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The prevalence and perceptions of smartphones use while driving among the Medical students in UQU 2016 - Cross-sectional stud

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ABSTRACT: Background: Using mobile phone while driving consider as one of the primary diversion sources of drivers, WHO reported that the drivers who used mobile while driving has the chance to be involved in car accidents four times more than the drivers who don't use the mobile. This study aimed to estimate the prevalence of Smartphones use while driving. And to assess the perception of risk of using a smartphone while driving among medical students in UQU 2016. **Method**: This is a cross-sectional study conducted among male medical students, College of Medicine at UQU, using self-administered questionnaire. **Result**: Out of 235 medical students, 68.51% were from group age 20-25 years, 98.3% drive a car, 82.13% involved in car accidents. What Sapp (71.91%) and Sanpchat (42.98%) were the main applications. More than half (53.19%) showed average risk behavior. Traffic light (41.7%) was the most common site of using the phone, followed by highway (36.6%). Reduce speed was reported by more than a half as the first behavior when using the phone **Conclusion:** The results showed that more than half had standard risk behaviors, indicating a low level of awareness of the danger of using the smartphone while driving. Further studies need to be conduct on a larger sample, and community base, to detect the prevalence of using the smartphone while driving among the population, and to determine the associated factors. **Recommendation:** More intervention campaigns need to be conducted to raise the level of awareness among medical students and community. Use the mass media to enhance the awareness of the risk of using a smartphone while driving among the community. Conduct educational campaigns in schools to increase the awareness level in early age.
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Keyword: Prevalence, perceptions, smartphones, driving, medical, students.

1. Introduction

1.1 Background

Kingdom of Saudi Arabia is considered one of the highest mortality rate related to Road Traffic Accident (RTA), and more than Two Third of Emergency Departments (ED) Injuries caused by RTA (1) (2). During an average year, about one person in 50 will involve in RTA; 1 % of them will die, 10 % will Admit to the hospital, and 25 % will be temporarily disabled (3). There are many causes of RTA, which are complicated, but the error on the part of drivers contributes to over 90 % (4).

Driver distraction is one of the critical error that causes RTA, with mobile phones use being one of the most common distractions to the drivers. This disturbance arises not only from dialing numbers and holding the phone but also from the conversation itself (5).

In A 2004 observational survey of drivers in the United States revealed that at any given time of day 5% were talking on hand held phones. (6)

And about the using of smartphones, the KSA Consider in 2013 alone, the third globally regarding smartphone penetration at 72.3%. (7) After looking at these numbers of Saudi Arabia among other countries, the other studies worldwide conducted about the relationship between poorer driving outcome while using the phone (texting and calling) (8) (9) (10).

Epidemiological research has found that smartphones use while driving associated with a fourfold increase in crash risk (11) (12). In line with this general increases of mobile phone use, there is also evidence of widespread use of mobiles while driving. Estimates of the number of drivers using cell phones while driving, reach to 68% (13).

1.2 Rationale

1. Me as a person facing the smartphone use while driving habit.
2. Direct contact with some of my friends and family member who encountered car crash related to smart phone use while driving

1.3 Aim Of The Study

To find out how widespread of smartphones use while driving, and to increase the awareness of the risks of using smartphones while driving, and to inform public health initiative and traffic authorities.

1.4 Objectives

1. To estimate the prevalence of Smartphones use while driving among medical students in UQU 2016.
2. To Determine the severity of the injury, admission to the Hospital That associated with a car crash accident related to the smartphone use while driving among the medical student of UQU 2016.
3. To assess the perception of the medical students about the risk of using a smartphone while driving among medical students in UQU 2016.

2. Literature review

1. International studies:

In USA study 2010, Schlehofer et al. conducted a cross sectional study to detect psychological predictors of cell phone use while driving among 69 college students who fill the survey, then their driving performance during using and not using simultaneous phone conversation was assessed. The findings showed decreasing in the driving performance when answering the cell phone, with high illusory control predicted. (13)

In Malaysia study 2011, Isa et al conduct a cross sectional study to define the mobile phone usage behavior while driving among students in Klang Valley. The results showed that two thirds of the participants used phone during driving, this behavior was more among male urban road. The authors suggested that there is need to design educational campaigns to raise the awareness of this dangerous behavior. (14)

In Taiwan study, 2011, Liu an OU conduct a cross sectional study to detect the influence of using "a Bluetooth hands-free cellular phone earpiece" on the behavior of drivers among two groups aging. Almost the half (48%) examined to assess their performance on the following divided-attention tasks under two driving load situations (high and low): (1) Trying to keep the speed under control and (2) using a mobile during driving. Independent variables: the length of the call conversation (long vs. short) and the conversational content (complex vs. simple) Dependent variables: the driving behavior of the participants, their task reaction times and accuracy. The findings of the study showed that under low loads, short periods of talking, and natural conversational, the driving behavior of the participants showed little variance in the vehicle's mean speed. In contrast, the complicated conversation had a significantly negative impact on driving behavior. The authors conclude that the use of a hands-free cellular phone the safety of driving (acceleration, pathway deviation, response time, and precision) of older drivers significantly higher than younger drivers. While performing divided attention tasks, the precision of the older drivers was 66.3 %, and that of the younger drivers was 96.3%. (15)

