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KNOWLEDGE, ATTITUDE AND PRACTICE OF ROAD TRAFFIC ACCIDENTS AMONG CAR DRIVERS IN MAJMAA CITY, SAUDI ARABIA, 2017-2018

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ABSTRACT

Background: Due to the fast pace and evolution of Al-Majmaa from being a small governorate to a city which in turn will increase RTAs as well as the increase of unaware population due to insufficient research and lack of alternative transportations, this study aims at evaluating Saudi drivers' knowledge, attitude, and practice (KAP) regarding traffic regulations, and their deterministic effect on RTAs in Al-Majmaa. **Method:** An Analytical cross-sectional study method which involved only Majmaah city population of 133 thousand people living in an area of 30,000 km2. This study was conducted in social media web sites, mainly Twitter, to identify the knowledge, attitude, and practice (KAP) regarding traffic regulations among the concerned society. **Results**: The results from the 157 participants under the various distributions starting with age distribution showed that the most preventable age groups for RTA's was from 21-30years. 69.4% of the participants owned a car with 90.5% having a driver's license. The data also showed that 56.1% of the respondents have a good knowledge about driving and traffic signs while 38.9% have a moderate knowledge and 5.1% have a poor knowledge about driving and traffic signs. On the other hand, 87.9% of the individuals have a poor attitude towards safe driving, and 12.1% have moderate attitude, and 0% have good attitude. Concerning Practice, we find that 52.9% of individuals have poor practice, and 44.6% have moderate practice, while only 2.5% have good practice. Data analysis based on knowledge, Attitude and Practice by gender, Age, Education level, marital status, and economic stats showed that 25% of people with poor knowledge were males while 75% of them were females. Also, most of people with poor

attitudes and practices were males while those who had a poor knowledge of driving practices were of good financial status (62.5%) and 25% of them were excellent financial status. Finally, there was a significant difference (at α=0.05) between the opinion of sample individuals about sample individual's practices while driving according to age, educational level, financial status and marital status as these determinants all had different deductions on their various effects on good driving practices. **Conclusion**: Educated Saudi drivers in Al-Majmaa are less likely to be involved in accidents, meanwhile age, experience, financial and marital status of drivers have a great influence on Road Traffic Accidents.

KEYWORDS: RTA's (Road Traffic Accidents), Knowledge, Attitude and Practices, Al-Majmaa, Saudi Arabia**.**

INTRODUCTION & LITERATURE REVIEW

In Saudi Arabia, the main means of transportation is motor vehicles. From early seventies till late nineties (1971-1997), over half a million (564,762) deaths or injuries happened as a result of Road Traffic Accidents (RTAs). A figure equivalent to 3.5% of the total population in Saudi Arabia**.**[1] According to the records, the 1st road traffic accident happened in America was in 1891, in the case of the former, the victim, Bridget Driscoll, was struck and killed by an automobile going at speed of 4 Miles\Hour.[2] RTAs nowadays, are considered as one of the important public health problems around the world. According to Global Status Report on driving safety-2009, over 1.2 million people die each year on the roads worldwide and between 20 and 50 million suffer non-fatal injuries. Currently, road traffic accidents are the 9th leading cause of death and are predicted to become the 5th leading cause of death by the year 2020.[3] The problem of RTAs is compounded by the fact that, the age groups primarily involved in RTAs belong to the most productive age group of 15-40 years.[4] RTA is determined as of the main causes of disability adjusted life years (DALY) both in developed and developing countries.[5]

Internationally, highest number of deaths from road accidents was in Saudi Arabia, with an average of 17 residents dying from this cause daily. The toll of road traffic fatality in KSA is quite high accounting for 4.7% of all mortalities, while road traffic fatalities do not exceed 1.7% in Australia, United Kingdom (UK), or United States of America (USA).[7]

According to Ageli M. and Zaidan A. study, Saudi Arabia experiences a high rate of deaths compared to other countries at 24.6 deaths per 100.000 populations. Traffic studies conducted in KSA indicate that the annual loss resulting from traffic accidents is about 7 billion riyals.[8] WHO statistics support the earlier mentioned study. Road traffic fatalities in KSA have increased over the last decade from 17.4 per 100.000 to 24 per 100.000 population compared with much lower rates in countries where road safety has been taken seriously, all primary and secondary preventive measures are implemented appropriately and high public awareness regarding road traffic safety, (e.g., 10 per 100.000 in America, and 5 per 100.000 in United Kingdom).[9]

Excessive speed was the most common cause reported in all recent and past studies[10] and according to AlHassa the most affected parts were the head and neck, lower extremities, upper extremities, trunk then viscera, respectively.

