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Is There Any Relationship between Mental Health and Driving Behavior of Taxi Drivers in Kerman?

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Abstract

Traffic accidents are the main reason of disability and the second reason of mortality in Iran. Therefore finding out the effective factors is vital. The aim of this study is to examine the relationship between mental health and taxi drivers' behavior in Kerman. This is a cross-sectional descriptive research in which Manchester driving behavior questionnaire (MDBQ) and "general health questionnaire (GHQ)" were used. The questionnaires were distributed between 186 taxi drivers during February and March 2015. Our study was conducted in the province of Kerman in the east south of Iran. We used descriptive methods as well as t-tests, chi-square tests, and logit models for data analysis. The data analysis showed that the driving behavior of Kermanian taxi drivers is good (4.13±0.481) and the mental health situation of them is partly good (3.61±0.662). The Pearson's correlation test showed overall driving behavior score is correlated positively with mental health score (r=0.83, P=0.000). Also there were positive correlations between all driving behavior dimensions and mental health dimensions at a level of significance of 0.005. The result of Chi-Square Test showed that there the younger drivers and who had less driving experience had higher mental health score. Single drivers and who had less education, which had faced with financial loss in their previous accidents, which had lose their driving license for a while, higher driving behavior score compared to the others (P<0.05). By some improvement actions in driver's mental health, we can effect on their behavior. And by proper driving behaviors, we can avoid from some mortalities, disabilities and heavy costs on society.

Keywords: Manchester driving behavior questionnaire (MDBQ), general health questionnaire (GHQ), taxi drivers, Kerman, Iran

1. Introduction

Traffic accidents result in a huge amount of financial and psychological costs and pains for families in addition to the death of healthy human and also is the leading cause of disability all around the world (WHO report, 2011; Vafaee-Najar et al., 2010). The WHO's statistics in 2011 indicate that traffic accidents kill 1.3milion people each year and 90 percent of these mortalities happen in low-income and middle-income countries (CDC, 2008). Forecasts for 2020 suggest that for traffic accidents' death in low-income countries there would be 80% of enhancement while it had a 30 % reduction in high-income countries (Ferdosi, & Rostami, 2010; Unicef, 2011).

In Iran, traffic accidents are the main reason of mortality. According to UNICEF's report, 28000 people have lost their lives during traffic accidents in 2006 in Iran which compared with 2000 (17000 persons) had a significant increase. About 2.5 percent of all traffic accidents in the world happen in Iran. That means Iran's accident rate is 20 times higher than anywhere else in the world (Toroyan, 2009).

The traffic accidents' situation in Iran shows that traffic accidents are the main reason of inability (Zargar, Khaji, Karbakhsh, & Zarei, 2004) and the second reason of mortality (Montazeri, 2004). Iran is facing with the index of 36 people per 100000people who are being killed in traffic accident each year (Ayati,2009); this rate is too high comparing with 22.6 per 100000 people in global level and 13.9 per 100000in Eastern Mediterranean (Akbari, Naghavi, & Soori, 2006). Besides the casualties of accidents, total amount of direct and indirect costs of driving accident are significant in Iran so that in 2007 this cost was more than 5% of GDP of Iran (Naqhavi, Jafari, Al-Dini, & Akbari, 2004).

Traffic accidents are consisting of a three factors' chain including human, environmental and vehicle factors (Gershon, Ben-Asher, & Shinar, 2012). The study shows that the human factor and especially drivers' behavior is the main reason of accidents (Lajunen, &Summala, 2003; Bener, & Crundal, 2004). Since most of accidents are due to high risk driving behaviors, they are preventable in most of the times and the most economical way of preventing is to reduce high risk driving behaviors (Nabi et al., 2007).

Various studies have investigated the drivers' behavior since now; some of these studies have examined the effect of factors like using drug and alcohol on drivers' behavior (Bernhoft et al., 2012); and some of the have studied the role of human factors related to drivers' driving ability and factors related to high risk behaviors in association with vehicle according to some variables like age, gender, occupation, driving behavior and deviations (Dinh, & Kubota, 2013; Kheirabadi, & Bolhari, 2012). Also some cases such as exhaustion and drivers' sleep quality have been studied (Gastaldi, Rossi, & Gecchele, 2014; Bordbar, & Nejatian, 2010). The importance of paying attention to specific groups of drivers caused drivers' behavior to be studied individually which among them Tehran's taxi drivers' behaviors can be mentioned (Shams et al., 2010).