In Kerman study, 2011, Mohammadi G conduct a cross sectional study to determine the rate of mobile phone and seat belt utilize in driving among college students aged 18-24 years. The study consisted of two phases. First, 265 college students filled a questionnaire. Second, from March 2007 to March 2008 all related data to street accident injuries. The results revealed that the participants unbelted or using mobile phone were more involved in accidents in last three years. Also, it showed that 19.0% of male and 4.2% of female drivers considered using the cell phone in driving not risky. The highest injury and property damage crash rates were 87 and 137 per 100 000 inhabitants, which occurred in male group aged 18-24 years. And 30% of all fatalities were 19-24 years old. They conclude that more than half didn't use belt, female were less involved in accidents, Younger students had the high rate of trauma and head injury. (16)

In Iran study 2012, Kian et al conduct an experimental study to determine the call answering rate in a sample of male postgraduate students of a university in Tehran by a driving simulator. The authors design 6 scenarios with different factors could affect the decisions to use mobile while driving (on way vs two ways road), different speed. The results showed that drivers consider two ways road and high speed are more risky than one way and low speed. They conclude that drivers from all ages and experiences could answer the phone while driving, where this decision is related more to the personality trait than driving scenario or age. (17)

In Iran study 2013, Pouyakian et al. conducted a study to detect the role of traffic situations on drivers' judgments to use or not to use a mobile phone. In this study, the influence of distance, speed, and road type as well as personal variables including age and experience are investigated. Forty-two drivers participated in observing 24 scenarios in a driving simulator. The findings showed that car speed, headway distance, and age are significant predictors for the decision of the drivers to answer an incoming call while driving. They conclude that headway distance and car speed can be utilized by "in-vehicle information systems" (IVIS) to alert drivers from the using of the mobile phone in certain traffic situations. (18) In Spain study 2015, Prat et al. conducted a study to identify the psychological predictors of texting while driving behavior using the Theory of Planned Behavior (TPB). Data were collected from 1082

colleges students through online questionnaire. The results showed that Attitude and perceived behavioral control significantly predicted the intention to send and read text messages while driving. Also, the findings support TPB, where perceived crash risk was positively associated with the prediction of determinations to send text messages and the number of messages read during last week. (19)

In Pennsylvania USA study 2015, McDonald et al. conduct a study to identify teen drivers' perceptions of utilizing cell phone during driving to inform future. Seven focused group with total 30 teen drivers (16-18 years) were carried out, all had driving licensed less than 1 year. The focus group interview guide and analysis based on the Theory of Planned Behavior, identifying the attitudes and perceived behavioral control. The results showed that the mean length of licensure was 173.7 days (sd 109.2; range 4–364). From the focus group data, three major subjects emerged; (1) Understand the risk but still engaging; (2) Considering the situation, and (3) Creating safer behaviors that might decrease risk. They conclude that there is a need for more active practices changing interventions to reduce the risks of accidents. (20)

In Australia study 2015, Saifuzzaman et al conduct a study to detect the effect of mobile phone conversations on car-following behavior. The CARRS-Q Advanced Driving Simulator was utilized to examine a group of Australian drivers aged 18–26 years on a car-following task in three randomized phone conditions: baseline (no phone conversation), hands-free and handheld. The results showed that drivers tended to select slower driving speeds, larger vehicle spacing, and longer time headways when they were engaged in either hands-free or handheld phone conversations. Also the findings determine the influence of phone talking on car-following behavior (driving speeds, vehicle spacing, and acceleration and decelerations). These finding would help in increasing the understanding of distraction on driving performance in order to design intervention procedures to decrease accidents rate. (21)

In Vientiane, Laos study 2016, Phommachanh et al. conduct a school-based questionnaire survey in central Vientiane in May 2014 to detect mobile phone use while driving among student motorcyclists in Laos, Of the 883 high school students rode motorcycles once a week, 40% never used phones while driving vehicles. students who used phone drives longer than nonusers, where 53% reported using the phone while driving once time per week and 68% used it for 1 min or longer daily, 33% using it for calling and 25% texting message, 8% reported using phone exactly before the accidents. (22)

In Switzerland study 2016, Roser et al. conducted a cross sectional study to detect the relations between mobile phone use problem and mental health and behavioral problems in 412 Swiss adolescents owning a cell phone while controlling for the amount of cell phone use by using the MPPUS-10 (Mobile Phone Problem Use Scale). The results showed that MPPUS-10 was 4.7 (95 % CI 1.8, 7.6) units higher in females than in males, increased significantly with age and significantly decreased with increasing educational level of the parents. They conclude that problematic mobile phone use associated with outside factors such as poor home and school environment and internal factors such as the decrease in mental health and behavioral problems of the adolescents. (23)

2. Arab countries studies:

In Erbil, Iraq study 2015, Shabila et al. conduct a self-administered questionnaire-based survey to determine risky driving behaviors among medical students in Erbil, and to explore the relationship between risky driving behaviors and perceptions of unsafe driving, 400 medical students at Hawler Medical University in Erbil were involved. The questionnaire asked about 21 risky driving behaviors, the perceived risk of each behavior and the preference for each behavior as ranked on a 5-point scale. The respond rate was (388: 96.5%),211 reported that they currently drove a vehicle (54.7%). Drivers most frequently engaged in the following behaviors: playing high music (35.9%), speeding (30.4%), accepting that front seat passengers didn't wear seat belts (27.9%) and used mobile phones (27.7%). Also there was a significant positive relationship between the preference for risky behaviors and risky driving behaviors ($P < 0.001$). They conclude that medical students in Erbil showed high frequencies of several severe risky driving behaviors. The preference for risky behaviors was found to be a significant predictor of risky driving behaviors. (24)

