



Original Article

Personality Characteristics in Motorcycle Injuries: a Case-Control Study

Leili abedi^a, Shahrokh Amiri^b, Salman abdi^b, Homayoun Sadeghi-Bazargani^c, Davoud Khorasani-Zavareh^d

^aDepartment of Statistics and Epidemiology, Tabriz University of Medical Sciences, Tabriz, Iran

^bResearch Center of Psychiatry and Behavioral Sciences, Tabriz University of Medical Sciences, Tabriz, Iran

^c1- Road Traffic Injury Research Centre, Tabriz University of Medical Sciences, Tabriz, Iran 2- WHO Collaborating Center on Safe Community Promotion, Stockholm, Sweden

^dSocial Determinants of Health Research Center, Urmia University of Medical Sciences, Urmia, Iran

Abstract

Purpose: The aim of the present study was to compare personality characteristics in injured motorcyclists and uninjured motorcyclists.

Methods: This study as part of a larger case-control study was carried out on 130 motorcycle traumatic patients along with 91 control patients admitted to Shohada and Imam Reza university hospitals as the two referral specialty centers in East Azarbyjan Province of Iran in 2013. The Persian version of the motorcycle Riding behavior questionnaire (MRBQ) was used to assess riding behavior. Also, Millon Clinical Multiaxial Inventory-III was used to assess personality disorders and psychiatric syndromes. Multivariate binary logistic regression was used as the main analysis method to estimate the adjusted odds ratios of subscales of Millon-III and risky behavior scales. The statistical analysis was conducted using Stata version 11 statistical software package.

Results: Mean/median scores of the personality subscales of schizoid, alienated, obsessive-compulsive, self-abusing, schizotypal, paranoid, post-traumatic stress, thought disorders, major depression, delusional disorder in the injured group were higher than in the control group ($P < 0.05$). However, histrionic personality disorder was observed less in the injured group than the control group ($P < 0.01$). According to the logistic regression models obsessive-compulsive and paranoid disorders were considered to be risk factors in motorcycle injuries.

Conclusion: According to the results of this study, obsessive-compulsive personality was a risk factor for motorcycle traffic injuries.

Keywords: Motorcycle traffic injuries, Case-control, Personality disorders, Risky riding behavior, Tabriz, Iran

Correspondence

Homayoun Sadeghi Bazargani,
WHO Collaborating Center on Community
Safety Promotion, Karolinska Institute,
Stockholm, Sweden.
Tel: +46700274099
Email: homayoun.sadeghi@swedensp.se

Received: 2015-06-01

Accepted: 2015-07-03

DOI: [10.13183/jecns.v2i1.38](https://doi.org/10.13183/jecns.v2i1.38)

©2015 Swedish Science Pioneers, All rights reserved.

Introduction

Road traffic injuries (RTIs) comprise a serious public health problem in the world and an estimated 1.24 million people are killed in road traffic injuries each year and as many as 50 million are injured [1, 2].

The increase in casualties among motorcyclists in recent years has turned into a very serious problem. Studying the hospitalized motorcycle injuries has indicated that serious damages have been prevalent, in so far as trauma and death have been reported 17.1% and 4.2%, respectively, and young motorcyclists have been seen to be more likely to die in comparison with those of

older age [3]. Moreover, other reports determined injuries to head and neck, body, spine, and eyes among the motor vehicle injuries [4-6]. These injuries, which result from ignoring safety rules while riding motorcycles, impose a large financial burden on the society [1, 7].

Social, medical and economic problems caused by motorcycle injuries emphasize the importance of identifying the factors influencing such injuries. Behavioral factor is one of the significant approaches to identify risk factors of motorcycle injuries. Previous studies have indicated that the majority of motorcycle accidents involve young men inclined to pick unsafe attitudes and perilous behaviors such as riding over the speed

limit [8]. Taking drugs and drinking alcoholic beverages [4, 9], aggressiveness [10], excitement-seeking [11], attention deficit hyperactivity disorder (ADHD) [12, 13], and various behavioral and personality factors have been reported [14].

