Study of Psycho-Social Factors Affecting Traffic Accidents Among Young Boys in Tehran

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Background: Unprecedented growth of fatalities due to traffic accidents in the recent years has raised great concerns and efforts of authorities in order to identify and control the causes of these accidents.

Objectives: In the present study, the contribution of psychological, social, demographic, environmental and behavioral factors on traffic accidents was studied for young boys in Tehran, emphasizing the importance of psychosocial factors.

Patients and Methods: The design of the present study was quantitative (correlational) in which a sample population including 253 boys from Tehran (Iran) with an age range of 18 to 24 who had been referred to insurance institutions, hospitals, correctional facilities as well as prisons, were selected using stratified cluster sampling during the year 2013. The subjects completed the following questionnaires: demographic, general health, lifestyle, Manchester Driving Behavior Questionnaire (MDBQ), young parenting, and NEO-Five Factor Inventory (NEO-FFI). For data analysis, descriptive statistics, correlation coefficient, and inferential statistics including simultaneous regression, stepwise regression, and structural equations modeling were used.

Results: The findings indicated that in the psychosocial model of driving behavior (including lapses, mistakes, and intentional violations) and accidents, psychological factors, depression (P < 0.02), personality trait of conscientiousness (P < 0.02), failure schema due to the parenting style of mother (P = 0.001), and perception of police commands (P < 0.002), played an important role in predicting driving behavior. Among social factors, perception of police regulations (P = 0.003), had an important effect on violations and mistakes. Among environmental and behavioral factors, major factors such as driving age (P = 0.001), drug and alcohol use (P = 0.001), having driver's license (P = 0.013), records of imprisonment or committing a crime (P = 0.012) were also able to predict occurrence of accidents.

Conclusions: As the results of this study show, different factors contribute to different driving behaviors and accidents. The broad scope of these factors links accidents to other social issues and damages.

Keywords: Psychosocial Factors; Traffic Accidents; Automobile Driving; Youths

1. Background

The unprecedented growth of fatalities due to traffic accidents has raised great concern and efforts of authorities in order to identify and control the causes of these accidents. It is estimated that about five million people lose their lives due to accidents annually, and those that become disabled are ten times as much (1). Of these, traffic accidents are among the most important causes of fatalities in developing countries as they take thousands of lives on the roads, daily. In reference to estimations, traffic accidents will remain the third cause of death at the global level until 2020 (2). Not only do traffic accidents take the lives of healthy people during the best time of their lives in terms of performance, efficiency

and fitness, yet they also impose many financial and psychological expenses as well as suffering on the families of the victims (3). Humans, roads and vehicles are the main components of traffic and transport, and each of these factors alone or in combination contribute to the occurrence of accidents. Based on experiences of developing countries, the contribution of human factor in accidents varies from 70% to 80%, which indicates the need for more attention to this factor among others. Different studies have considered various human factors contributing to traffic accidents, such as individual characteristics of the driver, driving violations, alcohol and drug use, fatigue and drowsiness, disability, personality traits, self-esteem,

mental health, parenting styles, aggression, family function, perception of risk, and other factors (4, 5). In addition to the above-mentioned factors, one of the important factors in traffic accidents is social factors, which include variables such as illegality, hostile driving, feeling of religious and national identity, social needs, attitudes toward laws and life style. In the present study, four models including Shope and Bingham (8), Morrongiello and Lasenby-Lessard (6) and Parker (7) were used to determine the role of human factors in accidents and design a community-based model for young boys in Tehran, emphasizing the importance of psychosocial factors.

Accordingly, the present study aimed to answer the following questions with regard to experimental and theoretical studies in this area:

- How each of the personality factors, including mental health, self-esteem, aggression and parenting, contribute to traffic accidents of young boys with the age range of 18 to 24?

- What are the social factors affecting traffic accidents in the age group of 18 - 24 in young boys?

2. Objectives

In the present study, the contribution of psychological, social, demographic, environmental and behavioral factors of youth on traffic accidents was studied for young boys in Tehran, emphasizing the importance of psychosocial factors.

3. Patients and Methods

3.1. Research Design

The design of the present study was quantitative (correlational) in which a sample population of 18 to 24 years old boys from Tehran (Iran) were selected in order to examine psychosocial factors affecting traffic accidents, during the year 2013.