In Doha, Qatar study 2013, Mahfoud et al. conduct an observational study to obtain credible estimates of the rate of seat belt and mobile phone use among car drivers and to detect the relation of these behaviors with other variables namely gender, time of the day and type of vehicle. Data was collected about 2,011 vehicles at 10sites within Doha city over a 2-weeks. Two trained supervisors examined each car and reported notices on a data collection form obtained from 2012 Oklahoma observational study. The results showed that 1,463 (72.7 %) drivers utilized a seat belt and 150 (7.5 %) their mobile phones during the duration of the observation period. They conclude that even with the high rate of car accidents in Doha, 3 out of 10 drivers do not use a seat belt and about 1 in 12 use a mobile phone while driving. They suggested the need for more awareness campaigns to increase law enforcement, to improve acquiescence to laws

demanding seat belt use and preventing cell phone use while driving. (25)

3. National studies:

In Saudi Arabia 2013, Osuagwu and his colleagues conduct a cross sectional study to give an insight into the behavior of Saudis and non-Saudis drivers towards the use of cell phones, text messaging and hands-free devices, and their associated risk of (Road Traffic Accidents) RTAs. A self-administered survey were distributed by hand on 520 male drivers [Saudis (70.2%), non-Saudis (29.7%)]. They aged between 16 – 61years, 32% (Saudis) and 18% (non-Saudis) start driving at age<16 years, 80.3% (Saudis) and 72.3% (non-Saudis) had a valid driver's license, 82.7% (Saudi) & 80.7% (non-Saudi) drivers use private vehicles. They conclude that younger age (16-30), being non- Saudi, the use of cell phones, and text messaging, increase the risk of involvement in RTAs where odds were greatest for making/receiving phone calls. (26)

In Riyadh study, 2016 Alosaimi and his colleagues conducted a cross-sectional study to detect the prevalence and correlates of smartphone addiction among King Saud university students in Saudi Arabia between September 2014 and March 2015, an electronic self-administered questionnaire and the problematic use of mobile phones (PUMP) Scale were used. Out of 2367 participants, 27.2% reported that they spent more than 8 hours per day using their smartphones. 75%percent used at least four applications per day, primarily for social networking and watching the news. As an adverse effect of using the smartphones, 43% had decreased sleeping hours and experienced a lack of energy the next day. Almost the third 30% had a more unhealthy lifestyle, the quarter stated that their academic achievement been adversely affected. There are statistically significant positive relationships between the four study variables, consequences of smartphone use, the number of hours per day spent using smartphones, years of research, and some applications used, and the variable outcome score on the PUMP. The mean values of the PUMP scale were 60.8 with a median of 60. They conclude that there is a high risk of addiction to the smartphone using among college students, with significant adverse effects on sleep, levels of energy, eating habits, weight, exercise, and academic performance. (27)

3. Methodology

3.1 Study Design: Cross-sectional study design.

3.2 Study Population:

The study conducted among male medical students, College of Medicine at UQU.

Eligibility criteria

1. Inclusion criteria:

Male Medical Students, College of Medicine at UQU, who drives a car and owned or used smartphones.

2. Exclusion criteria:

1t year Male Medical Students, and who didn't drive a car or don't own or used a smartphone.

3.3 Study Area: Makkah Al-Mokarmah is the holiest city in World, and it is one of the most populous regions (mintaqah) in Saudi Arabia. It located in western Saudi Arabia. It has an area of 153,128 km² and a population of 6,915,006 (2010 census).

3.4 Sample size:

The sample size was calculated by using **ROASOFT** sample size calculator. The Minimum Recommended Sample Size: 235. Mother population: 600The prevalence of the problem: 50% Confidence interval: 95% Error: 5%.

3.5 Sampling technique:

Stratified sampling: the divisions of a Male Medical student into smaller groups by the Clinical Years. Then A simple random sample from each students list is taken in a number symmetric to the layer size when compared to the population.

3.6 Data collection tool:

Self-administered Questionnaire validated by two consultants.

3.7 Data Collection techniques:

After visiting the Medical college and meeting with all batches leaders, and selecting the students randomly by the student's list, The Questionnaires distributed, and the leaders helped me to collect them all, on the same day to ensure the high level of response.

3.8 Study Variables

Dependent Variables:

Smartphones use among medical students Driver.

Independent variable:

Demographic

: (Age, clinical years, marital status, number of children)

Driving behavior Questions:

(Crash history in the last five years, the frequency of smartphone use while driving, their perception of the degree of risk associated with their driving behavior while using a smartphone).

Injury Questions:

(severity of the injury, admission to the Hospital).

Smartphones Questions:

(type and smartphone use (10), the most used Applications, most areas that smartphones used while driving).

4. Data entry and analysis:

Data analysis will be carried out by using statistical package for the social science (SPSS), P – Value <0.05 should be considered for significance.

3.9 Pilot study:

A pilot study conducted by five students of the study sample size and these sample results excluded from the study.

3.10 Reliability:

A reliability analysis was carried out on three parts of the questionnaire comprising 17 items. For the first part (driving knowledge) consists of 6 items, Cronbach's alpha showed the survey to reach acceptable reliability, $\alpha = 0.600$. For the second part (using smartphone applications) contains nine items, Cronbach's alpha showed the questionnaire to reach acceptable reliability, $\alpha = 0.650$. And for the third part (driving behaviors) consists of 2 items, Cronbach's alpha showed the survey to achieve acceptable reliability, $\alpha = 0.640$.

