ORIGINAL ARTICLE

Studying the Driving Safety Culture in Taxi Drivers in Tabriz City, Iran

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ABSTRACT

Today traffic accidents are remembered as a major problem that threatens public health and safety. Iran is a country that has a high traffic accidents rate among the countries. The aim of this study was studying of taxi drivers' safety culture in Tabriz city. This study was a descriptive-analytical study. The participants were the taxi drivers of Tabriz city. According to the results of a pilot study sample size estimated 120. The samples were selected in the clusters and randomly. The data collected through driver behavior questionnaire (DBQ) and were analyzed using independent t test, Pearson correlation and ANOVA. The results showed that there is a significant relationship between the number of hours worked per week and the incident. Also, there is a significant relationship between the observance of speed limits and driving time per week ($p < 0.05$). Given that the average behavior score of safety in the study was carried out 89/5 can be concluded that the safety of Tabriz taxi drivers is desirable.

KEYWORDS: *Safety Culture, Taxi Drivers, Tabriz*

INTRODUCTION

Traffic and traffic accidents are a major problem in many countries and driving safety and its management is one of the main concerns of each community [1]. This problem is getting the more complex and more dangerous concurrent with the increase in traffic in many developing countries [2].

In industrially developed countries, many victims of traffic accidents are drivers, so that the extent of these events among people has caused widespread concern [3]. Currently, traffic accidents are the ninth cause of years lost due to disability and premature death in the world and it is expected that in 2020 to become the sixth leading cause of death [4]. Injuries caused by the accidents so widespread that it is called "war

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road" [5]. On average, every day 64 people are killed in road accidents and the numbers of 1967 from these accidents are injured and sent to hospital and usually they are [6]. Of the three main causes of road accidents involving human factors, environmental and technical equipment, the human factor plays crucial role in these accidents [7] and Heinrich reported 88% of the incidents occur caused by unsafe actions [8]. The economic cost of road accidents in the world, close to 518 billion dollars is estimated that more than 65 billion dollars of this amount belongs to low-income countries. This figure is equivalent to the total annual development aid received by these countries. The exact calculation of total direct and indirect costs of injuries caused by road accidents indicate that more than 207 billion dollars spent in European Union member states and nearly 230 billion dollars in the United States as a result of these events [9]. The transport work-related accidents with vehicles represent a significant financial cost in the community. It has been calculated that the total cost of work-related road incidents in Australia is about 1.5 billion dollars [10] and more recently the average total insurance cost of a road incident to organizations and society is estimated at 28000 dollars [11]. Generally, a high proportion of deaths and injuries caused by road losses and work-related incidents. For example, driving work-related injuries are resulting in death or permanent disability more than twice as likely other workplace-related accidents. Work-related drivers are often defined as those who drive at least once a week for work purposes [12].

Information relating to the years 1995 to 2000 shows the 8 percent increasing in the mortality rate every year from traffic accidents in Iran. The rate of death from traffic accidents in this period is 25.8 per hundred thousand people. This amount comparing with the 19.9 per hundred thousand people worldwide and 15.2 per hundred thousand people in the Eastern Mediterranean Region is very high. By reviewing the one-year period (2000 to 2001) in the ten provinces of Iran it is revealed that the mortality rate resulting from traffic accidents was 30 per hundred thousand. This mortality rate in comparison with the level of the whole world and Eastern Mediterranean region is very high. In 2001 the total cost of traffic accidents in Iran was at least 4 billion dollars while this amount for 2006 was estimated 6

billion dollars [4]. According to Legal Medicine Organization report the traffic accident victims in East Azerbaijan province in 2006 were 1206 deaths and 11971 injuries. While in 2004 the number of deaths and injuries were 956 and 10051 respectively which shows an increase of 26% in deaths and 19% in injuries. This rate for the Iran is 11%. The number of deaths within East Azerbaijan province cities in 2004 was 334 cases while in 2005 this number was 439 cases, which represents upside of accident fatalities in the cities [2, 13].