Physical and financial damages caused by accidents in Kerman as the largest province of Iran have been considered as one of the most important serious health problems of this province in recent years. The object of this study is to examine the relationship between mental health and taxi drivers' behavior in Kerman as a large group of professional drivers who spend most of their time driving in the streets of the city.

2. Methodology

This study is a sectional-descriptive research which its required data has been collected in 2015. Sample of current study includes 186 drivers amongst taxi drivers of different lines in Kerman's organization of taxi services which was calculated using sample size determiner formula to estimate an average in the community considering 1.5 standard deviation according to similar studies' findings, error 0.15 and 95% confidence level and it was accomplished using stratified sampling method and selecting available samples in each category. Each taxi station in Kerman was determined as a category and available samples were invited to participate the study.

The data collection was accomplished through standard questionnaires called "Manchester driving behavior questionnaire (MDBQ)" to study attitudinal situation of taxi drivers and "general health questionnaire (GHQ)" (Abdoli et al., 2015; Yousofi, Ghasemi, &Taghavi, 2012) to detect possible psychiatric disorders. The "Manchester driving behavior questionnaire" was conducted and codificated in Manchester University by Reason & et al. in 1990 (Reason et al., 1990; Lajunen, & Summala, 2003). This questionnaire has been implemented and validated in various countries like England (Parker, McDonald, Rabbitt, &Sutcliffe, 2000), Australia (Newnam, Watson, &Murray, 2002) and Finland (Bianchi, & Summala, 2004) and it's based on the idea that driving mistakes and traffic violations have multifarious psychological reasons and also diverse adjustment methods and they should be distinguished (Reason et al., 1990; Davey, Wishart, Freeman, & Watson, 2007).

Manchester driving behavior questionnaire has two sections. Fist one had 14 questions for collecting patients' demographic data including age, gender, marital status, driving experience, number of accidents, being guilty or not in those accidents. Second section was including 50 questions in four sub sections the Slips (1 questions), the Intentional violations (17 questions), the Unintentional violations (3 questions) and mistakes (9 questions). The responses' measurement scale was Likert scale with 6 options containing never, almost never, sometimes, often, frequently and always.

Questions were studying this driving behavior questionnaire from two aspects; first type of behavior and second risk rate of that behavior for other drivers. Abnormal driving behaviors contain 4 categories: slips, mistakes, intentional violations and unintentional violations. Also, there are three categories about the amount of these behaviors' risk: behaviors without any risk for other drivers in a way that it just makes others uncomfortable (low risk), behaviors with the possibility to make some kind of risk for others (moderate risk) and behaviors which will definitely make trouble (high risk).

Several studies have shown Manchester driving behavior questionnaire has an acceptable reliability. In examining test retest of 80 drivers during a 7 weeks period of time, Parker & Reason (Parker, Reason, Manstead, & Stradling, 1995) achieved 0.81 correlation coefficient, and Westerman & Haigney (Westerman, & Haigney, 2000) achieved 0.76 internal consistency coefficients. These results match with other results including the research of Dobson & Brown & Ball (Dobson et al., 1999) and also Parker & et al. (Parker, Lajunen, & Stradling, 1998).

General Health Questionnaire (GHQ) has 28 questions in four dimensions which examine: first section (physical complaints), second section (stress), third section (social conflict) and forth section (depression). The responses' measurement scale was Likert scale with 6 options containing never, almost never, sometimes, often, frequently and always. This questionnaire's reliability and validity likewise has been examined in previous studies (Abdoli et al., 2015; Abdoli et al., 2015; Salahian, Hassani, &Rabiei, 2013).

After obtaining legal permits and due regards to ethnical issues, researchers went to taxi stations in Kerman and while explaining objects of this study, arbitrariness of participation and secrecy of responses, handed the questionnaire to drivers and gathered them after completion. Only in a few cases due to drivers' low educational level, questions and options were read to them and responses were registered.