Reviewing the above-mentioned behavioral traits as risk factors in previous studies has indicated that such traits could be studied as a part of personality disorder symptoms. This gains value in the light of the fact that durable and stable personality disorder pattern of behavior and inner experience is pervasive, inflexible and considerably different from the individual's expectations from cultural situations. Starting in adolescence or early adulthood, it remains stable over time and causes discomfort or emotional injury. Since these disorders are chronic and pervasive, they can result in serious problems in work and daily life. As a stable and influential pattern of behavior and inner experience, personality disorders can be predictors of an individual's future behaviors [15]. According to Millon's theory of personality disorders, high-risk behaviors, aggressiveness, sensation seeking and drug abuse are important aspects of personality disorders (as clinical patterns, severe injury, severe symptoms, and clinical symptoms). Each one refers to a particular dimension of mental trauma [16].

One study in Montréal pointed to borderline and antisocial personality disorders in which impulsive-aggressive behaviors play a central role and substance use disorders appear to be risk factors for young male deaths in MVAs. Interestingly, this effect seems to be specific to MVA case subjects aged 26 years or over [17]. Also, studies on the impact of personality factors in traffic injuries have shown that the traits of anger and normlessness were effective predictors for aggressive violations. The traits of anger, sensation-seeking, normlessness, and altruism were effective predictors for ordinary violations. Moreover, altruism and normlessness were significant predictors for the total number of accidents [18, 19].

Although personality disorders were not the substance of much research as the risk factor of motorcycle injuries in previous studies, it can somehow be claimed that most studies which checked the behavioral aspects of such injuries investigated, in fact, only a small part of personality symptoms. Basically, the consideration of different aspects of personality disorders presents a comprehensive look at different behavioral aspects of dangerous people, while it also makes sense to sum up previous studies in this field which can be used in behavioral interventions. On the other hand, behavioral studies need research on different geographical situations so that the findings would not be influenced by cultural and social factors. However, few studies have been conducted on this subject in Iran. In this regard, the current study was carried out with an approach to personality characteristics in order to investigate whether there were any associations between the symptoms of personality characteristics and the risk of motorcycle injuries.

Methods

This study, as part of a case-control research project, was carried out on 130 motorcycle traffic traumatic patients along with 91 control patients admitted to Shohada and Imam Reza university hospitals as the two referral specialty centers in East Azarbyjan

Province of Iran. Tabriz is the center of East Azerbaijan Province. Data collection was carried out during 2013. The inclusion criteria were as follows;

- Being the rider of a motorcycle
 - Being admitted to any of the two university hospitals
 - Being injured due to a motorcycle traffic accident (for cases)
 - Being admitted for a non-traumatic condition (for controls)
 - Consent to participate in the study
- The exclusion criteria included:
- Not having a known psychiatric disease except for adult ADHD and exposure of interest
 - Very severe injuries preventing the conducting of interviews during the hospital stay
 - Cognitive disorders because of their condition making the interview unreliable

A convenient sampling method was used to select the subjects. Samples were enrolled in an attempt to ensure the common source population and independence of exposure to selection principles in the selection of controls in case-control studies [20]. The controls were matched with the cases, by the age variable, through frequency matching technique. Considering the unavailability of adequate numbers of controls who fell in with the eligibility criteria, cases were enrolled in a twofold number of subsets. The variables assessed in this study included:

- 1- Demographic measures such as Age were measured as a numeric value, i.e., Marital Status; Educational level was scaled in four levels as: illiterate, primary school, high school and academic level.
- 2- Human related variables included: attention deficit hyperactivity disorder scale score; motorcycle riding behaviors score; the purpose of motorcycle riding (PMR) in two categories as riding motorcycle for fun (RMFF) and riding motorcycle for other purposes (RMFO); Helmet use measured in two scales (Yes, No); having motorcycle rider license.

