Cross-sectional Study

The prevalence of substance use among drivers with traffic injuries in Mazandaran Province, Northern Iran

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ABSTRACT

Background: Motor vehicle accidents (MVAs) are one of the main causes of mortality in developing countries. Although the association between alcohol and the risk of MVA has been known for a long time, only a few studies have been conducted on driving following substance consumption in a short period of time. This is while narcotic and stimulant use seems to be a threat to traffic safety and a serious health concern for substance users. In this study, we investigated the prevalence of substance use (narcotics and stimulants) in drivers with traffic injuries admitted to the orthopedic ward of Imam Khomeini Hospital between October 2020 and June 2021.
Methods: The current research is a cross-sectional, descriptive-analytical study. The statistical population consisted of 77 patients admitted to the orthopedic ward of a training hospital (Imam Khomeini) in Mazandaran Province, northern Iran. The Shapiro-Wilk test was used to determine the quantitative variables. The sampling method is random and consecutive. The method of data collection was through questionnaire tools. The software used was SPSS 26 with an independent *t*-test, Mann–Whitney *U* test, Chi-square or Fisher's exact test.
Results: In this study, the frequency of substance use was 18.18%. The prevalence of opioid usage was 35.7% and for stimulants it was 64.28%. There was no case of concomitant use of opioids and stimulants. In the opioid group, 60% of patients used opium, 20% methadone, and 20% tramadol. In the stimulant and alcohol groups, 12.12% utilized methamphetamine and 88.88% drank alcohol. The average age of consumers was 39 years, which was significantly higher in the opioid group (P = 0.040). The education level of substance users was remarkably lower (P < 0.05) and, occupationally, there was no statistically significant difference between groups of substance users (P = 0.290). Considerably, the unemployed population consumed more substances (P = 0.001). Multiple fractures (P < 0.05) and surgical treatment (P = 0.012) were more common in the user group.
Conclusion: Users of stimulants and alcohol were younger than opioid users, according to our results. There is an association between drug use and the incidence of traffic accidents, as well as lower educational levels, masculinity, fracture type, and patient complication type.

1. Introduction

Motor vehicle accidents (MVAs) are one of the leading causes of mortality in developing countries, claiming the lives of approximately 300,000 people every year. In the Organization for Economic Co-operation and Development (OECD) countries, the average mortality rate was 10.4 people per 100,000 [1]. Although the association between alcohol and the risk of MVA has been known for a long time, only a few studies have been conducted on driving following substance consumption in a short period of time. This is while narcotic and stimulant use seems to be a threat to traffic safety and a serious health concern for substance users. Quaglio et al. investigated heroin-related mortality in Italy and showed that road accidents are the third leading cause of death among injectable substance abusers, accounting for 10% of fatalities [2].

According to research, drinking causes considerable impairments in driving function. The laboratory findings show that drinking causes dose-dependent impairments in concentration, coordination, tracking, attention, and response speed, and that alcohol is associated with an increased risk of accident involvement and responsibility in accidents [3].

Delta-9-tetrahydrocannabinol (THC), the main component of cannabis, significantly interfered with driving functions. Reduced performance is usually dose-dependent and lasts for 2–4 h. In research, the negative effects of cannabis have been a source of contention [4,5]. A new THC paper showed that the risk of a fatal accident for a THC-positive driver was twice that of a driver who did not use drugs or alcohol [6]. However, another study found that when the driver's age was controlled, THC-positive drivers were no more likely to be blamed for accidents than drivers who did not use illicit substances [7].

Other studies, on the other hand, have shown no relationship between THC and crash involvement among damaged and seriously injured drivers [7,8]. However, there is conflicting evidence about whether opioids cause psychomotor disorders, which can be attributed to factors including the type of opioid prescription, administration route, and tolerability [9]. Laboratory research on stimulants and dysfunction has shown conflicting findings. Low dosages of amphetamine have little negative effect on cognitive function and may improve performance in some psychomotor activities, although they are usually reserved for fatigued people who execute uncomplicated tasks [10].

In general, laboratory research has revealed more evidence of psychomotor impairment in the presence of alcohol and other substances. When alcohol and cannabis are taken together, for example, there is evidence of a greater influence on performance [11]. According to studies, alcohol combined with other substances has been demonstrated to exacerbate driving dysfunction. In most cases, benzodiazepines and alcohol have an additive effect on performance. Similarly, the effects of cannabis and alcohol appear to be synergistic [12]. It has been proven that drivers who have used several substances combined with alcohol prior to driving are more likely to be injured than drivers who have consumed only one substance. Drivers who used numerous drugs were shown to be five times more likely to crash in research. Furthermore, both cannabis and alcohol increased the likelihood of an accident by 15 times for positive drivers [6].

