidents and the health risks resulting from them are no less important to health and medical than the rest of the health problems, as they are linked to many factors, including those related to the environment, including those related to human behavior and others related to the vehicle and road structure. Hence, the study was conducted to investigate risk factors associated with involvement in RTAs among drivers in El-Obeid City, North Kordofan State.

Materials and Methods

Study Area

North Kordofan State is one of the biggest states in Sudan; it is one of the 18 states of Sudan. It has an area of 185,302 km² and an estimated population of 2,920,890. *El-Obeid* city is the capital of North Kordofan State, which is located in a distinct geographical position. Its area has been estimated by 81 km² and the distance from Khartoum is about 560 km. The General Directorate of Traffic, North Kordofan State administratively follows the Federal General Traffic Department that manages the implementation of state traffic institutions in all parts of Sudan and thus the state administration is considered a unit for implementing the policy of the Federal Traffic Department within North Kordofan State. There are two units in El-Obeid city, one of which is in charge of the State Rapid Traffic Department and the other operates within cities and licensing affairs.

Sampling and Sample Techniques

This is a cross-sectional descriptive study of risk factors associated with road traffic accidents, *El-Obeid city - North Kordofan* State, Sudan from February to December 2018. A total of 296 vehicle drivers were selected for investigation of risk factors associated with exposure to road traffic accidents among vehicle drivers. The sample size was determined by using the following formula:

$$n = \frac{z^2 pq}{d^2}$$

Where:

n: Sample size,

z: The value of the standard normal variable corresponding to a confidence rate (95%), equal to 1.96

p: Probability value = (0.50),

q: Complement value = (1- 0.50),

d: Marginal of error = (0.05)

The sample size estimated was distributed among the group of drivers to uniform the size of each group, and the "proportional division" ensures that a greater number of items are withdrawn from the group with a larger size than the group with a smaller size, and the number of items pertaining to the group was determined (h) by size (n_h) which is given by the formula:

$$n_{prop} = \frac{N_h}{N} * n$$

Category of vehicles	Number (n)	Sample size required	
Taxi	879	879/2685*296	87
Tourist bus	49	49/2685*296	5
Bus	873	873/2685*296	67
Commercial motorcycle	1384	1384/2685*296	137
Total	2685		296

Data Collection

The researchers prepared a structured questionnaire and checked for consistency. It was used throughout the face-to-face interview. Verbal informed consent was taken from the drivers of the vehicles before they were interviewed for data collection. The structured questionnaire was divided into five parts as follows: Part I focused on the socio-demographic characteristics of the respondents, including age, marital status, educational level, and driving experience. Part II contained the risk Factors related to personal behaviors of RTA: (driving license, headphones use, seat belt use, and mobile phone use). Part III comprised questions on reasons for drivers' adherence to traffic rules and instructions. Part V comprised questions on drivers' practice towards stimulants. Finally; Part IV comprised questions about the general condition of the vehicle and exposure to road traffic accidents.

Data Processing and Analysis

Taking samples and filling out the questionnaire and cleaning all data and data were analyzed using the Statistical Package of Social Sciences (SPSS) version (23.0) software. Microsoft Excel (2010). Chi-square: (χ^2) was used to determine whether there is a significant association between different variables. Values were considered to be statistically significant when the p-value obtained was less than (0.05) and assessed strength of correlation using Odd Ratio (OR) with 95% confidence intervals (CI).

Result

The study included (296) drivers, all drivers who were interviewed were male. (63) (21.3%) of drivers were in the (15 - 25) age group, (107) (36.1%) of them in the (26 - 35) age group, (77) (26%) of them in the (36-45) age group, and (49) (16.6%) of them were over forty-five year (Fig. 1). According to marital status; (100) (33.1%) of the drivers were unmarried, (182) (61.1%) of them were married, (8) (3.7%) of them were widowed, (6) (2%) were divorced (Fig. 2). Regarding educational level; (37) (12.5%) of drivers not uneducated, (103) (34.8%) of them had a basic level education, (95) (32.1%) of them had a secondary level of education, and (61) (20.6%) of them had university qualified (Fig. 3). According to the driving experience, (Fig. 4) shows that driving experience varies; one year – 5 years with (101) (34.1%), 5 years – 10 years with (100) (33.8%), and more than 10 years with (95) (32.1%). It shows that (87.8%) of vehicles drivers have a driving license, (12.2%) do not have a driving license, (88%) have a valid license and (21%) have a non-valid one. (29.7%) use headphones (MP3) while driving, and (70.3%) of them do not use them. (97.4%) of them have seat belts in their vehicles and (2.6%) of them do not have a seat belt in their vehicles. (51%) use a seat belt while driving, and (49%) do not use a seat belt. (31.4%) use a mobile phone while driving and (68.6%) do not use a mobile phone (Table 1). Drivers' adherence to traffic rules and instructions during driving is due to following reasons: fear of law punishment, to driver safety and attributable to maintaining passenger safety; (15.3%), (28.1%)

