Original Article

Use of Mobile Phone while Driving in Saudi Arabia

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Abstract: The use of mobile phones has increased dramatically among drivers in multiple countries in the past few years. The primary objective of this study was to measure the prevalence of cell phone use while driving in Saudi Arabia and to find whether there is a relationship between car accidents and the use of mobile phones while driving. The secondary objective was to explore general knowledge and attitudes toward traffic regulations related to cell phone usage while driving. This is a cross-sectional study conducted among 585 drivers in Saudi Arabia using a self-reported online survey distributed through social media channels. Our results showed that 78.6% of the participants acknowledged that they use the phone while driving. The percentage who reported car accidents involving them or their friends or relatives while using the phone while driving was 43.8%, along with 71.8% mentioning near misses. The percentage of respondents who thought that using a mobile phone while driving had a strong impact on the driver's ability to drive was 31.5%. This study highlights the importance of raising awareness about risks of using Mobile phones during driving in Saudi Arabia and it recommends harsher penalties to reduce the use of mobile phones while driving.

Keywords: mobile phones; awareness; driving; Saudi Arabia

1. Introduction

Mobile telephony and Internet services are spreading, and are involved in many aspects of our lives. Saudi Arabia has been documented to be the country with the highest rate of mobile phone users in the world [1]. Several researchers have examined the relationship between the use of mobile phones while driving and risk [2]. The use of mobile phones while driving causes delays in the driver's response to any adverse road conditions, such as braking [3]. Some research has shown that people who use their mobile phones while driving are more than nine times more likely to have traffic accidents [4]. Saudi Arabia has one of the highest rates of traffic accidents in the world; in fact, Saudi Arabia has a special requirement with regard to global guidelines where it was previosly allowed men only to drive.

In the past years, multiple researches have been conducted to study the spread of mobile phone use while driving among their population, especially with regard to age. In Qatar, there is a high rate of mobile phone use while driving (73.2%), which is associated with traffic accidents [2]. In Iran, a study was conducted to measure the rate of cell phone use among drivers and found it to be more noticeable than other countries [5]. In New Zealand, more than 60% of drivers reported that they talk on their cell phones while driving [4] , as did 82% of drivers in Australia [6].

While one study showed no significant difference in performance or risk avoidance while driving between direct use of mobile devices and hands-free handsets, [7] many argue that the use of mobile devices while driving is more dangerous than that of hands-free phones [8]. Another study

assessed the impact of a hands-free mobile phone call versus talking to a passenger, and found that the effect is similarly negative [9].

Given the established relationship between mobile phone use and driving accidents, some countries have begun to restrict the use of mobile phones while driving. In New Zealand, a large percentage (50.1%) of study respondents said that handheld mobile phones should not be allowed to be used while driving; 29.4% said that mobile phones should be completely prohibited while driving, 10.3% supported their use, and 10.2% said that only text messages should be prohibited [4].

In the United States, there is wide support for legislation that bans the use of mobiles while driving, especially among people who do not have a mobile phone [10].

Among university students aged 20–29, who experience higher-than-average mortality in cars, researchers developed a 30-min multimedia presentation about the dangers of reckless driving; longitudinal study showed sustained better driving behavior and more attention as a result [11].

Raising public awareness and promoting health education in communities about the possible risks of mobile phone use while driving is of paramount importance in order to prevent such adverse events of using mobile phones while driving. To the best of our knowledge, there is a few Saudi studies that have measured the actual cell phone use while driving and evaluated attitude and behavior toward mobile phone while driving. Furthermore, assessing whether the use of new alternative technologies related to call phone use while driving will reduce the risk of road traffic accidents has been identified as a major research gap in the literature. In order to address this gap, the primary objective of this study was to valuate attitude and behavior toward mobile phone while driving and measuring the prevalence of actual cell phone use while driving. Other objectives of the study were to find any relationship between mobile use while driving and car accidents; to explore general knowledge of and attitudes toward traffic regulations related to cell phone usage while driving and to assess whether the use of new alternative technologies related to call phone use while driving will reduce the risk of road traffic accidents.

