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DETERMINANTS OF MOTORCYCLE RIDERS RISKY BEHAVIORS BASED ON PROTECTION MOTIVATION THEORY

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Abstract

The damages from traffic accidents are one of the main challenges in public health. Motorcycle riders are involved in more than half of the road traffic accident injuries. Human factor is important in accidents. This study was carried out to determine related factors with risky behaviors of motorcycle riders based on protection motivation theory (PMT). The cross sectional study, conducted on 221 male motorcycle riders. They used motorcycle for at least 2 hours a week. The participants were selected by cluster random sampling. The data was collected through self-report questionnaires and analyzed by T-test, correlation and regression in SPSS. The participants got 29.48% of the risky behavior score. Mostly reported risky behavior was escape due to the probability of confiscating of their motorcycles. Unsafe riding is more prevalent among young, single and unlicensed motorcycle riders. Risky motorcycle riding had positive significant association with perceived rewards and costs but it had significant indirect correlation with perceived susceptibility, severity, fear, self-efficacy, response efficacy, and protection motivation. Constructs of PMT could determine 48.6% of the variance of the unsafe behaviors. The direct role of perceived rewards ($\beta=0.58$) was more than the other constructs. The processes of the PMT could explain 48% of the variance in risky behaviors which the role of threat appraisal ($\beta =0.35$) was more than coping appraisal. PMT in predicting the risky behavior of motorcycle riders is useful. So that can be used as a framework to design education programs to reduce the number of motorcycle accidents.

Keywords: Road Accident, Motorcycle, Risky Behavior.

Introduction: Motorcycle riders are at higher risk of injuries, trauma, death, and disability compared to other road users (1). The risk of severe injury and death per kilometer of trip in motorcyclists is 40 and 30 times more than

passengers and other drivers respectively (2). In high income countries, motorcycles deaths include about 5 to 8% of all the deaths (3) while it is 23.8% in Iran (4) and 29.57% in Yazd (5). Behavioral factors are important in occurrence of motorcycle accidents (6). Law enforcement in most countries including Iran was not able to decline the risky behaviors in motorcyclists. Design and implementation of proper interventions aimed to reduction of the number and severity of motorcycle accidents needs proper knowledge about underlying causes of such risky behaviors. Protection motivation theory (PMT) is one of behavior based theories, which is used for prediction of intention to healthy behaviors. There are numerous successful application of PMT in predicting the intention and the behavior in a wide range of health issues such as smoking cessation (7), cancer prevention (8), risky behaviors of car drivers (9). Despite important role of human behaviors in occurrence of motorcycle accidents, application behavioral science theories of health education in this field are limited (10). There is a knowledge gap about underlying determinants of such risky behaviors (11). In this study, PMT has been designed and administered to investigate risky behaviors of sample of motorcycle riders (not on the target group of law violators). The results of the study are useful in design and implementation of education program to promote safe driving among motorcyclists.

Methods

This is a cross sectional study on sample of 221 motorcyclists in Yazd city, Iran by cluster sampling from 6 different districts of the city. Forty subjects in each cluster entered into the study. The inclusion criteria of the study was being male, having 18 years old or more, riding motorcycle for at least for 2 hours a week, being volunteer to take part in the study. In order to observe the ethical considerations, aim and the nature of the study have been explained for the participants verbally. Written consent was obtained from participants. The study methodology and framework was approved by ethic committee. A questionnaire including two section for acquiring **a**) personal and demographical information and **b**) items to assess the constructs of the PMT in motorcycle riders was developed by authors.

the first section of the questionnaire comprised of questions about age, marital status, education level, income, and also some information about motorcycle riding experience (i.e. duration, time of getting driver's license – duration of riding motorcycle), holding a driver's license, daily duration of motorcycle riding, ownership of the motorcycle).

In The section b, PMT constructs was designed based on 7 risky behaviors priorities of the Yazd motorcycle riders drawn from prior studies.

We were identified priorities of risky behaviors of motorcycle riders by a survey from 40 Police Officers. These behaviors include **1**) not wearing helmet while riding motorcycle, **2**) surpassing the limited speed, **3**) illegal

overtaking, **4)** crossing a red stoplight, **5)** riding against the legal direction, **6)** not attending to the front (using cell phone), and **7)** riding without a driving license.

