Research article

Distraction and related risk factors among professional and non-professional drivers

Alireza Razzaghi [a,*], Abolfazl Afshari [b], Kavous Shahsavarinia [c], Mirbahador Yazdani [d], Adel Nouri [e]

[a] Road Traffic Injury Research Center, Tabriz University of Medical Sciences, Tabriz, Iran/ Social Determinants of Health Research Center, Research Institute for Prevention of Non-Communicable Diseases, Qazvin University of Medical Sciences, Qazvin, Iran
[b] Departments of Civil Engineering, University of Yazd, Yazd, Iran
[c] Emergency and Trauma Care Research Center, Tabriz University of Medical Sciences, Tabriz, Iran
[d] Road Traffic Injury Research Center, Tabriz University of Medical Sciences, Tabriz, Iran
[e] Social Determinants of Health Research Center, Research Institute for Prevention of Non-Communicable Diseases, Qazvin University of Medical Sciences, Qazvin, Iran

A R T I C L E   I N F O

A B S T R A C T

Background: Distraction is one of the main driver's behavioral factors that reduces the performance of the drivers and might increase the accident risk. Distraction while driving holds significant importance, especially among professional drivers, and failure to address this matter may result in adverse implications for traffic safety. The present study was conducted to investigate distraction and related risk factors between two groups of private vehicle drivers and taxi drivers.
Methods: This analytical cross-sectional study was carried out in Tabriz, Iran in 2022. The total sample size in this study was 701 taxi drivers, professional drivers, and private vehicle drivers. The independent samples *t-test* was used to determine the statistically significant difference between groups and its sub-scales between the two studied groups. Moreover, the multivariable linear regression analysis was used to determine the predictors that affect distraction score. The test's level of significance was considered at 0.05.
Results: The mean distraction score among taxi drivers surpasses that of private vehicle drivers (2.82 vs. 2.32, p-value<0.05). The drivers with negative scores, over the past year, among private vehicle drivers and taxi drivers were 2.5 % and 5.2 %, respectively (p-value<0.05). A group of taxi drivers exhibits a higher level of distraction while driving and the mean distraction score for private vehicle drivers is lower than that of taxi drivers ($\beta = -0.11$, CI 95 %: 0.17, -0.05). Also, a history of damage or injury accidents has a significant impact on distraction while driving ($\beta = 0.12$, CI 95 %; 0.06–0.17).
Conclusions: The results indicate that distraction while driving is high amongst taxi drivers rather than private vehicle drivers. To have effective driver safety promotion interventions, it is recommended to consider driver distraction based on professional and non-professional drivers.

* Corresponding author. Address: Qazvin University of Medical Sciences, Shahid Bahonar Boulevard, Qazvin, Iran.
E-mail addresses: Alirezarazzaghi_21@yahoo.com, razzaghi.alireza1@gmail.com (A. Razzaghi), a.afsharifum@gmail.com (A. Afshari), Kavous. shahsavari@yahoo.com (K. Shahsavarinia), bahadoryazdani1990@gmail.com (M. Yazdani), adelnoure@gmail.com (A. Nouri).

1. Introduction

Road traffic accidents (RTAs) are one of the major public health problems around the world, especially in Low-and Middle-Income Countries (LMICs). The World Health Organization (WHO) in the Global Status Report of Road Safety (GSRRS) provided statistics that indicate a staggering number of over 1.9 million deaths due to RTAs annually in 2021 with a 5 % drop when compared to deaths in 2010 [1,2]. Nine out of every ten deaths transpire within low- and middle-income nations, with individuals in low-income nations persistently encountering the most elevated probability of death relative to their population [2].

The risky driver's behavior such as excessive speed, failure to adhere to traffic rules and regulations, distracted driving, and driving under the influence of alcohol or drugs all contribute to increased risks of occurrence and magnitude of RTAs [3,4]. It was indicated that over 90 % of reported traffic accidents were the outcome of human error [5], and safe driving habits played a crucial role in minimizing the number of accidents one experienced [6]. The occurrence of RTAs can be attributed to various risky behavioral factors, one of which is distraction [7]. A recent review of the literature revealed that driver distraction plays a significant role in a substantial portion of road accidents, including both those resulting in fatalities and those resulting in non-fatal injuries [8]. Distractions may increase road traffic accident risk by 12.8 times [9].

