

Mobile phone use while driving: Prevalence, task management strategies, risk perception and attitude among Qassim University students

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ABSTRACT

Background: Globally, motor vehicle accidents (MVAs) cause around 1.35 million deaths annually. Distracted driving, a risk factor for MVA, includes diversion of attention from driving because of use of mobile phone. **Objectives:** The aim of this study was to determine prevalence of mobile phone use and to explore task management strategies, risk perception and attitude towards mobile phone use while driving among Qassim University students. **Methods:** An online cross-sectional survey among 212 randomly selected medical ($n = 83$) and engineering students ($n = 129$) of Qassim University, Saudi Arabia, through semi-structured, self-administered questionnaire, designed using Google forms. The survey was conducted from February to March 2020. **Results:** The overall prevalence of mobile phone use while driving was 93.4% (medical students: 96.4%; engineering students: 91.5%). Around 49.5% participants 'often' or 'always' used mobile phone while driving. Among task management strategies, 169 (79.7%) participants were 'likely' or 'very likely' to lower their driving speed while 90 (42.5%) were 'likely' or 'very likely' to increase control over the steering while using mobile phone during driving. Regarding risk perception, 173 (81.6%) participants thought that they were 'unlikely' or 'very unlikely' to have MVA on looking at phone continuously for more than 2 s, and 185 (87.3%) participants thought that they were 'unlikely' or 'very unlikely' to have MVA by texting or browsing while driving. Thirty-six (17%) participants reported MVA because of distraction by mobile phone use while driving. **Conclusion:** High prevalence of mobile phone use during driving and low perceived risk of experiencing MVA because of mobile phone use was found among Qassim University students. Creating awareness on risks of mobile phone use while driving is recommended.

Keywords: Mobile phone, Qassim, risk perception, Saudi Arabia, task management

Introduction

A motor vehicle accident (MVA) is one of the main causes of death, physical and psychological injury. Also, it has an impact on the financial status of the individual and the country. In 2016, WHO reported around 1.35 million deaths due to MVA globally and ranked these accidents as the 8th leading cause of death among all ages. In Saudi Arabia, there were over 9,000 fatalities

with a rate of 28.8 deaths per 100,000 population in 2016.^[1] More than 500,000 MVAs were reported in 2016 in comparison to 200,000 MVA recorded in 2006.^[2] This sharp increase in MVAs during 10 years, can be attributed to change in lifestyle including increasing number of cars in Saudi Arabia.^[3]

One of the important risk factors for MVAs is distracted driving.^[4] Any activity that takes away attention from safe driving results in distracted driving. Talking or texting on mobile phone are included among the activities causing distracted driving.^[5] In Saudi Arabia, around 42.5 million mobile phone subscriptions were reported at the end of 2018^[6] which reflects the rampant

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use of mobile phones in Saudi population. However, only few studies are conducted in Saudi Arabia to measure the prevalence of distracted driving due to mobile phone use. A study in Saudi Arabia found that 95% of the participants were using a cell phone while driving.^[7] It is reported that the likelihood of MVAs increased 8 times when a mobile phone was used while driving.^[8] Another study conducted among university students in Saudi Arabia found that 44.6% of the students had a motor vehicle accident in the last 6 months; among these 37.9% of the accidents were attributed to the use of the mobile phone.^[9]

6 months; among these 37.9% of the accidents were attributed to the use of the mobile phone.^[9] To design effective preventive measures, it is important to explore the risk perception, attitude and behavior toward cell phone usage while driving. However, on this important aspect of public health, there is dearth of literature generally, and in Saudi Arabia specifically. Thus, the current study was designed to determine prevalence of mobile phone use while driving and to explore attitude, risk perception and task management strategies towards the mobile phone use while driving among Qassim university students in Saudi Arabia. Moreover, the study also compared the medical and engineering students on the above-mentioned aspects of mobile phone use while driving.

Subjects and Methods

An online cross-sectional survey was conducted among medical and engineering students in Qassim University, Saudi Arabia. For a total number of 500 engineering students and 185 medical students, email addresses were selected by systematic random sampling. A total of 240 invitations (140 for engineering students and 100 for medical students) were sent. The survey was conducted during February-March, 2020. Approved by Qassim Region Research Ethics Committee (QREC) “1440-1411763 on Monday, March11, 2019.