Ansari et al.,[1] stressed in his study that causes of traffic accidents in KSA fell in two categories: General and specific causes. General causes included a large increase in vehicles, expansion of road networks, large national development projects, and increase number of foreign workers. On the other hand, specific causes included driver errors, excess speed, violation of traffic signals, and road and vehicle safety conditions. Al-Saif[6] argued that in addition to the previous causes, age of the drivers, the use of seat belts, and the education level of drivers were important as well.

Causes and risk factors can fall in other form of categorization than Ansari's. In which they are divided to four main categories:

Social Factors

Research has consistently found an association between driver gender and age and risky driving behavior such that males and younger persons are more likely to engage in driving behaviors that lead to collisions **[11–12]**. As women are not allowed to drive in Saudi Arabia[13], thus the roads are more highly populated with male drivers than in most other countries. The median age of the Saudi population is 27.2 years (27.9 years for men and 26.2 years for women)[14], indicating that the population of drivers is skewed toward the younger age range that is more likely to engage in risky driving behaviors.[12] Over 65% Accidents were found to be as a result of over speeding or not obeying the traffic signs.[1]

Immigration is another important risk factors associated with the increase RTAs in Saudi Arabia. As expatriates are often unfamiliar with local driving requirements and conditions and practice different driving habits.[1] Non-Saudis are accountable for nearly 40% of road traffic collisions in Saudi Arabia.[15]

Worldwide, driving under the influence of alcohol is a common factor in collisions, accounting for one-third of vehicle-related events in the United States.[16] However, because of the illegality of alcohol and drug consumption in Saudi Arabia it is not a common factor for RTA.[17] According to General Department of Traffic at the Ministry of Interior in Saudi Arabia, it is estimated that ~0.09% of RTA occurring from 2004 to 2011 were caused by drivers driving under the influence of drugs.[18]

Electronic Devices

In 2013, United Nations reported Saudi Arabia has the greatest proportion of mobile phone users worldwide at 188%[19-20], which means, at the very least, that most (if not all) drivers will have a mobile phone at their disposal while driving a car. Studies have shown mobile phone use while driving to be a contributing factor to RTA in Saudi Arabia.[15]

Unfortunately, there is no consistent statements about the legality of electronics use during driving. Some reports state that it is illegal to use any electronic devise at all.[9,20,21] While others claim, on the other hand, that there is no specific law that prohibit phone use while driving, and accordingly that many individuals use their devices while driving.[22] The legality of mobile phone use while driving is an important issue to clarify and address, as a study examining the traffic safety knowledge and compliance among youth (high school and university students) found that 85% of study participants reported using mobile phones while driving.[23] Another study by Osuagwu et al.[22] found that making or receiving phone calls while driving was accompanied by seven times greater relative risk of RTA involvement among drivers in Saudi Arabia than those who did not.

Environmental Factors

Intense heat, that leads to tire blowouts which accounts for approximately thirty-nine percent of injuries[15,24] and improperly maintained tires that cannot withstand these conditions [25]. Mental capacity of drivers is reduced due to extreme levels of heat. Rain, fog, and dust do not play a significant role in RTAs in the Kingdom of Saudi Arabia.[15,4]

The layout of road networks also plays a role in RTAs. Some authors have described four-lane roads that immediately merge into three lanes after an intersection, or closures of highway entrances and exits during rush-hour due to construction contribute to the occurrence of RTAs.[15]

Roundabouts and intersections errors in not following the regulations. E.g.: Signaling, giving the priority to drivers already in the roundabout, driving in the proper lane.