Based on Motor Accident Authority data of NSW in 1994, taxis accounted for 0.2% of all registered vehicles, 1.9% of the vehicles involved in crashes and were involved in 3.2% of all reported crashes [14]. The number of traffic accidents and their effects reveals the importance of analysis the factors affecting the occurrence of these accidents [1]. Evidence shows that speed is the most likely illegal behavior by transport drivers that have been reported [15] and dangerous driving is a major cause of work-related accidents [16]. As a result, a clear and growing need for industry, government and community to allocate resources for knowledge and expertise in this field [12]. The concept of "safety culture" was introduced in 1980 and followed by the consequences of the Chernobyl accident in 1986. A suitable safety culture in organizations is determined through a strong focus on safety areas. Safety culture studies were conducted in a number of organizations and companies that are faced with the potential risks. A few studies were conducted in a limited extent in the transport sector [17]. Developed countries have been able to take measures such as the use of modern equipment, control speed and equip police and special attention to education and traffic safety and reduce traffic accidents significantly while in developing countries traffic culture and safety education have not been institutionalized yet [2]. Risky driving behaviors are one of the factors in the incidence of traffic accidents. This factor is the second leading cause of death and the first leading cause of years of life lost in Iran [4]. Also, the risky driving behavior is one of the most important factors affecting the incidence of traffic accidents. Because in many cases the human behavior is considered as a major factor in the occurrence of such events it is revealed the importance of attention to this factor in modification programs to reduce accidents.

Most of the usual correction in risky driving behaviors are designed and implemented according to opinions of experts and less attention is given to the views and ideas of target groups. In other words, in correction programs for dangerous behaviors of drivers and vehicle occupants, motorcyclists and cyclists and pedestrians, it has been less attention to the target audience [4]. In relation to traffic accidents many researches have focused on this problem. One of the main methods in this field is the study of individual differences in predicting events. If this predicting can be done in an acceptable accuracy, it can used for identifying training needs or other interventions. However, for practical and large-scale uses, the measurement technique should be reliable and friendly use [18]. Due to the increasing load of traffic accidents in the community, researchers have begun to focus on investigating the attitude and general behaviors of drivers involved in accidents. Also, they have investigated the relationships between these factors. Some numbers of measurement tools recently have been developed to examine individuals' driving behaviors such as Manchester Driver Behavior Questionnaire (DBQ) [19], and Driver Attitude Questionnaire (DAQ) [20]. These two questionnaires remain the predominant tools to assess general motorists' driving attitudes and outcomes. In addition within transportation context, the Safety Climate Questionnaire (SCQ) [21] is increasingly being utilized in work-related environments to determine the effect of safety rules, procedures, communication and support as well as management commitment on self-reported aberrant driving behaviors [22].

In this study the Driver Behavior Questionnaire (DBQ) is used. As mentioned earlier Drivers Behavior Questionnaire (DBQ) is a dominant tool for assessing the attitudes and driving results of public drivers. DBQ as a measurement tool has been extensively utilized within a range of driver safety research areas such as: the genetics of driving behavior [23] age differences in driving behavior [24], cross cultural studies [24, 25]. One of the most important applications of DBQ is predicting the individual differences in the accident [26]. The Driver Behavior Questionnaire (DBQ) is a well-researched measurement instrument that is used widely to assess aspects of driver behavior and reflects human error, lapses, and deliberate risky

actions [27]. This study intended to evaluate the safety culture of taxi drivers in Tabriz city that is a city in north-west of Iran. The driver behavior questionnaire (DBQ) was used to determine the status of safety culture of taxi drivers. Finally, control actions are proposed to improve the current situation.

METHODS

This study is a descriptive-analytical study that conducted in 2014. The participants were the taxi drivers of Tabriz city. According to results of a pilot study (based on 30 taxi drivers), with confidence 95%, d = 0.05 $z_{\alpha/2}^2 = 1.96$ and SD = 0.279 using the formula $\frac{z_{\alpha/2}^2 \times SD^2}{d^2}$, sample size estimated 120 persons.

Taxi drivers were selected for study because they have a significant share in urban transport and play a role in many accidents in cities as well as access to them is easy. At first the city was divided into five sections (North, South, East, West and Central) and then samples were randomly selected. Inclusion criterion for this study was at least one-year experience and exclusion criterion was the unwillingness of drivers to cooperation. As well as the drivers that their main job wasn't taxi service were excluded from the study. The samples were assured that their information will remain confidential. The data collecting method was a questionnaire. Available questionnaire was Driving Behavior Questionnaire (DBQ) that is used in many countries and is a valid questionnaire. Validity and reliability of the questionnaire is investigated by researchers.

Researchers went to taxi stations in different locations of the city and completed questionnaires.