Data were collected online by semi-structured, self-administered questionnaire using Google forms. The questionnaire collected information about demographic data, mobile phone use while driving, task management strategies, risk perception and attitude of the participants towards mobile phone use while driving. The participants rated the statements regarding task management strategies and risk perception on a Likert scale of 1–5, where 1 indicated ‘very unlikely’ and 5 indicated ‘very likely’. Five-point Likert scale, ranging from ‘strongly disagree’ to ‘strongly agree’ was used for attitude statements. For calculation of total attitude scores, the negative statements were reversed. Thus, higher attitude scores indicated a careful and positive attitude towards mobile phone use while driving.

Data were imported from Google forms and analyzed using SPSS statistical software Version 27. Data were analyzed using both descriptive and inferential statistics. Descriptive statistics were calculated as frequencies and percentages for categorical variables, while mean and standard deviation (SD) were calculated

for quantitative variables. For inferential statistics, the Chi-square test, independent sample *t* test, and one-way ANOVA tests were used to determine significant statistical difference. A significant difference was accepted at a *P* value less than 0.05

Results

Of 240 invited students, 212 including 83 from the College of Medicine and 129 from the College of Engineering, responded to the survey. Thus, the response rate of the survey was 88%. The mean age of the participants was 22.1 (± 1.8) years with a minimum of 19 years and a maximum of 27 years. Most of the participants, 41% from Medical College and 38% from Engineering college, were driving for 2–4 years after getting driving license. Almost all ($n = 211$) participants had been driving during last six months [Table 1].

Among the total 212 participants, 198 reported using mobile phone while driving, resulting in the overall prevalence of 93.4%. Among the medical students the prevalence was 96.4% (80/83) while it was 91.5% (118/129) among Engineering students. The phone types used by the participants were hand held ($n = 138$, 65.09%) and hand free ($n = 60$, 28.30%) [Figure 1].

On exploring the frequency of use of a hand-held mobile phone while driving, the handheld phone was used ‘often’ or ‘always’ by 41 (49.4%) medical students and 64 (49.6%) engineering students. On the other hand, 19.28% of medical students and 15.5% of engineering students answered that they ‘never/occasionally’ used the mobile phone while driving [Figure 2].

Table 2 shows participants’ task management strategies for mobile phone use while driving. A total of 169 (79.7%) participants including 69 (85.2%) from medical college and 100 (80%) from Engineering college were likely or very likely to lower their driving speed while using mobile phone during driving. On the other hand, only 37 (46.3%) students from medical college and 53 (42.4%) from engineering college stated that it is likely or very likely that they would increase control over the steering while using mobile phone during driving.

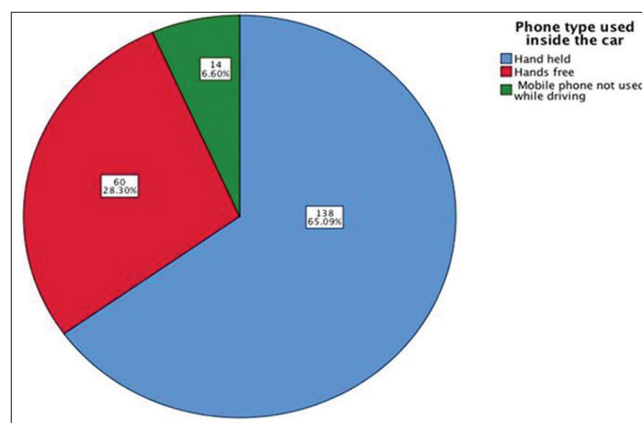


Figure 1: Phone types used inside the car by the study participants

Table 3 shows the participant's attitude towards talking on mobile phone while they drove. A total of 81 (38.2%) participants 'agreed' to the statement that the effect of talking on mobile phone while driving is very minor. Among engineering college students, 58 (45%) participants 'disagreed' that the effect of talking on mobile phone while driving is very minor. However, more than half (53%) of the participants

from medical collage 'agreed' that the effect of talking on mobile phone while driving was very minor. Responding to the statement that the person talking on the mobile phone while driving is the only person at risk, 123 (58.0%) participants agreed to the statement; higher proportion of medical students [59 (71.1%)] as compared to the engineering students [64 (49.6%)] agreed to the statement. Around half of the participants, each from medical college (51.8%) and engineering college (48.8%) disagreed that the distraction effect would last after finishing the call. 51.8% of the medical students and 33.3% of the engineering students thought that for them talking on mobile phone while driving was completely safe as they were very careful while talking.