The Persian version of the motorcycle riding behavior questionnaire (MRBQ) was used to assess risky behaviors of the motorcycle riders. It is a valid and reliable questionnaire with 48 items each having a five-item Likert scaled answer. It has been translated into Persian and validated by Motevallian et al [21]. Millon Clinical Multiaxial Inventory-III (MCMI- III) questionnaire was used to access personality characteristics and psychiatric syndromes. It has been translated into Persian and validated by Sharifi et al [16]. This questionnaire has 175 items, each with two (Yes, No) scaled answers; it also has 24 clinical scales classified in four categories:

A) The eleven personality clinical scales: Schizoid, Avoidant, Depressive, Dependent, Histrionic, Narcissistic, Antisocial, Sadistic, Compulsive, Negativistic, Masochistic; B) Three severe personality pathology scales: Schizotypal, Borderline, Paranoid; C) seven Clinical Syndrome Scales: Anxiety, Somatoform, Bipolar, dysthymia, Alcohol Dependence, Drug Dependence, Posttraumatic Stress Disorder; D) Three Severe Clinical Syndrome scales: Thought Disorder, Major Depression, and Delusional Disorder. The study used the mean of raw values for each subscale in MCMI-III.

Data analysis

Descriptive analysis and bivariate tests of association including independent t-test and Mann–Whitney–Wilcoxon test were used prior to the multivariate binary regression analysis as the main analysis method to estimate the adjusted odds ratios of the subscales of Millon-III and risky behavior scales. A P-value lower than 0.05 was indicative of statistical significance. Statistical analyses were carried out using Stata version 11 statistical software package.

The study was approved by the ethical committee of Tabriz University of Medical Sciences. Written informed consent was obtained from all study participants.

Results

A total of 221 subjects, all male motorcycle riders, were studied. The mean age of the participants in case and control groups were 27.67 (9.1) and 31.06 (8.54), respectively.

About 49% of cases, compared to 61% of controls, were married and only 12.3% of them had academic education compared to controls. Compared to controls, about two-thirds of cases didn't have motorcycle riding license and 33.1% of injured riders never used helmets while riding (Table 1).

The results of independent t-test/Mann-Whitney U test (Table 2) indicated that the mean of scores of personalities of schizoid, alienated, obsessive-compulsive, self-abusing, schizotypal, paranoid, post-traumatic stress, thought disorders, major depression, and delusional disorder in the injured group were higher than in the control. However, histrionic personality disorder was observed to be less in the injured group than the control. Few multivariate binary regression models were applied. In the first model, the dominant role of personality characteristics was indicated in the occurrence of motorcycle accidents in which obsessive-compulsive disorder had a predicting role.

In the second model, the score of risky riding behavior was as effective as confrontation in a way that risky riding behaviors accompanied by personality characteristics reacted even as a preventive factor; however, obsessive-compulsive disorder and Paranoid were the risk indicators in determining motorcycle accident likelihood.

Discussion

The current study indicated that the intensity of personality characteristics such as schizoid, alienation, obsession-compulsion, self-abuse, schizotypal, paranoia, post-traumatic stress, thought disorders, severe depression, and delusional disorders are different from socially normal samples. Therefore, the hypothesis suggesting that personality disorders may form an important factor in impaired behavioral tendencies to ride motorcycles was somehow confirmed. In this regard, previous studies emphasized behavioral anomalies in the injured motorcyclists and reported different problems such as excitement seeking [22], drug abuse [23], impulsivity, decreased self-control, sense of guilt [24], and depression among the injured riders. Other studies reported that aggression, traditionalism, alienation, violation-aggression, and impulsivity were related to

Table 1. The distribution of demographic variables between case and control groups.

Variables	Subgroups	N (%)		P-value
		Control	Case	
Marriage	Single	35(38.9)	66(51.2)	0.07
	Married	55(61.1)	63(48.8)	
Education level	Illiterate	4(4.5)	3(2.3)	0.01
	Primary school	22(24.7)	54(41.5)	
	High school	40(44.9)	57(43.8)	
	Academic education	23(25.8)	16(12.3)	
Purpose of motor riding	Fun	32(72.7)	96(73.8)	0.8
	Non-Fun	12(27.3)	34(26.2)	
Motorcycle riding license	Yes	26(28.9)	29(22.3)	0.26
	No	64(71.1)	101(77.7)	
Helmet usage	Never	27(30.3)	43(33.1)	0.001
	Rarely	16(18)	3(2.3)	
	Sometimes	17(19.1)	34(26.2)	
	Often	17(19.1)	14(10.8)	
	Always	12(13.5)	36(27.7)	

risky behaviors of riding and traffic accidents [25, 26]. Moreover, one study in Iran showed that anxiety, anger, sensation and excitement, altruism, and anomaly were risky behavioral factors in riding motorcycles [8].