2. Method

This is a cross-sectional study conducted among drivers in Saudi Arabia over a period of 8 months from June 2017 to January 2018. A self-reported online questionnaire was distributed through social media channels. This study included male drivers (as women in Saudi Arabia were in that period banned from driving by law and the ban was officially lifted on 24 June 2018 after finalizing the data), living in Saudi Arabia, aged 18 to 70 years old, who have a valid driver's license and who drive any type of car. People with multiple responses (similar Internet Protocol (IP) addresses), and those with incomplete responses were excluded from the study. The questionnaire prepared for this study consisted of three sections with 24 items, all tested and verified. Section I (items 1 to 7) covers the respondent's demographic data (age, nationality, level of education, current position, city, Type of mobile phone, and driving experience). Section II (items 8 to 15) inquiries about driver behavior while driving. Section III (items 16 to 24) asks about the driver's use of cell phone while driving and its risks and consequences. The average time needed to fill out the questionnaire was between 3 and 5 minutes. Sampling was conducted based on a research study in Qatar, we assumed the ratio of mobile phone use among drivers was 73.2% and by using the "openepi" online program (EPI). The sample size (n) needed for population representativeness was calculated to be 302, with confidence interval of 95% and 5% margin of error. Thus, to be safe the target sample size was adjusted to 350 [2]. Data were imported into SPSS software (v. 20). It was cleaned and coded using Data Entry Clerk software. Data were analyzed using SPSS. Descriptive statistics were conducted: frequencies and percentages for categorical variables and mean and standard deviation (SD) for continuous variables. Analytic statistics were conducted: chi-squared (χ^2) test to assess differences between categorical variables. Statistical significance was set to 0.05 or less. Ethical clearance was obtained from the King Abdullah International Medical Research Center (KAIMC) Institutional Review Board (IRB) in Riyadh and ethics committee permission and participation in the research was considered as consent. Privacy and confidentially were strictly protected, and no personal identifiers or information were collected or stored.

3. Results

3.1. Description of Study Population

Out of 850 respondents who were approached for the study, 585 met the inclusion criteria and enrolled, giving a response rate of 68.82%. Saudi Arabian citizens accounted for 95.2% of the total. Most of the participants had a bachelor's degree (63.8%) (Table 1). With regard to driving experience, there is no priority for any age group.

Table 1. General characteristics of study participants.

		No.	%
Age	18–24	256	9.5
	25–34	279	47.7
	35–44	146	25
	45–54	69	11.8
	55–64	30	5.1
	65 and more	5	0.9
Nationality	Saudi	557	95.2
	Non-Saudi	28	4.8
Education	Less than secondary	2	0.34
	secondary	86	14.70
	Bachelors	375	64.10
	Higher education	122	20.85
Occupation	Students	52	8.9
	Employees	458	78.3
	Retired	26	4.4
	Unemployed	18	3.1
	Freelancers	31	5.3
Driving years of experience	Less than 5	18	3.1
	5–10	138	23.6
	11–15	138	23.6
	16–20	107	18.3
	21–25	60	10.3
	26–30	58	9.9
	More than 30	66	11.3

3.2. The Behavior of Drivers while Driving

Our data show that many activities were practiced while driving, such as drinking (79.1%), mobile use (78.6%), eating (59.1%), listening to radio (56.4%) and exceeding the speed limit (34.1%).

Of those who used mobile phones while driving, many participants engaged in voice calls (88.4%), checked maps (59.5%), sent text messages (46.7%), used social media (about 39%), took photos (28.5%), watched videos (28.4%), played games (3.6%), or did other activities on their phones (3.8%). However, 9.2% of respondents put their phones in a place that could not be reached while driving and 29.1% of responded have fixed a place to put their mobile phone. Of the participants, (28.2%) used their phones only in emergency conditions and (71.8%) were use it in regular cases. As for the status of the vehicle while using the phone, 42.9% of the drivers use their mobile phones when the vehicle was parked, (61.5%) when it was stopped at a traffic signal, (39.4%) when driving at traffic, (33%) when driving at smooth road, and (41.9%) in all cases. Only (57.7%) of the respondents used the phone while driving alone, while 3.1% of the participants used it while diving with others in the car and 42.2% of drivers used it in both cases.