3.2. Population and Sampling

The population of this research consisted of all 18-24 years old boys with traffic accidents in Tehran, who had been referred to hospitals, insurance institutions, correctional facilities, and prisons. Of this population, 253 boys were selected from insurance institutions, hospitals, correctional facilities, and prisons using the stratified sampling method.

3.3. Inclusion and Exclusion Criteria

The following were the inclusion criteria; age between 18 - 24, positive history of traffic accident as a driver or pedestrian in 2 years ago, and having minimum degree of education for filling the questionnaires. Exclusion criteria were a history of mental disease, physical or mental retardation, lack of required education for filling the questionnaires.

3.4. Measuring Tools

3.4.1. Demographic Questionnaire

In these questionnaire characteristics such as time since obtaining a driver's license, history of accidents, time of the accidents during day and night, use of cellphone, fastening seat-belt, use of drugs and alcohol, attitudes toward traffic laws.

3.4.2. General Health Questionnaire

This questionnaire was designed by Goldberg and Hiller (9). Taghavi has examined the validity and reliability of this questionnaire in Iran. In his research, test-retest reliability, split-half reliability and Cronbach's alpha of the questionnaire were calculated as 0.70, 0.93 and 0.90, respectively (10).

3.4.3. Lifestyle Questionnaire

This questionnaire was developed by Al-Hemoud, et al. (11). It consists of 49 items which measure cultural factors, socio-economic factors, traffic-related stress, road and environmental conditions, and history of driving aggressions. Face validity of the mentioned questionnaire was reported as acceptable by Al-Hemoud et al. (11), using the views of experts of the field. It should also be noted that the reliability of the questionnaire in Al-Hemoud et al. (11) research was reported as 0.70, using Cronbach's Alpha.

3.4.4. Manchester Driving Behavior Questionnaire (MDBQ)

This questionnaire was designed by Reason et al. (12) in Manchester University. In Iran, Arizi and Haghayegh showed that the reliability of this tool by exploratory factor analysis indicates that four factors including lapses, mistakes, intentional violation, and unintentional violations are separated from each other (13). The internal consistencies (score of each component in comparison to the total score) were reported as 0.77, 0.81, 0.86, and 0.65, respectively.

3.4.5. Young Parenting Inventory

This inventory, which is a primary tool for identifying the roots of childhood schema, has been designed by Young (14). This inventory includes 72 questions. The reliability coefficient of this inventory has been reported as 0.60 for the mothers' form and 0.80 for fathers' form by Salavati (15).

3.4.6. NEO-Five Factor Inventory (NEO-FFI)

This questionnaire covers five big personality traits including extraversion, agreeableness, conscientious-

ness, neuroticism and openness to experience. Shope and Bingham confirmed the independence of these five factors in Shiraz University students based on factor analysis (8). Amongst these factors, neuroticism accounted for 11.4%, openness in experience 8.46%, conscientiousness 8%, agreeableness 7.73%, and extraversion 43% of the variance. These factors collectively accounted for 43% of the total variance. In this study, the reliability of the inventory was reported as 0.88 for neuroticism, and 0.77 for extraversion using Cronbach's Alpha coefficient. All questionnaires by confirmatory factor analysis and Cronbach's alpha coefficient were confirmed in the present study.

3.5. Method of Conducting the Study

The questionnaires were gathered, and interviews were done by the Red Crescent youth volunteers who had studied in relevant fields in psychology or social work. They were all in their last semester of either Bachelor of Science or Master of Science. The examiners were trained for conducting the research. After insuring the examiners' qualification, the research was performed in coordination with relevant agencies. During the research, the researcher monitored the examiners.

3.6. Method of Data Analysis

Descriptive statistics (mean, standard deviation, and graphs), correlation coefficient and referential statistics including simultaneous regression, step-wise regression, and structural equation modeling were used for analyzing the data. Quantitative data were analyzed using the SPSS and LISREL software. In order to analyze the research model, a modeling approach with instructive equations at the latent variable level was applied and the LISREL 8.70 software was used. In line with this, and for analyzing the model, firstly confirmatory factor analysis was used to check the reliability and validity of the research tool and then in the second phase all the relationships between latent variables and model fitness were reviewed. It should be reiterated that at all stages of the research maximum likelihood analysis was used. At last and in order to assess fitness of measurement and structural model with experimental data, K^2 index, K^2/df, Akaike information criterion, goodness of fit index, normed fit index, non-normed fit index, comparative fit index, root mean square error of approximation, standard RMR and SRMR) root mean square residual and standardized root mean square residual) were applied.