and (56.6%), respectively (Table 2). Drivers had used doping, drugs, smoke, tobacco, cannabis and alcohol; (9.1%), (48.3%), (48.2%), (44.1%), (7.7%) and (1%), respectively. (33.3%) of them had drank alcohol during driving. (31.1%) of them stated that doping have an effect on driving (Table 3). It shows that (97.3%) of the vehicles are in good condition. (98%) of the vehicles' brakes are in good condition. (93.9%) of them have their front windshields conducive to vision. (97.3%) of them are maintained periodically, (64.2%) of vehicle drivers maintains their vehicles every six months, annually, every two years and every three years; (26.4%), (3%), and (6.4%), respectively (Table 4). (61.8%) of the vehicle drivers were exposed to a traffic accident. Kind of traffic accident that exposed it was collision (69.6%), roll-over (16.8%) and squash (13.6%). (78.8%) of vehicle drivers were harmed as a result of traffic accidents. kind of harm were mild injuries (53.1%), severity injuries (22.8%) and fractures (24.1%) (Table 5). A few of vehicle drivers suffering from chronic diseases (5.7%). (88.2%) of them suffer from diabetes and (11.8%) of them suffer from Hypertension. (4.4%) of vehicle drivers suffer from low vision (Table 6). Drivers 26 – 35 years old 66 (36.1%) have had more RTAs when compared with those more than 45 years old 30 (16.4%); this association was highly statistically significant (p= 0.000). The occurrence of RTA increased as the level of education decreased, this was highly statistically significant (p= 0.000). More drivers with driving experience (one year – 10 years) (33.7%) had more RTA than those with more than 10 years (32.1%); this association was highly statistically significant (p= 0.000) (Table 7). It indicates earphones (MP3) use while driving [p= 0.001, OR 22.241; 95% CI (21.896, 22.606)], cell phone use while driving [p= 0.001, OR 21.430; 95% CI (21.182, 21.726)], doping consumption [p= 0.001, OR 21.488; 95% CI (21.194, 21.791)], alcohol drinking [p= 0.001, OR 20.737; 95% CI (20.501, 20.971)], use drugs [p= 0.001, OR 22.241; 95% CI (21.877, 22.631)], suffering from low vision [p= 0.001, OR 20.794.665; 95% CI (20.553, 21.033)] and condition of the brakes [p= 0.052, OR 20.754; 95% CI (20.515, 20.977)] were significantly associated with RTAs (Table 8).