According to the results of certain studies conducted in the United States, it has been observed that approximately 40 % of drivers who have been involved in vehicular collisions were distracted [7].

The diversion of the driver's attention not only results in injuries for the driver but also poses a risk to other road users, particularly those who are more susceptible to RTAs such as pedestrians and motorcyclists [10,11]. Moreover, children and elderly individuals may have reduced reaction times and limited mobility, heightening their vulnerability on the roads [12]. Therefore, drivers must prioritize their attention while behind the wheel and recognize their responsibility toward ensuring the safety of all road users. However, professional drivers such as taxi drivers face special driving conditions that may make them different from private vehicle drivers. The characteristics of professional driving are such that they may lead to negative impacts on health, including fatigue, drowsiness, stress, symptoms affecting mental and physical health, and depression [13]. Professional drivers, such as taxi drivers, are required to provide their services amidst recurrently stressful and hazardous circumstances, such as extended periods of work, congested traffic, various driving responsibilities, and disputes with passengers [14].

Taxi drivers experience significant physical and psychological strain as a result of extended periods of driving, prolonged interaction with passengers, job stress, and occasional altercations between the driver and passengers [15–18]. Therefore, they are more likely to be involved in unsafe and distracted driving [19]. On the other hand, some factors may be driver distraction that is associated with various other risk factors in driving, including elevated driving speed [4], prolonged reaction time [20], slower braking response [21], and heightened aggression [22], which are more likely to be seen among professional drivers such as taxi drivers due to their working conditions.

According to recent statistics, RTAs in Iran rank as the second leading cause of mortality for each of all age groups, and as the primary cause of death among individuals under the age of 40 years old [23]. In Iran, traffic accidents have resulted in economic costs that account for 6–8% of the national Gross Domestic Product (GDP) [24]. According to a consensus among diverse prominent Iranian researchers and stakeholders, RTAs is one of the ten top research priorities in Iran [25]. According to the findings of a study in Iran, 63.78 % of the drivers exhibited distraction while driving [10].

Distraction while driving holds significant importance, and failure to address this matter may result in adverse implications for traffic safety. Assessing distractions between taxi drivers, as professional drivers and non-professional drivers can clarify points that can be useful in road safety planning and policies. Despite the importance of the issue, few studies have been done in this regard and more scientific evidence is needed in this regard. To thoroughly investigate distraction between two groups of private vehicle drivers and taxi drivers, a professional driver, a comprehensive study would be essential. Given the increasing prevalence of distractions such as mobile devices, navigation systems, and other in-car technologies, it is crucial to understand the risk factors on driver performance and road safety. Without more specific data on these particular groups, we miss out on valuable insights. Distraction between professional and non-professional drivers remains virtually unexplored in Iran. The present study was conducted to investigate distraction and related risk factors between two groups of private vehicle drivers and taxi drivers.

2. Materials and method

2.1. The study design setting

This study was an analytical cross-sectional study to explore the distribution of distraction among twostudy groups and determine the risk factors among professional and non-professional Drivers. This study was carried out in 2022, focusing on taxi drivers, professional drivers, and private vehicle drivers in East Azerbaijan Province, Tabriz, Iran. The East Azerbaijan province is located in the northwest of Iran and spans an approximate area of 47,830 km^2 and with a population of over 1.7 million. Tabriz is the capital city of East Azerbaijan province and stands as one of the foremost economic center and metropolitan regions in the area.

2.2. Samsple size

The research sample consisted of participants who possessed a valid driving license had drive from one place to another and used the vehicle as a transport mode in the last three months. Regarding the formula for determining sample size, a minimum of 270 individuals per group was deemed necessary for this particular study. Using the cluster sampling method with a design effect of 1.3 was

taken into account. Hence, the sample size of 340 individuals was determined for each group (total sample size = 701).

The study conducted by Shiri et al. [24] was utilized to extract the necessary parameters for determining the sample size.