Moreover, drugs that are used with alcohol and various other substances clearly represent a larger risk to traffic safety. This is significant due to the high frequency of multiple drug abuse in the substance-abusing population [13]. As a result, the prevalence of substance use (narcotic and stimulant) use among drivers with traffic injuries admitted to the orthopedic department of Imam Khomeini Hospital between October 2020 and June 2021 was investigated in this study.

2. Patients and methods

This cross-sectional research was approved by the Mazandaran University of Medical Science Ethics Committee (NO: IR.MAZUMS. REC.1400.8023) and was carried out in accordance with the Helsinki Declaration Principles.

The current research is a cross-sectional, descriptive-analytical study. The statistical population consisted of patients who were admitted to the orthopedic ward of a training hospital (Imam Khomeini) in Mazandaran Province, northern Iran, between October 2020 and June 2021. A total of 77 patients were included in the statistical sample. The sampling method is random and consecutive. Data was collected through the use of questionnaire tools. Written informed consent was obtained from each patient to enter the study. The work has been reported in line with the STROCSS criteria [14]. This study is registered with the Research Registry, and the UIN is research registry 8167 https://www.researchregistry.com/register-now#home/registrationdetails/62eb54b52edefe0022f2087a/

3. Statistical analysis

The questionnaire includes demographics characteristics of patients such as age, gender, occupation, marital status, education, place of residence, and possession of a certificate; accident site (street or road); type of substance (narcotic or stimulant) if used; history of narcotic or stimulant use; fracture site; traffic accident complications; and type of treatment. The type of substance used in individuals was established by their clinical history and urine drug tests. Inclusion criteria included every patient admitted to the orthopedic ward with orthopedic injuries due to traffic accidents as an automobile driver older than 18 years. The exclusion criteria included automobile occupants and orthopedic events due to other causes. After collecting the questionnaire data, it was evaluated using the reliability test of SPSS 26 software (IBM Company). Initially, the Shapiro-Wilk Test was used to investigate the distribution of quantitative variables. Then, in order to describe the quantitative variables with normal distribution, the mean and standard deviation were used, and for the variables with abnormal distribution, the mean, minimum, and maximum were used. It also describes qualitative variables with frequency (percentage). For comparative analysis of independent groups, if the distribution of research data is normal, the T-test is used; if it is abnormal, the Mann-Whitney U test is used. The independent nominal variables were examined using the Chi-square or Fisher's exact test.

4. Results

According to the findings in this study, 14 (18.18%) were substance abusers; 5 (35.71%) and 9 (64.28%) were in the opioid and stimulant groups respectively. Opium was the most commonly used substance in the opioid group (60%), followed by methadone and tramadol (20%). In the stimulant group, alcohol (88.88%) and methamphetamine (12.12%) were the most common. The average age of narcotic users was 39 years (23–67) and 38 years (30–67) for non-narcotic users (P = 0.758). The mean age of opioid, stimulant, and concomitant users was, respectively, 43, 26, and 39 years old (P = 0.040). It was found that the opioid group had a higher mean age and it was lower in the stimulant group. Multiple fractures (42.8%), lower extremity fractures (39.9%), and clavicle fractures (23.8%) were the most common among narcotic and non-narcotic users, respectively. Stimulant users had a higher rate of severe injuries (66.66%), with 5 patients with multiple fractures drinking alcohol and 1 using methamphetamine. There is a significant difference in the number of fractures between the two groups (P < 0.05), as well as between the narcotic use groups. In fact, narcotic users were more likely to experience injuries and fractures. Sensory-motor (42.6%) and vascular (42.6%) trauma complications were the most common in substance use patients (35.7%). Sensory-motor complications were observed in 60.0% of opioid users, 33.33% of stimulant users, and 33.6% of non-substance users (P = 0.078). The stimulant group, on the other hand, had a high rate of vascular complications (44.44%). The type of substance utilized had a significant impact in terms of trauma consequences in these patients (P = 0.026). With a significant difference (P = 0.012), 92.9% of narcotic users and 76.2% of non-narcotic users had surgery. In the opioid and stimulant groups, it was the main treatment. There was also a significant variation in treatment type between various customer groups (P = 0.005) (Tables 1 and 2).