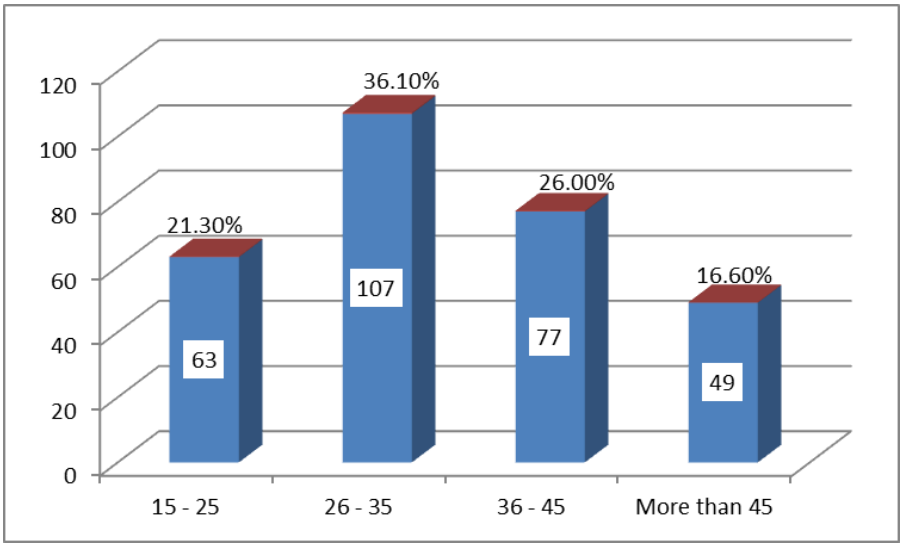

Figure 1: Distribution of drivers according to age group, El Obeid city, (n= 296).

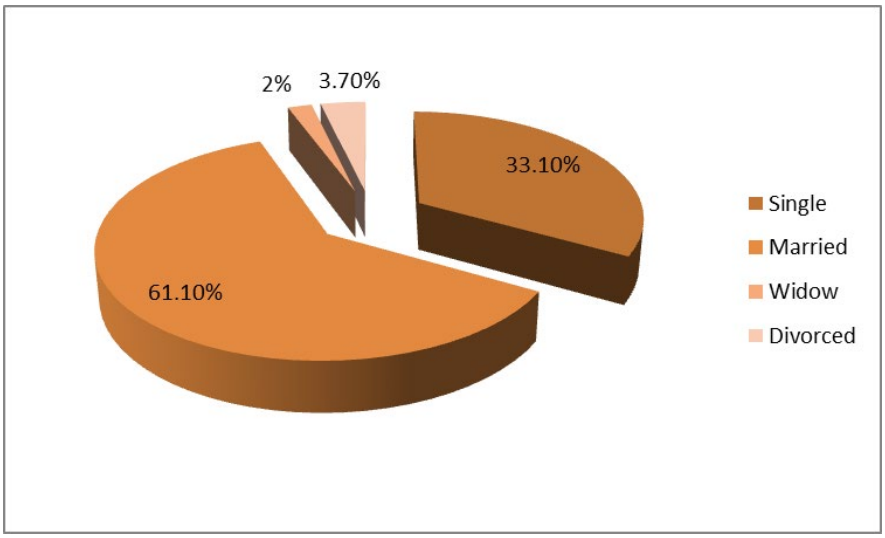

Figure 2: Distribution of drivers according to marital status, El Obeid city, (n= 296).

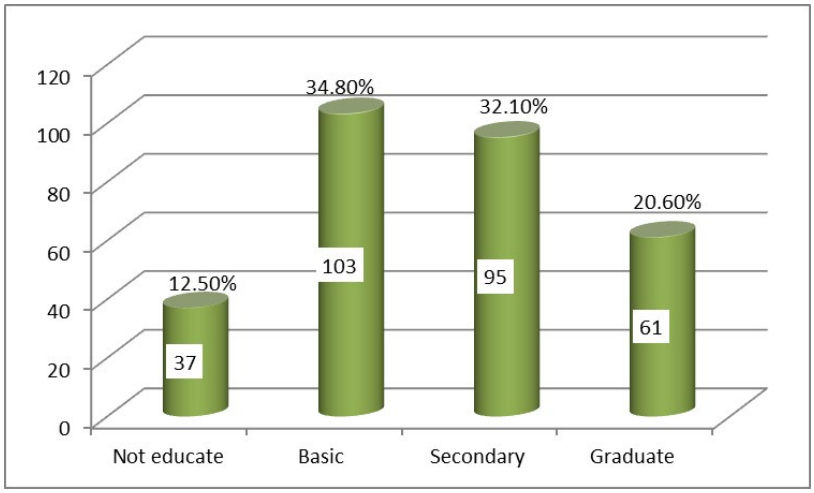

Figure 3: Distribution of drivers according to educational level, El Obeid city, (n= 296).