3.7. Ethical Principles

Ethical codes of the research were those endorsed by the ethics committee of the University of Social Welfare and Rehabilitation on 16th of July 2013 (Reg. USWR. REC.1393.104).

4. Results

4.1. Descriptive Demographic Findings

Table 1. Demographic Variables (n = 253)[a]

Variable	Frequency
Male, gender	100 (253)
Marriage status	
Single	80 (202)
Married	20 (51)
Age, y	
18 - 19	10.3 (26)
20 - 21	24.9 (63)
22 - 23	33.5 (85)
24 - 25	31.22 (79)
Education	
Less than high school	10 (25)
High school	30 (77)
University student	43 (108)
University graduate	17 (43)
Fathers' education	
Illiterate	13.9 (35)
8th grade or less	24.7 (62)
High school graduate	41.8 (106)
Bachelor	13.3 (34)
Master or higher	6.4 (16)
Mother's education	
Illiterate	19.7 (50)
8th grade or less	37.1 (94)
High school graduate	33.8 (85)
Bachelor	6.4 (16)
Master or higher	3 (8)
Driving license	
No	25.3 (64)
Yes	74.7 (189)
Driving year experience, y	
1 - 2	36.5 (92)
3 - 4	27.5 (70)
5 - 6	21.4 (54)
7 - 8	9.4 (24)
9 - 10	5 (13)
Accident experience	
1 time	36 (91)
2 times	28.9 (73)
3 times	16.5 (41)
4 times	9.3 (24)
5 times or more	9.3 (24)

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

4.2. Findings of Stepwise Regression Analysis for Behavioral Variables, Environmental Variables and Stochastic Model

Factors such as the time since obtaining a driving's license, fastening seat belt, drug and alcohol use, concentration, reaction, satisfaction with the driving training institute, playing on the computer, attitude towards obeying rules and cooperation with the police are behavioral factors. All of the behavioral factors are considered as predictive vari-

ables of traffic violations in regression equation. Results are shown in Table 2. Factors such as the day of the accident during the week, time of accident during day and night, type of vehicle, location of accident, using a cell-phone, weather conditions, road status, technical failure of the car, listening to music at the time of accident, having a record of imprisonment and effect of traffic fines are categorized as environmental factors. All environmental factors as predictive variables of accident records are included in the regression equation. Results are shown in Table 2.

Table 2. Regression Parameter [a]

Model	Non-Standardized Coefficients		Standardized Coefficients	t	Statistical Significance
	B Coefficient	Standard Error			
Behavioral Variables					
Fixed	1.765	0.181	B Coefficient	9.769	0.000
Driving age	0.156	0.30	0.303	5.198	0.000
Use of drug and alcohol	0.724	0.221	0.192	3.279	0.001
Driving's license	-0.404	0.161	-0.147	-2.50	0.13
Environmental Variables					
Fixed	2.076	0.89	B Coefficient	23.447	0.000
Prison	0.477	0.188	0.158	2.537	0.12
Stochastic Model					
Perception of police regulations	0.084	0.028	0.189	3.013	0.003
Aggression	0.073	0.026	0.173	2.832	0.005
Driving style	0.039	0.018	0.130	2.106	0.036
Fixed	-0.798	0.618		-1.29	0.197

[a] Predictor: Fixed, Driving age, Use of drug and alcohol, Driving's license, Fixed, Prison, Driving Style, Aggression, Perception of Police Regulations.

