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Relationship between mobile phone addiction and driving accidents in two groups of drivers with and without accidents

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Abstract: Today, the use of mobile phones has become a concern due to the advancement of technology. The aim of this study is to investigate the status of mobile phone addiction in drivers of Khuzestan province. The statistical population of the study was 120 drivers who had the experience of accidents and 120 drivers who had no accidents were selected by simple random sampling. In this study, the standard mobile phone addiction questionnaire was used. The results showed that there is a significant difference between the rate of mobile phone addiction of injured and non-injured drivers (P <0.01). There is a significant difference in the rate of mobile phone addiction of accident and non-accident drivers based on the duration of mobile phone use, marital status and their driving history (P <0.05). According to the results, the relationship between cell phone addiction and the occurrence of traffic accidents is obvious.

Keywords: mobile phone addiction; cell phone; traffic accidents; driving; duration of cell phone use; education; distraction; marital status; age; driving experience.

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1 Introduction

According to the World Health Organization (WHO), traffic accidents are the eighth leading cause of death worldwide and the leading cause of death among people aged 5 to 29, and in 2016 it was estimated that 1.35 million people were killed each year due to road accidents and 20 to 50 million people are killed and injured around the world (Organization, 2018). The data show that the average mortality rate is 27.5 per 100,000 people, this risk is three times higher in low-income countries than in high-income countries and the average mortality rate in high-income countries is 8.3 per 100,000 people (Rahmanian et al., 2021). Road accidents have increased among the general population due to the increasing use of vehicles, changing lifestyles and increasing dangerous behaviours (Taravatmanesh et al., 2018).

Iran is one of the countries with the highest number of deaths in road accident statistics; so we still see an increase in deaths due to road accidents in Iran (Taravatmanesh et al., 2015). According to available estimates, this is 5 times higher than the global average, and on average we see more than 70 deaths due to road accidents every day (Farahbakhsh et al., 2018). Road accidents are the most common cause of injury and the second leading cause of death after cardiovascular disease, and impose enormous economic costs on the country, both directly and indirectly (Monsef et al., 2015). The results of Khademi and Moradi's study showed that 73.4% of the victims of traffic accidents are men and the main cause of death was a head injury. Also, most of the victims of accidents are cars and then motorcycles (Entezami et al., 2015).

One of the first steps in studying road traffic accidents is to identify the factors that affect the occurrence of these collisions. Researchers divide the factors affecting the collision into four general categories: human factors, environmental factors, vehicle factors and road factors (Naderi et al., 2021). Studies have shown that human factors are responsible for 93% of accidents, while environmental factors and vehicle factors are effective in 34% and 13%, respectively (Rowe et al., 2015). These results show the importance of the role of human factors in the occurrence of traffic accidents and the need for special attention to this factor. The most important reasons for driving accidents are the behaviour and psychological characteristics of the vehicle driver (Heidaryan et al., 2020).

Driving distractions cause injuries and deaths from road accidents around the world (Stavrinos et al., 2020). According to estimates provided by the National Highway Traffic Safety Administration in 2018, distracted driving accounts for approximately 8% of all fatal crashes and 15% of all fatal crashes (Analysis N.C.F.S.A., 2020). Previous research has shown that distracted driving, in addition to affecting drivers, may harm other road users, such as cyclists and pedestrians (Simmons et al., 2020; Engelberg et al., 2015). However, the exact number of deaths due to distracted driving in Iran is not

known; but in the study of 1000 drivers in Mashhad found that distraction in more than a third of people was involved in at least one accident in the past five years (Kalantari et al., 2019).

Several factors that may distract the driver vary in the complexity and demands of the driver's mental workload (Oviedo-Trespalacios et al., 2016). According to recent studies, the use of mobile phones while driving can be considered one of the main types of distracting driving (Simmons et al., 2016). Although the use of mobile phones is strictly prohibited in most countries, including Iran, a significant proportion of drivers still use mobile phones while driving (Kalantari et al., 2021).

The mobile phone, as the most popular mobile terminal on the internet, has become an essential tool for human life and transformation in it. Globally, 90% of people own a mobile phone, 59% of them are smartphones (Poushter et al., 2018). Mobile phone addiction is considered as an important stimulus in adapting to a variety of psychological and behavioural problems. Users addicted to cell phones may experience severe anxiety, sleep disturbances, stress and depression (Yang et al., 2019; Liu et al., 2017). Therefore, cell phone addiction may be positively associated with psychological distress (Lian et al., 2021). In countries with high road safety performance, such as Australia, studies have shown that one in two drivers engages in activities such as texting or browsing on their cell phones while driving (Oviedo-Trespalacios and Scott-Parker, 2017). In the UK, 22 to 30% of drivers reported engaging in phone calls and video interactions daily (Przepiorka et al., 2018).