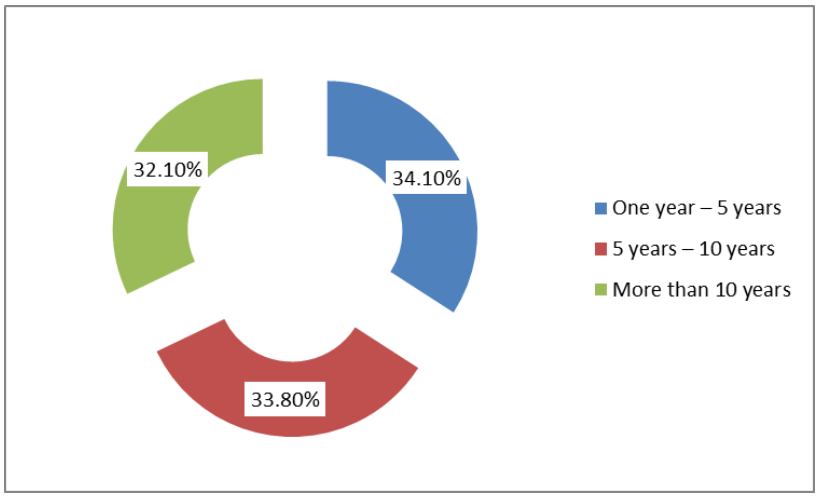

Figure 4: Distribution of drivers according to driving experience, El-Obeid City, (n= 296).

Table 1: Showing drivers' adherence to traffic rules and instructions during driving, El Obeid City, (n= 296).

Variables	Frequency	Percent (%)
Do you adhere to traffic rules and instructions?		
Yes	293	99%
No	3	1%
Do you have a driving license?		
Yes	260	87.8%
No	36	12.2%
If yes, is it valid?		
Yes	228	88%
No	31	12%
Do you use earphones (MP3) while driving?		
Yes	88	29.7%
No	208	70.3%
Is there a seat belt in the vehicle?		
Yes	155	52.4%
No	141	47.6%

Do you use the seat belt permanently during driving?		
Yes	79	51%
No	76	49%
Do you use your cell phone while driving?		
Yes	93	31.4%
No	203	68.6%

Table 2: Reasons for drivers' adherence to traffic rules and instructions, El Obeid City, (n= 296).

Percent (%)	Frequency	Variables
Do you adhered to traffic rules and instructions during driving		
Yes	288	97.3%
No	8	2.7%
What are reasons that encourage you adherence to traffic rules and instructions? (n= 296)		
Fear of the punishment of the law	44	15.3%
In order to protect myself	81	28.1%
For the safety of passengers	163	56.6%
Total	288	

Table 3: Showing drivers' use of drugs/alcohol while driving, El Obeid City, (n= 296).

Variables	Frequency	Percent (%)
Do you take any kind of doping?		
Yes	27	9.1%
No	269	90.9%
Do you use drugs?		
Yes	143	48.3%
No	153	51.7%
If you use drugs, what are they?		
Cigarette	69	48.3%
Tobaccos	63	44.1%
Hashish/cannabis	11	7.7%
Do you drink any kind of alcohol?		
Yes	3	1%
No	293	99%
If you drink alcohol, when is that?		
while driving	1	33.3%
After work	2	66.7%
Do these stimulants have an effect on the driving process?		
Yes	98	33.1%
No	198	66.9%

Table 4: Showing the general condition of the vehicle, El Obeid city, (n= 296).

Variables	Frequency	Percent (%)
The condition of the vehicle you are driving?		
Good	8	2.7%
Not good	288	97.3%
What is the condition of the brakes?		
Good	6	2%
Not good	290	98%
Does windshield help vision?		
Yes	278	93.9%
No	18	6.1%
Do you maintain the vehicle periodically?		
Yes	288	97.3%
No	8	2.7%
If you do regular maintenance how is it done?		
Every 6 months	190	64.2%
Every year	78	26.4%
Every two years	9	3%
Every three years	19	6.4%

Table 5: Distribution of the studied drivers according to exposure to road traffic accidents, El Obeid city, (n= 296).

Variables	Frequency	Percent (%)
Previous Exposure to Road Traffic Accident		
Yes	184	61.8%
No	114	38.2%
If you had been exposed to a traffic accident, what kind? (n= 184)		
Collision/Crash	128	69.6%
Roll-over	31	16.8%
Squash	25	13.6%
Have you ever been hurt as a result of a traffic accident? (n= 184)		
Yes	145	78.8%
No	39	21.2%
If yes, what kind of harm/injury did you suffer? (n= 145)		
Mild injuries	77	53.1%
Severity injuries	33	22.8%
Fractures	35	24.1%

Table 6: Distribution of the studied drivers according to their health status, El Obeid city, (n= 296).

