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The Relationship Between Self-Control and Car Accidents

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Background: Car accidents are one of the major causes of death and serious injuries all over the world. Human factors, especially psychological factors play an important role in accident occurrence.
Objectives: This study was conducted in order to determine the relationship between self-control and car accidents based on demographic factors in Gonabad, in 2011.
Patients and Methods: In this correlation study, 440 drivers in Gonabad (219 females, 221 males) were selected with non-probability sampling method, using Morgan table. They all fulfilled personal information and Schneider self-control questionnaires (1974). Data were analyzed with SPSS-18 software using t-test, one-way ANOVA, stepwise regression-test and Fisher's test.
Results: Data showed that 80.9% of drivers suffer from low self-control. There was a strong negative correlation between self-control and car accident ($P < 0.05$). There was no relationship between self-control and gender, age, marital status, occupation, level of education and frequency of accidents in drivers with previous history of accident ($P > 0.05$). Stepwise regression test showed that gender and self-control are correlated with accident occurrence.
Conclusions: Considering the results of our study, it seems that paying more attention to all factors affecting car accident is a necessity and in order to reduce car accident rate, preparing a long-term plan for self-control education and evaluation should be put in to consideration.

Keywords: Accidents; History; Human

1. Background

Driving has become an essential part of life for occupational, social, educational, economic and recreational reasons. However, motor vehicle accidents are a major cause of mortality and morbidity in different societies. The increased need of populations for driving in the modern world has resulted in higher car accidents and unfortunately higher mortality rates. This has made motor vehicle crashes an important public health issue (1). It has been estimated that annually 2 million people pass away and more than 15 million get injured in road accidents all over the world (2). Iran possesses the highest mortality rate in road accidents in the world and its human and economic costs are enormous (3). Road accidents cost 6 billion dollars every year in Iran which is equal to more than 5% of gross domestic product (GDP) (4). Various factors including human factors, vehicle's condition, physical and social status, play roles in the mortality rate of car accidents (5). Among human factors, self-control is an important one. Self-control is defined as inherent conflict between logic, impulses, knowledge and motivation (6). This concept which got spread by Schneider in 1974 has been defined in different ways. Self-control is a response or a sequence of responses performed by an individual when he or she wants to alter the consequence of the next event (7). It has also been defined as the ability to postpone gratification instead of being impulsive (8); ability to control emotion, behavior and habits properly; postponing reward taking and effective management and strong will (9). Some scientists believe that self-control is not teachable and it has a genetic-neurologic base. Others state that self-control, like any other psychological capacity cannot develop naturally, without environmental stimuli (7). Brain functional imaging shows that self-control is related to the posterior part of medial prefrontal cortex. Self-control requires sufficient glucose levels in the brain and it is dependent on brain executive function (10). Based on Freud's psychoanalytic theory, self-control inhibits inappropriate impulses. Although humans have a low psychological energy to control their socially inappropriate demands, they use self-control to do so because they want to delay instant gratification for long term satisfaction which seems to have more advantages for them (7). Self-controlled people can select the best responses; however, impulsive people tend to choose immediate gratification (11). People with low self-con-

trol are self-centered and do not pay attention to others' needs, they lack empathy and other people's sufferings are not important for them. Coping with frustration is hard for them, and the rate of violation and aggression is higher in them (12). On the other hand, people with high self-control pay more attention to long term consequences of their behavior, they are able to postpone gratification and they are more likely to think, talk and act logically (13). Some scholars are of the opinion that long term practice can increase self-control. The mechanism might be better glucose uptake in the brain or reinforcing appropriate behaviors by regular impulses inhibition (14, 15). Some studies conducted in Iran, showed a high prevalence of low self-control among Iranians. In a study by Etebarian et al. the prevalence was reported to be 88% and in another study carried out by Allah Verdi Poor et al. the reported rate was 33.9% (16, 17). According to several studies, self-control is the base of many psychological problems. Low self-control is seen in impulse control disorder, pyromania, kleptomania, trichotillomania and type B personality disorder. Self-control is needed to inhibit a person from harmful activities such as excessive smoking, gambling and high risk sexual activity (14). Low self-control is associated with antisocial personality disorder substance abuse disorder and anger management problems; whereas, excessively high self-control is associated with anorexia and obsessive-compulsive disorder (18). There is a higher probability for individuals with low self-control to involve in car accidents (13). Some similar studies have evaluated the relationship between self-control and aggressive driving (13), self-regulation and car accidents rate (19) and occupational dissatisfaction and rate of accidents (20). Some other studies have tried to access all factors associated with motor vehicle accidents (21-24).

