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Original article

## Prevalence and risk factors of alcohol and substance abuse among motorcycle drivers in Fars province, Iran

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## ABSTRACT

**Purpose:** The aim of this present study is to investigate the prevalence of alcohol and substance abuse (ASA) and its relationship with other risky driving behaviors among motorcycle drivers.**Methods:** This is a cross sectional study which is performed at Shiraz city of Iran. Data from motorcycle drivers were collected using a standard questionnaire in eight major streets at different times of the day. The data includes consumption of alcohol and other substances two hours before driving and some of the risky behaviors during driving.**Results:** A total of 414 drivers with a mean  $\pm$  SD age of (27.0  $\pm$  9.3) years participated in the study. Alcohol or substance consumptions two hours before driving was significantly associated with risky driving behaviors such as using mobile phone during driving, poor maneuvering, and driving over the speed limit (both  $p < 0.001$ ). It was also associated with carelessness about safety such as driving with technical defects ( $p < 0.001$ ) and not wearing a crash helmet ( $p = 0.008$ ).**Conclusion:** Screening for alcohol and substance consumption among motorcycle drivers is an efficient way to identify drivers that are at a greater risk for road traffic accidents.© 2016 Production and hosting by Elsevier B.V. on behalf of Daping Hospital and the Research Institute of Surgery of the Third Military Medical University. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

## Introduction

A road traffic accident (RTA) is a serious public health problem in the world. It is estimated that 1.24 million human lives are lost annually worldwide, and it is projected to increase up to 65% over the next 20 years. It is predicted that road traffic accidents will rise enough to become among the five leading causes of mortality by 2030.<sup>1</sup> Iran is among the countries with the highest rate of RTA causing high mortality and morbidity.<sup>2</sup> During the past two past decades the health burden of traffic accidents in Iran increased by

sixty percent.<sup>3</sup> According to World Health Organization (WHO) reports on traffic accidents in 2009, the RTA death rate per one hundred thousand people was 31.1 in Iran, while the average was 18.8 in the rest of world.<sup>4</sup>

Although the number of motorcycle drivers is less than car drivers in Iran, a major part of mortality and morbidity belongs to motorcycle drivers especially in rural areas.<sup>5,6</sup> Motorcycle accidents are the most common cause of injuries, accounting for 49.1% of all trauma cases each year worldwide. The risk of morbidity and mortality is approximately ten times more than users of four-wheeled vehicles. Thus WHO has classified motorcyclists as a group with a high risk of injuries.<sup>7</sup>

Different risk factors for incidence of RTA have been identified. Two main factors that increase the risk of RTA in drivers are alcohol and substance abuse (ASA).<sup>8</sup> A large proportion of road traffic crashes are related to driving under the influence (DUI) of alcohol

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or drugs.<sup>9</sup> The risk of accidents can increase with ASA by impairing the driver's awareness and problem solving skills. Furthermore, drivers who are under the influence of substances or alcohol do not consider the consequences of their behaviors and actions on others. These can increase the risk of being involved in or causing an accident.<sup>10,11</sup> Statistics demonstrated that this matter is more remarkable among fatally injured victims of RTA.<sup>12</sup> Also some studies indicated that ASA among fatally injured motorcyclists is significantly associated with risky driver behavior such as not wearing a motorcycle helmet.<sup>13</sup> It seems that a large portion of RTAs would be preventable if more efficient limitations against driving after intake of substances or alcohol could be applied. The permanent monitoring of all drivers for this risk factor is not cost-effective and also not applicable in some settings. Thus there is a need to identify high risk drivers for ASA in order to design a more effective monitoring system.<sup>14</sup>

Most studies have investigated the prevalence of ASA in drivers who experienced RTA<sup>15–17</sup> and in the general population of drivers<sup>18,19</sup>; no study focused on this issue among motorcyclists in Iran. Some former studies on motorcycle drivers suggested further research in order to determine the best predictors of motorcyclists' risky behaviors.<sup>20</sup> The aim of the present study is to investigate the prevalence of ASA among motorcycle drivers and its associated RTA factors in Fars province of Iran.

