

Association of Life Stress with Road Accidents

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Abstract

Introduction: Road accidents are a major cause of health problems in the world, and lifestyle stress is one of the most important factors in the occurrence of these events.

Objective: The aim of this study was to determine the association between life stress and road accidents.

Materials and Methods: A case-control study was conducted in Hamadan in 2013. The sampling method was carried out in two stages: the first stage involved simple randomization, and the second stage was convenient sampling. The sample size consisted of 103 people who referred to the car accident insurance centers (case group: regarding road accidents), and 206 people who referred to the police stations (control group: no accident). The measurement tool was a two-part self-reporting questionnaire that included information regarding demographic and lifestyle stress. The data was analyzed by the Chi-square test and Logistic regression based on age and sex. The significance level of all the tests was considered as less than 0.05.

Results: The results indicated that life stresses (financial problems, family arguments, occupational problems, and night shifts), and stresses during driving (retaliatory or angry reactions during driving, fear of possible damage during driving, and poor road conditions) have a significant difference between the two groups ($p = 0.05$), such that the odds of road accidents caused by lifestyle stress in the case group was about three times more than the control group ($P = 0.001$, $OR = 2.958$, $95\% CI = 1.66-5.26$).

Conclusion: The results of this study demonstrated the role of lifestyle stress as a contributing factor to road accidents; so, it can be concluded that reducing the level of these stresses may prevent such accidents.

Keywords: Psychological Stress, Life Style, Traffic Accidents

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Introduction

As defined by the World Health Organization (WHO), an event that occurs without any preliminaries can lead to a detectable injury [1]. Due to the high frequency of road accidents and the direct involvement of people in such cases, it is of particular interest to bring attention to them for the welfare of community health [2]. These events are now the eighth leading cause of death in the world [3]. In Iran, road accidents, with an incidence of 32%, are the second leading cause of death, and the first cause of lost years of life [4]; this imposes a cost of 1–2% of the gross national production, which is equivalent to five billion dollars a year [5]. According to the Michigan Traffic Research Institute, Iran ranks third among the top 10 countries with the highest mortality from accidents. This ranking corresponds to a rate of 18 per 100,000 people for deaths caused due to road accidents in the world [6]. Several factors contribute to road accidents. The four main causes of road accidents include human factors, traffic factors, vehicle, and weather conditions [7]. Among these factors, the major cause of accidents is related to the human factors [1, 8].

Recently, the role of stress in road accidents has attracted many researchers' attention. Al-Hemoud et al. classified stress-related road accidents into two general categories: life-related stress, and stresses during driving, respectively, and stated that life-related stress can play a role in the occurrence of road accidents. The results of their study showed that fatigue while driving that is caused by working in night shifts could be considered as an important factor in the occurrence of road accidents [9]. Taylor and Dorn considered several factors, such as lack of physical activity, stress, and fatigue, to be effective in causing accidents [10]. In Wallen Warner's study, the results showed that

people's lifestyles are influenced by a variety of factors, such as their economic status; besides, people belonging to different social classes exhibit different behaviors in day-driving [11]. Several studies have also documented the role of sleep deprivation in road accidents [12–15]. According to the study of Öz et al., stresses during driving include the effects of road and heavy traffic conditions on driving, angry or retaliatory reactions during driving, fear of possible damage during driving, bad weather, fatigue after driving, and life stresses that include financial problems, arguments with relatives and friends, and occupational problems [16].

An important factor in the prevention of road accidents involves paying particular attention to human factors. Community health nurses, as one of the main members of the health team, can play an important role in identifying the risk factors of road accidents. Since in Iran, especially in Hamedan, where a few studies have been done to determine the direct role of lifestyle-induced stress on road accidents, most of which are related to road accidents and outside urban areas, it was decided to conduct a study to determine the association between lifestyle-induced stress (driving stress and life stress) with occurrence of road accidents among the drivers of Hamedan city.