3.11 Ethical Considerations

- Research committee approval of Makkah Joint Program of Family medicine.
- Institutional and departmental approval from Umm Al-Qura University Medical College dean.
- Written consents from all participants to be obtained included in the Questionnaire.
- All information will maintain confidentiality.

2.11 Budget: Self-funded budget.

4. Results

More than half of the sample was between 20 and 25 years of age were 161 (68.51%). Most of them were unmarried, 219 (93.19%), and 16 (6.81%) were married, of whom 3 had children. As for the years of study, there are 41, 17.45% in the second year, 47% in the third year, 45 in 19.15% in the fourth year, 52% in the fifth year, 22.13% in the fifth year, 50% in the second year, 21.28% Sixth Year. **(Table 1)**

Table (2) show that is the most of the samples has a driving license of 209 people with 94%. Almost all of the respondents are driving the car themselves by 231.98%. There are 193 individuals with 82.13% accidents and 75 individuals with 38.86% the accident is due to a smartphone use while driving. **(Table 2)**

Table (1): - The sample distribution regarding demographic data (Age, Marital status, Children number, clinical year)

	N	%
Age		
≤20	44	18.72
20-25	161	68.51
≥25	30	12.77
Range	18-27	
Mean±SD	22.343±1.779	
Marital status		
Married	16	6.81
Single	219	93.19
Children number		
No	232	98.72
Yes	3	1.28
Clinical year		
Second year	41	17.45
Third Year	47	20.00
Fourth Year	45	19.15
Fifth Year	52	22.13
Sixth Year	50	21.28

Table (2): the frequency and percentage regarding (license, Drive a Car, Exposure to a car accident and car accident related to smartphone

	N	%
Do you have a valid driver license?		
Yes	209	88.94
No	26	11.06
Do You Drive a Car?		
Yes	231	98.30
No	4	1.70
Have you ever been in a car accident?		
Yes	193	82.13
No	42	17.87
Have you ever been in a car accident related to smartphone use while driving? (N=193)		
Yes	75	38.86
No	118	61.14

Table (3) show that the most used Applications when the incident occurred is WhatsApp where the number of users 40 by 17.02%, followed by Snap Chat where the number of users 17 7.23%, followed by maps and the number of users 11 by 4.68%. While the use of other applications (Facebook, Browse internet, Instagram, and others) very little. **(Table 3)**

Table (3): the frequency and percentage for the applications used during accidents

What are the used Applications by you when you encountered the accident? (n=235)		
	N	**%**
Whats App	40	17.02
Snap Chat	17	7.23
Maps	11	4.68
Facebook	3	1.28
Browse internet	2	0.85
Instagram	1	0.43
Other	1	0.43
not related	160	68.09

Table (4) show that is the most of the sample used the Whatsapp during the accident and the number of users 40 by 53.33%. Followed by Snapechat and the number of users 17 by 22.67%. Then by maps and the number of users 11 by 14.67% followed by Facebook by 4.0%. Followed by the Internet (2.67%), and finally, Instagram (1.33**%). (Table 4)**

Table (5) show that is we have 68 with 28.94% visited Emergency Department (ER) and 46 with 19.57% admitted to hospital. While found 30 with 12.77% exposed to Fracture and 22 with 9.36% presented to Laceration, but 183 with 77.87% not exposed to injury and all our samples owns a smartphone **(Table 5)**

Table (4) what are the used Applications by you when you encountered the accident?

	N	**%**
Related	75	31.91
Not related	160	68.09
If related (n=160)		
Facebook	3	4.00
SnapChat	17	22.67
Instagram	1	1.33
Maps	11	14.67
WhatsApp	40	53.33
Browse internet	2	2.67
Other	1	1.33

Table (5): The frequency and percentage for (visited Emergency Department (ER), admitted to Hospital, types of injury and own a smartphone)

	N	**%**
Have you visited Emergency Department (ER)?		
Yes	68	28.94
No	167	71.06
Have you admitted to Hospital?		
Yes	46	19.57
No	189	80.43
Types of injury		
Fracture	30	12.77
Laceration	22	9.36
No injury	183	77.87
Do you own a smartphone?		
Yes	235	100.00

Table (6) show that is the most of the sample used the Whatsapp during the driving and the number of users 169 by 71.91%. Followed by Snapechat and the number of users 101 by 42.98%. The maps and the number of users line by 23.8% followed by Twitter by 16.17. Followed by Instagram (13.19%), followed by the Internet (7.23%), then SMS Email with the same percentage, and finally, Facebook with (6.81%). **(Table 6)**

Table (7) show that is the greater percentage used the phone in the Traffic light, with rate 41.70 and Highway with 36.6%. After this inside the city with 15.74% and the little of the sample with 4.26% used it

in Rush hour and there are only three with 1.28 don't use it, and one used it anywhere. **(Table 7)**

Table (6) Applications for you while driving a car

Applications by you while driving a car		
	N	**%**
WhatsApp	169	71.91
Snap Chat	101	42.98
Maps	56	23.83
Twitter	38	16.17
Instagram	31	13.19
Internet	17	7.23
SMS Email	17	7.23
Facebook	16	6.81
Other	17	7.23

Table (7): The frequency and percentage for the most sites you used your phone while driving