## Materials and methods

This cross-sectional study was conducted in Shiraz, capital of Fars province, Iran. Shiraz is the fifth largest city of Iran and located in southwest of the country with a population of about 1,700,000 people in 2011 according to the Statistical Center of Iran.

A total of 414 motorcyclists participated in this study. All motorcycle drivers were selected randomly based on their presence in a particular area of the city at specific times. The goals of study were explained to the drivers who were asked to fill out the questionnaire after giving their written informed consent in the space provided in the questionnaire.

Data from motorcycle drivers were collected using a standard questionnaire in eight major streets at different times of the day. The questionnaire was designed by university faculty members, experts from the traffic and transportation organization and the traffic police.

The first part of the questionnaire contained baseline characteristics including age, marital status, living location (city or rural areas), education level, income level, having driving license and type of motor. Also this part included information about wearing a crash helmet in the past three months, reasons for riding a motorcycle, RTA in the past year, driving motorcycle with a technical defect, strange maneuvering, using a mobile phone while driving and speeding over the limit. In the second part of the questionnaire, motorcycle drivers were asked for substance usage (cigarettes, alcohol, opium, heroin, water pipe, cannabis, Lysergic acid diethylamide (LSD), crystal meth, and hypnotic drugs). Also the frequency of substance usage was recorded and categorized as occasional (less than one times consumption per week for narcotics and alcohol) and continual (more than one times consumption per week for narcotics and alcohol) use. Moreover, the drivers' use of narcotics or alcohol was less than two hours before driving.

## Statistical analysis

Statistical Package for the Social Sciences Version 15.0 (SPSS Inc., Chicago, IL, USA) was used to analyze the data. Frequency (%) and mean  $\pm$  standard deviation were used as descriptive indices. Chi-square test, odds ratio (OR) and corresponding confidence interval (95% CI) were used to assess the relationships between independent variables and consumption of narcotics and alcohol less than two hours before driving as dependent variable. *p*-values less than 0.05 are considered statistically significant.

## Results

A total of 414 motorcyclists participated in the study. All participants were males, 16–64 years of age with mean age of (27.0  $\pm$  9.3) years. The prevalence of drivers who used alcohol, opium, and cannabis was 150 (36.2%), 29 (7.0%) and 15 (3.6%) respectively (Table 1).

The prevalence of narcotics and alcohol usage less than two hours before driving was 64 (15.5%). A crash helmet was worn by 137 (33.1%) motorcycle drivers always or most of the time. Only 129 (31.2%) drivers had a valid driver license with 33 (8.0%) of the drivers being under 18 years of age, the minimum legal age for getting a drivers license in Iran.

Table 2 shows the association of baseline driving-related variables with consumption of narcotics and alcohol less than two

**Table 1**  
Prevalence of substance abuse among motorcycle drivers (*n* = 414).

Substance	Consumption			
	Never( <i>n</i> , %)	Occasional( <i>n</i> ,%)	Continual( <i>n</i> ,%)	
Cigarette smoking	260 (62.8)	3 (0.7)	152 (36.7)	
Hookah	252 (60.8)	8 (1.9)	155 (37.4)	
Alcohol	264 (63.8)	66 (15.9)	84 (20.3)	
At least one narcotic used	224 (54.1)	85 (20.5)	105 (25.4)	
Narcotics	Opium	385 (93.0)	4 (1.0)	25 (6)
	Heroin	413 (99.8)	0 (0.0)	1 (0.2)
	Cannabis	399 (96.4)	5 (1.2)	10 (2.4)
	Crystal methamphetamine	410 (99.0)	0 (0.0)	4 (1.0)
	Hypnotic and sedative drugs	404 (97.6)	8 (1.9)	5 (0.5)
	Tramadol	403 (97.3)	7 (1.7)	4 (1.0)
	Other	407 (98.3)	0 (0.0)	7 (1.7)

**Table 2**

Association of demographic and driving-related variables with consumption of narcotics and alcohol less than two hours before driving among motorcyclist.