2. Objectives

These studies have shown that the risk of a car accident is lower in males than females (24) and accidents rate is higher in women (22). They have also demonstrated that married people involve in more accidents in comparison with singles and the risk of having an accident is reduced as the driver becomes more experienced and his or her driving license becomes older (24). These studies also show that stressful jobs have a predictive value in the incidence of a car accident (22) and accidents rates are higher in older ages (25). Regarding the importance of self-control in road accidents as well as in every aspect of life and lack of studies in this field, especially in our country, we decided to conduct this study in order to determine the relationship between self-control in drivers and car accidents based on demographic factors.

3. Patients and Methods

In this correlation study, the population was 38000 drivers in Gonabad who all had type B driving license (a kind of license to drive automobiles not buses or trucks) and they had been driving at least for one year continuously. Using Morgan table, Sample volume determined 440 drivers (221 males and 219 females) that they were selected by convenience sampling based on inclusion criteria (having type B driving license and history of driving at least for one year continuously). After informing the participants about the goals of this study and assuring them that their information will be kept secret, they were asked to fulfill the personal and Schneider's self-control (1974) questionnaires. Schneider's self-control (1974) questionnaire is a short questionnaire which contains 18 true or false items. If subjects answer items 1, 2, 3, 7, 9, 11, 13, 14, 15, 16 as false and items 4, 5, 6, 8, 10, 12, 17, 18 as true, they get one score for each item. People who gain 0-9 score are considered as low self-control and people with the score of 10-18 are considered as high self-control individuals (16) we used this method in our study to categorize our sample. Schneider has approved the validity of this questionnaire (26) and using test-retest method, its reliability has been reported 83% (27, 28). In various studies validity of this measure has been demonstrated (29) and using Cronbach's alpha, its reliability has been reported 0.75 and 0.70 in two different studies (26,30) In Iran, using Cronbach's alpha, the questionnaire's reliability was reported 0.84 (16). In our study the assessed reliability with Cronbach's alpha was 0.78. Personal information questionnaire contained 20 questions, 10 asking about driving and accidents history, 6 asking about demographic information such as age, gender, marital status, occupation, level of education and monthly income and the last 4 questions were about the time they got their driving license, driving history and number of accidents in the recent year. Questionnaires were spread out to drivers in parking lots, parks, crowded places, offices and organizations. After informing the drivers about the study and obtaining their agreement to participate and also assuring that they have at least One year history of continuous driving, we asked them to answer the questionnaire truthfully. Data was analyzed with SPSS-18 software using t-test, one-way ANOVA, stepwise regression-test and Fisher's test.

4. Results

Table 1 shows descriptive data of the sample. From all 440 people, 50.2% were male and 49.8% were female, 13.6% were single and 86.4% married. The majority had diploma (44.1%) and were employees (30.2%). Mean age was 33.3 years (SD 8.98) and mean for driving history was 8.48 years (SD 8.30). 356 people (80.9%) had low self-control and 84 (19.1%) had high self-control. 173 people had a previous history of car accident but 267 of them (60.7%) did not have any history of car accident. 82.3% did not have an accident in the recent year, 13.6% had one accident, 2.7% two and 1.4% 3 accidents in the recent year. Based on the

Table 1. Frequency and Percentage of Self-Control, History of Accident and Demographic Factors [a]

Variable	Frequency
Self-control	
High	84 (19.1)
Low	356 (80.9)
History of accident	
Yes	173 (39.3)
No	267 (60.7)
History in the recent year of accident	
Yes	78 (17.7)
1 Time	60 (13.6)
2 Times	12 (2.7)
3 Times	6 (1.4)
No	362 (82.3)
Sex	
Male	221 (50.2)
Female	219 (49.8)
Marital status	
Single	60 (13.6)
Married	380 (86.4)
Occupation	
Workman	16 (3.6)
Employee	133 (30.2)
Teacher	32 (7.3)
Businessman	121 (27.5)
Retired	16 (3.6)
Others	122 (27.7)
level of education	
Lower than diploma	52 (11.8)
Diploma	194 (44.1)
Bachelor degree	161 (36.6)
Master degree and higher	33 (7.5)
Driving history	
Less than 5 years	222 (50.5)
5-10 years	77 (17.5)
10-15 years	74 (16.8)
More than 15 years	67 (15.2)
Total	440 (100)

[a] Data are presented as No. (%).