Roads of Khuzestan province have been found to be one of the regions with the highest number of accidents and deaths due to road collisions. This issue increases direct costs (such as medical expenses due to accidents and care for the disabled) and indirectly (such as psychological problems and depression in family members, permanent or temporary loss of active workforce). The present study was conducted to investigate the rate of mobile phone addiction in road accident drivers in Khuzestan province.

2 Methods

In this descriptive-survey study, first coordination was done with the traffic police of Khuzestan province and obtaining their consent and ensuring the confidentiality of the information of the participants in the study. The size of the statistical population in this study was more than 2000 drivers in Khuzestan province from September 2020 to August 2021. The statistical population of the study was two groups of male drivers in Khuzestan province who had a history of traffic accidents and no history of traffic accidents. Using Cochran's formula, 120 drivers with a history of accidents and 120 drivers without a history were selected. The data collection tool is a mobile phone addiction questionnaire developed by Sevari (2014) to measure addiction and severe dependence on mobile phones. This questionnaire consists of 13 questions that measure the three factors or components of de-creativity (with 7 questions), inclination (3 questions) and loneliness (3 questions). In this study, cell phone addiction refers to the score that drivers give to 13 questions of the mobile phone addiction questionnaire. The scoring of this questionnaire is based on a 5-point likert scale (never = 1, rarely = 2, sometimes = 3, often = 4, always = 5). The minimum possible score will be 13 and the maximum 65. If the scores of the questionnaire are between 13 and 26, the rate of mobile phone addiction is weak,

between 26 and 39, the rate of mobile phone addiction is moderate and the scores above 39, the rate of mobile phone addiction is very high. In order to evaluate the reliability of this questionnaire, Sevari (2014) used Cronbach's alpha method. According to the findings, Cronbach's alpha of the whole questionnaire was equal to 0.85 and was calculated to be 0.83 for the de-creativity scale, 0.70 for the inclination and 0.70 for the loneliness. In the present study, the obtained information was analysed using descriptive statistics and inferential statistics (comparison test of the mean of two independent populations, ANOVA test). In a descriptive analysis of the frequency distribution table, central indices and dispersion were calculated by using SPSS-22. This study was conducted with the ethics code (IR.ACECR.JDM.REC.1400.030).

3 Results

The sample size in this study included 240 drivers who were divided into two groups of 120 people with and without accidents. It was found that 72 people (30%) had less than 5 years of driving experience and 55 people had 5 to 10 years of driving experience. The majority of the samples (27%) were over 35-years-old (see Table 1).

Table 1 Demographic characteristics (education, driving experience and age) of drivers

Variable		*Frequency*		*P-value*
		Number	*Percentage*	
Education	Diploma and less	71	29.6	0.4
	Associate degree	52	21.7	
	Bachelor	58	24.2	
	Master's degree and higher	59	24.6	
Driving experience	Less than 5 years	72	30	0.04
	Between 5 and 10 years	63	26.3	
	Between 10 and 15 years	50	20.8	
	Over 15 years	55	22.9	
Age (years)	20–25	66	27.5	0.7
	25–30	55	22.9	
	30–35	50	20.8	
	More than 35	69	28.7	

Among the drivers who have experienced the accident, 10 of them have used mobile phones for less than two hours during the day and 68 drivers have used mobile phones for more than 6 hours. The average score of the mobile phone addiction index for drivers who had an accident experience was 45.84 and for drivers who had no accidents were 25.6. There was a significant difference between the rate of mobile phone addiction in an accident and non-accident drivers through the Independent Two Sample Mean Test (P <0.01). Regarding components of the questionnaire, the de-creativity index in drivers with accidents is 29.91, the inclination index is 7.9 and the loneliness index is 8.02 (see Table 2). According to the Kolmogorov-Smirnov test, the distribution of data in independent and dependent variables is normal.

Table 2 Comparison of mean and standard deviation of mobile phone addiction components in accident and non-accident groups

	Mean ± standard deviation		*P-value*
	Drivers without accident	*Accident drivers*	
Mobile phone addiction	25.6±4.18	45.84±3.68	*P*<0.01
De-creativity	13.04±3.9	29.91±3.3	
Inclination	0.78±0.037	7.9±0.89	
Loneliness	4.55±1.2	8.02±0.81	

There was a significant difference between the rate of mobile phone addiction and mobile phone use during the day in the two groups of drivers (P = 0.04). However, in the ANOVA test, the level of significance between mobile phone addiction and their average age and level of education was more than 5%, which was not significantly correlated (see Table 3). Significantly, mobile phone addiction and driving experience were associated with accident drivers (P = 0.04). This means that drivers with a history of traffic accidents and mobile phone addiction have less history of driving. Also, there was a significant relationship (P = 0.005) between the mobile phone addiction of drivers who had an accident and those who did not have an accident based on their marital status.