Variables	Frequency	Percent (%)
Do you suffer from any chronic disease?		
Yes	279	94.3%
No	17	5.7%
If you suffer from any chronic disease, what disease do you suffer from?		
Diabetes	15	88.2%
Hypertension	2	11.8%
Do you suffer from low vision?		
Yes	13	4.4%
No	283	95.6%

Table 7: Association between driver's characteristics and previous exposure to Road Traffic Accident, El Obeid city, (n= 296).

Variables	Previous Exposure to RTA		Total	X2	P-value
	Yes	*No*			
Age group					
15 - 25	39	24	63	250.219	0.000
26 - 35	66	41	107		
36 - 45	48	29	77		
More than 45	30	19	49		
Marital status					
Single	61	37	98	104.986	0.000
Married	112	69	181		
Widow	4	2	6		
Divorced	7	4	11		
Educational level					
Not educate	23 (	14	37.0	196.275	0.000
Basic	64	39	103		
Secondary	59	36	95		
Graduate	38	23	61		
Driving experience (n= 184)					
One year – 5 years	62	39	101	233.463	0.000
5 years – 10 years	62	38	100		
More than 10 years	59	36	95		

Table 8: Association between driver's practices and previous exposure to Road Traffic Accident, El Obeid city, (n= 296).

Variables	Chi-Square	No	Total	95% Confidence interval	
				Lower	Upper
Do you adhere to traffic rules and instructions?					
Yes	1.871	0.001	22.598	22.233	23.062
No					
Do you have a driving license?					
Yes	25.307	0.001	-20.940	-21.127	-20.688
No					
Do you use earphones (MP3) while driving?					
Yes	77.328	0.001	22.241	21.896	22.606
No					
Do you use your cell phone while driving?					
Yes	83.735	0.001	21.430	21.182	21.726
No					
Do you take any kind of doping?					
Yes	18.346	0.001	21.488	21.194	21.791
No					
Do you drink any kind of alcohol?					
Yes	1.871	0.171	20.737	20.501	20.971
No					
Do you use drugs?					
Yes	170.830	0.001	22.241	21.877	22.631
No					

Does windshield help vision?					
Yes No	11.834	0.001	-20.824	-21.046	-20.563
Do you maintain the vehicle periodically					
Yes No	5.077	0.001	-20.765	-21.000	-20.535
Do you suffer from low vision?					
Yes No	8.396	0.001	20.794.665	20.553	21.033
What is the condition of the brakes?					
Yes No	3.782	0.052	20.754	20.515	20.977

Discussion

The present study found that driving experience ranges from one year – 5 years with (101) (34.1%), 5 years – 10 years with (100) (33.8%), and more than 10 years with (95) (32.1%). Similarly, a previous study conducted in Ibadan, Nigeria showed that all drivers had driving experience ranging from 5 years to 43 years [14]. Concerning this finding, Egede (2014) mentioned that experience has shown that in countries where enforcement is adequate, road traffic accidents have declined [2].

This study discovered that drivers with driving experience (one year – 10 years) (33.7%) had more RTA than those more than 10 years (32.1%); This association was highly statistically significant (p= 0.000). A similar previous study conducted in Benin City, Nigeria showed that more respondents with driving experience greater than 20 years (46.5%) had less RTA than those less or equal to 20 years (48.7%). This was not statistically significant [15]. Similarly, a previous study conducted in the Hilly District of Nepal showed that drivers who were experienced from 5 to 10 years were 5.6 times (95% CI: 1.1, 35.5) and those experienced greater than 10 years were 5.9 times (1.3, 32.5) more likely to have exposed with an accident than those who were experienced less than or equal to 5 years [4].

The current study showed that (87.8%) of vehicle drivers had a driving license. This finding is comparable to the study conducted in Ibadan, Nigeria showed that all drivers had professional driving licences [14]. Also, a study conducted in Nigeria indicated that (16.24%) of drivers did not have a valid driving licence at the time of RTI occurrence [2].