Table 2. Mean Score of Self-Control Based in History of Previous Accident

History of Accident	No.	Mean ± SD	df	T	Sig
Self-Control			438	3.745	0.000
Yes	173	6.5780 ± 3.03487			
No	267	7.6854 ± 3.02594			

Table 3. Comparison Between High and Low Self-Control Based on History of Previous Accidents

History of Accident	Self-Control, No. (%)			Result Fisher Test
	High	Low	Total	
Yes	25 (29.8)	148 (41.6)	173 (39.3)	$X^2 = 3.97$
No	59 (70.2)	208 (58.4)	267 (60.7)	DF = 1
Total	84 (100)	356 (100)	440 (100)	P = 0.048

data presented in Table 2, calculated T (3.75) was bigger than table's T; therefore, it can be assumed with 95% confidence interval that there is a statistically meaningful association between overall score of self-control and history of accidents (P = 0.000).

Fisher's exact test also showed a significant difference between self-control and previous history of accident (P = 0.048). 41.6% of people with low self-control had previous history of accidents, while 29.8 percent of drivers with high self-control had this history (Table 3).

Table 4 compares mean score of self-control in drivers with history of accident based on demographic factors. In this group of drivers, there is no difference in self-control between males and females (P = 0.18). There is also no significant difference between marital status and self-control (P = 0.11). Differences in mean self-control score among people with different occupations (P = 0.30) and different levels of education (P = 0.46) are not meaningful as well. According to one-way ANOA test, there is no link between self-control and the number of previous accidents in the recent year (P = 0.06).

As table 5 presents, Pearson Correlation test indicates that there is negative significant correlation between self-control and age in the group with previous history of accidents (P < 0.05). Table 6 shows that there is an association between accident occurrence and gender and also self-control. Probability of having a car accident is less in women and as self-control increases, odds of having an accident decrease.

5. Discussion

Our study showed that 80.9 percent of drivers in Gonabad suffer from low self-control and only 19.1 percent

Table 4. Comparison of Mean score of Self-Control in Drivers With History of Accident Based on Demographic Factors

Demographic Factors	Frequency	Self-Control, Mean ± SD	T	F	DF	P Value
Sex			1.33		171	0.18
Male	60	7.00 ± 3.48				
Female	113	6.35 ± 2.76				
Marital status			1.61		171	0.11
Single	19	7.63 ± 3.08				
Married	154	6.45 ± 3.01				
Occupation			1.23		172	0.30
Workman	5	7.00 ± 1.87				
Employee	54	6.04 ± 2.73				
Teacher	11	6.82 ± 2.44				
Businessman	59	6.92 ± 2.94				
Retired	8	4.87 ± 1.46				
Others	36	7.08 ± 3.94				
level of education			0.94		168	0.46
Elementary school	8	6.37 ± 1.30				
2 Years of high school	12	6.00 ± 1.48				
Diploma	72	6.46 ± 3.32				
Bachelor ± degree	64	7.13 ± 3.23				
Master degree and higher	17	5.53 ± 3.03				
History of accidents				3.55	439	0.06
1-2 Times	72	6.46 ± 3.77				
More than 2 times	6	8.83 ± 4.07				

Table 5. The Correlation Between Self-Control and Age in 2 Groups With and Without History of Accident

Age Groups Based on History of Accident	Self-control	
	R	P Value
Yes	0.26	0.001
No	0.06	0.319

Table 6. The Correlation Between Factors Affecting on Accident Occurrence in Logistic Regression Model [a]

Variable	OR	P Value
Age	0.982	0.343
Sex	0.434	0.001
Driving license history	1.032	0.526
Driving history	1.003	0.952
Self-control	0.833	0.001
Occupation	1.07	0.42
Marital status	1.36	0.36

[a] Abbreviation: OR, Odds Ratio.