2.3. Data collection

The instrument used for data collection included a demographic information form, which gathered data on variables such as age, gender, driving history (had a driven to go from one place to another and use of the vehicle as a transport mode in the last three months), driving negative score (The negative score depends on the number of errors and its impact on traffic accidents. According to the law, each driver will receive a total of 30 negative points and after 30 points, he will be recorded for 3 months. If the driver commits a violation again after receiving the license, another 25 negative points will be added and his license will be confiscated for 6 months), accident history)having a history of accidents during the last 6 months(, the outcome of accident (death, injury, and damaged accident), and a driver's distraction susceptibility questionnaire which was specifically designed and validated to assess driving distraction [26]. The questionnaire utilized for psychometric purposes was developed by Soori et al. in Iran. The questionnaire's content validity was assessed through a quantitative method, utilizing feedback from 12 external experts. The Content Validity Ratio (CVR) and Content Validity Index (CVI) were 82 % and 92 %, respectively. The cronbach's alpha as a reliability parameter was 81 % [10].

The questionnaire comprises a total of 39 questions, which are divided into three sections. The charastics of using questionnaire is presented in Table 1.

The assessment employs a 5-point Likert scale to grade responses. Participants are required to provide a score ranging from 1 (strongly disagree) to 5 (strongly agree) for each question in the "Attitudes and beliefs about involuntary distraction" and "Susceptibility to Distraction" sections. Additionally, the "engaging in distraction" section considers a score range from 1 (never) to 5 (often). In the Susceptibility to Distraction section, the option "never happened" is also assigned a score of zero. The present questionnaire enumerates involuntary distraction factors that may affect driving performance [26]. These factors comprise engaging in phone conversations, sending text messages or dialing on a mobile phone, interacting with audiovisual devices, reading billboards and roadside advertisements, frequently reviewing accident scenes on the side of the road, and conversing with passengers. Additionally, the questionnaire identifies predisposing factors for distractions, such as the ringing of a mobile phone, receiving an alarm sound from a mobile phone, listening to music or the radio, roadside advertisements and announcements, roadside accident scenes, and conversing with passengers and the driver. To gather a representative sample, the data were collected from five areas of the city included: North, South, East, West, and Center based on socioeconomic status. Upon initial introduction and declaration of the study's objectives, the interviewers obtained informed consent from the participants before administering the questionnaire.

When conducting interviews, it is crucial to consider the qualifications, training, and experience of the interviewers themselves. Therefore, interviewers were selected from those who graduated with a master's degree in Traffic Safety & Health. Initially, two briefing sessions were conducted with the interviewers to discuss the aims of the study and its implementation strategies. Before conducting the interviews with the drivers, a trial interview session was also conducted with each of the interviewers. Interviewers were recruited from both male and female populations.

2.4. Inclusion and exclusion criteria

The current study integrated the following inclusion criteria: being at least 18 years old, possessing a valid driving license (the minimum age for obtaining a driver's license in Iran is 18 years old, so that an individual is legally allowed to operate a motor vehicle on public roads), having a driving history (had a driven to go from one place to another and use of the vehicle as a transport mode) in the past three months for private vehicle and taxi drivers, and informed consent to participate in the study. The criterion for excluding samples was based on individuals' reluctance to participate.

2.5. Ethics

The present investigation adhered to ethical and humanitarian considerations, as well as ethical principles, under the Declaration of Helsinki. Before administering the survey, detailed explanations of the study's purpose, procedures, and voluntary nature were delineated to all participants, and they were provided with a guarantee of the confidentiality of the gathered data. Moreover, they were given ample time to ask questions and clarify any concerns before agreeing to take part in the research. Participants were assured that all data collected would be treated with strict confidentiality.These measures served to safeguard the privacy of all participants,

Table 1
The charastics of using questionnaire.

Section	Subsection	Number of questions
Distraction Engagement	–	7
Attitudes and Belliefs about Voluntary Distraction	-Attitude	6
	-Percived control	6
	-Perciveed social norms 1	6
	-Percived social norms 2	6
Susceptibility to Involuntary Distraction	–	8

fostering trust in the research process while upholding ethical standards of professional conduct. The ethical code of this study was IR. TBZMED.REC.1400.022.