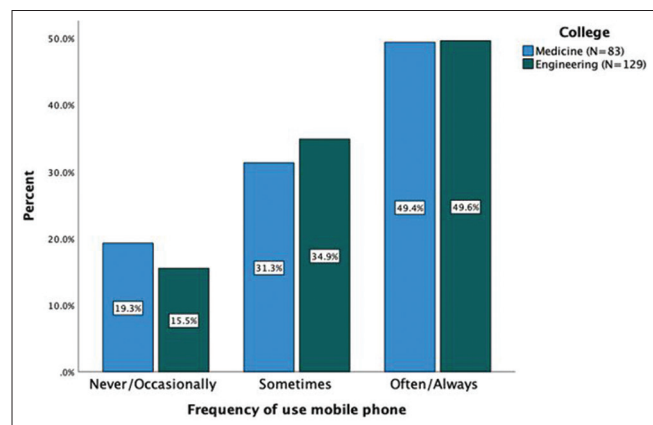


Figure 2: Frequency of use of a hand held mobile phone while driving among the students

Participants' opinion about probability to have MVA when they are using mobile phone while driving was explored [Table 4]. A total of 100 participants (medical, $n = 36$, engineering, $n = 64$) had the opinion that they were 'likely' or 'very likely' to have an accident when they are recording a voice message. On the other hand, 173 (81.6%) participants thought that they were 'unlikely' or 'very unlikely' to have MVA when they are looking at phone continuously for more than 2 s. In addition, 185 (87.3%) participants (medical $n = 75$, engineering $n = 110$) had the opinion

Table 1: Demographic characteristics of study participants

	Medical College n (%)	Engineering College n (%)	Total n (%)
Age			
19-21 years	35 (42.2%)	52 (40.6%)	87 (41.2%)
22-24 years	37 (44.6%)	63 (49.2%)	100 (47.4%)
25-27 years	11 (13.3%)	13 (10.2%)	24 (11.4%)
Total	83 (100%)	128 (100%)	211 (100.0%)
Academic year:			
1 st year	20 (24.1%)	3 (2.3%)	23 (10.8%)
2 nd year	14 (16.9%)	28 (21.7%)	42 (19.8%)
3 rd year	18 (21.7%)	36 (27.9%)	54 (25.5%)
4 th year	10 (12%)	32 (24.8%)	42 (19.8%)
5 th year	21 (25.3%)	30 (23.3%)	51 (24.1%)
Total	83 (100%)	129 (100%)	212 (100.0%)
Duration of driving Prior to getting license			
≤2 Years	38 (45.8%)	76 (59.4%)	114 (54.0%)
>2-4 Years	31 (37.3%)	31 (24.2%)	62 (29.4%)
>4 Years	14 (16.9%)	21 (16.4%)	35 (16.6%)
Total	83 (100%)	128 (100%)	211 (100.0%)
Duration of driving after getting license:			
≤2 years	15 (18.1%)	24 (18.6%)	39 (18.4%)
>2-4 Years	34 (41%)	49 (38%)	83 (39.2%)
>4-6 Years	18 (21.7%)	44 (34.1%)	62 (29.2%)
>6 Years	16 (19.3%)	12 (9.3%)	28 (13.2%)
Total	83 (100%)	129 (100%)	212 (100.0%)
Driving during last 6 months			
Yes	83 (100%)	128 (99.2%)	211 (99.5%)
No	0	1 (.8%)	1 (0.5%)
Total	83 (100%)	129 (100%)	212 (100.0%)
Duration of driving (Hours/week):			
≤10 h/week	66 (79.5%)	75 (58.1%)	141 (66.5%)
>10 h/week	17 (20.5%)	54 (41.9%)	71 (33.5%)
Total	83 (100%)	129 (100)	212 (100.0%)

Table 2: Participant's task management strategies for mobile phone use while driving