Also, Manchester driving behavior questionnaire was used to design few of The construct of behavior questions (12).

Measures

All of PMT constructs scaled based on 5-point Likert Scale (from strong Disagree=1 to strong agree=5). The global score of each scale was calculated by summing up each attribute score.

Table1: PMT measures and result of internal reliability.

Factors	Items	Example Item	Scoring	Cronbach's Alpha
Perceived susceptibility	13	If I drive with an illegal speed, the possibility of having an accident increases for me.	1=strong Disagree 5= strong agree	0.845
Perceived Severity	9	Accident can have impacts on my appearance and beauty.	1=strong Disagree 5= strong agree	0.837
Perceived Self-efficacy	11	When my friends suggest a motorcycle race in the street, I simply refuse.	1=strong Disagree 5= strong agree	0.915
Perceived Response efficacy	14	If I ride a motorcycle within legal speed range, the possibility of damage and getting hurt, either for me or for others, decreases.	1=strong Disagree 5= strong agree	0.96
Perceived Rewards	16	"Motorcycle riding within illegal speed range helps me arrive sooner at my destination.	1=strong Disagree 5= strong agree	0.963
Perceived Costs	21	Riding motorcycle makes me angry.	1=strong Disagree 5= strong agree	0.96
Protection Motivation	7	I decided to abide the speed limit	1 =strong disagree 5=strong agree	0.961
Fear	12	I am afraid of being the cause of somebody else's death	1 =strong disagree 5=strong agree	0.956
Risky behavior	22	In order not to confront traffic, I	1=Never,	0.879

drive fast in alleys leading to my destination 2=Rarely,
3=Sometimes,
4=Often,
5=Always

The participants filled out the questionnaire by self-reporting. Content validity and face validity of the questionnaire was approved by a panel of experts. To determine the internal reliability, 15 people were examined in a pilot study and the coefficient of cronbach's alpha was between 0.83 and 0.96, which shows an acceptable internal reliability of the measures (Table1).

The collected data were analyzed by SPSS, statistical software, version 22 using T-test, Pearson correlation coefficient, and linear regression.

Protection motivation theory (PMT)

PMT is one of behavior based theories, which is used for prediction of intention to healthy behaviors. According to PMT, a combination of environmental and individual factors leads to 2 indipended process: threat appraisal and coping appraisal (13).Threat appraisal appraises Maladaptive Behaviors and involves reward from maladaptive behaviors and Perceived threat (perceived severity and susceptibility). Reward from maladaptive behaviors increases the possibility of maladaptive responses. On the contrary, the threat reduces the possibility of selecting maladaptive responses. Fear is an intermediate variable between Perceived Susceptibility, Perceived Severity, and Threat Appraisal. Therefore, if a person perceives that he/ she is vulnerable against a serious health threat, a higher level of fear is aroused. As a result, his motivation to take preventive actions (Protection Behavior) increases(14). Coping appraisal also evaluates coping ability and eliminating the danger. It involves self-efficacy, response efficacy, and perceived costs. Self-efficacy and response efficacy increases the possibility of giving adaptive responses while perceived costs decrease the possibility of adaptive responses (15). The two cognitive mediating processes are merged on the way to establish protection motivation. So, adapting a healthy and appropriate behavior means transforming motivation to intention, which finally leads to the new behavior (16).

Results

221 participants were included in the study. The age range of participants was 18-78 with a mean of 29.98 ± 10.38 of the participants 58.8% were married; 23.1% had academic education. From them, 66.1% were self-employed, 14.9% were workers, 3.6% were employees, 5.9% were university students, 0.5% were on their military service, 3.2% were retired, and only 5.9% were unemployed. The income mean of the participants was 228.24 ± 98.28 \$.