2.6. Statistical analysis

The statistical software package of IBM SPSS version 20 was used to perform the analysis. The descriptive statistics including mean (standard deviation) for quantitative variables and frequency (percent) for qualitative variables were reported. The independent sample *t*-test was used to determine the statistically significant difference in mean distraction score and its subscales between the two studied groups. The independent samples *t*-test was used to determine whether the two groups differed from each other. The independent *t*-test was used to compare the distraction scale means between the two groups of taxi and private car drivers. Also, the chi-square test was used to compare frequencies and percentages of studied variables between the two groups. Moreover, the multivariable linear regression analysis was used to determine the predictors that affect distraction score. Multiple linear regression is a statistical methodology that employs a multitude of explanatory variables to predict a response variable. The fundamental principle behind a multiple linear regression is to evaluate the possibility of predicting a single continuous dependent variable based on a collection of independent (or predictor) variables. Multiple regression models must meet five fundamental assumptions: 1) the presence of linearity, 2) the requirement of homoskedasticity, 3) the assumption of error independence, 4) the condition of normality, and 5) the independence of independent variables. The test's level of significance was considered at 0.05.

3. Results

3.1.Descriptives.

The study comprised a sample of 700 drivers from the Tabriz city. Out of the total sample population, it was found that 49 % (n = 343) were categorized as taxi drivers, while the remaining (n = 357, 51 %) were classified as private vehicle drivers. It was shown that 76.4 % of the drivers of private vehicles were male (n = 535), while 98.5 % of taxi drivers were male (n = 165) (Fig. 1). The distribution of sex among drivers was different (98.5 % male among taxi drivers vs. 55.2 % among private car drivers). The negative driving scores between private vehicle drivers and taxi drivers were 2.5 % and 5.2 %, respectively.

The mean age of participants was 41.37 years (SD = 13.09), while the youngest and the oldest participants were 18 71 years old, respectively. The mean duration of driving experience among the participants was 17.54 years, (SD = 12.11), while the range of driving experience varied from a minimum of 1 year to a maximum of 50 years. Table 2 presents descriptive statistics of the variables under investigation by the drivers who participated in the study.

3.1. .Analytical results

The distribution of collected data about distraction engagement and predisposing factors for distraction in the two studied groups is presented in Tables 3 and 4. Table 5 presents a comparison of the mean distraction scores across subscales of using a questionnaire, including Distraction Engagement, Attitudes, Perceived Control, Perceived Social Norms 1 and 2, and Susceptibility to Distraction, between two distinct groups of drivers, namely Taxi drivers and private car drivers. The mean distraction score of taxi drivers surpasses that of private vehicle drivers (p-value<0.01). The statistical analysis indicated a significant difference in the mean observation among all subscales, except for Distraction Engagement (p-value <0.05(.

To examine the correlation between the mean distraction score between taxi drivers and private vehicle drivers, a multiple linear
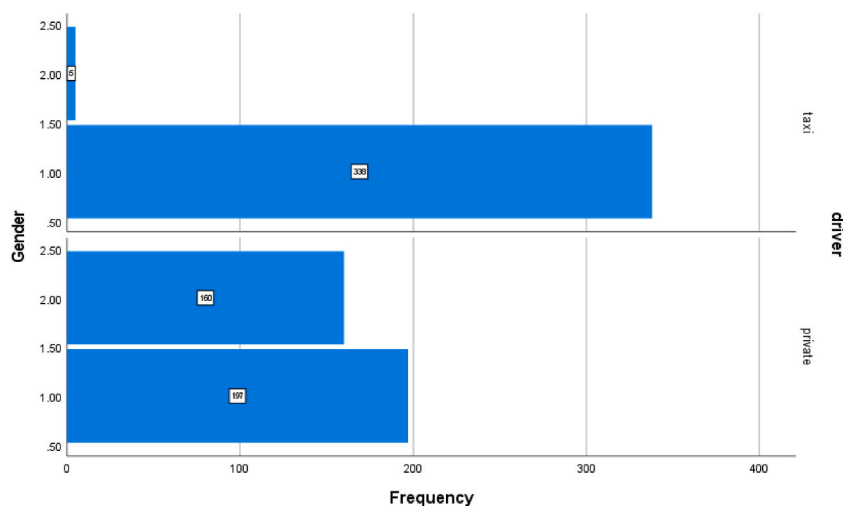

Fig. 1. Distribution of driver's gender frequencies in two studied groups.

Table 2
Comparison of frequency and percentage of studied variables in two groups of taxi drivers and private vehicles.