of them have high self-control. The rate of low self-control in this study was similar to the one reported in Etebarian et al. study (88%) (16), but it was higher than the rate presented in Allah Verdi Poor et al. study (33.9%) (17). Self-control is a unique individual characteristic which varies in different people. As a result, the differences in the rate of self-control in the mentioned studies can be due to personality, demographic and cultural differences in the samples. 173 drivers (39.3%) had a history of accident; whereas, 267 of them (60.7%) did not. 82.3% had no accident in the recent year, 13.6% had experienced one accident, 2.7% two and 1.4% had three accidents in the recent year. Data showed that there is a significant correlation between self-control and involving in an accident. History of having an accident in high and low self-control drivers were 29.8% and 42.6% respectively, and this is similar to the results of other studies in this field (13, 20). It appears that low self-control drivers involve in more collisions since they have high risk behaviors while driving such as high speed, improper overtaking and lower obedience to the rules. Some of low self-control individuals' characteristics are being adventures, risk taking, impulsive, having low tolerance, tendency to do wrong things

and seeking immediate gratification. Existence of such traits in a driver can affect driving and increase the risk of accidents. According to some researchers, when a driver's self-control is low, he or she is unable to cope with driving rules and cannot behave based on common standards, so they can be a threat for everyone (19). Although there was a correlation between sex and having an accident, and the probability of involving in a crash was less in women than men, there was no link between sex and self-control and also between self-control and accidents based on the sex. These finding are the same as the result of similar studies conducted earlier (21, 22). Despite the fact that self-control is influenced by cultural and environmental factors, it seems that sex does not affect those cultural, environmental and educational factors affecting self-control. There was negative significant correlation between self-control and history of having an accident based on age ($P < 0.05$). It means that as drivers with history of accidents get older, self-control is reduced in them. This is similar to the results presented in Rahmani et al. study (20). Moreover, Rostami et al. study showed that rate of having an accident is higher in older drivers (25). Some scholars point out that driving risks increase in the group aged more than 65 and 65-69 year-old drivers encounter deadly crashes 1.45 times more than 40-49 year-old ones. This can be because of physical and psychological characteristics of old people including slow process of sensing danger and avoiding it, and it draws attention to this part of the society as an important part to take care of in order to reduce road accidents. There was no significant correlation between self-control and involving in an accident based on drivers' marital status, level of education and occupation ($P > 0.05$). This does not consistent with the results of Rahmani et al. study which showed higher rate of collisions in married people comparing to singles (20), and also other studies which presented a link between accident rate, level of education (1, 20) and occupation (20-22). However, there was no connection between education and rate of accidents in young drivers (19-24 years old) in Lancaster et al. study (24). No relation was detected between self-control and accident rate based on history of driving ($P > 0.05$). This is inconsistent with Lancester et al. study results which showed that odds for having a car crash are reduced after driving for 8-9 years continuously and also Laapotti et al. study which indicated that as millage drove by a driver goes up, disobedience from rules and accident rate increases (23, 24). Based on this result, it seems that gaining driving experience does not increase self-control, so it cannot reduce accident rates. In other words, low self-control is more than a skill deficit in driving to be learnt by experience. Our study shows that self-control and number of accidents in the recent year do not correlate ($P > 0.05$). As mentioned earlier, self-control is one of the most important variables in personality aspects of driving and this study shows that there is a significant correlation between self-control and accident occurrence while there was no link between self-control and number of accidents a driver had in the recent year. This is opposite to Elyas study results which showed that self-control and accident rates are associated (19). Logistic regression test showed that only sex and self-control are related to accident occurrence. Probability of accident is less in women and it is reduced as self-control increases. This is similar to some other studies showing that women have fewer accidents than men (20, 24). Since there is no difference in self-control between men and women in our study, it seems that factors other than self-control such as women's greater caution, hormonal factors (high testosterone levels in men) and cultural and social factors(considering aggressive driving as a manly behavior rather than women's behavior) involve in reducing women's accidents. Some limitations of our study included limited samples, non-probable sampling and using self-report questionnaires. Overcoming these limitations in future studies would help us to gather more reliable information and develop accurate plans in order to reduce car accidents. We can conclude from our findings that self-control is relatively low in drivers and there is a significant correlation between low self-control and car accident occurrence. Based on these results and since driving is a social behavior which affects people's interaction with each other, psychological evaluation of drivers seems to be a necessity. We suggest evaluating drivers' self-control in driving exams and even in specific time periods after the driver has obtained his license, and if a low self-control driver was monitored, specific organizations become involved in helping the driver to increase his self-control via education. Therefore, we can expect less car accidents in the near future in Iran.

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Authors' Contributions

Fateme Karimpour: original idea and study design, gathering data, data analysis; Jahanshir Tavakolizadeh: original idea and study design, observing the data gathering and analysis, writing the article.

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