Road traffic accidents with camels is very common in KSA and the outcome of these accidents is generally bleak [27]. Annually, there is over 600 camel-vehicle accidents which causing major property damage and numerous deaths.[28]

Pedestrian-Related Crashes

Previous studies have found that over three-quarters of pedestrians involved in road traffic collisions were hit while crossing a road without utilizing a crosswalk. Head and neck injuries resulting from these collisions accounted for 34% of fatalities.[29] Children are more often injured as pedestrians than as vehicle passengers [30], often as unsupervised children playing in the streets who then fall victim to oncoming traffic [15]. Many children are killed or suffer long-term neurological damage from head trauma [30]. One study found that nearly 26% of crashes in Saudi Arabia were pedestrian related. For comparison, only 7% of injuries are related to pedestrians in the US.[29]

Driver education will always be thought as one of the initial steps to prevent these RTAs, but in a research paper done by Al-Subhi[31] no significant difference in the number of road traffic collisions reported between drivers with or without formal driving education.

Al-Subhi's study faced many limitations. However, despite these limitations, another review of the international literature on driver education support his findings on the basis that, overall, researchers have not found driver education to be an effective countermeasure for road traffic collisions.[32]

Another way to reduce RTAs is to encourage the use of safer modes of travel. The four main travel modes are –rail, air, marine and road – travelling by the latter puts people at the greatest injury risk per kilometer travelled by far.[33,34]

Giving priority to higher-occupancy vehicles E.g.: Buses or cars with at least two or more occupants, by having their own lanes. That can reduce the use of motor vehicles and therefor reduction in RTAs.[34] That will decrease road congestions which will in turn reduce the need for speeding, as studies showed it is one of the primary causes of RTAs.[11,41]

Designing smart vehicles

Smart, audible seat-belt reminders that detect whether or not belts are in use in each occupied seat and emit increasingly aggressive warning signals until belts are fastened.[37] For example, in Sweden, over a third of all new cars sold are equipped with these.[34] These reminders could boost the rate to an estimated 97% and contribute to a 20% reduction in deaths among car occupants.[38]

Intelligent speed adaptation is a system by which the vehicle determines the speed limit for a road. The system could reduce fatal crashes by an estimated 18–25% at the advisory level, 19– 32% at the voluntary level and 37–59% at the mandatory level.[39] High driver acceptance of such a system was indicated after a thorough experimental trials in Sweden.[34]

Electronic stability programs can help maintain the stability of a car in adverse weather conditions, preventing skidding and loss of control on wet roads and ice. Electronic stability programs are being offered only in luxury vehicles, but recent tests in Sweden indicate that they could reduce crashes related to ice and snow by 32–38%.[34]

Fatigue is one of the major risks for RTA that needs to be addressed. As a recent study in New Zealand[40] found that the incidence of road crashes could be reduced by up to 19% if people did not drive: 1) while feeling sleepy, 2) after sleeping for less than five hours in the previous 24 hours or 3) between 02:00 and 05:00. An earlier study in the United States[34] identified three groups of drivers at high risk of being involved in crashes while fatigued: young people, especially men aged 16–29 years; shift workers who work at night or have long, irregular working hours; and people with untreated sleep apnea or narcolepsy.

The government of Saudi Arabia is working on *Traffic law enforcement*. Which is another way to fight and prevent RTAs. **"**Saher" system was introduced as a tool for decreasing the incidence of road traffic injuries in Saudi Arabia. It is "an automated traffic control and management system" that uses a series of digital cameras placed along the roadside that can measure the speed of cars, capture photos of erring vehicles, recognize repeat offenders, issue

tickets and notifications of fines for traffic violations, alert police patrols to the location of a collision, and monitor and control traffic lights automatically in order to improve the flow of traffic through intersections.[42] Improve road and vehicle safety, promote safer driving behaviors, and expand emergency services with the goal of saving the lives of millions.[37] So far, Saher is implemented in places where it merely focuses on speeding and running red lights, which only account for 31% of RTAs. This way it ignores all the remaining 69% of causes like reckless driving as it needs to be implemented in a more comprehensive manner, Al-Turki says.

Justification

As the statistics show these horrifying numbers, we, as doctors and heath promoters, believe in the need to provide reliable information about knowledge, attitude and practice among the Al-Majmaa city drivers. Taking in consideration two main things: one, Al-Majmaa is expanding in fast paces and evolving from being small governorate to a city. Which in turn will increase the RTAs. Two: Still to the time of writing these words, the main means of transportations are the motor vehicles. The increase of unaware population due to insufficient research and lack of alternative transportations (E.g.: buses, metro, trams) will merely maintain the reckless behavior and lead to increase in RTAs.