Variable	Total	Taxi drivers	Private car drivers	p-value
	Frequency (%)	**Frequency (%)**	**Frequency (%)**	
Age (year)				
18–29	173 (24.7)	21 (6.1)	152 (42.6)	
30–39	149 (21.3)	53 (15.5)	96 (26.9)	0.001
40–49	155 (22.1)	97 (28.3)	58 (16.2)	
50–59	155 (22.1)	120 (35.0)	35 (9.8)	
60–69	65 (9.3)	49 (14.3)	16 (4.5)	
70–79	3 (0.4)	3 (0.9)	–	
Sex				
	536 (76.4)	338 (98.5)	197 (55.2)	
Male	165 (23.6)	5 (1.5)	160 (44.8)	
female				
History of driving (last three months)				
≤2	72 (10.3)	6 (1.7)	66 (18.5)	0.001
3–10	185 (26.4)	36 (10.5)	149 (41.7)	
11–20	215 (30.7)	127 (37.0)	88 (24.6)	
21–30	131 (18.7)	98 (28.6)	33 (9.2)	
>30	97 (13.9)	76 (22.2)	21 (5.9)	
Marriage status				
Married	486 (69.4)	291 (84.8)	195 (54.6)	0.001
Single	181 (25.9)	33 (9.6)	147 (41.2)	
Divorced	21 (3.0)	8 (2.3)	11 (3.1)	
Deceased wife	12 (1.7)	11 (3.2)	1 (1.3)	
Education				
Elementary	40 (5.7)	35 (10.2)	5 (1.4)	0.001
Middle	69 (9.9)	64 (18.7)	5 (1.4)	
High	39 (5.6)	31 (9.0)	8 (2.2)	
Diploma	206 (29.4)	135 (39.4)	71 (19.9)	
Associate degree	70 (10.0)	29 (8.5)	41 (11.5)	
Bachelor's	171 (24.4)	39 (11.4)	132 (37.0)	
Master's	86 (12.3)	10 (2.9)	78 (21.6)	
Doctoral	19 (2.7)	–	19 (5.0)	
Vehicle type				
Domestic	656 (9.37)	341 (99.4)	315 (88.2)	0.001
Foreign	44 (6.3)	2 (0.6)	42 (11.8)	
Accident history				
No	483 (69.0)	210 (61.2)	273 (76.5)	0.001
Yes	217 (31.0)	133 (38.8)	84 (23.5)	
Outcome of accident				
Non-injury accident	201 (28.7)	120 (35.0)	81 (22.7)	0.001
Injury accident	11 (1.6)	10 (2.9)	1 (0.3)	
No accident	488 (69.7)	213 (62.1)	275 (77.0)	
Driving negative score				
Yes	27 (3.9)	18 (5.2)	9 (2.5)	0.001
No	673 (96.1)	325 (94.8)	348 (97.5)	

regression analysis was conducted to account for the impact of additional variables. Table 6 presented the results of the multivariable linear regression analysis, indicating that the mean distraction score among taxi drivers was greater than private vehicle drivers. Furthermore, it was determined that certain variables, like the age of the driver ($\beta = 0.01$, CI 95 %; 0.008–0.04), a history of driving more than 20 trips annually ($\beta = 0.004$, CI 95 %; 0.001–0.08), and a history of damage or injury accidents ($\beta = 0.12$, CI 95 %; 0.06–0.17), had significant impact on the mean distraction score.

As a result, the group of taxi drivers exhibited a higher level of distraction and the mean distraction score for private vehicle drivers was 0.11 lower than taxi drivers ($\beta = 0.11$, CI 95 %: 0.17, −0.05) (Table 6).

4. Discussion

The present study was conducted to investigate distraction and related risk factors between two groups of private vehicle drivers and taxi drivers. Distraction is one of the main driver's behavioral factors that reduces the performance of the drivers and might increase the accident risk. Although most drivers disapprove of distracted driving, they continue to engage in this behavior due to a complex combination of factors [27]. The results of this study showed that the mean distraction score among taxi drivers surpasses that of private vehicle drivers (2.81 vs. 2.31) Except for Distraction Engagement, the observed differences in the mean were statistically significant ($p < 0.05$). The high score of distraction among taxi drivers can be due to their risky behavior. According to results of a study taxi drivers comparing to app-based passenger-carrying drivers had a higher probability in using electronic device (31.8 % vs. 7.6 %, $p < 0.001$) or to be involved in an accident (29.6 % vs. 4.6 %, $p < 0.001$) when using ED [28]. However, our findings run counter

Table 3

The distribution of collected data about distraction engagement in two studied groups.