Where are the Most sites you used your phone while driving?		
	N	**%**
Highway	86	36.60
Inside the city	37	15.74
Traffic light	98	41.70
Rush-hour	10	4.26
Don't Use	3	1.28
Any Where	1	0.43
Total	235	100.00

We found that the largest proportion of the sample using the phone driving cars at the speed of 81 to 81 To 100 Km/h. The number of 112 by 47.66% and 64 by 27.23% used it while drive with speed 41 To 80 Km/h and 32 of 13.62% with speed Below 40Km/h and 27 with 11.49 above. (Table 8)

Table (8): The frequency and percentage for the average speed of the car while using the smartphone

What is the average speed of your car while you are using your smartphone?		
	N	**%**
Below 40Km/h	32	13.62
41 To 80 Km/h	64	27.23
81 To 100 Km/h	112	47.66
Above 100 Km/h	27	11.49
Total	235	100.00

Table (9) show there are 48 by20.43% driving their car with low-risk behaviors, 125 with 53.19% driving their car with Average risk behaviors and 62 with 26.38% with high-risk behaviors. **(Table 9)**

Table (9): The frequency and percentage of Risk of driving behavior

The risk		
	N	**%**
Low risk	48	20.43
Average risk	125	53.19
High risk	62	26.38
Total	235	100.00

Table (10) show that is no significant relationship between the risk and (age, marital status and Clinical year) where all P-values more than 0.05. **(Table 10)**

Table (10): The relation between Risk of driving behavior and demographic data (Age, Marital status and Clinical year)

			The risk				Chi-square	
			Low risk	Average risk	High risk	Total	X^2	P-value
Age	<20	N	13	16	15	44	6.436	0.169
		%	27.08	12.80	24.19	18.72		
	20-25	N	30	91	40	161		
		%	62.50	72.80	64.52	68.51		
	>=25	N	5	18	7	30		
		%	10.42	14.40	11.29	12.77		
Marital status	Married	N	2	11	3	16	1.746	0.418
		%	4.17	8.80	4.84	6.81		
	Single	N	46	114	59	219		
		%	95.83	91.20	95.16	93.19		
Clinical year	Second year	N	12	15	14	41	13.752	0.088
		%	25.00	12.00	22.58	17.45		
	Third Year	N	9	28	10	47		
		%	18.75	22.40	16.13	20.00		
	Fourth Year	N	12	19	14	45		
		%	25.00	15.20	22.58	19.15		
	Fifth Year	N	6	36	10	52		
		%	12.50	28.80	16.13	22.13		
	Sixth Year	N	9	27	14	50		
		%	18.75	21.60	22.58	21.28		

Table (11) show that is no significant relationship between the risk of driving behavior and valid driver license where X^2=0.996 and P-value=0.608. **(Table 11)**

Table (11): The relation between Risk of driving behavior and valid driver license

Do you have a valid driver license		The risk			
		Low risk	Average risk	High risk	Total
Yes	N	43	113	53	209
	%	89.58	90.40	85.48	88.94
No	N	5	12	9	26
	%	10.42	9.60	14.52	11.06
Total	N	48	125	62	235
	%	100.00	100.00	100.00	100.00
Chi-square	X^2	0.996			
	P-value	0.608			

Table (12) show that is a significant relationship between the risk of driving behavior and history of a car accident where X^2=17.902 and P-value<0.001. We have 59 with 95.16% driving behavior with high risk and have a history about car accidence and 103 with 82.4% driving behavior with average risk, but we have 31 with 64.58% driving behavior with little risk. (Table 12)

Table (12): The relation between Risk of driving behavior

Have you ever been in car accident		The risk			
		Low risk	Average risk	High risk	Total
Yes	N	31	103	59	193
	%	64.58	82.40	95.16	82.13
No	N	17	22	3	42
	%	35.42	17.60	4.84	17.87
Total	N	48	125	62	235
	%	100.00	100.00	100.00	100.00
Chi-square	X^2	17.902			
	P-value	<0.001*			

Table (13) show that is a significant relationship between the risk of driving behavior and the car accident related to smartphone use while driving (in the past) where X^2=9.547 and P-value=0.008. We have 21 with 33.87% driving behavior with high risk and the car accident related to smartphone use while driving and 47 with 37.6% driving behavior with average risk but we have 7 with 14.58% driving behavior with low risk. **(Table 13)**

Table (13): The relation between Risk of driving behavior and the car accident related to smartphone use while driving

Have you ever been in a car accident related to smartphone use while driving?		The risk			
		Low risk	Average risk	High risk	Total
Yes	N	7	47	21	75
	%	14.58	37.60	33.87	31.91
No	N	41	78	41	160
	%	85.42	62.40	66.13	68.09
Total	N	48	125	62	235
	%	100.00	100.00	100.00	100.00
Chi-square	X^2	9.547			
	P-value	0.008*			

Table (14) show that is no significant relationship between the risk of driving behavior and the applications used when encountered the accident where X^2=22.747 and P-value=0.065**.** (Table 14)

Table (15) showed that is no significant relationship between the risk of driving behavior and visited Emergency Department (ER) where X^2=3.406 and P-value=0.182. (Table 15)

Table (14): The relation between Risk of driving behavior and Applications when encountered the accident