79.6% of the participants (176 people) were the owner of the motorcycle. The motorcycle riding experience of 36.4% was 5-10 years (based on duration of motorcycle riding). The mean motorcycle riding experience was 10.47 ± 8.5 years. The mean of motorcycle riding experience (length of holding driver's license) was 7.09 ± 9.2 year and mean daily motorcycle riding was 2 hours and 23 minutes with the standard deviation of 1 hour and 23 minutes. 44.8% of motorcycle riders had drivers' license. 36.7% of the riders held the license for less than 5 years. The means and standard deviations of the examined construct scores range of possible score and percent of acquired score of PMT constructs and processes are shown in table 2.

Table 2: means, standard deviations, range of possible score, percent of acquired score of PMT constructs and processes

		Mean	SD	Possible score	percent of acquired score
Constructs	Perceived self-efficacy	43.74	8.81	11-55	74.4
	Perceived response efficacy	61.94	10.66	14-70	85.6
	Perceived Severity	36.41	6.12	9-45	59.58
	Perceived susceptibility	51.93	9.03	13-65	74.86
	Perceived Rewards	38.55	14.67	16-80	32.23
	Perceived Costs	56.01	19.69	21-105	41.67
	Fear	50.82	10.37	12-60	80.87
	Motivation	28.54	5.86	7-35	76.95
	Risky Behavior	47.95	14.73	22-110	29.48
Processes	Coping Appraisal	49.65-	30.37	104- (-85)	18.7
	Perceived Threat Appraisal	49.78	20.73	58- (-94)	32.75

Among the PMT constructs, perceived response efficacy and fear got the highest scores respectively. The highest mean score of the risky behaviors of motorcyclists indicating the high frequency of those behaviors were "Escaping the place with a possibility of confiscating motorcycle with the mean score of 3.17", "Not using helmet while riding motorcycle with an mean score of 3.06" and "Not paying attention to speed limit while riding motorcycle with an mean score of 3.02. While the lowest reported risky behavior was riding against the legal direction of vehicles with the mean score of 1.32. To specify the correlation between constructs and processes of PMT regarding risky behaviors Pearson correlation test was used, which are demonstrated in table 3.

Table 3: The correlation Matrix of PMT constructs and processes for the motorcyclist risky behavior.

	1	2	3	4	5	6	7	8	9	10

Const ructs	1. Perceived susceptibility									
	2. Perceived Severity	0.39	5**							
	3. Perceived Rewards	-	-	0.06	0.19					
		6	0**							
	4. Perceived Costs	-	-	.817						
		0.02	0.22	**						
		6	5**							
	5. Fear	0.20	0.40	-	-					
		1**	9**	0.20	0.22					
				5**	6**					
5. Perceived Response Efficacy	0.08	0.22	-	-	0.20					
	9	6**	0.44	0.35	7**					
			0**	5**						
6. Perceived self-efficacy	0.19	0.21	-	-	0.20	0.35				
	8**	1**	0.41	0.36	8**	4**				
			4**	5**						
7. Motivation	0.28	0.45	-	-	0.28	0.36	0.45			
	7**	2**	0.45	0.43	9**	3**	3**			
			1**	9**						
8. Risky behavior	-	-	0.65	0.55	-	-	-	-		
	0.13	0.23	9**	4**	0.19	0.27	0.45	0.50		
	3*	6**			6**	6**	3**	6**		
Proce sses	9. Coping appraisal	0.10	0.28	-	-	0.28	0.68	0.65	0.54	-
		6	7**	0.80	0.87	0**	5**	2**	4**	0.58
				5**	9**					8**
	10. Threat appraisal	-	-	0.79	.656	-	-	0-	-	0.59
	0.59	0.60	3**	**	0.35	0.41	.442	0.57	4**	0.70
	9**	2**			3**	7**	**	7**		0**

*P<0.05, **P<0.001

Risky motorcycle riding, had a positive correlation with the perceived rewards, costs, and a negative correlation with sensitivity, perceived severity, fear, self-efficacy, Perceived response efficacy and protection motivation. There was a significant correlation between age and perceived costs($r=-0.16$, $P=0.016$), perceived rewards ($r=-0.15$, $P=0.026$), protection motivation($r=0.16$, $P=0.016$), risky behavior ($r=-0.28$, $P<0.001$). Sensitivity, perceived severity, fear, and

self-efficiency did not have significant correlation with the age of individuals. There was not any significant relation between PMT constructs and processes and participants education level, level of income and job. According to T-test, there was a positive relation among marital status and some PMT construct and processes, which is shown in table 4.