Materials and Methods

The present case-control study gathered data in Hamedan from the beginning of October to December 2013. In order to determine the sample size, as per the criteria of a 90% test power, alpha of 0.05, and stress prevalence of about 40%, in case of the non-accident group, which is according to Hasanzadeh's study [17], a minimum of 94 drivers were required in each group (case and control). Since in case-control studies, the number of people

in the control group is usually considered as 1.5 to 2 times that of the case group, the number of patients consisting the case group was 94, and the control group consisted of 187 patients. In addition, in order to increase the study accuracy, 30 subjects were added to the samples. As a result, a total of 309 people, including 103 drivers who applied for road insurance (case group), and 206 drivers who referred to Police stations (control group) were considered as the research sample.

The sampling method was two-staged. In the first step, simple randomization sampling method was used, and among the 17 road insurance companies in Hamedan, 10 centers (more than 50% of centers), and among the 6 police stations, 4 centers (more than 60% of centers) were selected. Then, from each center, individuals were recruited into the study by convenient sampling.

The inclusion criteria included age (between 18 and 65 years old), possessing a driving license, vehicles of all types including driving, taxis, van, minivans, and having at least elementary literacy due to the self-reporting nature of the questionnaire. For the case group, samples were selected from the drivers who were guilty of road accidents resulting in financial damages of the vehicle (up to 600\$), and who personally referred to the insurance centers for paying the fee. In the control group, samples were taken from drivers who were referred to the Police stations for renewal, replacement, and replication, and had no road accidents over the past year.

The measurement tool was a researcher-made questionnaire, designed based on relevant texts and references; it included two parts: demographic data (age, sex, occupation, and educational level), and information on lifestyle-related stresses

(including stresses during driving and life stress). There were nine questions in the questionnaire that were scored based on a three-point Likert scale, from zero to two (always, sometimes, and never). Among these nine questions, four questions were related to "life stress" (having financial problems, family arguments, occupational problems, and staying up at night for professional reasons) over the past year, and five questions were related to "driving stress" (reactions of a retaliatory or angry nature during driving, fear of possible damage during driving, the effects of poor road and weather conditions on driving, and fatigue during driving) over the past year. The scores of the questionnaire ranged from 0–18, and the median was used to determine lifestyle-induced stress (low or high). In this study, low lifestyle stress was demonstrated by those who had a median score of driving stress ≥ 13 , and high lifestyle stress by those who had the driving stress score less than the median. Accordingly, a higher score indicated a lower amount of driving stress.

To determine the validity of this tool, face validity and content validity methods were used; at first, the questionnaire was prepared based on reviewing similar studies, then it was provided to 10 faculty members of the Hamedan University of Medical Sciences and their viewpoints were considered. To test the reliability of the questionnaire, the test–retest method was used. In the first stage, the questionnaire was provided to 10 drivers who referred to insurance centers to pay for damages. In the second stage, two weeks later, the drivers were asked to complete the questionnaire again. The data of the questionnaire was analyzed by the SPSS software. The correlation coefficient was found to be equal to 89% that confirmed the reliability of the instrument. It should be noted that the drivers completing the questionnaire, at this stage,

were excluded from the study and were not considered as research samples.

In order to collect the data, after obtaining a confirmatory letter from the Research and Technology vice chancellor of the Hamedan University of Medical Sciences, the researcher referred to the insurance centers and police stations. Then the drivers were given a brief explanation about the research objectives and to the procedure for answering the questionnaire in written and verbal forms. The participants gave their written informed

consent to participate in the research. Subsequently, the demographic information and lifestyle stress levels of each participant were determined. The data was analyzed using SPSS version 20 software. In this study, the significance level was considered less than 0.05. For the analysis, descriptive and inferential statistics were used. Descriptive statistics included frequency, percentage and mean, and analytical tests included the Chi-square test and Logistic regression along with matching the effects of age and sex.