3.3. Perception and Awareness

The percentage of drivers who were aware of local law regarding using mobile phones while driving was about 84%, so that around 16% were not aware. The percentage of drivers who perceived

a strongly agree risk in using mobile phones while driving was 82.1%, while (17.1%) of them agree only, and (0.5%) disagree and (0.3%) strongly disagree. Of 79% participants were trying to stop use mobile phone while driving. Drivers who agree strongly that they need to stop the car aside to use their mobile phone were about 60.9% and (33.2%) agree, While (4.8%) don't agree. And (1.2%) strongly disagree. Further, 21.2% of the participants think car accidents can help them to reduce the use of mobile phone while driving, and 25.1% thought that new technology to ease communication would contribute to reducing the use of mobile phones while driving. Several participants believed the application of severe punishment would help a lot (21%), and those who believe that public awareness should increase, about 25.5%. Only 7.5% of respondents said their habits would not change. With regard to technologies that could help reduce the use of mobile phones while driving, they mentioned Bluetooth (42.4%), GPS (42.1%), smart display (17.6%) and cruise control (37.6%).

3.4. Outcomes of Using Mobile Phone while Driving

The percentage of respondents who thought that using a mobile phone while driving had a strong impact on the driver's ability to drive was 31.5%, while 59% believed their driving ability was affected slightly and 9.6% responded that the use of a mobile phone did not affect their driving ability. The percentage who reported car accidents involving them or their friends or relatives while using the phone while driving was 43.8%, along with 71.8% mentioning near misses and 15.9% had a Penalty with a Ticket because of using mobile phone while driving.

Table 2 shows a significant correlation between the driver's awareness of the risk of using the phone while driving and trying to stop using it ($p < 0.05$); there were no statistically significant correlations with other factors. In addition, as shown in Table 3, it is clear that the frequency of using a mobile phone has a significant relationship with the driver's driving ability. There is also a significant correlation between phone use in normal conditions or in emergency drivers driving ability ($p < 0.05$). Finally, there is a significant correlation between stopping at traffic signals and the impact of mobile use on drivers' ability to drive ($p < 0.05$). Other factors have no significant correlation ($p > 0.05$).

Table 2. Factors associated with drivers attempt to stop using mobile phone while driving.

	Trying to Stop Using Phone while Driving		
	Yes	**No**	***p* Value**
Local law			
Yes	391 (84.6%)	100 (81.3%)	0.223
No	71 (15.4%)	23 (18.7%)	
Danger			
Strongly Agree	395(85.8%)	85 (69.1%)	
Agree	65 (14.1%)	35 (25.5%)	0.00
Disagree	2 (0.4%)	11 (0.8%)	
Strongly disagree	0 (0%)	2 (1.6%)	
Accidents			
Yes	207 (55.2%)	74 (60.2%)	0.188
No	255 (55.2%)	35 (28.5%)	
Impending accidents			
Yes	332 (71.9%)	88 (71.5%)	0.513
No	130 (28.1%)	35 (28.5%)	
Traffic violation Tickets			
Yes	72 (15.6%)	21 (17.1%)	0.390
No	390 (84.4%)	102 (82.9%)	
Other Screaming at you			
Yes	136 (29.4%)	40 (32.5%)	0.289
No	326 (70.6%)	83 (67.5%)	

Table 3. Attributable factors that affecting the driver's ability to drive.