The collected data were analyzed by means of SPSS software version 16 and descriptive and inferential statistics. In this case were used to describe demographic characteristics of the frequency, mean, standard deviation and median; ANOVA and T-test were applied for comparing driving behavior situation and mental health among demographic groups and Pearson tests and Chi-square were used to determine the relation between independent variables and driving behavior situation and mental health.

3. Findings

In this research, 186 taxi drivers were studied all of them were male drivers (100%) and their average age was 41/2±11/3 years old and their age range was 20-74. Most of these drivers were married (92.5%) and most percentage of drivers have had finished high school (41.4%). They had their driving certification with an average of 18/6±10/6. They have been taxi drivers on average for 13/6±9/08 years.

22.1% of drivers had experienced at least 2 accidents. 79.5% of drivers had suffered financial losses in accidents and only (13.1%) had faced with physical harm at one of the passengers or pedestrians or occupants of other vehicles.

In data analysis, 50 questions of Manchester driving behavior questionnaire were divided into four dimensions of Slips, the Intentional violations, the Unintentional violations and mistakes and General Health Questionnaire was divided into four dimensions of physical complaints, stress, social conflict and depression. Therefore, driving behavior and mental health's grades of taxi drivers of Kerman were calculated.

A five-point Likert-type response scale was used to rate these questionnaires as not committing any of high risk behaviors during driving was rated 5 and having the daily habitude of committing any of high risk behaviors was rated 1. The findings related to each dimension's rates show that in general, the driving behavior situation of Kerman's taxi drivers is eligible and the mental health situation of them is partly good (Tables 1 and 2).

Table 1. Mean and standard deviation of driving behavior and mental health dimensions of Kerman's taxi drivers

	Dimensions	Mean and Standard Deviation
Driving behavior	slip	4.10±0.491
	intentional violations	4.12±0.549
	mistakes	4.21±0.581
	unintentional violations	4.11±0.650
	Total	4.13±0.481
Mental health	physical	3.56±0.871
	stress	3.56±0.804
	social	3.06±0.930
	depression	4.26±0.820
	Total	3.61±0.662

Comparing driving behavior and mental health in different groups of drivers

Table 2. The relationship between driving behavior and mental health of Kerman's taxi drivers

Dimensions			Driving Behavior					Mental Health				
			Slips	Intentional Violations	Mistakes	Unintentional Violations	Behavior's Total Score	Physical	Stress	Social	Depression	Health's Total Score
Driving Behavior	Slips	Pearson Correlation	1.00									
		Sig. (2-Tailed)	0.00									
	Intentional Violations	Pearson Correlation	0.72	1.00								
		Sig. (2-Tailed)	0.00	0.00								
	Mistakes	Pearson Correlation	0.76	0.71	1.00							
		Sig. (2-Tailed)	0.00	0.00	0.00							
	Unintentional Violations	Pearson Correlation	0.55	0.58	0.48	1.00						
		Sig. (2-Tailed)	0.00	0.00	0.00	0.00						
	Behavior's Total Score	Pearson Correlation	0.87	0.88	0.86	0.79	1.00					
		Sig. (2-Tailed)	0.00	0.00	0.00	0.00	0.00					
Mental Health	Physical	Pearson Correlation	0.27	0.23	0.20	0.11	0.23	1.00				
		Sig. (2-Tailed)	0.00	0.00	0.01	0.15	0.00	0.00				
	Stress	Pearson Correlation	0.35	0.32	0.27	0.11	0.30	0.68	1.00			
		Sig. (2-Tailed)	0.00	0.00	0.00	0.12	0.00	0.00	0.00			
	Social	Pearson Correlation	0.12	0.16	0.14	0.12	0.16	0.37	0.26	0.26		
		Sig. (2-Tailed)	0.10	0.03	0.05	0.11	0.03	0.00	0.00	0.00		
	Depression	Pearson Correlation	0.42	0.46	0.37	0.29	0.45	0.53	0.65	0.65	1.00	
		Sig. (2-Tailed)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
	Health's Total Score	Pearson Correlation	0.37	0.37	0.31	0.20	0.36	0.83	0.82	0.82	0.80	1.00
		Sig. (2-Tailed)	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00

4. Association between Sample Characteristics and Driving Behaviour and Mental Health

Investigation of driving behavior dimensions and mental health dimensions' rate in different age groups illustrated that there is a meaningful relation between drivers' age and the amount of their intentional and unintentional violations and total score of their driving behavior, drivers' stress and depression and the total score of their mental health. So that in all dimensions, except for stress, people older than 30 years old achieved better scores and they have a better mental health.