When you are using your mobile phone while driving, how likely is it that you would	Medical college			Engineering College		
	Very unlikely/unlikely n (%)	Uncertain n (%)	Likely/very likely n (%)	Very unlikely/unlikely n (%)	Uncertain n (%)	Likely/very likely n (%)
Lower your driving speed	1 (1.2%)	11 (13.6%)	69 (85.2%)	10 (8%)	15 (12%)	100 (80%)
Total		81 (100%)			125 (100%)	
Increase your distance from the vehicle in front	1 (1.2%)	14 (17.1%)	67 (81.7%)	13 (10.4%)	19 (15.2%)	93 (74.4%)
Total		82 (100%)			125 (100%)	
Scan the environment more often:	11 (13.4%)	23 (28%)	48 (58.5%)	23 (18.4%)	29 (23.2%)	73 (58.4%)
Total		82 (100%)			125 (100%)	
Increase the control over the steering	20 (25%)	23 (28.7%)	37 (46.3%)	34 (27.2%)	38 (30.4%)	53 (42.4%)
Total		80 (100%)			125 (100%)	
Keep your mobile phone low (e.g. in lap or on passenger seat) for avoiding police	12 (14.6%)	13 (15.9%)	57 (69.5%)	22 (17.6%)	18 (14.4%)	85 (68%)
Total		82 (100%)			125 (100%)	

Table 3: Participant's attitude towards talking on mobile phone while driving (n = 212)

	Medical college (n=83) n (%)	Engineering College (n=129) n (%)	Total n (%)
The effects of talking on mobile phone while driving are likely to be only very minor			
Strongly agree/Agree	44 (53%)	37 (28.7%)	81 (38.2%)
Neutral	16 (19.3%)	34 (26.4%)	50 (23.6%)
Disagree/Strongly disagree	23 (27.7%)	58 (45%)	81 (38.2%)
Total	83 (100.0%)	129 (100.0%)	212 (100.0%)
The only people at risk are those who are talking on mobile while driving			
Strongly agree/Agree	59 (71.1%)	64 (49.6%)	123 (58.0%)
Neutral	11 (13.3%)	27 (20.9%)	38 (17.9%)
Disagree/Strongly disagree	13 (15.7%)	38 (29.5%)	51 (24.1%)
Total	83 (100.0%)	129 (100.0%)	212 (100.0%)
Any distraction effects by talking on mobile phone while driving will last even after finishing the talk			
Strongly agree/Agree	17 (20.5%)	25 (19.4%)	42 (19.8%)
Neutral	23 (27.7%)	41 (31.8%)	64 (30.2%)
Disagree/Strongly disagree	43 (51.8%)	63 (48.8%)	106 (50.0%)
Total	83 (100.0%)	129 (100.0%)	212 (100.0%)
Presence of law enforcement and risk of a fine will prevent me from talking on mobile phone while driving			
Strongly agree/Agree	14 (16.9%)	15 (11.6%)	29 (13.7%)
Neutral	12 (14.5%)	33 (25.6%)	45 (21.2%)
Disagree/Strongly disagree	57 (68.7%)	81 (62.8%)	138 (65.1%)
Total	83 (100.0%)	129 (100.0%)	212 (100.0%)
For me, talking on mobile phone while driving is completely safe because I am generally extra careful			
Strongly agree/Agree	43 (51.8%)	43 (33.3%)	86 (40.6%)
Neutral	20 (24.1%)	37 (28.7%)	57 (26.9%)
Disagree/Strongly disagree	20 (24.1%)	49 (38%)	69 (32.5%)
Total	83 (100.0%)	129 (100.0%)	212 (100.0%)

that it was 'unlikely' or 'very unlikely' to have an accident when they are texting or browsing while driving [Table 3].

A total of 36 (17%) participants reported MVA because of distraction by mobile phone use while driving. Of these 36 participants, 3 (8.3%) had to get admitted to the hospital as a consequence of the accident. Nine (25%) participants reported injuries as a result of accident. Among the type of injuries

suffered by those who had an accident, 5 reported bruises, 3 suffered from cuts while 1 participant had a fracture.

Of a total attitude score of 25, participants' mean attitude score towards talking on mobile phone while driving was 15.36 ± 2.78 with a minimum of 8 and a maximum of 22. The higher scores reflected a careful attitude towards mobile phone use while driving. For medical students, the mean attitude score (16.3 ± 2.77)

Table 4: Perceived crash risk of the participants for various tasks related to mobile phone use (n = 212)