4.3. Model of Psychosocial Factors Affecting Driving Behavior

4.3.1. Results of Ultimate Regression Analysis for Intentional Violations Model, the Mistakes Model, the Lapses Model and Unintentional Violations

Table 3. Regression Parameters [a]

Model	Non-Standardized Coefficients		Standardized Coefficients	t	Significance
	B Coefficient	Standard Error	β Coefficient		
Mistakes Model					
Depression	0.841	0.160	0.288	5.244	0.000
Failure (mother)	0.915	0.155	0.316	5.917	0.000
Conscientiousness	0.725	0.207	0.181	3.497	0.001
Perception of police commands	0.876	0.276	0.162	3.172	0.002
Aggression	0.557	0.266	0.108	2.095	0.037
Fixed	2.828	4.803		0.589	0.557
Intentional Violations Model					
Depression	0.584	0.160	0.217	3.650	0.000
Perception of police commands	1.477	0.272	0.297	5.429	0.000

Failure (Mother)	0.745	0.182	0.279	4.095	0.000
Conscientiousness	0.463	0.205	0.126	2.261	0.025
Fixed	3.395	5.092		0.667	0.506
Lapses Model					
Failure (mother)	0.088	0.088	0.256	3.904	0.000
Conscientiousness	0.098	0.098	0.184	3.465	0.001
Depression	0.078	0.078	0.140	2.409	0.017
Perception of Police Commands	0.128	0.128	0.175	3.406	0.001
Abandonment (father)	0.089	0.089	0.192	2.895	0.004
Family	0.200	0.200	0.129	2.454	0.015
Fixed	4.248	4.248		-1.680	0.093
Unintentional Violations					
Obedience (mother)	0.078	0.021	0.272	3.748	0.000
Family	0.139	0.049	0.159	2.814	0.005
Agreeableness	0.043	0.022	0.120	1.946	0.053
Abandonment (father)	0.063	0.020	0.205	3.109	0.002
Dependence (mother)	-0.048	0.017	-0.178	-2.74	0.007
Consciousness	0.064	0.026	0.153	2.436	0.016
Fixed	-1.367	0.960		-1.420	0.156

[a] Predictor: depression, perception of police commands, failure (mother),conscientiousness/ failure (Mother), conscientiousness, depression, perception of police commands, abandonment (father), family/ obedience (mother), family, agreeableness, abandonment (father), dependence (mother), consciousness.

Table 4. Fitness Indicators for Assessment of Driving Behaviors Models [a]

Indicator Model	Absolute Indicators						Comparing Indicators			
	K^2	P	Df	K^2/df	GFI	AGFI	NFI	TLI	CFI	RMSEA
Intentional violation	1223.26	0.00	610	2.00	0.86	0.83	0.87	0.91	0.93	0.05
Mistakes	1390.30	0.00	724	1.90	0.85	0.83	0.85	0.90	0.92	0.04
Lapses	1890.73	0.00	956	1.97	0.83	0.80	0.86	0.91	0.92	0.05

[a] Abbreviations: AGFI, adjusted goodness of fit indicators; GFI, goodness of fit indicators; NFI, normed fitness indicators; RMSEA, root mean square error of approximation.

4.4. Model of Fitness and Comparing Their Indicators Among Cases

After development of the structural equation on the basis of the theoretical model in LISREL software, fitness indicators for the primary model were assessed. As indicated by Table 4, fitness of this model with data is acceptable; however, considering the high degree of freedom in the model, revision of the model does not make any problems for model identification. Results of the fitness indicators acquired from analysis of revised model are presented in Table 4. Chi-Square which assesses the whole model is a traditional approach for determination of fitness for models. Being insignificant proves fitness of model with data. The Second indicator is the root mean square error of approximation (RMSEA). Based on available resources about modeling of structural equations, it is proposed that for indicators less than 0.05, fitness of model is desirable, and for 0.05 to 0.08 fitness is acceptable. In addition, if goodness of fit indicators (GFI), adjusted goodness of fit indicators (AGFI), normed fitness indicators (NFI) and on-normed fitness of indicators (NNFI) are above 0.9, the model has desirable fitness. Finally, if SRMR (another indicator for model fitness) and undetermined average of variance and covariance are less than 0.05, fitness of the model is desirable. Considering these indicators, it can be concluded the intentional violation and laps for male cases has a better fitness model comparing to other indicators, however further modifications are needed for enhancement of fitness.