5. Discussion

There are several studies that show that substance abuse has a negative effect on traffic safety. Every year, hundreds of drivers are suspected of driving while inebriated [15]. In comparison to substance-free drivers, substance-impaired drivers have a significantly higher relative chance of being killed in a fatal collision [16]. This study looks at the prevalence of substance use among those who have been injured in traffic accidents and have orthopedic problems. The results in

Table 1
Variables based on substance consumption.

Variable		Substance consumption		P-value	Analysis test	
		YES	NO		Chi square	fisher
Age	Min	23	30	0.758		
	Max	67	67	Mann-whitney		
	Median	39	38			
Gender	Male	12(85.71)	60(95.1)	0.169		+
	Female	2(14.28)	3(4.9)			
Marital status	Single	8(57.1)	40(63.49)	0.507	+	
	Married	6(43.9)	23(26.51)			
Education	Under diploma	11(78.6)	21(33.13)	0.000	+	
	High school diploma	2(14.7)	25(39.6)			
	University	1(7.7)	17(26.7)			
Occupation	Employee	1(7.3)	15(23.8)	0.001	+	
	Self-employment	4(28.2)	28(44.6)			
	Unemployed	9(64.5)	20(31.4)			
Residence	Urban	9(64.1)	40(63.2)	0.655	+	
	Rural	5(35.9)	23(26.8)			
Scene	Interurban	6(42.6)	24(38.8)	0.661	+	
	Suburban	8(57.4)	39(61.2)			
Past substance history	YES	10(71.8)	10(71.8)	0.000	+	
	NO					
Frequency of consumption	Total	14(18.18)	63(81.81)	–		
	Opium, Methadone,Heroin, Tramadol	–	–			
	Cannabis, Methamphetamine,Alcohol	–	–			
	Opium + cannabis	–	–			
	Opium + alcohol	–	–			
Fracture site	Clavicle	1(7.1)	15(23.8)	0.000	+	
	Upper limb	1(7.1)	12(19.7)			
	Lower limb	2(14.3)	25(39.9)			
	Upper and lower limb	4(28.3)	3(4.5)			
	Multiple	6(42.8)	8(12.6)			
Complication	Sensory-motor	6(42.6)	21(33.6)	0.078	+	
	Vascular	5(35.7)	18(28.1)			
	Infection	2(14.3)	5(7.92)			
	Uncomplicated	1(7.1)	13(20.2)			
	Sensory	–	3(4.7)			
	Motor	–	2(3.19)			
	Embolism	–	1(1.5)			
Treatment	Surgery	13(92.9)	48(76.2)	0.012	+	
	Non surgery	1(7.1)	15(23.8)			

Tables 1 and 2 provided a detailed description of the patient's characteristics.

In addition to its individual negative effects, substance use has the ability to disrupt attention and increase reaction time in drivers [17]. In Iran, various researches have been conducted to investigate the usage of substances in road traffic accidents. We determined that alcohol was the most commonly used substance by drivers. In studies performed in Iran to study this issue, alcohol consumption has not been researched or assessed as less widespread than opioids [18–21]. It seems that substance usage patterns are going to change and these results could sound the alarm. Marijuana and alcohol are the most common substances in western countries, while opioids are the most prevalent substances among Iranians [21]. This pattern needs to be revised. Further research is needed to define alcohol consumption in the general population, particularly among drivers. Although producing, selling, and drinking alcohol is illegal in certain nations, such as Iran and Saudi Arabia, overall alcohol consumption in our country is considered to be higher per person per year than in several European countries [22]. Despite legal and religious limitations, alcohol drinking is a common problem, with one out of every eight people having consumed alcohol at some point in their lives [23]. These statements, together with our findings, should emphasize the need for logical and practical preparation for the health of alcohol consumers.

Since 78% of substance users who had an accident were unlearned or illiterate, more literacy is associated with reduced substance usage. Previous studies found a significant association between literacy and addiction [24]. These findings could be a renewed emphasis on the irreplaceable role of the educational system in people's personalities.

Drug-impaired drivers who had accidents were more likely to be men, but it was not statistically significant. Furthermore, marital status shows no substantial relationship with substance abuse. The relationship between employment position and substance use was shown to be considerable. Unemployed patients have a higher rate of substance use than employed individuals.