Question	Taxi drivers Freq. (%)					Private car drivers Freq. (%)				
Section 1: Distraction Engagement	Never	Rarely	Sometimes	Mostly	Most of Times	Never	Rarely	Sometimes	Mostly	Most of Times
hold phone conversations	69 (20.1)	129 (37.6)	120 (35.0)	20 (5.8)	5 (1.5)	87 (24.4)	96 (26.9)	118 (33.1)	36 (10.1)	20 (5.6)
manually interact with a phone	181 (52.8)	97 (28.3)	54 (15.7)	7 (2.0)	4 (1.2)	161 (45.1)	105 (29.4)	60 (16.8)	28 (7.8)	3 (0.8)
adjust the settings of in-vehicle technology	33 (9.6)	54 (15.7)	151 (44.0)	65 (19.0)	40 (11.7)	51 (14.3)	86 (24.1)	104 (29.1)	89 (24.9)	27 (7.6)
read roadside advertisements	94 (27.4)	97 (28.3)	103 (30.0)	41 (12.0)	8 (2.3)	99 (27.7)	103 (28.9)	100 (28.0)	43 (12.0)	12 (3.4)
continually check roadside accident scenes if there are any	106 (30.9)	120 (35.0)	95 (27.7)	16 (4.7)	5 (1.5)	111 (31.1)	126 (35.3)	71 (19.9)	32 (9.0)	17 (4.8)
chat with passengers if you have them	7 (2.0)	43 (12.5)	146 (42.6)	92 (26.8)	55 (16.0)	11 (3.1)	42 (11.8)	121 (33.9)	113 (31.7)	70 (19.6)
daydream	43 (12.5)	74 (21.6)	135 (39.4)	47 (13.7)	44 (12.8)	85 (23.8)	112 (31.4)	94 (26.3)	38 (10.6)	28 (7.8)

to these findings. In current study, hold phone conversations among private car drivers was higher than taxi drivers (15.3 % vs. 7.3 %). Prior research has also indicated an increase in the use of mobile phones by private car drivers. In a study, it was pointed out that driver type, commercial and non-commercial drivers, is a powerful predictor of attitudes towards distracted driving behavior [29]. In a study it is stated that distraction among commercial drivers such as taxi drivers is one of the main challenges due to using app-based services, direct attention to passengers, and using electronic devices such as GPS devices. This situation puts them not only a risk of road traffic accidents but also the passengers whom they are transporting [28]. Moreover, it was shown that distracted driving exerts a significant causal impact on aggressive driving, contributing to the alarming rise of road accidents and traffic-related fatalities [30].

In this study, it was found that an increase in the driver's age was associated with an increase in the mean score of distraction (β = −0.11, CI95 %: −0.17 _ −0.05). Therefore, we expect an increment in distraction among older drivers. Age and driving experience were introduced as moderating factors in driver characteristics. In a study that aims to characterize phone-related distractions in older drivers (age >65), it was shown that 60 % of older adults reported being distracted using the cell phone while driving [31]. The natural biological processes can significantly impact on visual, motor, and cognitive abilities, all of which are crucial for safe driving [32]. These gradual changes make it increasingly difficult for older individuals to process information rapidly and effectively assess potentially hazardous situations while driving [33]. These situations can lead to distraction, especially serialization papttern among elderly drivers [34].

The results of prior studies showed that most drivers perceived their skills as being higher than their peers [28,31,35]. Over-confidence of drivers about their ability in driving skills might put them at higher risk of exposure to road traffic accidents [28]. Commercial drivers may experience such over-confidence in driving more than other drivers due to more driving experience. Therefore, this leads to less attention among them. The results of a study in Iran showed that high-risk driving behaviors among taxi drivers were more involved in accidents compared to other drivers including private vehicles and other commercial drivers [36]. Taxi drivers usually drive long hours to earn their living. Therefore, they are more likely to be involved in unsafe driving [19]. Daily driving intensity has also been found to be a significant predictor of road traffic accidents. This refers to the level of mental and physical effort exerted by individuals while driving on a day-to-day basis. High levels of daily driving intensity substantially increase the risk of being involved in an accident [19]. Psychosocial work factors such as daily driving, job strain, excessive workloads, and ineffective communication may result in poor work conditions among taxi drivers. Moreover, they are subjected to higher levels of stress resulting from tight schedules, heavy traffic, and demanding passengers [37]. On the other hand, professional drivers may encounter daytime sleepiness due to irregular working hours and shift patterns, which in turn increases the risk of fatigue-related accidents [38]. Also, it was declared that professional drivers like taxi drivers may abuse alcohol and use illicit drugs because of long hours of driving and try to compensate for the job strain, and fatigue [39]. All these situations can lead to distraction among taxi drivers.