Table 3 Characteristics of drivers in both accident and non-accident groups

		Frequency (Percentage)		*P-value*
		Accident drivers	*Drivers without accident*	
Duration of cell phone use during the day	Less than 2 hours	10 (8)	80 (66)	0.04
	2 to 4 hours	27 (22)	30 (25)	
	4 to 6 hours	15 (12)	5 (4)	
	More than 6 hours	68 (56)	5 (4)	
Marital status	Single	26	21	0.005
	Married	94	99	

4 Discussion

This study was conducted to investigate mobile phone addiction and its relationship with the experience of traffic accidents in drivers in Khuzestan province. The index of mobile phone addiction in two groups of 120 drivers with and without accidents is 45.84 and 25.6, respectively. This difference shows a significant relationship between the groups measured and therefore introduces mobile phone addiction as an effective factor in the occurrence of traffic accidents.

Kalantari et al. (2021) shown that a large part of Iranian drivers use their mobile phones while driving. According to this study, mobile phone addiction while driving is a distraction for drivers. In another study, Dingus et al. (2016) found that drivers who use

mobile phones for activities such as texting and reading have a higher risk of accidents (with a 3.6 odds ratio). In an analysis of crash data conducted by Beanland et al. (2013), it was found that in 20% of crashes, distractions inside the vehicle, such as interacting with passengers and using a cell phone while driving, were involved. The association between the prevalence of cell phone use and traffic accidents has been confirmed in other studies.

In a similar survey in Nigeria, Adeyemi (2021) stated that about 88% of Nigerian drivers were prone to mobile phone addiction, and about 65% reported that a road accident was related to their cell phone use while driving. After adjusting for age, gender, marital status, education level and driving experience, respondents who were prone to mobile phone addiction were 2.47 times more likely to experience cell phone-related road accidents (Adeyemi, 2021). The tendency to mobile addiction may be an important risk factor for reported road accidents among drivers. The results of the Adeyemi (2021) study on cell mobile phone addiction and the experience of traffic accidents are similar to the present study.

Among the participants in the study of Al-Jasser et al. (2018) conducted in Saudi Arabia, 44.6% reported that they had an accident in the 6 months before the study and 37.9% attributed these accidents to mobile phone use. The risk of a collision was significantly higher among participants who reported frequent use of mobile phones for texting and calling (Al-Jasser et al., 2018).

In the present study, there is a significant difference between the rates of mobile phone addiction in accident drivers based on the duration of mobile phone use. Drivers who have been using mobile phones for a longer period have a higher score on their mobile phone addiction. The same is true for drivers who have not seen an accident. The product obtained in this study is in line with the research of Zamani et al. (2016). The results showed that demographic factors such as gender, type of university, place of residence and field of study of students do not affect their dependence on mobile phones. Only marital status and type of university and duration of mobile phone use have been effective in mobile dependence (Zamani et al., 2016). Also, the driving experience has been effective in mobile phone dependence and addiction, which has a significant relationship with the group of drivers with accidents in the present study.

Also, Shokri et al. (2018) shown that the driver thinks that he has self-control over his behaviour and can react appropriately and quickly to unexpected events (such as the sudden braking of the opposite car when using a mobile phone), and that causes the use of mobile phones while driving (Shokri et al., 2018). Therefore, the attention of the authorities and efforts to train drivers seem necessary. Montuori et al. (2021) concluded in their study that cell phone use while driving is common in the study population, despite having a university education and awareness of the dangers (Montuori et al., 2021). This result explains how knowledge is not related to the behaviour performed. In the present study, no relationship was found between education level and mobile phone addiction. But in the Masuri et al. (2019) study, it was found that a driver with a high level of internet addiction has a risky behaviour to commit violations related to road traffic. Similar to the results of the current study, traffic accidents are the result of dangerous driving behaviour and mobile phone addiction will affect it.

This study is a cross-sectional study. According to the studied samples and the time of the study, past and future courses have not been included in the research and are one of the limitations of the study. Also, this study was conducted only in the group of male drivers, so it is recommended that this issue be considered in the female community as well.

5 Conclusion

As stated in the results of this study, the relationship between mobile phone addiction and the occurrence of traffic accidents is obvious, which affects the behaviour and cognitive characteristics of the individual due to the adverse effects of using a mobile phone in the long run. This dependence causes drivers to use mobile phones even while driving, which is the cause of distractions and many driving accidents. This study was conducted among road drivers in Khuzestan province. Owing to the pervasiveness of the issue of mobile phone addiction, and the high rate of mobile phone use, while driving in the country, this issue will need a special investigation. It is suggested that in the future, studies be conducted to identify the factors involved in mobile phone addiction and wider studies on this issue in the country. Also, the implementation of educational intervention and observation of results can confirm the accuracy of the effect of mobile phone dependence and its relationship with accidents.

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