This study illustrated that more than half (51%) use a seat belt while driving. This result is in line with the study conducted in Bahirdar city, northwest Ethiopia illustrated that driving without using a seat belt was 52.7% [16]. in addition, a previous study conducted in Tanzania showed that helmet and seat belt use among motorcyclists and occupants of vehicles was recorded in 43.3% and 24.4% of patients, respectively [17]. This result is higher than that found in Alexandria, Egypt, (20%) of the studied drivers using seat belts [11]. Also, the current result is higher than that found in Khartoum, Sudan where only about 17% of people used seat belts [8].

This study observed that the majority of drivers 288(97.3%) have adhered to traffic rules and instructions while driving. About this finding, Egede (2014) mentioned that traffic laws are for the protection of all road network users. For the laws to have the desired effects, enforcement by the various law, enforcement agencies must be fair and just [2].

It was observed that less than half (48.2%) of drivers were a smoker. This result is lower than that from a study conducted in Alexandria, Egypt showed that more than half (55%) of them were smokers [11]. In the current study, less than one-tenth (9.1%) of drivers had used stimulants. This result is lower than that from a study conducted in Alexandria, Egypt showed that one-fifth (20%) of the studied drivers use stimulants [11].

The current study showed that a few (1%) drivers who drank alcohol while driving, all drivers who drank alcohol had been exposed to RTA, while (61.4%) of those who did not drink alcohol had been exposed to RTA [p= 0.001, OR 20.737; 95% CI (20.501, 20.971)] was significantly associated with RTAs. This result is lower than that found in Bahirdar city, northwest Ethiopia illustrated that driving after alcohol consumption is 27.5% [16]. This result is also comparable to a study conducted in Ibadan, Nigeria showed that the prevalence of RTA was lower amongst drivers who did not take alcohol, cola nut, and other CNS stimulants while driving (OR 0.9, 95% CI=0.3-2.3, P >0.05) [14]. This result is in line with the study conducted in Benin City, Nigeria showed that most drivers who drank alcohol had been involved in RTA, while (33.3%) of those who did not consume alcohol had been involved in RTA. This was statistically significant (p= 0.001) [15]. Concerning this finding, Egede (2014) mentioned that drug and alcohol use while driving is an obvious predictor of road traffic accidents, road traffic injury, and death [2].

The present study discovered that the commonest risk factors associated with RTAs were the use of earphones (MP3), cell phone use, doping consumption while driving, alcohol drinking, drugs use, suffering from low vision, and condition of the brakes. Many studies in different countries reported a variety of findings

e.g. A similar study conducted in Bahirdar city, northwest Ethiopia discovered different factors associated with RTAs as; speeding, drink-drive, unfastening of a seat belt, driving while feeling sleepy, and Highway Code violations [16]. Also differently, Majdzadeh et al, reported that driver-dependent risk factors were drivers' age, gender, safety equipment use (seat belt or helmet), and ejection from the motor vehicle following collision [18]. A study conducted in Accra found that factors associated with the RTA cases found included driving while intoxicated, driver fatigue, use of cell phones while driving, poor weather conditions, and bad road design among others [6].

The present study showed that the prevalence of road traffic accidents was (61.8%) among vehicle drivers. This result is higher than that found in Benin City, Nigeria (47.9%) respondents had reported being previously involved in a road traffic accident [15]. In addition, a similar study conducted in Alexandria, Egypt found that one quarter (25%) of the studied drivers were previously exposed to RTA [11]. The current study showed that the common kind of injuries prevailing were mild injuries (53.1%), followed by severe injuries (22.8%) and fractures (24.1%). a previous conducted in Tanzania revealed that fractures were the most common nature of injury sustained accounting for 34.1%, followed by superficial injuries at 26.1% [17].