	Medical college (n=83) n (%)	Engineering College (n=129) n (%)	Total n (%)
In your opinion, how likely are you to have a crash if you are using a mobile phone for...			
A recorded voice message			
Very unlikely/Unlikely	22 (26.5%)	30 (23.3%)	52 (24.5%)
Uncertain	25 (30.1%)	35 (27.1%)	60 (28.3%)
Very Likely/Likely	36 (43.4%)	64 (49.6%)	100 (47.2%)
Total	83 (100%)	129 (100%)	212 (100.0%)
Texting/browsing			
Very unlikely/Unlikely	6 (7.2%)	110 (85.3%)	185 (87.3%)
Uncertain	2 (2.4%)	15 (11.6%)	21 (9.9%)
Very Likely/Likely	75 (90.4%)	4 (3.1%)	6 (2.8%)
Total	83 (100%)	129 (100%)	212 (100.0%)
Looking at the phone continuously for >2 sec			
Very unlikely/Unlikely	12 (14.5%)	102 (79.1%)	173 (81.6%)
Uncertain	0	23 (17.8%)	35 (16.5%)
Very Likely/Likely	71 (85.5%)	4 (3.1%)	4 (1.9%)
Total	83 (100%)	129 (100%)	212 (100.0%)
Answering a ringing phone			
Very unlikely/Unlikely	19 (22.9%)	42 (32.6%)	75 (35.4%)
Uncertain	31 (37.3%)	42 (32.6%)	61 (28.8%)
Very Likely/Likely	33 (39.8%)	45 (34.9%)	76 (35.8%)
Total	83 (100%)	129 (100%)	212 (100.0%)

towards talking on mobile phone while driving was higher as compared to the engineering students (14.75 ± 2.61). This difference was statistically significant at $P < 0.0001$. Similarly, the mean scores were significantly different among the academic years ($p < 0.006$). The mean attitude scores had significant statistical association with frequency of talking ($p = 0.001$) and frequency of texting ($p = 0.046$). The participants who were talking or texting 'never/occasionally' had the highest attitude scores while those doing it 'often/always' had the lowest mean attitude scores [Table 5].

Discussion

Our study explored the prevalence of mobile phone use, task management strategies, risk perception and attitude towards mobile phone use while driving among university students. In our study, the mean age of the participants was 22.1 (± 1.8), which is similar to the participants in another study conducted among university students in Saudi Arabia in which the mean age of the participants was reported as 21.29 (± 1.76) years.^[10] An interesting finding in our study was more than half (53.8%) of the participants had been driving for around 2 years before getting driving license. This can be explained by the cultural norms and acceptance of the community of driving before acquiring driving license. Most of the participants in the present study were driving for 10 or less hours per week. Similar driving hours are reported in a study from Australia where 40.3% of the participants were driving for 6-10 hours per week.^[11]

Our study indicated a high prevalence (93.4%) of mobile phone use while driving among university students. High prevalence of mobile phone use is also reported by other studies in Saudi Arabia; a

prevalence of 93%^[9] in Riyadh and 90%^[10] in Jeddah is documented. Internationally, a study from California, USA, reported a prevalence of 90% of talking and texting on mobile phone while driving.^[12] In contrast, some studies have reported lower prevalence of mobile phone use while driving as compared to our study. The prevalence of mobile phone use while driving was reported as 66.6% in Bandung Indonesia,^[13] 52% in Canada^[14] and 49% in Australia.^[11]

In the present study, majority of the participants were using handheld mobile phone while driving leading them to increased risk of distracted driving. Similarly, a high percentage is reported by Al-Jasser^[8] as 93% of the students used handheld and 7% used hands-free mobile phone while driving. In Bandung, Indonesia, 45.1% used hand held mobile phone during driving,^[13] and 35.5% of the study participants were reported to use it while driving in Canada.^[14]

The frequency of use of a hand held mobile phone while driving was 'often' or 'always' by almost half ($n = 105$) of the total study participants in our study. In contrast, a study from the United Kingdom, reported that 19.6% of the participants used a handheld mobile phone while driving.^[15] This difference may be explained by the difference in level of awareness among the two study populations about the risk involved in mobile phone use while driving.