5. Discussion

The present study aimed to determine the psychosocial aspects affecting traffic accidents in boys aged 18 to 24. It also aimed to advance theoretical insight and obtain practical implications for designing a community-based model for describing psychosocial factors of car accidents. To answer the question concerning the share of personality factor, mental health, self-esteem, aggression, social and demographic factors in driving behavior aspects (Manchester) and traffic accidents among 18 to 24 year-old boys, and the question concerning what percentage of driving violations these factors predict, the method of multiple regression analysis (step-wise) was used. Finally, the variables, which were able to predict traffic accidents and driving behaviors, were entered into the structural equation model and examined in terms of fit indices.

Considering driving behavior, the findings indicate that personality trait of conscientiousness with β coefficient of 0.12 is able to predict different mistakes and intentional violations in the sample population. In addition, depressed mood and failure schema with relevant coefficients of 0.21 and 0.28, respectively, could predict violations and mistakes in boys. Amongst social factors, perception of police laws with β coefficient of 0.30, and significance level of 0.01, could predict violations and mistakes in driving.

Being duty-oriented is an aspect of personality, which considers active processes of planning, organizing, tracking and follow-up of thoughts in an individual. The findings of the present study are consistent with previous reports in that the higher the scores of responsibility, the higher the conscientiousness of individuals in driving; hence, the less the violations (16). In a study done by Gharaei et al. (17), the results showed that the drivers with such records, had higher scores in terms of neuroticism and lower scores in terms of flexibility, compatibility and sense of responsibility. Amongst the mental health aspects, depression is a type of negative emotion, which might negatively affect the driver's interpretation of the traffic environment, his/her driving behaviors and concentration, so that he/she cannot react and behave properly in the required circumstances. The drivers, who obtained high scores in non-normality, had more traffic accidents or higher possibility of having accidents. According to the results of Gharaei et al.'s study (17), the mean scores of paranoid thoughts, obsession and compulsion, sensitivity in interpersonal relationship and depression of both professional and nonprofessional groups who had road accidents, were higher than other aspects. A failure schema means the belief in an individual's failure. It also means that failure is inevitable for the individual. It seems that parenting styles and developing incompatible schemas can affect the occurrence of accidents as well as risky driving behaviors, by influencing other variables like aggression, self-esteem

and personality characteristics. As the results of previous studies show, there is a relationship between democratic parenting styles and aggressive behaviors in a way that more democratic parenting styles, reduces aggressive behaviors. However, easy-going or even despotic styles can increase aggression in youth (18). As mentioned earlier, aggression is one of the strong predictors of car accidents in boys. However hostility did not emerge as a significant predictor of violation behavior in this study. A previous study suggests that drivers who believe outcomes are controlled by external forces (external LOC, e.g. events controlled by fate and not self), may be less likely to change behavior in response to outcomes than those with internal LOC, who perceive outcomes to be dependent on their own skills, efforts or behaviors (19).

Regarding car accidents, three factors including perception of police laws, driving style, and aggression were able to predict boys' traffic accidents with β coefficients of 0.18, 0.17 and 0.13, respectively. The strongest predictor of accidents was perception of police laws. These results were consistent with the results of Al-Hemoud et al.'s study in which the factor of 'perception of police laws' was the strongest predictor of accidents among other five factors (including social factors, life stresses, driving style, perception of police commands and driving stresses). Factor of driving style, one of the subscales of lifestyle questionnaire in Al-Hemoud et al.'s study, was also a predictor of boys' driving accidents. The results of Gharaei et al. (17) study suggested that driver's physical status, their emotional status while driving, and the specifications of the vehicle are in direct relationship with the driver's personality, environmental conditions, police traffic measures, cultural aspects of the community, quality of the training an individual receives in driving institutions and the driver's experience. The findings of different studies on the relationship between aggression and traffic accidents indicates that aggression and violence can play an effective role in traffic accidents (20).

On the other hand, major social factors such as the number of years an individual has been driving cars, use of drugs and alcohol, having driver's license, and record of imprisonment or crime, are predictors of boys' car accidents. Factors like record of imprisonment and crime, and use of drugs and alcohol are predictors of driving behavior dimensions among individuals in a society.