Drivers' type of car has a meaningful relation with unintentional violations and social dimension of mental health; The TUKEY test showed that drivers with Roa cars have committed less unintentional violations and have better social health. There was also a meaningful difference in committing slips and mistakes in driving, physical health, depression and stress and likewise total score of driving behavior and total score of mental health, with their route directions. The TUKEY test revealed that the discrepancy between mental health situation and driving behavior of drivers in various routes is insignificant; for instance drivers who were traveling in the city center have evaluated their physical health better than other drivers in other parts of city.

The drivers with less than 10years of experience had committed less intentional violations and they had better driving behavior and mental health and drivers who had experienced more accidents, in all dimensions of driving behavior and its total score and also in depression dimension of mental health, had less scores comparing to other drivers.

The drivers who had the experience of accidents with personal injury to themselves, pedestrian, occupants or the passengers of other vehicles, in all dimensions of driving behavior and mental health except for the dimension of unintentional violations and mental health, had achieved less average score.

5. Correlation Tests Results

The Pearson's correlation test showed overall driving behavior score is correlated positively with mental health score (r=0.83, P=0.000). Since the result of Chi-Square Test showed that there is significant relationship between driving behavior and mental health (Table 3). Also there were positive correlations between all driving behavior dimensions and mental health dimensions at a level of significance of 0.005 (Table 2).

The result of Chi-Square Test showed that there is statistically significant difference between younger and older drivers. Younger drivers had on the average 1.41 (95% CI 0.79-1.35) higher mental health score as compared to older drivers (P=0.04). Drivers who had less driving experience had on the average 2.17 (95% CI 0.98-4.33) higher mental health score as compared to who had more than 10 years driving experience (P=0.04).

Drivers who had less education significantly had better driving behavior than drivers of the same age who had more education (P=0.07). Single drivers had on the average 15.3 (95% CI 2.77-85.1) higher driving behavior score compared to married drivers (p<0.001). Drivers who had faced with financial loss in their previous accidents had on the average 2.17 (95% CI 0.98-4.33) higher driving behavior score as compared to who hadn't faced with financial loss in their previous accidents (P=0.04). Chi-Square Test showed that driving license cancellation is significantly correlated with driving behavior. Drivers who had lose their driving license for a while had 11.8 (95% CI 1.03-134) higher driving behavior score as compared to other drivers (P=0.05).

Being guilty in previous accidents, accident history and facing with injury due to accident didn't have correlation with driving behavior and mental health scores (Table 3).

The result of Linear Regression using backward method showed that 20% of driving behavior score variations can be described by accident history, driver's education and facing with injury due to accident variable and other constant variables didn't have any significant effect on driving behavior scores (Table 4).

Table 3. Odds ratios (OR) and 95% confidence intervals (CI) of the factors influencing Driving behaviour and Mental health among Kerman taxi drivers (n=186)

Variables		Driving behavior					Mental health				
		N	P value	OR	95% C I		N	P value	OR	95% C I	
					Lower	Upper				Lower	Upper
Age	Under 30 years	26	0.48	1.63	0.26	9.16	26	0.04*	1.41	0.79	1.35
	Upper 30 years	161					161				
Education	Under diploma	86	0.07*	6.11	0.7	53.1	86	0.32	1.28	0.59	2.75
	Diploma and Upper	100					100				
Marriage status	Single	14	0.00*	15.3	2.77	85.1	14	0.18	2.17	0.62	7.56
	Married	172					172				
Driving experience	Under 10 years	48	0.52	1.37	0.24	7.73	48	0.04*	2.17	0.98	4.33
	Upper 10 years	130					130				
Accident history	More than 10 times	154	0.00	0.25	0.00	0.15	154	0.61	0.97	0.19	4.79
	Less than 10 times	10					10				
previous accident	More than 12 mounts	92	0.45	1.62	0.29	9.12	92	0.34	0.78	0.39	1.72
	Less than 10 times	71					71				