The present study discovered that drivers 26 – 35 years old 66 (36.1%) have had more RTAs when compared with those more than 45 years old 30 (16.4%). This association was highly statistically significant (p = 0.000). Similarly, previous studies conducted in different parts of the world; studies conducted in Ibadan, Nigeria showed that RTA prevalence was higher among older drivers (OR=1.7, 95%CI=0.5-5.9; P>0, 05) [14]. Another study conducted in Benin City, Nigeria showed that respondents more than 50 years old (50.0%) have had more RTAs, when compared with those less than 50 years old (47.2%). This association was not statistically significant (p = 0.703) [15]. In addition, a similar study conducted in the Hilly District of Nepal found that drivers who were aged less than or equal to 30 years were more likely (OR: 3.6; 95% CI: 1.0, 14.3) to have been exposed with an accident than those who were above 30 years [4].

In the present study, (5.7%) of vehicle drivers suffer from chronic diseases. where around (88.2%) of them suffer from diabetes and (11.8%) of them suffer from Hypertension. Similarly, a previous study conducted in Alexandria, Egypt observed that half (50%) of the studied drivers did not complain from any health problem, while around one-quarter of the studied drivers were suffering from hypertension (25%) & less than one-fifth were complaining of diabetes (15%) [11].

In this study occurrence of RTA increased as the level of education decreased, this was highly statistically significant (p = 0.000). This finding is in disagreement with a previous study conducted in Benin City, Nigeria revealed that the occurrence of RTA increased as the level of education increased, this was statistically significant (p = 0.050) [15].

The current study showed that the general condition of the brakes [p= 0.052, OR 20.754; 95% CI (20.515, 20.977)] was significantly associated with RTAs. Similarly, a previous study conducted in Mekelle Town, Northern Ethiopia showed that driving a mechanically faulty taxi (AOR = 4.91, 2.81–8.61) was strongly associated with road traffic crash involvement [19]. The present study showed that cell phone use while driving [p= 0.001, OR 21.430; 95% CI (21.182, 21.726)] was highly significantly associated with RTAs. This result was comparable with a previous study conducted in Mekelle Town, Northern Ethiopia showed that receiving mobile phone calls while driving (AOR = 1.91, 1.24–2.92) was associated with higher odds of road traffic crash involvement [19].

This study found that alcohol drinking [p= 0.001, OR 20.737; 95% CI (20.501, 20.971)] was highly significantly associated with RTAs. A similar study conducted in Mekelle Town, Northern Ethiopia revealed that a history of alcohol use (AOR = 1.51, 1.00–2.28) was associated with higher odds of road traffic crash involvement [19]. Also, a similar study conducted in Tanzania showed that drinking and driving appeared to be among the contributing factors to road traffic crashes, as 21.7% of the road traffic crash victims were suspected to be under the influence of alcohol [17].

This study found that drivers suffering from visual impairment [p= 0.001, OR 20.794.665; 95% CI (20.553, 21.033)] were significantly associated with RTAs. This result is in line with the study conducted in Ibadan, Nigeria showed that RTA prevalence was higher among drivers with visual impairment (OR=1.6, 95% CI=0-9, X2= 0.49, P > 0.05) [14]. About this finding, Egede (2014) mentioned that driver factors include driver behavior, visual and auditory acuity [2]. Ocansey (2011), indicated that the poor vision of drivers could also be a major contributory factor to road accidents [20]. Many limitations are identified in this survey. This survey did not cover the risk factors related to road infrastructure, environmental factors, geographic conditions and climate change, socioeconomic status, and knowledge of drivers towards traffic signals that may be responsible for the road traffic accident. Future surveys should explore these gaps in this research area.

Conclusions

Drivers had used stimulants, drugs, smoke, tobacco, cannabis, and alcohol while driving. There is a need for accelerating the laws against stimulant consumption and excessive speed among vehicle drivers and motorcyclists during driving by local authorities in order to reduce RTAs. Early maintenance, habilitation, and restoration of the national road are essential for reducing fractures, lifelong injuries and mortality resulting from RTAs. The researchers sought to conduct more studies on traffic road accidents and the factors associated with them. The health sector should play an important role in research related to risk factors.

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Ethical Considerations

Institutional approval was taken from both administrations. The Department of Public and Environmental Health, University of Kordofan and the General Directorate of Traffic, North Kordofan State, reviewed and approved this study. The purpose of the study was carefully illuminated to the drivers after which their consent was pursued before interviewed. The final report will be submitted to the University of Kordofan and the General Directorate of Traffic, North Kordofan State. Also, the findings will be available through Publication in journals.

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