Objectives

General

Evaluating Saudi drivers' knowledge, attitude, and practice (KAP) regarding traffic regulations, and their deterministic effect on RTAs in Al-Majmaa.

Specific

- Determine the magnitude of the road traffic accidents problem in Al-Majmaa province, Saudi Arabia.
- List the determinant factors behind these accidents.
- Formulate a set of recommendations that may help in the development of a control program.

METHODOLOGY

Study design

Analytical cross-sectional study. That conducted in social media web sites, mainly Twitter, to identify the knowledge, attitude, and practice (KAP) regarding traffic regulations among the concerned society.

Study area

This study involve only Majmaah city population which is 133 thousand people live in an area of 30,000 km2. Majmaah has 16 small cities and villages that belong to Riyadh region, bordered on the north and north-west by Zulfi, the eastern region and south by Thadig and Shaqra province, from the middle by Remah province and from the west by Ghat province. Prince / Abdul Rahman bin Abdullah bin Faisal bin Farhan Al Saud serves as the Governor. Almajmaah City is the capital city of the province. Of population 73,000.

Study population

The study population focusing on driving males in Majmaa city. Excluding those who don't drive and females.

Sample size

Total enumeration method used for including all the adult male and female agreed to answer the questionnaire in this study.

Data collection

Data collected by a close ended questionnaire which will be filled by the participants themselves. The researchers available to answer any queries the participants have so that there is no difficulty in understanding the questions in the forms.

The questionnaire translated by the researchers themselves and administered in the local language for the benefit of the participants.

Data analysis

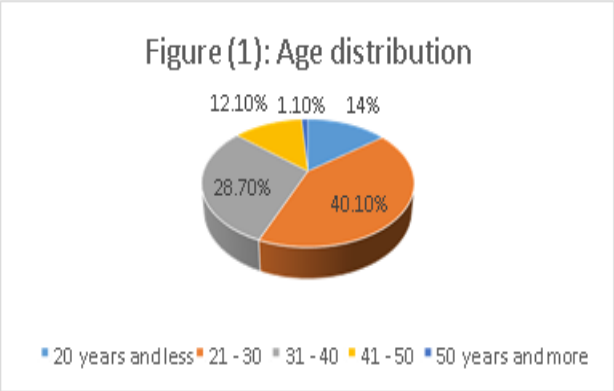
All the data entered in the SPSS version 23, applying Pearson's Chi square tests and analysis of variance used to find out the significance of the Knowledge, attitude, and practice regarding traffic regulations, and their deterministic effect on RTAs in Al-Majmaa. A 95% degree of freedom with p-value of <0.05 considered as statistically significant.

Ethical concern

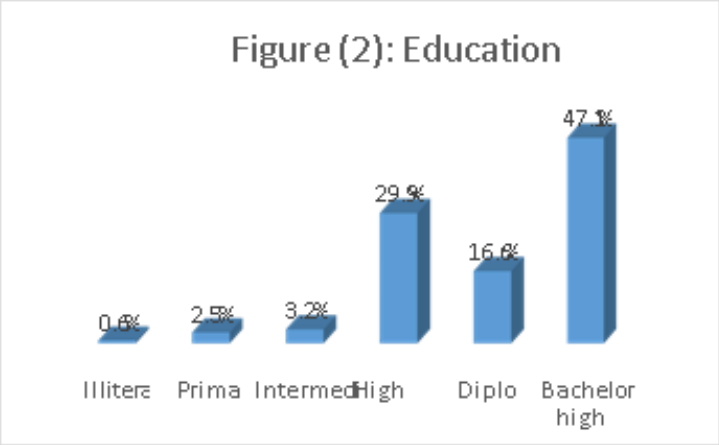
Ethical approval obtained from Ethics Committee of Health and Basic Medical and Health Research Center (BMHRC) of Majmaa University. All women invited assured of the voluntary participation in the research. Confidentiality and anonymity of the subject will be maintained throughout the study.

RESULTS

We included 157 participants. They were divided to 5 age groups and the most preventable age group was from 21 to 30 years old as shown in figure (1).