Injury	Yes	21	0.17	3.62	0.62	21.8	21	0.59	1	0.32	3.22
	No	142					142				
Financial loss	Yes	136	0.04*	2.07	0.67	1.37	136	0.64	0.77	0.08	6.81
	No	35					35				
License cancellation	Yes	4	0.05*	11.8	1.03	134	4	0.55	1.53	0.15	15.2
	No	174					174				
Being guilty	Yes	39	0.48	1.46	0.25	8.28	39	0.3	1.39	0.54	3.34
	No	124					124				

Table 4. Factors associated with Driving behaviour and Mental health among Kerman taxi drivers by multiple linear regression (n=186)

Dependent Variables	**Predictors**	**B**	**Std. Error**	**Beta**	**P value**	**95% Confidence Interval for B**	
						Upper Bound	Upper Bound
Driving behaviour	(Constant)	3.489	0.224		0	3.05	3.93
	Accident history	-0.046	0.01	-0.335	0	-0.07	-0.03
	Education	0.152	0.067	0.157	0.025	0.02	0.28
	Injury	0.324	0.101	0.222	0.002	0.12	0.52
Mental health	(Constant)	3.27	0.23		0.00	2.82	3.72
	Age	0.01	0.01	0.22	0.04	0.00	0.03
	Driving experience	0.00	0.01	-0.05	0.64	-0.02	0.01
	Accident history	-0.03	0.02	-0.14	0.08	-0.06	0.00
	previous accident	0.00	0.00	-0.12	0.04	-0.01	0.00

6. Discussion and Conclusion

The aim of this research was to investigate the relationship between mental health and driving behavior. The required data for this study were collected through two questionnaires: Manchester driving behavior questionnaire and General Health Questionnaire from 186 taxi drivers in Kerman. Driving is a social act which human behavior factor has the most important role in it (Kheirabadi, & Bolhari, 2012). Taxi drivers, are a large group of professional drivers in Kerman who spend a lot of their time on driving and most of them have acquired sufficient skills to do this duty properly. Modification of driving behavior in this group would have a desirable effect on reduction of violations and accidents in the city and also causing improvement in driving culture of society's other segments. The first step in designing and implementing modification programs in risky driving behaviors is being aware of their driving behavior status. Finding analysis revealed that all the dimensions of driving behavior and mental health have positive interaction with each other. Therefore, it seems that drivers' mental health has a major impact on driving behavior.

The study's findings showed that in general, the driving behavior situation of Kerman's taxi drivers is eligible and the mental health situation of them is partly good. The results of another study which had examined the high risk driving behaviors among taxi drivers in the capital of Iran illustrated that the attitude of drivers toward driving safely was also eligible and most of drivers reported that they always or often don't do high risk driving behavior. In that study three common high risk behavior in drivers included using cellphone during driving, not having proper distance with the car ahead and not driving between the lines (Sucha, Sramkova, & Risser, 2014).

This study's findings demonstrated that there is a meaningful positive relation between mental health and driving behavior. That means if people are in a proper mental health their driving behavior will also be eligible. Thus the first hypothesis of this study was approved. Yousefi et al. in the conclusion of their study also stated high risk driving behavior is a function of drivers' mental health. Mental health affects directly on drivers' behavior and mental health undermines high risk driving behaviors (Yousofi, Ghasemi, & Taghavi, 2012). The findings of Shakerinia's study agree with findings of current study in a way that this researcher in his study's conclusion had stated that there is a direct meaningful relation direct between high risk driving behavior and mental health (shakerinia, 2010; shakerinia, & mohammadpoor, 2010).

The analysis of Manchester driving behavior questionnaire indicates that mistakes during driving is the most common errors of studied driving behavior and behaviors of slips dimension had the lowest rate. The results of a study conducted by Hamed Al Reesi et al. showed that mistakes had a meaningful relation with accidents but slips had no relation with accident happening (Al Reesi, 2013). This means that mistakes comparing to slips are

more effective on accidents.

The mentioned analysis on health questionnaire data demonstrates that among four dimensions (GHQ), depression is the most common and social disturbance has the lowest rate in Kerman's taxi drivers. Stress and depression symptoms and high risk driving have a meaningful positive relation so that depression has the most effect on people's mind and also driving behavior (Salahian, Hassani, & Rabiei, 2013).