Variables		Narcotics or alcohol consumption less than two hours before driving		p-value	OR (95% CI)
		No(n,%)	Yes(n, %)		
Age (years)	<1	28 (48.8)	5 (15.2)	0.789	0.71 (0.19–2.64)
	18–24	139 (82.7)	29 (17.3)		0.83 (0.31–2.22)
	25–34	129 (87.2)	19 (12.8)		0.59 (0.21–1.63)
	35–44	30 (85.7)	5 (14.3)		0.67 (0.18–2.45)
	>45	24 (80.0)	6 (20.0)		1
Marital status	Single	205 (83.3)	41 (16.7)	0.411	1.26 (0.72–2.19)
	Married	145 (86.3)	23 (13.7)		1
Education	Under diploma	167 (81.9)	37 (18.1)	0.320	1.38 (0.63–3.03)
	High school diploma	127 (87.6)	18 (12.4)		0.88 (0.37–2.08)
	University	56 (86.2)	9 (13.8)		1
Living location	Shiraz	322 (85.2)	56 (14.8)	0.240	1
	Other	28 (77.8)	8 (22.2)		0.61 (0.26–1.40)
Salary ( $\times 10,000$ Rls)	$\leq 500$	255 (84.7)	46 (15.3)	0.871	0.95 (0.53–1.72)
	>500	95 (84.1)	18 (15.9)		1
Usage times (per week)	$\leq 3$	120 (91.6)	11 (8.4)	0.007	1
	>3	230 (81.3)	53 (18.7)		1.90 (1.30–2.78)
Type of motor	<125 cc	329 (85.2)	57 (14.8)	0.148	1
	>125 cc	21 (75.0)	7 (25.0)		1.92 (0.78–4.73)
Using mobile phone during driving	No	196 (92.5)	16 (7.5)	<0.001	1
	Yes	154 (76.2)	48 (23.8)		3.82 (2.09–6.98)
Maneuvering while driving	No	303 (89.1)	37 (10.9)	<0.001	1
	Yes	47 (63.5)	27 (36.5)		4.70 (2.62–8.43)
Speeding over the limit	No	190 (91.8)	17 (8.2)	<0.001	1
	Yes	160 (77.3)	47 (22.7)		3.28 (1.81–5.94)
Usage reason	Non-recreational	306 (86.7)	47 (13.3)	0.004	1
	Recreational	44 (72.1)	17 (27.9)		2.51 (1.33–4.76)
Valid driver license	No	232 (81.4)	53 (18.6)	0.008	2.45 (1.23–4.87)
	Yes	118 (91.5)	11 (8.5)		1
RTA in past year	No	218 (88.3)	29 (11.7)	0.011	1
	Yes	132 (79.0)	35 (21.0)		1.99 (1.16–3.41)
Driving with technical defect	No	212 (90.2)	23 (9.8)	<0.001	1
	Yes	138 (77.1)	41 (22.9)		2.74 (1.57–4.76)
Wearing safety helmet	No	225 (81.2)	52 (18.8)	0.008	2.41 (1.24–4.68)
	Yes	125 (91.2)	12 (8.8)		1

Abbreviations in alphabetic order: OR = odds ratio; Rls = Iranian Rials; RTA = road traffic accident.