This study also found that the riding behavioral scale has a preventive role while obsessive-compulsive and paranoid disorders were considered as potential determinants of motorcycle injuries. The previous studies emphasized the role of risky riding behaviors in road traffic injuries [27, 28].

Obsessive-compulsive disorder and paranoid are the predictors of motorcycle injuries. This finding is inconsistent with previous studies which reported borderline personality disorders, antisocial and aggressive impulsive behaviors to be the risk factors of personality disorders for motorcycle injuries [17]. It appears that idealism in achieving the highest excitement such as riding at the highest speed and displaying unique stunt moves, as motorcyclists do in streets, can be explained by this personality disorder. The previous study conducted in Iran also emphasized the emotional factor in motorcycle accidents [29]. On the other hand, obsessive-compulsive and paranoid disorders can be evaluated as the outcome of motorcycle traffic injuries, in so far as previous studies indicated obsessive-compulsive symptoms as shown in brain injuries [30].

Although previous studies reported that 17.3% of the injuries took drugs and almost one fourth of them drank alcoholic beverages [4], drugs and alcohol were evaluated as an important risk factor in the occurrence of traffic injuries. They are related to the non-compliance with traffic rules such as not fastening the seat belt, high speed, mental confusion while driving and accidents as a result. However, the result of the current study did not indicate any relationships between the problems of taking drugs or drinking alcohol with motorcycle injuries [9, 31]. This finding can be interpreted in several ways. Basically, cultural problems in the accurate self-statement of taking drugs and drinking alcohol in Iran are one among the most important

Table 2. Independent t-test or Man Whitney-U tests results and Multivariate logistic regression models.

MCMI-III scales	Mean(SD) or median (25% to 75%)		P-value	OR(95% CI)	
	Case	Control		Model 1	Model 2
Personality clinical scales					^a 0.97(0.96-0.99)**
Schizoid	10.06(4.59)	8.33(4.15)	0.01	0.96(0.86-1.08)	0.92(0.82-1.05)
Avoidant	8(5-12)	6(4-9)	0.004	0.98(0.86-1.13)	0.99(0.86-1.14)
Depressive	8(4-13)	10(6-15)	0.06		
Dependent	10.9(4.9)	10.3(4.04)	0.3		
Histrionic	13.21(3.57)	14.8(4.88)	0.003	0.9(0.82-1.01)	0.92(0.82-1.02)
Narcissistic	14.1(4.21)	13.6(3.88)	0.3		
Antisocial	10.1(4.55)	10.4(4.8)	0.7		
Sadistic	10.69(5.2)	11.1(6)	0.5		
Compulsive	15.8(3.04)	14.3(3.44)	0.001	1.13(1.02-1.26)**	1.16(1.03-1.29)**
Negativistic	11.8(6.1)	10.9(6.1)	0.2		
Masochistic	9.36(4.59)	7.67(4.42)	0.007	1.02(0.89-1.18)	1.04(0.9-1.21)
Severe personality pathology scales					
Schizotypal	9(4-14)	4(2-11)	0.003	0.99(0.86-1.13)	1.01(0.87-1.16)
Borderline	10(5-15)	8(5-13)	0.08		
Paranoid	12.4(5.54)	9.91(4.71)	0.001	1.03(0.91-1.16)	1.15(1.02-1.29)**
Clinical syndrome scales					
Anxiety	7(3-11)	5(2-9)	0.07		
Somatoform	5(2-9)	5(2-9)	0.1		
Bipolar	7(3-11)	3(3-9)	0.3		
Dysthymia	6(2-11)	4(1-9)	0.06		
Alcohol dependence	3.37(2.58)	5.81(3.09)	0.2		
Drug dependence	5(3-7)	5(3-6)	0.2		
Posttraumatic stress disorder	6(2-12)	4(1-7)	0.003	1.10(0.96-1.26)	1.03(0.89-1.19)
Severe clinical syndrome scales					
Thought disorder	8(4-13)	5(3-11)	0.02	0.92(0.81-1.06)	0.94(0.8-1.08)
Major depression	6(3-11)	4(2-9)	0.03	0.96(0.86-1.08)	1.01(0.89-1.15)