In the current study traveling more than 20 times in a year was recognized as a predictor of distraction. As regards, taxi drivers have more travel than private vehicle drivers and due to long hours of driving among taxi drivers, they are at risk for different chronic health issues such as high blood pressure, high glucose levels, and musculoskeletal diseases [38]. Professional drivers, such as taxi drivers, face significantly heightened occupational health risks such as musculoskeletal and low back pain due to the nature of their work [40]. These individuals often spend extensive amounts of time behind the wheel, enduring prolonged exposure to various hazards on the roads. Additionally, professional drivers confront ergonomic challenges from inadequate seat design and poor posture while driving [41]. This situation becomes very important when we take into account that in Iran most tax drivers are men, and men are less likely to seek health care [42]. In our study, 98.5 % of taxi drivers were male while it was 55.2 % among private car drivers. This situation creates a vicious cycle that ultimately puts taxi drivers's health at risk.

One of the main findings of this study was that distraction mean score increased among drivers who had prior injury accidents. After experiencing a prior injury accident, individuals may find that their attention span is not what it used to be. Accidents resulting in

Table 4

The distribution of collected data about predisposing factors for distractions in two studied groups.

Section 2: Attitudes and Beliefs about Voluntary Distraction]	Strongly Disagree	Disagree	Neutral	Agree	Strongly Ag	Never happens	Strongly Disagree	Disagree	Neutral	Agree	Strongly Ag	Never happens
your phone is ringing.	78 (22.7)	64 (18.7)	19 (5.5)	129 (37.6)	50 (14.6)	3 (0.9)	53 (14.8)	83 (23.2)	29 (8.1)	132 (37.0)	54 (15.1)	6 (1.7)
you receive an alert from your phone	92 (26.8)	53 (15.5)	22 (6.4)	111 (32.4)	64 (18.7)	1 (0.3)	61 (17.1)	0 (22.4)	27 (7.6)	132 (37.0)	49 (13.7)	8 (2.2)
you are listening to music	159 (46.4)	103 (30.0)	46 (13.4)	29 (8.5)	4 (1.2)	2 (0.6)	131 (36.7)	124 (34.7)	37 (10.4)	37 (10.4)	17 (4.8)	10 (2.8)
you are listening to talk radio	159 (46.4)	96 (28.0)	60 (17.5)	21 (6.1)	2 (0.6)	5 (1.5)	126 (35.3)	127 (35.6)	49 (13.7)	34 (9.5)	9 (2.5)	12 (3.4)
there are roadside advertisements	117 (34.1)	102 (29.7)	56 (16.3)	48 (14.0)	16 (4.7)	4 (1.2)	71 (19.9)	122 (34.2)	64 (17.9)	67 (18.8)	22 (6.2)	11 (3.1)
there are roadside accident scenes	88 (25.7)	82 (23.9)	52 (15.2)	83 (24.2)	36 (10.5)	2 (0.6)	53 (14.8)	63 (17.6)	57 (16.0)	118 (33.1)	60 (16.8)	6 (1.7)
a passenger speaks to you	123 (35.9)	103 (30.0)	67 (19.5)	45 (13.1)	3 (0.9)	2 (0.6)	78 (21.8)	122 (34.2)	64 (17.9)	74 (20.7)	11 (3.1)	7 (2.0)
daydreaming	76 (22.2)	65 (19.0)	67 (19.5)	77 (22.4)	54 (15.7)	4 (1.2)	56 (15.7)	61 (17.1)	49 (13.7)	111 (31.1)	70 (19.6)	10 (2.8)

Table 5
Compare of the distraction scale means between the two studied groups.