	Effect of Using Mobile Phone on Driving			
	Strongly Affect	**Slightly Affect**	**No Effect**	***p* Value**
Phone use frequency				
Rarely	71 (38.6%)	88 (25.5%)	23 (41.1%)	0.00
Sometimes	74 (40.2%)	200 (58%)	16 (28.6%)	
Always	39 (21.2%)	57 (16.5%)	17 (30.4%)	
Putting phone in unreachable place while driving				
Yes	26 (14.1%)	22 (6%)	6 (10.7%)	0.12
No	158 (85.9%)	323 (93.6%)	50 (89.3%)	
Fix the phone to the windscreen or dashboard				
Yes	57 (31%)	101 (29.3%)	12 (21.4%)	0.383
No	127 (69%)	244(70.7%)	44 (78.6%)	
Phone using Circumstance				
Emergency	68 (37%)	81 (23.5%)	16 (28.6%)	0.005
Normal cases	116 (63%)	264 (76.5%)	40 (71.4%)	
Conditions when phone uses while driving				
Alone	96 (52.2%)	199 (57.7%)	25 (44.6%)	0.143
With others in the car	9 (4.9%)	8 (2.3%)	1 (1.8%)	
in both cases	79 (42.9%)	138 (40%)	30 (53.6%)	
Vehicles status when using phone mobile Standstill				
Yes	86 (46.7%)	142 (41.3%)	23 (41.1%)	0.447
No	98(53.3%)	203 (58.8%)	33 (58.9%)	
Stopping at Traffic signal				
Yes	107 (58.2%)	228 (66.1%)	25 (44.6%)	0.05
No	77 (41.8%)	117 (33.9%)	31 (55.4%)	
Moving in traffic				
Yes	78 (42.6%)	137 (39.7%)	15(26.8%)	0.103
No	105(57.4%)	208 (60.3%)	41 (73.2%)	
Moving within the regular speed limit				
Yes	55 (29.9%)	123 (35.7%)	15 (26.8%)	0.237
No	129 (70.1%)	222 (64.3%)	41(73.2%)	

3.5. Predicting Mobile Use while Driving

Many parameters, such as age, nationality, education, occupation, type of phone, and years of driving experience, were introduced in the logistic regression analysis. Age and education were significant as predictors for mobile use while driving. See Table 4.

Table 4. The expectation of using mobile phone while driving.

Factors	B	S.E.	Wald Test	*p* Value	OR (95% CI)
age	−0.084-	0.025	11.310	0.001	0.920(0.876–0.966)
Education	0.705	0.165	18.127	0.000	2.023(1.463–2.798)
Nationality	−0.240-	0.452	0.282	0.595	0.787(0.325–1.907)
Position	0.205	0.142	2.067	0.151	1.227(0.928–1.621)
Experience	0.037	0.025	2.168	0.141	1.038(0.988–1.090)

4. Discussion

The use of mobile phones while driving is increasing dramatically all over the world. In this study, the rates of mobile use while driving showed a record-high percentage (78.6%) among drivers in Saudi Arabia. On the other hand, El Bcheraoui et al., in 2014, studied risky driving patterns among Saudis and found that 81.2% of drivers reported using a cell phone while driving, supporting our

participant suggestion that traffic law enforcement needs to become stricter on this point [12]. Despite the benefits of using mobile phones in cars, such as making emergency calls and reporting road accidents or serious situations [13], the risk of accident is also increased by up to 4 times even for a short call [2]. In an experimental study about the effect of mobile phone conversations on drivers' reaction time in braking response, mobile call duration was the most important factor increasing reaction time [14]. Our study showed that most users of mobile phones while driving are middle-aged, with great differences among age groups. This result is different from Pratt et al. (2014) and other studies that found the highest range of mobile use in younger drivers, suggesting a busy lifestyle [15,16]. It also differs from Piner et al. (2010) and Huth et al. (2015), which showed no significant difference by age [2,17]. Regarding driving experience, our study failed to show any relationship between years of driving experience and use of a cell phone. This finding, along with the high overall rate of mobile phone use while driving in Saudi Arabia, suggests that this behavior is socially acceptable in general. Although a high proportion of the population use their mobile phones for a range of activities, phone calls were the most common mobile phone use while driving, and may be particularly distracting [17]. Most respondents used their mobile phones normally, not only in emergencies, and 39.3% did so when driving a moving car in traffic, which is a major safety issue. On the other hand, our study has shown that other activities can also distract the driver and affect his performance, such as eating and drinking. Some studies have shown that visual or manual performance of other activities, such as car radios, also affects driving performance, especially with less experienced drivers [17,18]. The results also supported Solman et al. (2004), which expressed increased awareness of mobile phone use while driving among the population [3].