Among individual characteristics of studied taxi drivers, age, type of the car, drivers' route direction, having experience, record of accidents, and record of accidents resulting in personal injury had a meaningful impact on taxi drivers' driving behavior in Kerman. Younger drivers committed more intentional and unintentional high risk driving behaviors which can be due to the characteristics of having less experience, taking more risks and being impatient in them. In another study which had studied driving behavior of youth, it has been reported that younger drivers feel that inappropriate and high risk behaviors are less risky for them (Gheorghiu, & Havârneanu, 2012). In addition, effects of the desire of doing high risk driving behavior are much stronger than the understanding of risks during driving and this situation in young male drivers is more rather than old or female drivers (Rhodes, & Pivik, 2011).

In current study having experience was inversely associated with driving behavior and drivers who had more experience in driving and having accidents had less scores in driving behavior and mental health compared to the other drivers but the study that was carried out in Tehran demonstrated that there was a meaningful positive relation between positive attitude towards quitting high risk behaviors and having experience in driving (Shams et al., 2012).

While there wasn't any meaningful difference between driving behavior and mental health for those drivers who had the experience of accidents resulting in financial losses. Having the experience of personal injury to the driver, pedestrian or occupants of the other vehicle result in a meaningful difference in the score of driving behavior in the two groups of drivers. It seems like troubles and the consequences of an accident and getting injured are so much that it can be a factor causing improvement in drivers' behavior of studied taxi drivers.

Education is also an effective factor in having a proper driving behavior so that the driving behaviors of the drivers who had finished high school or those with more education than that were 6 times better than those whose education was less than high school. The positive relation f education and driving behavior was approved in other studies too (Shaaban, 2013).

Taxi drivers are a large group in the cities and for the first time this study has been investigating the relation between mental healths and driving behavior among taxi drivers in Iran. However, it seems that executing appropriate qualitative studies for the extraction of reasons of drivers' high risk driving behavior could be able to provide more information for designers and programmers of driving behavior modification programs. Results of this quantitative study accompanied to findings of mentioned qualitative studies along with using the experience of other communities would be helpful in designing effective programs.

This study has some constraints. First constraint comparing with other studies in other countries is that in this study only male drivers have been studied. Urban taxi driving is a masculine job in Iran and just a few female taxi drivers are working just for private enterprises so female drivers weren't available.

The other constraint of this study was concerning about not stating the truth in responses of both questionnaires. Exposing high risk driving behavior could lead in legal prosecution, so drivers were cautious about reporting their behavior during driving or about their mental health. In order to gain the trust of drivers, in advance and before starting, researchers gave taxi drivers enough information about Kerman medical school as the trustee of the study and about objects of this study and all the questionnaires were completed anonymously and privately. Being cautious in self-surveying is common in behavior survey studies and using some indirect questioning methods like Proxy Respondent and Random Response could somehow increase the accuracy.

Since high risk behavior modification requires cooperation and a coalition of all organizations and involved groups in traffic area and about taxi drivers' behavior, at least two sections of traffic police and organization of managing and supervising taxi services of Iran have key role, it will be a great step forward to form a Working group to pay extra attention to taxi drivers' high risk behavior modification. Also, it would be helpful to provide constant trainings to taxi drivers, to use available educational opportunities in drivers' workplace, using the help of city capabilities to inform taxi drivers properly about high risk behavior and providing required situations and facilities to quit such behaviors.

7. Conclusion

The provided result of this study showed that mental health is effective on drivers' behavior. Therefore, drivers'

behavior could be impacted by doing some works to improve mental health and disability, death, huge costs of accidents could be prevented proper by enhancing driving behaviors. To modify high risk driving behavior, after training them taxi drivers can be suggested as the role model of driving. Since taxi drivers are a large group of urban professional drivers who spend a lot of their time on driving so they can be a good role model for other communities' drivers too. In addition, high risk drivers can be recognized and modificational trainings would be designed for them using simulated tests and periodic mental health tests.

Competing Interests Statement

The authors declare that there is no conflict of interests regarding the publication of this paper.

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