While figure 2 shows that 47.1% got university degree (bachelor or higher) followed by 29.9% with high school degree, 16.6% with diploma,3.2% with middle school, 2.5% with primary school and only 0.6% were illiterate.



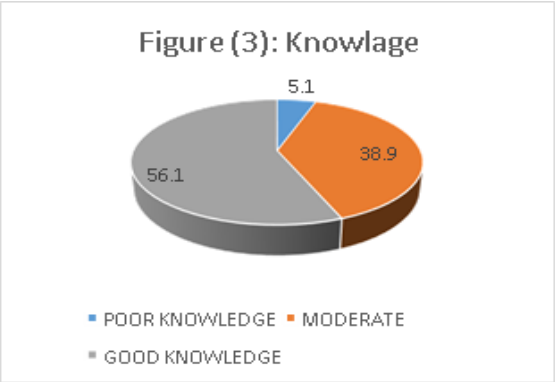
Also, 72% with moderate financial statues, 17.2% with high financial statues and 10.8% with low financial statues. Concerning marital status, 50.3% were married, and 49.7% were single. 69.4% own a car, 30.6% don't own a car. 90.5% have a driving license, 9.5% don't have a driving license (As shown in table1).

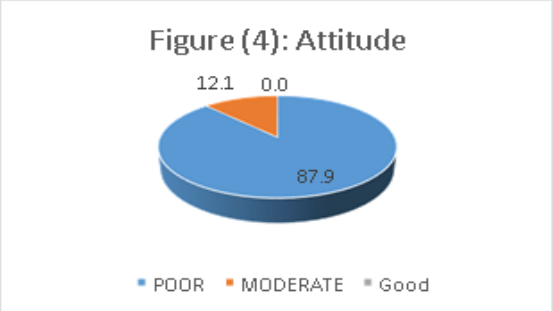
Table 1: Baseline characteristics of participants.

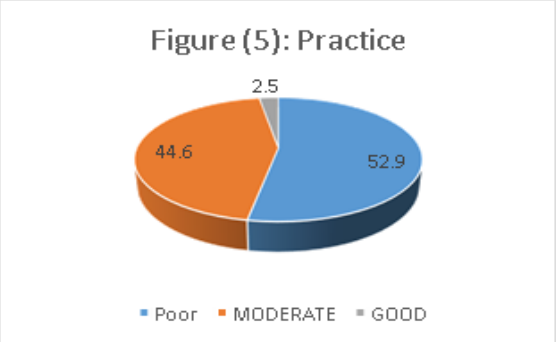
Variable	Percent	Frequency
Financial status (%):		
Low	%10.8	17
Moderate	%72	113
High	%17.2	27
Marital status (%)		
Single	49.7	78
Married	50.3	79
Owning a car (%):		
YES	69.4	109
NO	30.6	48
Having a driving license (%):		
YES	90.5	142
NO	9.5	15

The data in figure (3) also shows that 56.1% of the respondents have a good knowledge about driving and the traffic signs, where 38.9% have moderate knowledge, while only 5.1% have poor knowledge.

On the other hand, figure (3) shows that 87.9% of the individuals have a poor attitude towards safe driving, and 12.1% have moderate attitude, and 0% have good attitude.







Concerning Practice, we find that 52.9% of individuals have poor practice, and 44.6% have moderate practice, while only 2.5% have good practice (as shown in figure 5).

Data in table 2 shows the distribution of knowledge, Attitude and Practice by gender, Age, Education level, marital status, and economic stats. We found that 25% of people with poor knowledge were males while 75% of them were females. On the other hand, most of people with poor attitude and practice were males. We can also see that most of people who have poor knowledge were classified as good financial status and 25% of them were classified as excellent financial status. We can also notice the same pattern with people with poor attitude and practice.

Table 2: Distribution of knowledge, Attitude and Practice by gender, Age, Education level, marital status, and economic stats.