hours before driving. The results indicated that drivers who used a motorcycle more than 3 times per week ( $OR = 1.90$ , 95%  $CI: 1.30–2.78$ ) had a greater rate of narcotics and alcohol consumption less than two hours before driving than those who use it less than or equal to 3 times per week. Using a mobile phone during driving ( $OR = 3.82$ , 95%  $CI: 2.09–6.98$ ), maneuvering while driving ( $OR = 4.70$ , 95%  $CI: 2.62–8.43$ ), speeding over the limit ( $OR = 3.28$ , 95%  $CI: 1.81–5.94$ ), not holding a valid driver license ( $OR = 2.45$ , 95%  $CI: 1.23–4.87$ ), RTA in past year ( $OR = 1.99$ , 95%  $CI: 1.16–3.41$ ), driving with technical defect ( $OR = 2.74$ , 95%  $CI: 1.57–4.76$ ), using the motorcycle for recreation ( $OR = 2.51$ , 95%  $CI: 1.33–4.76$ ), and not wearing a crash helmet ( $OR = 2.41$ , 95%  $CI: 1.24–4.68$ ) was associated with a higher likelihood that the driver would consume narcotics and alcohol less than two hours before driving (Table 2).

Alcohol consumption in younger drivers was significantly more than other drivers. Motorcycle drivers who were 25 years old had almost 7 times more alcohol consumption than drivers who were 45 years or older ( $p = 0.001$ ). Also drivers who were not married were more likely to consume alcohol than married ( $p = 0.001$ ). Using a mobile phone during driving, maneuvering while driving, speeding over the limit, not holding a valid driver license, driving with a technical defect, recreational motorcycle use, and not using a crash helmet were associated with a higher likelihood of alcohol consumption by the driver (Table 3). Table 4 shows the association of demographic and driving-related variables with consumption of narcotics among motorcyclists.

Pleasure of substance usage was the most important reason for using narcotics and alcohol consumption less than two hours

before driving in 35 (8.5%) motorcycle drivers. Additional reasons for using narcotics and alcohol less than two hours before driving included boosting emotional effects of drug abuse by motorcycle driving ( $n = 32$ , 7.7%), habitual usage due to addiction ( $n = 15$ , 3.6%), perception of further skill and more self-confidence ( $n = 9$ , 2.2%) and other reasons ( $n = 7$ , 1.5%).

## Discussion

The aim of present study is to investigate the prevalence of ASA among motorcycle drivers and its relationship with other risky driving behaviors. The results indicate that the prevalence of ASA is high among motorcycle drivers and it is associated with other risky behaviors.

Previous studies indicated that approximately one quarter of mortalities from traffic accidents in Fars province (24.4%)<sup>7</sup> and Iran (23%)<sup>21</sup> were involved in motorcycle drivers. This high rate of mortality has a great burden on society because a majority of the victims are young, between 15 and 35 years old.<sup>7</sup> In addition to the high rate of mortality, the morbidity of motorcycle drivers from traffic accidents are considerably higher when compared to car drivers.<sup>5</sup> This is because not only the safety of the motorcycles are lower than cars, but also many motorcycle drivers do not wear crash helmets<sup>7,22</sup> despite the fact that the risk of fatality from a crash is increased among motorcycle drivers who do not wear a crash helmet.<sup>23</sup>

Different factors are associated with wearing a crash helmet by motorcycle drivers.<sup>24</sup> Drugs and alcohol consumption have an