Raw scale values from Millon-III inventory were analyzed. First model: Determinants of personality disorder in the incident. Second model: Motorcycle riding behavior scale as the main exposure of interest. ^a: Risky behavior **P<0.01

barriers to information collection in different studies. Therefore, conducting more studies and clinical experiments can increase the accuracy of research findings.

Generally, from the findings of this study, it can be concluded that according to Millon's theory, personality disorder is hierarchical and comprised of different levels (life, family, social and cultural). Therefore, many personality disorder symptoms in the injured motorcyclists can be considered to be caused by maladaptive performance of individuals in controlling failure. Therefore, mental interventions can be effective as appropriate treatment methods to control the symptoms of personality disorders among motorcyclists and decrease subsequent injuries as a result.

Conclusion

According to the research findings, screening results of obsessive-compulsive and paranoid disorders were found to be risk factors in motorcycle injuries. The results of this study can be used to treat the behavioral problems of the injured. On the other hand, the symptoms of behavioral problems in motorcyclists can indicate the risk in the future. This indicates

the importance of managing them with respect to identification and mental interventions.

Acknowledgments

We would like to thank all staff in Shohada and Imam Reza University Hospitals in Tabriz. We also appreciate the vice chancellor of the faculty of health in Tabriz University of Medical Sciences for their financial support.

References

1. Eltorai AE, Daniels AH, Grauer JN, Browner BD, Born CT. Costs of non-helmeted motorcycle riding in Connecticut. *Connecticut medicine*. 2014;78(2):91-3.
2. Peden M, Scurfield R, Sleet D, Mohan D, Hyder A, Jarawan E. *World report on road traffic injury prevention*. 2004.
3. Leijdesdorff HA, Siegerink B, Sier C F M, Reurings M C B, Schipper I B. Injury pattern, injury severity, and mortality in 33,495 hospital-admitted victims of motorized two-wheeled vehicle crashes in The Netherlands. *Journal of trauma and acute care surgery*. 2012;72(5):1363-8.