What are the used Applications by you when you encountered the accident?		The risk			
		Low risk	Average risk	High risk	Total
Facebook	N	0	3	0	3
	%	0.00	2.40	0.00	1.28
SnapChat	N	2	11	4	17
	%	4.17	8.80	6.45	7.23
Instagram	N	0	1	0	1
	%	0.00	0.80	0.00	0.43
Maps	N	0	9	2	11
	%	0.00	7.20	3.23	4.68
WhatsApp	N	5	21	14	40
	%	10.42	16.80	22.58	17.02
Browse internet	N	0	2	0	2
	%	0.00	1.60	0.00	0.85
Other	N	0	0	1	1
	%	0.00	0.00	1.61	0.43
Not related	N	41	78	41	160
	%	85.42	62.40	66.13	68.09
Total	N	48	125	62	235
	%	100.00	100.00	100.00	100.00
Chi-square	X^2	22.747			
	P-value	0.065			

Table (15): The relation between Risk of driving behavior and visited Emergency Department (ER)

Have you visited Emergency Department (ER)?		The risk			
		Low risk	Average risk	High risk	Total
Yes	N	13	42	13	68
	%	27.08	33.60	20.97	28.94
No	N	35	83	49	167
	%	72.92	66.40	79.03	71.06
Total	N	48	125	62	235
	%	100.00	100.00	100.00	100.00
Chi-square	X^2	3.406			
	P-value	0.182			

Table (16) showed that is no significant relationship between the risk of driving behavior and admitted to hospital where X^2=0.107 and P-value=0.948. **(Table 16)**

Table (16): The relation between Risk of driving behavior and admitted to Hospital

Have you admitted to Hospital?		The risk			
		Low risk	Average risk	High risk	Total
Yes	N	9	24	13	46
	%	18.75	19.20	20.97	19.57
No	N	39	101	49	189
	%	81.25	80.80	79.03	80.43
Total	N	48	125	62	235
	%	100.00	100.00	100.00	100.00
Chi-square	X^2	0.107			
	P-value	0.948			

Table (17) show that is no significant relationship between the risk of driving behavior and Type of injury where X^2=2.263 and P-value=0.687. **(Table 17)**

Table (17): The relation between Risk of driving behavior and Types of injury

Types of injury		The risk			
		Low risk	Average risk	High risk	Total
Fracture	N	4	16	10	30
	%	8.33	12.80	16.13	12.77
Laceration	N	5	13	4	22
	%	10.42	10.40	6.45	9.36
No injury	N	39	96	48	183
	%	81.25	76.80	77.42	77.87
Total	N	48	125	62	235
	%	100.00	100.00	100.00	100.00
Chi-square	X^2	2.263			
	P-value	0.687			

Table (18) show that there is a significant relationship between the history of a vehicle crash (Have you ever been in a car accident) and age X^2=7.752, P-value=0.021. The highest percentage in age 20-25year with 72.54%, but no significant with Marital status, clinical year and having children where each P-values more than 0.05. **(Table 18)**

Table (18): The relation between history of car accident (Have you ever been in car accident) and

			Have you ever been in car accident			Chi-square	
			Yes	No	Total	X^2	P-value
Age	<20	N	31	13	44	7.752	0.021*
		%	16.06	30.95	18.72		
	20-25	N	140	21	161		
		%	72.54	50.00	68.51		
	>=25	N	22	8	30		
		%	11.40	19.05	12.77		
Marital status	Married	N	15	1	16	1.976	0.160
		%	7.77	2.38	6.81		
	single	N	178	41	219		
		%	92.23	97.62	93.19		
Children n	No	N	190	42	232	1.190	0.275
		%	98.45	100.00	98.72		
	Yes	N	3	0	3		
		%	1.55	0.00	1.28		
Clinical year	Second year	N	27	14	41	9.206	0.05*
		%	13.99	33.33	17.45		
	Third Year	N	41	6	47		
		%	21.24	14.29	20.00		
	Fourth Year	N	38	7	45		
		%	19.69	16.67	19.15		
	Fifth Year	N	45	7	52		
		%	23.32	16.67	22.13		
	Sixth Year	N	42	8	50		
		%	21.76	19.05	21.28		

Table (19) show that there is a significant relationship between the history of a vehicle crash (Have you ever been in a car accident) and (Have you ever been in a car accident related to smartphone use while driving?) X^2=36.433 and P-value<0.01. The highest percentage is for yes (Have you ever been in a car accident related to smartphone use while driving?) With 38.86% versus No with 0%. However, no significant relation with (Do you have a valid driver license) and (Do You Drive a Car) where each P-value more than 0.05. **(Table 19)**

Table (19): The relation between history of car accident (Have you ever been in car accident)

			Have you ever been in car accident			Chi-square	
			Yes	No	Total	X^2	P-value
Do you have a valid driver license	Yes	N	169	40	209	2.461	0.117
		%	87.56	95.24	88.94		
	No	N	24	2	26		
		%	12.44	4.76	11.06		
Do You Drive a Car	Yes	N	191	40	231	2.179	0.140
		%	98.96	95.24	98.30		
	No	N	2	2	4		
		%	1.04	4.76	1.70		
Have you ever been in a car accident related to smartphone use while driving?	Yes	N	75	0	75	36.433	<0.001*
		%	38.86	0.00	31.91		
	No	N	118	42	160		
		%	61.14	100.00	68.09		

Table (20) show that is a significant relationship between the history of a vehicle crash (Have you ever been in a car accident) and (Applications encountered the accident) in WhatsApp X^2=9.074 and P-value=0.003 with the highest percentage 20.73%. But no significant relation with other application where all P-values more than 0.05. (Table 20)

Table (20): The relation between history of car accident (Have you ever been in car accident)