The DBQ questionnaire composed of 4 parts [19, 27]: 1. Demographic and general characteristics (gender, age, education, experience, duration of license, driving hours per week, accidents per year, kilometers per year); 2. Following the speed limits; 3.Attention to driving 4. Driving behavior during traffic or at traffic lights. The last three sections of the questionnaire (except the first part which contains demographic characteristics), consist of a group of 50 items.

Each item can be score of 1 and 2, which scope average (scope center) determines the status of desirable and undesirable safety behavior. The first

part of the following the speed limits is composed of 19 items and arrange of scores from 19 to 38 and cutting or center point 28.5. This means that higher scores than 28.5 is indicator of compliance with speed limits and lower than it is indicator of non-compliance with speed limits. The second part, which includes attention to driving, is also composed of 12 items, thus, its range is from 12 to 24 and its cutoff point is 18. The section of driving behavior during traffic or at traffic lights is contains 19 items. Its scores range is from 19 to 38 and its cutting point is 28.5. The general safety behavior scores scope is changed from 50 to 100, so that a score higher than 75 indicates desired safety behavior and lower than 75 indicates undesirable safety behavior.

To complete the questionnaire researchers, ride as a passenger in a taxi at the all the way and out of sight of the driver, recorded the requested items. For not completing more than one questionnaire for unique taxi driver, the taxi number was recorded in the top of the questionnaire. For observing the unsafe acts, time was determined from seven AM to seven PM. At the end of the line, the aim of study was explained to the driver and if he was willing to cooperate and has a year of work experience, his other personal information had been inserted in the questionnaire. The data after collected, analyzed using SPSS software (version 21) and were extracted the relevant data of descriptive statistics and analytical. As well as the independent t

test was used to compare means and Pearson correlation was used to examine the relationship between variables and ANOVA test was used to compare the driving behavior average in each Analytical category.

RESULTS

All participants in the study were male with average age of 42 years (SD= ±9). Taxi drivers had at least 1 year and maximum 36 years work experience with an average 12 (SD= ±7). 50% of participants were under diploma, 39.8% had diploma degree and 10.2% of them had academic degree.

The frequency of accidents per year was 31.7% including 21.7% of drivers had only one accident last year, 9.2% and 0.8% of them had two and three accidents last year respectively and 68.3% of drivers did not have any accident in last year.

The results showed that the score of compliance with speed limits, driving accuracy, driving behavior during traffic and general safety behavior were 34.5, 20.9, 31.9 and 89.5 respectively. The average of all these variables is higher than cutoff points (Table 1).

Table 1. Status of safety behaviors of taxi drivers in Tabriz

Variable	Range scores	Average	Interval of confidence percent 95	Status
Compliance with speed limits	19-38	34.5	34-35	Favorable
Attention to driving	12-24	20.9	20.5-21.2	Favorable
Driving behaviors during traffic or traffic lights	19-38	31.9	32.4-31.3	Favorable
General safety behaviors	50-100	89.5	88.1-90.8	Favorable

The results of independent t-test indicate that there is no statistically significant relationship between age, work experience, certificate experience and driver safety behavior with accident, but relationship between the number of hours worked per week and accident occurrence is significant. The mean difference of driving hours per week between the two groups was 8.4 (Table 2).

Also, according to Pearson correlation test there is significant and direct relationship between compliance with speed limits with driving hours per week and duration of license ($p<0.05$). There is a significant inverse relationship between compliance with speed limits the number of accident ($p<0.05$).

Table 2: Relationship between safety behavior and demographic variables with the crash occurrence in year

Variable	Crash occurrence in year	Without crash in year	Difference between averages	p-value
Age	39.5	41.6	-2.1	0.26
Work experience	10.4	12.8	-2.4	0.1
Driving hours in a week	68.3	59.9	8.4	0.03
Duration of license	15.5	90.1	2.1	0.18
Driving safety behavior	88	90.1	2.1	0.18

This means that non-compliance with speed limits lead to more accidents. Attention to driving has the direct and meaningful relationship with driving hours in a week ($p<0.05$). Attention to driving has the significant inverse relationship with driving hours in a week ($p<0.05$). This means that by reducing attention to driving, the number of accidents increases.

There is significant inverse relationship between the driving behaviors during traffic or traffic lights with age, the number of accidents occurred per

year and duration of license ($p<0.05$) and relationship between the driving behaviors and driving hours in a week is significant and direct ($p<0.05$) (Table 3).

Results of one-way analysis of variance (ANOA) showed that the relationship between education and safety behaviors of drivers, as well as between education and factors associated with safe driving of drivers (compliance with the speed limits, attention to driving and driving behavior of drivers when traffic or during traffic lights) isn't significant.