**Table 3**  
Association of demographic and driving related variables with consumption of alcohol among motorcyclist.

Variables	Alcohol consumption		p-value	OR (95% CI)	
	No(n,%)	Yes(n,%)			
Age (year)	<18	18 (54.5)	15 (45.5)	0.001	7.50 (1.90–29.7)
	18–24	94 (56.0)	74 (44.0)		7.08 (2.07–24.27)
	25–34	98 (66.2)	50 (33.8)		4.59 (1.33–15.88)
	35–44	27 (77.1)	8 (22.9)		2.67 (0.64–11.14)
	>45	27 (90.0)	3 (10.0)		1
Marital status	Single	141 (57.3)	105 (42.7)	0.001	2.03 (1.33–3.11)
	Married	123 (73.2)	45 (26.8)		1
Education	Under diploma	126 (61.8)	78 (38.2)	0.044	0.77 (0.44–1.35)
	High school diploma	102 (70.3)	43 (29.7)		0.52 (0.59–0.96)
	University	36 (55.4)	29 (44.6)		1
Living location	Shiraz	239 (63.2)	139 (36.8)	0.458	1.32 (0.63–2.77)
	Other	25 (69.4)	11 (30.6)		1
Salary (×10,000 Rls)	≤500	193 (64.1)	108 (35.9)	0.808	1
	>500	71 (62.8)	42 (37.2)		1.05 (0.68–1.67)
Usage times (per week)	≤3	89 (67.9)	42 (32.1)	0.230	1
	>3	175 (61.8)	108 (38.2)		1.32 (0.85–2.04)
	>125 cc	244 (63.2)	142 (36.8)		1
Type of motor	<125 cc	20 (71.4)	8 (28.6)	0.382	1.45 (0.63–3.45)
	>125 cc	161 (74.9)	51 (24.1)		1
Using mobile phone during driving	No	103 (51.0)	99 (49.0)	<0.001	3.03 (2.00–4.61)
	Yes	229 (67.4)	111 (32.6)		1
Maneuvering while driving	No	35 (47.3)	39 (52.7)	0.001	2.30 (1.38–3.83)
	Yes	156 (75.4)	51 (24.6)		<0.001
Speeding over the limit	No	108 (52.2)	99 (47.8)	0.024	2.80 (1.85–4.3)
	Yes	233 (66.0)	120 (34.0)		1
Usage reason	Non-recreational	31 (50.8)	30 (49.2)	0.010	1.88 (1.09–3.25)
	Recreational	170 (59.6)	115 (40.4)		1.82 (1.15–2.86)
Valid driver license	No	94 (72.9)	35 (27.1)	0.118	1
	Yes	99 (59.3)	68 (40.7)		1
RTA in past year	No	165 (66.8)	82 (33.2)	<0.001	1.38 (0.92–2.08)
	Yes	175 (74.5)	60 (25.5)		1
Driving with technical defect	No	89 (49.7)	90 (50.3)	<0.001	2.95 (1.95–4.64)
	Yes	160 (57.8)	117 (42.2)		<0.001
Wearing safety helmet	No	104 (75.9)	33 (24.1)	<0.001	2.30 (1.46–3.65)
	Yes				1

Abbreviations in alphabetic order: OR = odds ratio; Rls = Iranian rials; RTA = road traffic accident.

inverse correlation with crash helmet-wearing.<sup>13</sup> The WHO report on alcohol consumption in 2014 reveals that the prevalence of alcohol abuse disorders among the general population in Iran is only 0.6%.<sup>25</sup> However, this prevalence is much higher (36.2%) among motorcycle drivers according to the result of our study. Although there has been no prior study on drugs and alcohol consumption among motorcycle drivers in Iran, previous investigations showed high rates of alcohol consumption (8.6%, 12%) among injured and fatally injured drivers.<sup>15,26</sup> In a study conducted in Vietnam,<sup>27</sup> 44.9% of respondents reported drinking and driving. Salako et al<sup>9</sup> reported that 62.7% of commercial motorcyclists in Nigeria take alcohol during work hours. In the United States, a report by National Highway Transportation Safety Administration (NHTSA) stated that approximately 40% of all traffic fatalities were alcohol-related.<sup>28</sup> Study of Wei-Shin et al conducted in Taiwan revealed that death ratio among motorcycle drivers who consumed alcohol (109.6) is significantly higher than drivers who did not consume alcohol (42.9).<sup>29</sup> Also a meta-analysis completed by Taylor et al indicated that the odds ratio of fatal accidents increased by 1.74 for every 0.02% increase in blood alcohol concentration of motorcyclists.<sup>30</sup> Also many studies showed a significant relationship between drug abuse and fatal traffic accidents especially among motorcycle drivers.<sup>31,32</sup>

The estimated prevalence of substance abuse disorders in Iran according to the WHO report in 2007 was 3.32% for men and 0.55% for women.<sup>33</sup> The prevalence of substance abuse for motorcycle drivers was 16.4% in our study and from 8.9% to 25.0% in others similar to ours.<sup>15,26,34,35</sup> Thus, the prevalence of ASA is remarkably higher in motorcycle drivers compared to the normal population.