4. Araqi E, Vahedian M. Study on susceptible and damages from motorcycle accidents in Mashhad in 2005. *Quarterly of Horizon of Medical Sciences*. 2007,13(1).
5. White D, Lang J, Russell G, Tetsworth K, Harvey K, Bellamy N. A comparison of injuries to moped/scooter and motorcycle riders in Queensland, Australia. *Injury*. 2013,44(6):855-62.
6. Besharati M, Shoja M. Ocular injuries occurring in motor vehicular accident victims, *Yazd Province*. 2006.
7. Puvanachandra P, Hoe C, El-Sayed H, Saad R, Al-Gasseer N, Bakr M, et al. Road traffic injuries and data systems in Egypt: Addressing the challenges. *Traffic injury prevention*. 2012,13(sup1):44-56.
8. Malakpour F, Mohamadian J, Malekpour A, Salimi S, Sarmful A. Study of relationship between personality, attitudes to safety and risky behavior among motorcycle drivers in Tehran city. *JHSW*. 2012,2(2):61-8.
9. Weiss H B, Kaplan S, Prato CG. Analysis of factors associated with injury severity in crashes involving young New Zealand drivers. *Accident Analysis & Prevention*. 2014,65:142-55.
10. Paleti R, Eluru N, Bhat C R. Examining the influence of aggressive driving behavior on driver injury severity in traffic crashes. *Accident Analysis & Prevention*. 2010,42(6):1839-54.
11. Machin MA, Sankey KS. Relationships between young drivers' personality characteristics, risk perceptions, and driving behaviour. *Accident analysis & prevention*. 2008,40(2):541-7.
12. Vaa T. ADHD and relative risk of accidents in road traffic: A meta-analysis. *Accident Analysis & Prevention*. 2014,62:415-25.
13. Safiri S, Sadeghi-Bazargani H, Amiri S, Khanjani N, Safarpour H, Karamzad N, et al. Association between Adult Attention Deficit-Hyperactivity Disorder and motorcycle traffic injuries in Kerman, Iran: a case-control study. *Journal of Clinical Research & Governance*. 2013,2(1):17-21.
14. Shope JT, Bingham CR. Teen driving: motor-vehicle crashes and factors that contribute. *American Journal of Preventive Medicine*. 2008,35(3):S261-S71.
15. Comprehensive textbook of psychiatry. 8, editor. Philadelphia: *Lippincott Willias & Wilkins* 2005.
16. Sharifi A A, Moulavi H, Namdari K. The validity of MCMI-III (millon, 1994) scales. *Knowledge & Research In Applied Psychology* 2008,9(34):27-38.
17. Dumais A, Lesage A D, Boyer R, Lalovic A, Chawky N, Ménard-Buteau C, et al. Psychiatric risk factors for motor vehicle fatalities in young men. *Canadian journal of psychiatry*. 2005,50:838-44.
18. Jiaoyan Y, Feng D, Weina Q, Zhun G, Xianghong S. Effects of personality on risky driving behavior and accident involvement for Chinese drivers. *Traffic injury prevention*. 2013,14(6):565-71.
19. Kong J, Zhang K, Chen X. Personality and attitudes as predictors of risky driving behavior: evidence from beijing drivers. *Digital Human Modeling and Applications in Health, Safety, Ergonomics, and Risk Management Healthcare and Safety of the Environment and Transport: Springer*; 2013. p. 38-44.
20. Wacholder S, Silverman DT, McLaughlin JK, Mandel JS. Selection of controls in case-control studies: II. Types of controls. *American journal of epidemiology*. 1992,135(9):1029-41.
21. Motevalian SA, Asadi-Larri M, Rahimi H, Eftekhar M. Validation of a Persian Version of Motorcycle Rider Behavior Questionnaire. 55th AAAM Annual Conference Annals of Advances in Automotive Medicine. 2011,55.
22. Jonah BA, Thiessen R, Au-Yeung E. Sensation seeking, risky driving and behavioral adaptation. *Accident Analysis & Prevention*. 2001,33(5):679-84.
23. Ainy E, Movahedi M, Aghaei A, Soori H. Study of risky behaviors leading to unintentional injuries among high school students in Tehran, Iran. *Saudi medical journal*. 2011,32(11):1168-71.
24. Hilakivi I, Veilahti J, Asplund P, Sinivuo J, Laitinen L, Koskenvuo K. A sixteen-factor personality test for predicting automobile driving accidents of young drivers. *Accident Analysis & Prevention*. 1989,21(5):413-8.
25. Sârbescu P, Costea I, Rusu S. Using the alternative Five Factor Personality Model to explain driving anger expression. *Procedia-Social and Behavioral Sciences*. 2012,33:273-7.
26. Gulliver P, Begg D. Personality factors as predictors of persistent risky driving behavior and crash involvement among young adults. *Injury Prevention*. 2007,13(6):376-81.
27. Hassen A, Godesso A, Abebe L, Girma E. Risky driving behaviors for road traffic accident among drivers in Mekele city, Northern Ethiopia. *BMC research notes*. 2011,4(1):535.
28. Fergusson D, Swain-Campbell N, Horwood J. Risky driving behaviour in young people: prevalence, personal characteristics and traffic accidents. *Australian and New Zealand journal of public health*. 2003,27(3):337-42.
29. Zamani-Alavijeh F, Niknami S, Bazargan M, Mohammadi E, Montazeri A, Ahmadi F, et al. Accident-related risk behaviors associated with motivations for motorcycle use in Iran: a country with very high traffic deaths. *Traffic injury prevention*. 2009,10(3):237-42.
30. Coetzer BR. Obsessive-compulsive disorder following brain injury: a review. *The International Journal of Psychiatry in Medicine*. 2004,34(4):363-77.
31. Shyhalla K. Alcohol involvement and other risky driver behaviors: effects on crash initiation and crash severity. *Traffic injury prevention*. 2014,15(4):325-34.