		Knowledge			Attitude			Practice		
		POOR	MODERATE	GOOD	POOR	MODERATE	GOOD	POOR	MODERATE	GOOD
Gender	Male	25.0	32.8	94.3	68.1	57.9	0.0	68.7	62.9	100.0
	Female	75.0	67.2	5.7	31.9	42.1	0.0	31.3	37.1	0.0
Age	20 or Less	25.0	21.3	8.0	14.5	10.5	0.0	18.1	10.0	0.0
	21-30	37.5	34.4	44.3	43.5	15.8	0.0	45.8	34.3	25.0
	31-40	37.5	27.9	28.4	27.5	36.8	0.0	27.7	30.0	25.0
	41-50	0.0	14.8	11.4	10.1	26.3	0.0	6.0	18.6	25.0
	50+	0.0	1.6	8.0	4.3	10.5	0.0	2.4	7.1	25.0
Education level	Nil	0.0	1.6	0.0	.7	0.0	0.0	1.2	0.0	0.0
	Primary	0.0	3.3	2.3	2.2	5.3	0.0	0.0	5.7	0.0
	Intermediate	0.0	0.0	5.7	3.6	0.0	0.0	3.6	2.9	0.0
	High school	62.5	31.1	26.1	30.4	26.3	0.0	34.9	24.3	25.0
	Diploma	0.0	19.7	15.9	13.8	36.8	0.0	12.0	20.0	50.0
	Bachelor or higher	37.5	44.3	50.0	49.3	31.6	0.0	48.2	47.1	25.0
Marital status	Single	50.0	47.5	51.1	52.2	31.6	0.0	57.8	41.4	25.0
	Marred	50.0	52.5	48.9	47.8	68.4	0.0	42.2	58.6	75.0
Financial status	Poor	12.5	9.8	11.4	12.3	0.0	0.0	8.4	14.3	0.0
	Good	62.5	73.8	71.6	70.3	84.2	0.0	72.3	71.4	75.0
	Excellent	25.0	16.4	17.0	17.4	15.8	0.0	19.3	14.3	25.0

Results from the questions on sample individual's practices while driving were as follows

The sample individual's practices while driving is high from the opinion of the study sample, the total mean is (2.70) with standard deviation (0.260) and the standard divisions for sentences are (0.454-1.359) that is s 'low values, so there is homogeneity in sample individual's opinion about all of sentences.

Sentence number seven came first (Complying to traffic signals while driving) with mean 0.764, standard division 0.454 and very high level, then sentence number one (Complying to speed limits while driving) with mean 3.375, standard division 0.559 and very high level, while sentence number six (Drug abuse while driving) came in the last place with mean 1.299, standard division 0.486 and weak level, and all the other sentence came with intermediate and high level.

Researchers found that the sample individuals practice while driving in the high level of response from the opinion of the study sample may be due to a conviction of individuals to Complying to these practices (table 2).

Table 3: sample individual's practices while driving.

Sentence		Level of response					mean	Standard division	Arrangement of sentence	Level of response
			NA.	Never	Sometime	Always				
1	Complying to speed limits while driving	F	0	6	86	65	3.375	0.559	2	Very high
		%	0	3.8	54.8	41.4				
2	Using safety belt	F	0	34	96	27	2.955	0.623	5	High
		%	0	21.7	61.1	17.2				
3	Holding the mobile phone while driving	F	0	25	93	39	3.089	0.634	3	High
		%	0	15.9	59.2	24.8				
4	Using the hand-free for talking to others while driving:	F	0	27	89	41	3.089	0.654	4	High
		%	0	17.2	56.7	26.1				
5	Smoking while driving	F	83	37	15	22	1.847	1.081	9	Intermediate
		%	52.9	23.6	9.6	14				
6	Drug abuse while driving	F	112	43	2	0	1.299	0.486	10	Weak
		%	71.3	27.4	1.3	0				
7	Complying to traffic signals while driving	F	0	2	33	122	3.764	0.454	1	Very high
		%	0	1.3	21	77.7				
8	Medical Glasses while driving	F	75	14	15	53	2.293	1.359	8	Intermediate
		%	47.8	8.9	9.6	33.8				
9	Continuing driving even when exhausted	F	0	35	104	18	2.891	0.572	6	High
		%	0	22.3	66.2	11.5				
10	Risky overtaking maneuvers	F	0	98	56	3	2.394	0.528	7	Intermediate
		%	0	62.4	35.7	62.4				
Total mean " sample members practices while driving "							2.700	0.260	---	High
F means frequency. % means percent.										

One-way ANOVA was performed to know if there is a significance difference for the answers of sample individuals according to the study variables (age - education Level - financial status - marital status). In which there is a significant difference for the answers of the sample individuals (Table 3).