This higher prevalence could be due to the lower than average socio-economical class of motorcycle drivers.<sup>36,37</sup> Motorcycle driving is more popular among the lower class because of its lower costs.<sup>38</sup> Although we tried to choose our participants randomly, most of the participants had not attained a high school diploma and had a low income. More ASA among this group may be a way to seek relief from the socio-economical stresses they encounter.<sup>39,40</sup>

Previous investigations have indicated ASA as a risk factor for RTAs.<sup>8</sup> Alcohol consumption and abusing drugs with sedative properties put drivers at a higher risk of RTA by reducing their alertness and reaction time. Also Amphetamines can increase the self-confidence of the drivers and make them vulnerable to more risky driving behaviors.<sup>10,11</sup>

According to the result, shown in Table 2, ASA has an association with other risk factors of RTA. It is indicated that ASA less than two hours before driving is significantly associated with other risky driving behaviors such as driving over the speed limit (OR = 3.28), maneuvering (OR = 4.70), and using mobile phone during driving (OR = 3.82). Also, ASA was associated with carelessness of the drivers about safety issues such as driving without wearing a crash helmet (OR = 2.41) or driving with a technical defect in their vehicles (OR = 2.74). Thus, ASA is not independent from other risky driving behaviors. It seems that a remarkable proportion of RTAs would be preventable if more efficient restrictions against driving after intake of substances or alcohol could be applied. A comprehensive driving under the influence (DUI) law could help many countries to reduce morbidities and mortalities caused by impaired driving especially among the motorcycle drivers.<sup>41</sup>

**Table 4**  
Association of demographic and driving related variables with consumption of narcotics among motorcyclist.

Variables	Narcotics consumption		p-value	OR (95% CI)	
	No(n,%)	Yes(n,%)			
Age (year)	<18	29 (87.9)	4 (12.1)	0.716	0.45 (0.12–1.74)
	18–24	143 (85.1)	25 (14.9)		0.57 (0.22–1.48)
	25–34	121 (81.8)	27 (18.2)		0.73 (0.29–1.88)
	35–44	29 (82.9)	6 (17.1)		0.68 (0.20–2.3)
	>45	23 (76.7)	7 (23.3)		1
Marital status	Single	211 (85.8)	35 (14.2)	0.107	0.65 (0.39–1.10)
	Married	134 (79.8)	34 (20.2)		1
Education	Under diploma	162 (79.4)	42 (20.6)	0.04	2.15 (0.91–5.05)
	High school diploma	125 (86.2)	20 (13.8)		1.33 (0.53–3.31)
	University	58 (89.2)	7 (10.8)		1
Living location	Shiraz	316 (83.6)	62 (16.4)	0.640	0.81 (0.34–1.94)
	Other	29 (80.6)	7 (19.4)		1
Salary (×10,000 Rls)	≤500	248 (82.4)	53 (17.6)	0.403	1.30 (0.70–2.38)
	>500	97 (85.8)	16 (14.2)		1
Usage times (per week)	≤3	111 (84.7)	20 (15.3)	0.603	1.16 (0.66–2.05)
	>3	234 (82.7)	49 (17.3)		1
	>3	234 (82.7)	49 (17.3)		1
Type of motor	<125 cc	325 (84.2)	61 (15.8)	0.080	1
	>125 cc	20 (71.4)	8 (28.6)		2.13 (0.90–5.06)
Using mobile phone during driving	No	181 (85.4)	31 (14.6)	0.254	1
	Yes	164 (81.2)	38 (18.8)		1.35 (0.8–2.30)
Maneuvering while driving	No	291 (85.6)	49 (14.4)	0.009	1
	Yes	54 (73.0)	20 (27.0)		2.20 (1.21–3.99)
Speeding over the limit	No	178 (86.0)	29 (14.0)	0.148	1
	Yes	167 (80.7)	40 (19.3)		1.47 (0.87–2.48)
Usage reason	Non-recreational	296 (83.9)	57 (16.1)	0.464	1
	Recreational	49 (80.3)	12 (19.7)		1.27 (1.64–2.54)
Valid driver license	No	239 (83.9)	46 (16.1)	0.669	1.28 (0.65–1.95)
	Yes	106 (82.2)	23 (17.8)		1
RTA in past year	No	130 (77.8)	37 (22.2)	0.015	1
	Yes	215 (87.0)	32 (13.0)		1.91 (1.14–3.22)
Driving with technical defect	No	206 (87.7)	29 (12.3)	0.008	1
	Yes	139 (77.7)	40 (22.3)		2.04 (1.21–3.45)
Wearing safety helmet	No	223 (80.5)	54 (19.5)	0.024	1.97 (1.07–3.64)
	Yes	122 (89.1)	15 (10.9)		1