Table 1: Comparison of the frequency distribution of demographic information between the case and control groups

Variable	Category	Case group N (%)	Control group N (%)	Sig.*
Age	19-25	13 (12.5)	42 (20.4)	0.018
	26-30	31 (30.1)	41 (19.9)	
	31-35	22 (21.4)	77 (37.4)	
	36-40	15 (14.6)	19 (9.1)	
	41-45	8 (7.8)	7 (3.4)	
	46-50	8 (7.8)	10 (4.9)	
	51-55	4 (3.9)	8 (3.9)	
	56-60	2 (1.9)	2 (1)	
Sex	Male	83 (80.6)	165 (80.1)	0.92
	Female	20 (19.4)	41 (19.9)	
Educational level	Elementary	2 (1.9)	5 (2.4)	0.001
	Secondary	13 (14.6)	9 (4.4)	
	High school Diploma	30 (28.2)	13 (15)	
	Associate's degree	21 (20.4)	58 (23.8)	
	Bachelor's degree	29 (26.2)	101 (49)	
	Higher	9 (8.7)	20 (5.4)	

*Chi 2 Test

Table 2: Comparison of Life Stress in two groups of case and control

Life stress	Always		Sometimes		Never		Sig.*
	Case N (%)	Control N (%)	Case N (%)	Control N (%)	Case N (%)	Control N (%)	
Having economic problems	27 (26.2)	31 (15)	49 (47.6)	124 (60.2)	27 (26.2)	51 (24.8)	0.037
Having family arguments	8 (8.7)	0 (0)	52 (50.5)	104 (50.5)	43 (41.7)	102 (49.5)	0.001
Having occupational problems	2 (1.9)	0 (0)	48 (46.6)	90 (43.7)	53 (51.5)	116 (56.3)	0.009
Staying awake at night for job reasons	9 (8.7)	16 (7.8)	87 (87.9)	107 (51.9)	7 (3.4)	83 (40.3)	0.040

*Chi 2 Test

Results

The mean age of the case group was 29.8 ± 8.48 years and the mean age of the control group was 32.47 ± 8.60 years. Most of the participants in the case group (30.1%) were between the ages 26–30, and the majority of the participants in the control group (37.4%) were between the ages of 31–35. The results of the comparison of the two groups, based on the Chi-square test, showed that there was a significant difference in the age distribution of the subjects between the case and control groups ($P = 0.018$). In addition, 80.6% of the case group and

80.1% of the control group included males, and the rest of the cases involved women. The comparison of the two groups based on the Chi-square test showed no significant difference in terms of sex between them ($P = 0.92$). The educational level distribution of the studied units in the two groups showed that most of the case group (28.2%) had high school education, and most of the control group (50%) had undergraduate education. The results of the Chi-square test showed that the educational level distribution was different between the two groups ($P = 0.001$) (Table 1).

Table 3: Comparison of driving stress between two groups of case and control

Driving stress	Always		Sometimes		Never		Sig.*
	Case N (%)	Control N (%)	Case N (%)	Control N (%)	Case N (%)	Control N (%)	
Retaliation and anger during driving	7 (6.8)	1 (0.5)	37 (35.9)	67 (32.5)	59 (57.3)	138 (67)	0.003
Fear of possible damage during driving	9 (8.7)	7 (3.4)	52 (50.5)	91 (44.2)	42 (40.8)	108 (52.4)	0.043
Poor road conditions	13 (12.67)	16 (7.8)	66 (64.1)	92 (44.7)	24 (23.3)	98 (47.8)	0.001
Bad weather conditions	4 (3.9)	6 (2.9)	28 (27.2)	32 (15.5)	71 (68.9)	168 (81.6)	0.040
Fatigue	9 (8.7)	13 (6.3)	66 (64.1)	107 (51.9)	28 (27.2)	86 (41.7)	0.042

*Chi 2 Test

Table 4: Estimated odds ratio adjusted for age and sex in car accident in the case and control groups

Variable	Case N (%)	Control N (%)	Logistic regression test		
			Sig.	Adjusted Odds Ratio	Adjusted CI 95%
High	78 (75.7)	120 (58.3)			
Low	25 (24.3)	86 (41.7)	0.001	2.958	1.661-5.265
Total	103 (100)	206 (100)			

The comparison of life stress over the past year in the case group with the control group showed that there was a significant difference between the two groups in terms of financial problems ($P=0.037$), family arguments ($P=0.001$), occupational problems ($P=0.009$), and staying awake at night for occupational reasons ($P=0.040$) (Table 2).