Dimension	**age**	**Sum of Squares**	**df**	**Mean Square**	**F**	**Sig.**
sample members practices while driving	Between Groups	.329	4	0.082	1.223	0.303
	Within Groups	10.231	152	0.067		
	Total	10.560	156			
Dimension	Education level	**Sum of Squares**	**df**	**Mean Square**	**F**	**Sig.**
sample members practices while driving	Between Groups	0.347	5	0.069	1.027	0.404
	Within	10.213	151	0.068		
	Groups	10.560	156			

Dimension	**Financial status**	**Sum of Squares**	**df**	**Mean Square**	**F**	**Sig.**
sample members practices while driving	**Total**	0.018	2	0.009	0.134	0.874
	Between Groups	10.542	154	0.068		
	Within	10.560	156			
Dimension	**Marital statues**	**Sum of Squares**	**df**	**Mean Square**	**F**	**Sig.**
sample members practices while driving	**Groups**	0.102	1	0.102	1.510	0.221
	Total	10.458	155	0.067		
	Between Groups	10.560	156			

To determine the category that made this difference between the opinions of sample individuals about sample individuals practice while driving according to Financial status, we will do Kruskal-Wallis (table 4)

Dimension	**age**	**N**	**Mean rank**	**Chisquare**	**df**	**Sig.**
sample individual's practices while driving	20 YEARS OR LESS	22	62.84	6.439	4	0.169
	21-30 YEAR	63	87.33			
	31-40 YEAR	45	79.57			
	41-50 YEAR	19	66.79			
	ABOVE 50 YEARS	8	83.63			
	Total	157				
Dimension	education Level	N	Mean rank	Chisquare	df	Sig.
sample individual's practices while driving	Illiterate	1	36.50	4.018	5	0.547
	Primary	4	82.13			
	Intermediate	5	107.80			

	High school	47	73.34			
	Diploma	26	76.87			
	Bachelor orhigher	74	81.80			
	Total	157				
Dimension	Financial status	N	Mean rank	Chisquare	df	Sig.
sample individual's practices while driving	Poor	17	73	0.339	2	0.844
	Good	113	79.64			
	Excellent	27	80.11			
	Total	157				
Dimension	Marital statues	N	Mean rank	Chisquare	df	Sig.
sample individual's practices while driving	single	78	82.94	1.181	1	0.277
	married	79	75.11			
	Total	157				

1. There is a significant difference (at α=0.05) between the opinion of sample individuals about sample individual's practices while driving according to age due to the sample individuals who their age is between 21-30 year
2. There is a significant difference (at α=0.05) between the opinion of sample individuals about sample individual's practices while driving according to education Level due to the sample individuals who have intermediate certification.
3. There is a significant difference (at α=0.05) between the opinion of sample individuals about sample individual's practices while driving according to Financial status due to the sample individuals who their financial status is excellent.
4. There is a significant difference (at α=0.05) between the opinion of sample individuals about sample individual's practices while driving according to marital status due to the sample individuals who their marital status is single.

DISCUSSION

According to the World Health Organization (WHO) report in 2015[43], injuries caused by driving accidents are the most common reason for mortality (WHO, 2015).

According to our study, the results showed that there is a significant difference (at α=0.05) between the opinion of sample individuals about sample individual's practices while driving according to education Level this is consistent with the conclusion of Jalel (1973).[44] As according to his study, it was found that the educated Saudis are less involved in accidents than the illiterate ones which means that the educational level of the driver has a significant impact on the abundance or lack of accidents in the community.

On the other hand, the results of this study show that there is a significant difference (at α=0.05) between the opinion of sample individuals about sample individual's practices while driving according to Financial status due to the sample individuals who their financial status is excellent. However, an Australian study found that young drivers from low economic backgrounds are twice likely to injure because of a crash when compared with young drivers from higher socioeconomic backgrounds and that the impact of socio-economic status on crash risk appears to persist over time.[45]

According to Elvik's study, young car drivers are 5 to 10 times more likely to experience car accidents when compared to drivers among the safest age group.[46]

Johnell, et al in 2014 in their study concluded that being married was associated with substantially lower risks of being involved in road accidents compared with being a widow or divorced. While in our study, it is more associated with being single.[47]

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