Abbreviations in alphabetic order: OR = odds ratio; Rls = Iranian rials; RTA = road traffic accident.

Alcohol usage has a considerable prevalence among the motorcycle drivers in the Fars population. Alcohol usage among motorcycle drivers is associated with many factors.<sup>26</sup> This study shows that drivers in the lower age groups, drivers who were single, drivers who had education at university, drivers who used their mobile phones during driving, drivers who were maneuvering during the driving, drivers who were speeding over the limit, drivers who had a driving license, drivers who were driving with motorcycle technical defects, drivers who were not wearing a crash helmet, and those who did not have a driving license had the greatest risk of alcohol usage before driving.

Although many of the aforementioned risk factors of alcohol usage among motorcyclists are proven by other studies,<sup>42–44</sup> but increased risk of alcohol usage among the drivers with education at university level is a noteworthy matter that should be researched more and supported by other studies.

Prevalence of narcotics abuse before motorcycle driving was less than cigarettes, hookah, and alcohol usage among Fars motorcyclists. Nevertheless, given the damaging psychological effects of narcotics and increased risk of accidents after narcotics usage,<sup>13</sup> determining risk factors of narcotics abuse among motorcycle drivers is an important stage for implementing preventive strategies. This study indicated that narcotics usage among motorcyclists of Fars province is associated with lower education level, maneuvering while driving, driving with motorcycle technical defects, and not using a crash helmet.

It seems that alcohol and narcotics usage among motorcycle drivers in Fars province of Iran is directly associated with socio-cultural determinants. Promoting a culture of driving in the context

of educational programs and social marketing initiatives could be helpful for the Iranian population.<sup>13</sup>

A simple oral fluid can be used for detecting both drug and alcohol consumption. Studies have reported a successful experience of screening drivers by analysis of their saliva which is easy and non-invasive<sup>45,46</sup> although costs and benefits of any predictive program should be taken into the consideration.<sup>47</sup>

The goal of this study was explained to the participants and they were assured that their information would remain confidential. However, the prevalence of ASA could be underestimated because of social stigmatization and legal restrictions. Furthermore, in spite of similar results in studies from different countries, the results could vary in other settings due to socio-cultural differences.

In conclusion, it seems that ASA as a risk factor for RTAs has overlap and association with other risky driving behaviors among motorcycle drivers. Thus, it is suggested to screen motorcycle drivers for substance and alcohol abuse in order to identify motorcycle drivers at a higher risk of RTA more efficiently while taking the cost-effectiveness of any ASA assessment program into consideration.

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