The results of the present research indicate that having a driver's license can negatively predict car accidents, in a way that not having a driver's license can increase traffic accidents and vice versa. The number of years one has been driving also affects the number of accidents among the sample population. The more driving-experience of the individual, the less the number of violations, hence accidents. In a self-report study on the ability of driving, the results suggested that driving experience, which is measured by the number of years passed from obtaining

a driver's license, is a strong predictor of effective use of safe behaviors on the road (21).

Fastening seat belts could also negatively predict the accidents. Fastening seat belts can decrease car accidents, mistakes, and violations; on the contrary, not fastening seat belts can increase risks of car accidents. The results of Clarke et al. (22) study suggested that in all car accidents, no one had used seat belts and safety helmets.

Neglect, which includes distraction from the driving task, is one of the factors contributing to car accidents in young and beginner drivers (23). An example is neglecting safety distance in the traffic or factors such as slippery roads due to rain. Police reports regarding accidents caused by neglect or lack of attention are very complex, however, according to reports, 32% of 16-year-old boys' accidents are caused by neglect (24).

In general, as the results of this study and other studies in this area show, different factors contribute to different driving behaviors and accidents. The broad scope of these factors links accidents with other social issues and damages. As indicated, use of drugs or alcohol as well as having imprisonment or crime records also contributes to car accidents. Psychological problems which are prevalent in today's society, including aggression, depression and frustration, have had their effects on the issue. Another factor is lack of public awareness and education on these social issues, which play a major role in this regard. Therefore, as indicated, many factors have domino effects on different social damages and problems. Accordingly, in order to lower traffic accidents and modify driving culture we have to consider multi-faceted strategies and apply them properly.

Some of the models were based on sub scales while the number of cases was not sufficient for running the models. This can be considered as the most important weakness of this research. Hence, the findings of the research rely on the run models. Some of the parenting schemes like self-reliance and attention were not significant.

5.1. Practical Suggestions

Research studies on traffic accidents suggest that a multidimensional and comprehensive approach must be taken for adolescents' high-risk driving behaviors (8). Therefore, having a better understanding of the contributing factors in adolescent's driving behaviors and early interventions toward high-risk driving behaviors can help prevent life-threatening consequences in adulthood.

- The present study confirmed the role of attitude toward rules and laws, which is in line with Ajzen's theory of planned behavior (25). Therefore, designing training and media programs, with the specific aim of changing attitude towards behavioral consequences of over speeding whilst driving, is suggested among adolescents.

- Considering the high rate of accidents and results of different studies on the effects of psychological and personality factors on high-risk driving behaviors, it is nec-essary that the relevant authorities pay attention to this issue, and do not rely solely on eye examination for driver's license tests, and, like many countries, consider the applicants' mental state as well; this could be achieved by making personality tests and psychological examinations along with physical examinations mandatory for obtaining a driver's license.

- Considering the importance of perception of police regulations in the model of accidents, it is suggested that the authorities make some interventions in order to correct individuals' attitudes and beliefs towards better enforcement of laws and regulations with regard to psychological principles.

- The contents and methods of training in driving institutions should be revised so that the applicant can learn how to drive safely and skillfully.

- Annual ranking of driving institutions should take place, where accident statistics are considered in this ranking.

- Mass media should be used with the aim of changing public attitudes from high-risk driving towards safe driving and making this a culture.

- Educational materials related to safe driving should be subtly included in the course material of different educational levels with the aim of reducing the false allure of high-risk driving.

- Incentives (like insurance exemption) should be put in place for safe drivers, and more severe punishments (like higher insurance costs) for high-risk drivers. This can be done by organizations such as traffic police, ministry of health, insurance companies, etc.

- Parenting packages for adolescents and youngsters should be organized in order to correct inefficient parenting styles and increase children's health.

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Authors' Contributions

Seyyed Mohammad Hossein Javadi and Siyamak Tahmasebi: study concept and design, and acquisition of data, analysis and interpretation of data, and drafting of the manuscript. Hossein Fekr Azad, Siyamak Tahmasebi and Hassan Rafiei: critical revision of the manuscript for important intellectual content. Mehdi rahgozar: statistical analysis. Hossein Fekr Azad, Siyamak Tahmasebi, Hassan Rafiei, Mehdi rahgozar: administrative, technical, and material support. Alireza Tajlili: study supervision.

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