The comparison of driving stresses over the past year between the case group and the control group showed a significant difference for some cases, such as reactions of anger and retaliation ($P= 0.003$), fear of possible damage during driving ($P = 0.043$), the effect of poor road conditions ($P = 0.001$), and fatigue during driving ($P=0.42$) (Table 3).

In addition, Logistic regression was used to adjust the age and sex ($p=0.001$) that showed that the case group had 2.95 times more stress than the control group ($P=0.001$, OR = 2.958, 95% CI: 1.66 – 5.26) (Table 4).

Discussion

The results of this study showed that there is a difference between the case and control groups in terms of lifestyle-related stress. The case group had about three times more life stress than the case group. Therefore, lifestyle stress seems to be a contributing factor in road accidents in Hamedan. Al-Hemoud et al. referred to the role of lifestyle stress in the occurrence of road accidents, and stated that modulating these stress factors had a deterrent effect on road accidents [9]; therefore, the result of the present study is consistent with the aforementioned research.

Useche et al. mentioned that psychosocial factors are one of the many factors responsible for road accidents [18]. In another study, the researchers found that work-related stress, and burnout of BRT

drivers could increase the incidence of road accidents in Colombian professional drivers [19]. Ismail also showed in his study that behavioral characteristics and stress in drivers influenced road accidents [20]; therefore, it can be stated that the present study is in line with the aforementioned studies. In addition, financial problems leading to life stress over the past year showed a significant difference between the two groups, indicating its increasing role in the occurrence of road accidents. Several studies have also shown that having financial problems can be considered as a predisposing factor in road accidents [11, 14, 21].

Having family arguments as well as occupational problems, such as having problems with colleagues over the past year, as factors of life stress, also showed a significant difference between the two groups, which means that they have a favorable role in the occurrence of road accidents. These results are consistent with the results of the study by Vassallo et al. stating that those who have weak and inappropriate associations with other family members, friends or other community members are more likely to be involved in road accidents [22]. In addition, Abbasi and his colleagues found that a significant percentage of young people with a road accident had interpersonal problems, and experienced a kind of intimate loss [23].

Night shifts over the past year, as a factor of life stress, showed a significant difference between the two groups. This means that night shift workers are more likely to have accidents than others. According to Lim's study, normal working hours consist of only eight hours a day, and more than that is considered as surplus. An increase in work hours and night shifts can be considered as a contributing factor for road accidents [24].

The fear of possible damage during driving, and the effects of poor road conditions on driving over the past year showed a significant difference between the two groups, which indicates their significant role in the occurrence of road accidents. The result of this study is in line with the study of Al-Hemoud, which categorized fear of possible damage during driving as a part of driving stress and showed that it is involved in road accidents [9].

Severe fatigue after driving over the past year, as a cause of driving stress, had a significant difference between the two groups, indicating the involvement of fatigue in the occurrence of road accidents. Fatigue clearly contradicts between unwillingness and the need to drive. The result is the driver's ignorance from the front that leads to an accident [25].

Based on the results of this study, the role of life stress is undeniable in road accidents. The higher these stresses are, which include life stress and driving stress, the more likely it is for accidents to occur. It was also found that life stress, such as having financial problems, family arguments, and occupational problems play a role in road accidents. In addition, driving stresses, such as retaliatory or angry reactions during driving, fear of possible damage during driving, the effects of poor road conditions, and severe fatigue can have a positive effect on road accidents.

Since the study subjects were questioned about accidents over the past year, some of the answers may have been associated with recall bias that could not be controlled.

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Conflict of interest

No conflict of interest has been declared by the authors.

Author contributions

All authors have agreed on the final version and meet at least one of the following criteria [recommended by the ICMJE

(<http://www.icmje.org/recommendations/>):

-Substantial contributions to conception and design, acquisition of data, or analysis and interpretation of data;

-Drafting the article or revising it critically for important intellectual content

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