What are the used Applications by you when you encountered the accident?		Have you ever been in car accident			Chi-square	
		Yes	No	Total	X^2	P-value
Facebook	**N**	3	0	3	0.003	0.956
	%	1.55	0.00	1.28		
Snap Chat	**N**	17	0	17	2.783	0.095
	%	8.81	0.00	7.23		
Instagram	**N**	1	0	1	0.000	1.000
	%	0.52	0.00	0.43		
Maps	**N**	11	0	11	1.396	0.237
	%	5.70	0.00	4.68		
WhatsApp	**N**	40	0	40	9.074	0.003*
	%	20.73	0.00	17.02		
Browse internet	**N**	2	0	2	0.000	1.000
	%	1.04	0.00	0.85		
Other	**N**	1	0	1	0.000	1.000
	%	0.52	0.00	0.43		
Not related	**N**	118	42	160	22.217	<0001*
	%	61.14	100.00	68.09		
Total	**N**	193	42	235		
	%	100.00	100.00	100.00		
Chi-square	X^2	36.433				
	P-value	<0.001*				

Table (21) show that is a significant relationship between the history of a vehicle crash (Have you ever been in a car accident) and (visited Emergency Department (ER). The highest percentage of who people have a history of a car accident (37.72%) versus haven't history (2.38%) X^2=24.064 and P-value<0.001. And so on admitted to hospital where X^2=10.979 P-value<0.001 and so on Types of injury (Fracture, laceration) where X^2=13.759 P-value<0.001.

Table (22) shows that is no significant relationship between the history of a car accident (Have you ever been in a car accident) and Application (using during driving) where each P-value more than 0.05. **(Table 22)**

Table (21): The relation between history of car accident (Have you ever been in car accident) and (Emergency Department (ER), admitted to Hospital and Types of injury)

			Have you ever been in car accident			Chi-square	
			Yes	No	Total	X^2	P-value
Have you visited Emergency Department (ER)?	Yes	N	67	1	68	24.064	<0.001*
		%	34.72	2.38	28.94		
	No	N	126	41	167		
		%	65.28	97.62	71.06		
Have you admitted to Hospital?	Yes	N	46	0	46	10.979	<0.001*
		%	23.83	0.00	19.57		
	No	N	147	42	189		
		%	76.17	100.00	80.43		
Types of injury	Fracture	N	28	2	30	13.759	<0.001*
		%	14.51	4.76	12.77		
	laceration	N	22	0	22		
		%	11.40	0.00	9.36		
	No injury	N	143	40	183		
		%	74.09	95.24	77.87		

Table (22): The relation between history of car accident (Have you ever been in car accident) and Application (using during driving)

		Have you ever been in car accident			Chi-square	
		Yes	No	Total	X^2	P-value
FACEBOOK	N	13	3	16	0.009	0.925
	%	6.74	7.14	6.81		
TWITTER	N	33	5	38	0.731	0.393
	%	17.10	11.90	16.17		
SNAPCHAT	N	85	16	101	0.502	0.479
	%	44.04	38.10	42.98		
INSTAGRAM	N	27	4	31	0.644	0.422
	%	13.99	9.52	13.19		
MAPS	N	47	9	56	0.166	0.684
	%	24.35	21.43	23.83		
INTERNET	N	17	0	17	6.977	0.008*
	%	8.81	0.00	7.23		
SMS EMAIL	N	15	2	17	0.513	0.474
	%	7.77	4.76	7.23		
WHATSAPP	N	144	25	169	3.888	0.049
	%	74.61	59.52	71.91		
OTHER	N	14	3	17	0.001	0.980
	%	7.25	7.14	7.23		

4. Discussion

In the last decades, the rate of driver distraction problem and accidents increased around the world. Sources of distracting could be internal or external to the vehicle. Internal sources could be using mobile phones while driving, eating while driving, talking to passengers, smoking, writing texts, adjusting a radio, CD player, or MP3, while external sources could be looking at moving objects outside the vehicle or watching people along the road. There are several forms of distracting (physical, visual, cognitive and auditory). (28) Using mobile phone while driving consider as one of the primary diversion sources. WHO reported that the drivers who used mobile while driving has the chance to be involved in car accidents four times more than the drivers who don't use the mobile. (28,29) The current study aimed to detect the prevalence of Smartphones use while driving. To determine the severity of the injury, admission to the Hospital that associated with a car crash accident related to the smartphone use while driving. And to assess the perception of risk of using a smartphone while driving among medical students in UQU 2016. Results of the present study showed that the majorities

(98.3%) of the medical students drive cars, and from them, 9.4% of them didn't have a valid license. The majority (193-82.13%) reported that they involved in car accidents before, from them 75 (38.9%) stated that the accidents were related to the use of the smartphone during driving. In Malaysia study 2011, the mean age was 22.5 ± 1.5 range (18-25), all had valid driving license and third quarters had it from more than three years. The majority reported involving in 0-3 accidents during the last five years. (14) In Pennsylvania study 2015, the mean age was 17.4 ± 0.5 ranged (16-18), with driving license less than one year. (20)