Users of narcotics were older than those who used stimulants. It might be a warning sign for policymakers to pay more attention to the chemical usage patterns of young adults in order to better plan. Narcotic users were more likely to have many fractures and were at a higher risk of having to undergo surgery. According to Soroush et al., morphine-positive individuals have a higher correlation with penetrating trauma than blunt trauma [18]. Also, Heydari et al. show substance abuse can lead to dangerous driving behaviors such as maneuvering while driving, speeding beyond the speed limit, and more, all of which can lead to more serious accidents [19].

One of the limitations of our research is that drug users conceal the type of drugs they consume because of the illegality of some stimulants and narcotics in Iran as well as the patients' fear of the consequences associated with them, and this problem had an effect on our statistical population. On the other hand, one of the study's strengths is the accurate recording of patients' information by physicians and nurses, as well as a warning to the country's health policymakers concerning drug abuse and preventing easy access by young people.

Based on the findings of this study, it is recommended that various organizations, including traffic police, the Ministry of Health, the Ministry of Education, and the National Youth Organization, collaborate to prevent substance traffic accidents, raise driver awareness, and evaluate

Table 2
Variables based on the type of substance consumption.

Variable		Type of Substance consumption			P-value	Analysis test	
		opioid	Stimulant and alcohol	both		Chi square	fisher
Age	Min	28	23	–	0.040		+
	Max	67	31	–	Kruskal-wallis		
	Median	43	26	–			
Gender	Male	4(80)	8(88.88)	0	1.000		+
	Female	1(20)	1(11.11)	0			
Marital status	Single	2(50)	5(55.55)	–	0.891		+
	Married	2(50)	4(44.44)	–			
Education	Under diploma	4(80)	7(77.77)	–	0.000		+
	High school diploma	–	2(22.22)	–			
	University	1(20)	–				
Occupation	Employee	1(20)	–	–	0.290		
	Self-employment	1(20)	3(33.33)	–			+
	Unemployed	3(60)	6(66.66)	–			
Residence	Urban	3(60)	6(66.66)	–	0.041		+
	Rural	2(40)	3(33.33)	–			
Scene	Interurban	2(40)	4(44.44)	–	0.909		+
	Suburban	3(60)	5(55.55)	–			
Past substance history	YES	3(60)	7(77.77)	–	0.411		+
	NO	2(40)	2(22.22)	–			
Frequency of consumption	Total	5(35.71)	9(64.28)	–	–		
	Opium	3(60)	–	–			
	Methadone	1(20)	–	–			
	Heroin	0	–	–			
	Tramadol	1(20)	–	–			
	Cannabis	–	0	–			
	Methamphetamine	–	1(12.12)	–			
	Alcohol	–	8(88.88)	–			
	Opium + cannabis	–	–	–			
	Opium + alcohol	–	–	–			
Fracture site	Clavicle	1(20)	–	–	0.000		+
	Upper limb	11(20)	–	–			
	Lower limb	–	1(11.11)	–			
	Upper and lower limb	2(40)	2(22.22)	–			
	Multiple	–	6(66.66)	–			
Complication	Sensory-motor	3(60)	3(33.33)	–	0.026		+
	Vascular	1(20)	4(44.44)	–			
	Infection	1(20)	1(11.11)	–			
	Uncomplicated	–	1(11.11)	–			
	Sensory	–	–	–			
	Motor	–	–	–			
	Embolism	–	–	–			
Treatment	Surgery	4(80)	9(100)	–	0.005		
	Non surgery	1(20)	–	–			

their psychological health.

6. Conclusion

Because most drivers who suffer from severe accidents can be caused by the consumption of stimulants such as alcohol and methamphetamine, they are also at greater risk for multiple fractures and various complications. As a result, it is necessary to train drivers' driving skills and conduct periodic controls with different tests. Furthermore, governments must pay greater attention to this substance consumption behavior.

Availability of data and materials

The authors are responsible for data. Access to all relevant raw data will be free to any scientist.

Provenance and peer review

Not commissioned, externally peer-reviewed.

Ethical approval

This cross-sectional research was approved by the Mazandaran University of Medical Science Ethics Committee (NO: IR.MAZUMS.REC.1400.8023).

Author contribution

IGK and MSA designed the study, wrote the manuscript. ZZ and HRR analyzed, interpreted the data and editing the manuscript. ZZ and KR are responsible for collecting data and submitting the manuscript. All the authors reviewed the paper and approved the final version of the manuscript.

Registration of research studies

8167.

Guarantor

Iraj Goli Khatir.

Consent

Written informed consent was obtained from each patient to enter the study.

Declaration of competing interest

None.

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Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.amsu.2022.104768.

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