Scales	Taxi drivers Mean (SD)	Private car drivers Mean (SD)	p-value
Distraction Engagement	2.55 (0.58)	2.54 (0.69)	0.2
Attitudes (You think, it is alright for you to drive and …)	2.41 (0.52)	2.29 (0.67)	0.02
Perceived control (You believe you can drive well even when you …)	2.94 (0.77)	2.81 (0.88)	0.03
Perceived social norms 1 (Most drivers around me drive and …)	3.92 (0.70)	3.80 (0.75)	0.02
Perceived Social Norms 2 (Most people who are important to me think, it is alright for me to drive and …)	2.59 (0.57)	2.39 (0.73)	0.001
Susceptibility to Involuntary Distraction	2.81 (1.003)	2.42 (0.95)	0.0001
Total mean score	2.82 (0.31)	2.31 (0.40)	0.01

Table 6
Crude and adjusted relationship between studied groups (taxi and private car drivers) and distraction.

Variables	Unstandardized Coefficient β	Standardized Coefficient β	95 % CI for β	p-value
Driver groups (private car drivers)	−0.11	−0.15	−0.17 _ −0.05	0.001
Age	0.01	0.4	0.008 _ 0.04	0.001
Driving history (more than 20 travel during the year)	0.004	0.14	0.001 _ 0.08	0.04
Accident history (injured accident)	0.12	0.14	0.06 _ 0.17	0.001
Constant	3.42	0.09		

injuries can have long-lasting effects on individuals, extending far beyond the physical recovery process [43]. It is found that accident history affects the driving behavior. Accident history can be used to indicate road aggressiveness. On the other hand, the results of our study showed that the driving negative score, which is applied by the police based on the driver's violations, of driving among taxi drivers was approximately twice that of private vehicle drivers (5.2 % vs. 2.5 %). Accident history is a predictor that determines driving behaviors and contributes to a better understanding of the distraction while driving.

In a study, it was shown that 42 % of drivers are distraction-prone and 58 % are distraction-avers. This study pointed out that driver type is a powerful predictor of norms and attitudes toward distracted driving behavior and sanctions for distracted driving [29].

4.1. Conclusion

The findings of the investigation of distraction and related risk factors between two groups of private vehicle drivers and taxi drivers indicated that distraction while driving is high amongst taxi drivers, as professional drivers, rather than private car drivers. Moreover, the variables of driver's age, driving more than 20 travels per year, and history of injured or damaged accidents were defined as risk factors on distraction while driving. Understanding these implications informs policy-makers and managers about the dangers of distractions and can serve as crucial deterrents and preventative measures to ensure safer roads for all users, especially for professional drivers.

4.2. Study limitations and future directions

One of the potential limitations of our study may be the prestige bias of participants. Also, it is important to consider that the number of areas examined may not provide optimum external generalizability. Moreover, although we used a cluster sampling method, the samples may not be representative of the general population of private vehicle and taxi drivers.

To have effective driver safety promotion interventions, it is recommended to consider driver distraction based on professional and non-professional drivers. In countries like Iran, which are limited in terms of budget and resources, providing relevant interventions for professional drivers like taxi drivers is a high priority. Moreover, the identified risk factors such as the driver's age, driving more than 20 travels per year, and history of injured or damaged accident should be considered in policy development.

It is recommended that other professional drivers such as truck drivers be considered to determine distraction while driving and related risk factors.

Ethical approval and consent to participate: The present investigation adhered to ethical and humanitarian considerations, as well as ethical principles, under the Declaration of Helsinki. Before administering the survey, the overarching aims of the investigation were delineated to all participants, and they were provided with a guarantee of the confidentiality of the gathered data. The ethical code of this study was IR.TBZMED.REC.1400.022.

Consent to publish

Not applicable.

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Availability of data and materials

Upon reasonable demand, data will be made accessible.

Data availability statement

Data will be made available on request.

CRediT authorship contribution statement

Alireza Razzaghi: Writing – review & editing, Writing – original draft, Validation, Supervision, Project administration, Methodology, Formal analysis, Data curation, Conceptualization. **Abolfazl Afshari:** Writing – review & editing, Software, Data curation. **Kavous Shahsavarinia:** Writing – review & editing, Data curation, Conceptualization. **Mirbahador Yazdani:** Writing – review & editing, Software, Data curation. **Adel Nouri:** Writing – review & editing, Software, Data curation.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.heliyon.2024.e31530.

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