Lowering motor vehicle speed for mobile phone use while driving is a common task management strategy reported in various studies.^[11,16] The current study found that around 20% of participants from engineering college and 12% of participants from medical collage were unlikely or very unlikely to lower their speed if they were using mobile phone while driving. Similarly, a

Table 5: Association of participants' demographic characteristics with attitude toward talking on mobile phone while driving

Demographic characteristics		Attitude toward talking	
		Mean Score±SD	Statistics and P
College	Medical (n=83)	16.3±2.77	t=4.11, P<0.0001
	Engineering (n=129)	14.75±2.61	
Age group (years)	19-21 (n=87)	15.6±2.7	F=2.52, P=0.083
	22-24 (n=100)	15.4±2.8	
	25-27 (n=24)	14.2±2.6	
Academic year	1 st (n=23)	15.40±3.10	F=3.911, P<0.006
	2 nd (n=42)	16.50±2.02	
	3 rd (n=54)	18.33±1.28	
	4 th (n=42)	15.60±2.75	
	5 th (n=51)	15.61±3.12	
Duration of driving prior to getting license	≤2 YEARS (n=114)	15.27±2.85	F=0.221, P=0.802
	> 2-4 YEARS (n=62)	15.38±2.72	
	> 4 YEARS (n=35)	15.62±2.69	
Duration of driving after getting license	≤ 2 years (n=39)	15.36±2.69	F=1.023, P=0.384
	>2-4 years (n=83)	15.59±2.78	
	>4-6 Years (n=62)	15.41±2.71	
	>6 Years (n=28)	14.53±3.01	
Driving duration (Hours/Week)	≤10 h (n=141)	15.63±2.8	t=2.030, P=0.802
	>10 h (n=71)	14.19±2.73	
Phone types inside the car	Hands Free (n=138)	15.27±2.63	F=0.18, P=0.836
	Hand held (n=60)	15.5±3.25	
	Don't use mobile phone inside the car (n=14)	15.57±1.91	
Frequency of talking	Never/Occasionally (n=45)	16.42±1.70	F=7.490, P=0.001
	Sometimes (n=79)	15.61±2.51	
	Often/Always (n=87)	14.57±2.86	
Frequency of texting	Never/Occasionally (n=39)	16.13±2.79	F=3.11, P=0.046
	Sometimes (n=68)	15.59±2.63	
	Often/Always (n=104)	14.91±2.82	

substantial proportion of the study participants reported of not increasing control over the steering while using mobile phone during driving. These findings underscore the importance of creating awareness among university students to refrain them from these risky behaviors.

In the present study, the medical students as compared to the engineering students had a better and careful attitude towards talking on mobile phone while driving. A study from USA reported positive attitude towards talking when compared to texting or browsing on mobile phone.^[17]

It is documented that the risk of MVA increases as the driver takes the eyes off the road for more than 2 s.^[11] In our study, the majority of participants thought that they were unlikely or very unlikely to have an accident when looking at their phones continuously for more than 2 s. In contrast, only 10% of the study participants in Australia thought that they were unlikely or very unlikely to have an accident in the same situation.^[11] In the current study, a total of 185 (87.3%) participants had the opinion that it was unlikely or very unlikely to have crashes on texting or browsing while driving. Contrary to this, a similar study in Australia found that only 9% of the study participants had the opinion that they are unlikely to have MVA on texting or browsing during driving.^[11] These finding in our study point

to the need of educating the university students about the risks of mobile phone use while driving.

Our study has some limitations. First, our study included only males aged 18 and above, studying in two colleges of a single city. This limits the generalizability of our study. Second, the study was conducted as an online survey through a self-administered questionnaire. Thus, some of the questions might be misunderstood by the participants. However, the questionnaire was pre-tested and modifications were done according to the comments of the participants. Third, it was a self-reported survey, and the possibility of social desirability bias cannot be ruled out.

In conclusion, our study showed a high prevalence of mobile phone use during driving among Qassim University students in Saudi Arabia. Majority of the participants used handheld mobile phone putting them at higher risk of distracted driving. The participants had a low perceived risk of experiencing MVA because of mobile phone use. Based on the results of our study, we recommend awareness campaigns for university students focusing on risks of mobile phone use while driving. During these campaigns, the students can be advised to use technology, such as turning off cellular data, using Bluetooth or putting the mobile phone on airplane mode while driving. Moreover, strict

law enforcement and fines imposed on those not abiding the law will also deter the students from using mobile phone while driving.

Primary prevention is the cornerstone of primary health care and one of the main responsibilities of primary health-care physicians. Our study provides information about mobile phone use during driving among young adults. This information will help the primary health-care physicians to create awareness and educate the adolescents regarding risks of mobile phone use during driving, leading to safe driving and reduction in accidents due to distracted driving.

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Conflicts of interest

There are no conflicts of interest.

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