In Riyadh study 2011, the authors reported that texting while driving was five times more likely to result in accidents. (26) In Vientiane, Laos study 2016, the mean age was17.1 ± 1.2, 62% reported participating in accidents, and 8% of them were involved in phone call exactly before the accidents. (22) The results showed that 84.7% stated using the smartphone while driving while 15.3% stated never used. The most common application used during driving the car 71.91% was What Sapp, followed by 42.9% used snap chat, as well as during the accidents, 53.3% reported using What Sapp, followed by snap chat (22.7%). Indicates that the participants are confident and more confident to take a risk. In Malaysia study 2011, 66.6% participants used mobile to answer the call or sending SMS at least once, while 33.4% stated that they never used the phone. (14)

In Kerman study 2011, 74% reported using mobile while driving. (16)

In Iraq study 2015, 27.7% reported using mobile while driving and 13.5% reported texting while driving. (24) In Vientiane, Laos study 2016, 528 (60%) don't use, and 355 (40%) stated using mobile while driving, where 33% using it for calling and 25% texting message. (22)

Less than half (41.7%) reported using the phone in the traffic light, followed by (36.6%) on the high way, then (15.7%) inside the city. Almost the half (47.66%) reported their speed 81 to 100 Km/h, and 27.23% recorded their speed 41 To 80 Km/h.

In Pennsylvania study 2015, the participants reported that external factors such as knowing the road, site of road affect the driver's response. While they stated that inclement weather, driving speedily on the highway reduces this opportunity, but not prevent it at all, this indicates that even that the teens know that it is risky behavior they still engaged in it. (20) In Tehran study, the results showed that the frequency of answering the mobile phone was higher in one road way than two ways. Also it was higher if the speed was lower (61.3%), (60.1%) and (54.2%) for 20 km/h, 50 km/h and 80 km/h respectively. (17) In respect to the behavior depend on the site of the road, in the urban area more than half (60%) stated reduce speed while answer the phone, and 16.65% don't use the phone. While in highway road 52.7% indicated reduce speed while responding to the phone, and 24.26% stated that they don't alter. It could explain that they feel more safe, less risky and more capable of controlling the car if they reduce the speed. (14)

According to the question about using smartphone frequency depending on the site of the road. In urban road (34.04%) reported using their phone once a day and 15.3% more than one time daily, while in high way road 30.2% reported using their phone once a day and 22.9% more than one time daily. In Kerman study,2011,37.4% stated that they always used mobile while driving. (16) In Australia study 2015, 46.9% reported using mobile once or twice per week, while 34.8% stated using mobile once or twice per day. (21)

In Vientiane, Laos study 2016, 53% reported using mobile once time per week, while 14% stated using mobile 1daily, 46% used it for 1-5 minutes. (22) The results showed that more than half (53.19%) showed average risk behaviors and 26.3% showed high-risk behaviors. Indicate the low level of awareness among medical students. In Iraq study 2015, the mean score of risky behavior was 2.17 ± 0.60. (397), 15.6% and 15.1% stated enjoying risky behaviors of using mobile and texting while driving respectively, where more than two thirds (69.5%) think that texting while driving and 57.0% believe that using mobile while driving are risky behaviors. (24)

Regarding admitting to the hospital, the results showed that 68 (28.9%) visited ER, and only 46 (19.57%) admitted to the hospital, 30 (12.77%) suffered from fractures, and 22 (9.36%) suffered from laceration.

In Kerman study 20, the injury, death, and property damage crash rates per 100 000 populations were 87, 11, 137 respectively, which indicating high incidence and low safety performance, where 51% of deaths caused by trauma and 22% by the head injury. (16) The findings of the study showed a significant association between the level of risk behavior and being in an accident before. Where the students who involved in this kind of accidents before had the higher rate of high and average risk behaviors than who don't involve in accidents before ($p<0.001$, $p=0.008$). Otherwise, there was no significant association between level of risk behavior and demographic data (age, marital status and academic year), having a license, driving a car, type of applications, visited ER department, admitted to the hospital, and kind of injuries. Also, the results showed significant association a significant association between being in an accident before and age, academic year, being in an accident related to smartphone use,

using What Sapp and the internet, visited ER, admitted to the hospital, and kind of injuries. In Riyadh study 20, there was no significant association between being in danger from accidents and having valid driving license. However, there was a significant association between involving in accidents and having valid driving license, where the Saudi police traffic department oblige all drivers to have a valid license. On the other hand, there was significant negative association with age and involving in accidents (increasing in age decreasing the rate of accidents included) (26).

In Spain study 2015, there was a significant positive relationship between perceived crash risk and the prediction of intentions to send and read the text; they explained that by the fact that behavior is relatively stable, as well as intentions. (19)

Limitation

There are some constraints in this study. All the participants were from the medical college in UQU. The sample size was small (n=235), also there was the limitation of time.

6. Conclusion

The results highlighted the fact that using the smartphone while driving is a common behavior among drivers. More than half had normal risk behaviors, indicating a low level of awareness of the danger of using the smartphone while driving. The majority were involved in accidents before. The most common applications were What Sapp and snap chat. The typical behavior when answering the phone was reduced speed. A significant association between the level of risk behavior and being in an accident before was found.

7. Recommendation:

1. Further studies need to be conduct on a larger sample, and community base, to detect the prevalence of using a smartphone while driving among the community, and to determine the associated factors.

2. More intervention campaigns need to be conducted to raise the level of awareness among medical students and community.

3. Use the mass media to enhance the awareness of the risk of using a smartphone while driving among the community.

4. Conduct educational campaigns in schools to increase the awareness level in early age.

5. Decisions makers should take into their consideration all the studies about this phenom to design effective intervention program.

6. Policy makers need to have changes in driving and road safety legislation and revise all existing traffic regulations.

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