Table 3: Pearson correlation between demographic variables and safety behaviors and its related factors

Variable	Age	Work experience	Driving hours in a week	Number of accidents occurred in year	Duration of license
Safety behaviors	0.1	0.07	0.04	0.17	0.09
Compliance with speed limits	0.06	0.18	0.02	- 0.26	0.04
Attention to driving	0.15	0.18	0.03	- 0.25	0.16
Driving behavior during traffic or traffic lights	-0.03	-0.1	0.04	-0.07	-0.06

DISCUSSION AND CONCLUSION

This study was performed to evaluate the safety culture of taxi drivers in Tabriz. According to results of this study, the frequency of accidents in year estimated 31.7% and more people had no car accident in during the past year (68.3%). Results indicated that there is no significant relationship between age, work experience, duration of license and driver safety behavior with the occurrence of accidents in year. This means that these variables aren't relation to the accident occurred in year. In a study Mohamadfam and et al found a significant relationship between the age and unsafe behavior. They concluded that this is because of influence of various factors on unsafe behavior [28]. Also, in study of malekpour and et al, it was found that there is no significant difference between average attitude to safety in drivers according to age, marital status, education, accident history, driving history and driving hours per week [29].

There was a significant correlation between the hours of driving per week and in the occurrence of accidents in the year and the average number of working hours is high in drivers who had suffered at least a car accident last year. This finding confirms the results of other studies that showed drivers who regularly drive during the day are more exposed to driving errors. Taxi official company must identify such drivers and reduce the possibility of such driving errors through a range of interventions

including proper supervision [12]. Results as well as showed significant direct relationship between the compliance with speed limits and driving hours per week and duration of license. But the results showed significant negative correlation between the compliance with speed limits and the number of accidents in the year. This indicates that drivers who were driving at an unauthorized speed had more accidents. According Shams and et al the driving with illegal speeding, illegal overtaking and left shift without attention to forward are causes of 77% traffic accidents [30]. The study of Adl and et al indicated that the frequency of "driving with illegal speed" was 53.8% [13]. The study of Mohammadfam and et al also showed a high frequency of this unsafe act [28].

In this study, it was showed that there is a significant inverse correlation between the driving attentions with the number of occurred accident in year. This means that by reducing the attention to be driving the number of accidents per year increases. Adl and et al showed that some unsafe behaviors among lines taxi drivers in Tehran such as exchanging of money while driving, not the steering wheel with both hands, talking to passengers while driving and using a cell-phone while driving are actions that cause a nuisance in right driving task and disrupt the driver attention. This lack of attention causes other driving unsafe acts such as overtaking from the right side, not looking at the side's mirrors, stopping at prohibited places, not using traffic lights and boarding or alighting the passengers on

pedestrian crosswalks [13]. Statistics of traffic accidents show that inattention to driving is the cause of 25 to 30% accidents [31]. In the study of Zangyabadi and et al this behavior with 14.16% was the main cause of accidents on the Isfahan highways [32].

The results showed that there is a significant inverse relationship between driving behavior during traffic or traffic lights with age, work experience and the number of occurred accident in a year and duration of license and this relation with driving hours in a week is a direct significant correlation. This means that with increasing age, work experience and duration of license, drivers showed safety behaviors during traffic or traffic lights, thus the number of accidents occurred in year is low. But drivers, who are driving more hours during the week do not show safe and appropriate behavior during traffic or a traffic light for reasons such as boredom or impatience, etc.

Drivers' safety behavior and its associated factors (compliance with the speed limits, attention to driving and driving behavior of drivers during traffic or traffic lights) didn't have a significant relationship with individual education. Other studies showed that there is no significant relationship between education and attitudes to safety, too [33]. But a study that was done by Shams and et al results showed that self-reported behavior of taxi drivers about positive attitude towards leave dangerous behavior with education has inverse significant relationship [4].

Considering that the average of drivers' safety behavior in this study that was obtained 89.5, it can be concluded that the safety state in Tabriz taxi drivers is desirable. But considering the importance and severity of the consequences due to some unsafe acts of drivers, such as driving whit unauthorized speed and careless attention at driving, control measures are necessary. In addition, by organizing training courses for the drivers as well as simulation driving training and retraining courses can reduce unsafe driving acts and improve drivers' safety behavior.

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CONFLICT OF INTEREST

The authors declare that no conflict of interest exists.

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