Unfortunately, this awareness did not reduce the frequency of the habit [3]. However, most respondents did try to stop using their mobile phone while driving, using various techniques such as placing the mobile phone in an inaccessible location. In addition, there was a strong correlation between awareness of the dangers of mobile phone use while driving and attempts to stop using them. Most respondents were aware of local law and penalties for using a cell phone while driving, but this knowledge did not reduce the habit. This finding contrasts with the Carpenter et al., report of 2015, which showed the reduction of mobile phone using while driving as the result of a ban in Canada [19]. In addition, text-message blockers in the United States have reduced text messages while driving among high school drivers [20], while the Finnish Labor Free Phone Law reduced the use of handsets and mobile phones while driving [21], even though it did not change the attitude of ordinary telephone users while driving [22]. Our study showed that 31.5% of respondents believe that the use of mobile phones while driving severely affects their performance, while 59% reported a slight effect; this is consistent with Kim's report (2013) and others [23].

Different effects of use of mobile phones while driving have been reported in a variety of studies, such as delayed reactions to changes Roads [24,25]. Made a very important decision to stop the decisions [26], crossing red signals [2] and deteriorating road control [27]. On the other hand, 9.6% of respondents said that there is no effect of mobile phone use while driving on driving ability; this may be related to long driving experience with frequent use of the mobile phone, which has been shown to reduce incidents [28]. Many respondents reported car accidents or near misses experienced by them or their friends or relatives when using the phone while driving. These results are higher than those found by Seo et al. (2004) [29]. The present findings support the results of several studies that have shown a significant correlation between the use of cell phones and car accidents [3,30].

There were some limitations to this study. First, the use of self-report could give rise to bias. Second, we were not able to include female drivers in our study as long as they were prohibited from driving in Saudi Arabia at the time of conducting the study and the ban was officially lifted on 24 June 2018 after collecting the data and future research should be conducted among both males and females.

5. Conclusions

In conclusion, based on our analysis, the frequency of cell phone use while driving is very high among drivers in Saudi Arabia, especially among the more educated and despite their recognition of

the risk and familiarity with the laws and penalties. Drivers suggest introducing new technology to help them control their use of mobile phones and increase awareness of the risks of using mobile phones while driving. After conducting this research, we recommend the following. First, policymakers should focus on raising awareness and also making penalties stronger. Second, the Ministry of the Interior should be involved, because it has a key role in restricting and enforcing laws to limit the use of phones while driving. Third, the Ministry of Health can also play a key role, by strengthening community medical department and involving them in promoting health education in communities about the risks of mobile phone use while driving. Forth, the Ministry of Education should be involved, by educating school-age students about desirable behaviors and the dangers of using phones while driving. Fifth, the Ministry of Information can play a major role by promoting visual media for television, radio, and social media about the dangers of mobile phone use while driving and how to prevent it.

Author Contributions: Conceptualization, Marwah Abdullah , Najlaa Alsubeeh and Mashael Alhassan ; Methodology, Marwah Abdullah , Najlaa Alsubeeh and Mashael Alhassan ; Software, Marwah Abdullah , Najlaa Alsubee; Validation, Marwah Abdullah , Najlaa Alsubeeh; Formal Analysis, Marwah Abdullah , Najlaa Alsubeeh ; Investigation, Marwah Abdullah , Najlaa Alsubeeh; Resources, Marwah Abdullah , Najlaa Alsubeeh.; Data Curation Marwah Abdullah , Najlaa Alsubeeh; Writing – Original Draft Preparation, Marwah Abdullah , Najlaa Alsubeeh and Mashael Alhassan; Writing – Review & Editing, Marwah Abdullah , Najlaa Alsubeeh ; Visualization, Marwah Abdullah , Najlaa Alsubeeh and Mashael Alhassan.; Supervision, Marwah Abdullah and Najlaa Alsubeeh; Project Administration, Marwah Abdullah , Najlaa Alsubeeh and Mashael Alhassan.

Funding: This research received no external funding.

Acknowledgments: A lot of thanks and appreciation to Imad Abdulmajeed and Maha Alfarrah for their guidance, encouragement, and support, in carrying out this project work. We also wish to express our gratitude to Hind Al-Shatry, Research Coordinator, for her technical and administrative support.

Conflicts of Interest: The author reports no conflict of interest in this work.

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