Table 4: Mean score and standard deviation of PMT constructs and processes according to marital status.

variables		Marital status		p
		single	Married	
		Mean ±SD	Mean ±SD	
constructs	Perceived self-efficiency	42.95± 8.91	44.27 ±8.75	0.274
	Perceived response efficacy	61.62± 11.7	62.16 ±9.96	0.72
	Perceived Severity	36.12 ±6.17	36.6 ±6.1	0.55
	Perceived susceptibility	51.19± 10	52.44 ±8.24	0.33
	Perceived Rewards	42.71±15.67	35.64 ±13.23	0.001
	Perceived Costs	61.39±20.8	52.25± 18.01	0.001
	fear	50.62 ±10	50.96 ±10.26	0.814
	motivation	27.07±6.7	29.57 ±4.96	0.003
	Risky behavior	53.98 ±16.24	43.73±11.93	0.0001
processes	Coping appraisal	43.18±32.5	54.18±28.02	0.008
	Threat appraisal	-44.6 ±22.19	-53.41 ±18.89	0.002

According to T-test, there was no relation between the risky behavior of motorcycle riders and their ownership, but risky behavior was related to holding a driver's license. Risky behavior was observed less in the people who had a driver's license compared to those who did not. The mean score and standard deviation of risky behavior in the licensed people was 43.72±12.18 while it was 51.39±15.73 for people without a license. There was not a significant correlation between PMT constructs and processes and motorcycle riding experience (based on duration of motorcycle riding and length of holding driver's license). Studying the prediction of risky behaviors through cognitive mediators processes of coping appraisal and threat appraisal linear regression indicated that these two processes predicted 48% of the behavior in which the role of threat appraisal process ($\beta=0.3590$) was more than coping appraisal process. And of all constructs, the perceived rewards is the best predictor of risky behavior ($\beta=0.5775$)

Table-5: Regression analysis of PMT constructs and processes as predictors of risky behavior.

independent variable	Standard	Non-	t	P.	F	R ²	dependent
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Construct	Constant		43.8693	5.2146	0.0001	28.8	0.486	Risky behavior
	Perceived self- efficiency	-0.2146	-0.3584	-3.806	0.0001			
	Perceived Response Efficacy	0.0812	0.1122	1.4341	0.153			
	Perceived Severity	-0.0835	-0.2009	-	0.156			
				1.4225				
	Perceived susceptibility	-0.0242	-0.0395	-	0.657			
				0.4449				
	Perceived Rewards	0.5775	0.5796	6.4095	0.0001			
	Perceived Costs	0.0111	0.0083	0.1278	0.898			
Processes	Fear	-0.0088	-0.0125	-	0.873			
				0.1601				
	Constant		68.732	34.499	0.0001	75.95	0.48	
	Coping appraisal	-0.237	-0.164	-4.629	0.0001			
	Threat appraisal	0.359	0.254	4.91	0.0001			

Discussion

In this study we examined the applicability of PMT in prediction of motorcyclist's risky behaviors. The present study shows that the three intentional violations "I escape the place where there is a possibility of confiscating my motorcycle", "while riding motorcycle I do not use a helmet", and "While motorcycle riding I do not pay attention to speedometer ", were the mostly reported risky .The idea that "I escape the place where there is a possibility of confiscating my motorcycle" shows that most of the motorcyclists ride regardless of motorcycle safety (17), some of them are unlicensed riders, and many of them neglect the traffic rules and regulations. Some research show the effectiveness of people's attitude toward violation, law, and police in risky behavior of riding (18). Some studied show the performance and behavior of police influence risky behaviors of motorcycle riders, and is one of the important social factors with both direct and indirect role in riding accidents and damages. This result was in line with Zamani-Alavijeh study (19). It is clear those who ride without helmet or license, exceed speed, or ride against the legal direction are more likely to be seized than those who ride lawfully. Positive attitude toward wearing helmet is more important than the awareness of its wearing benefits. We found weaknesses in use of helmet by motorcyclists despite carrying helmet, and knowing its advantages. Physical structure of helmet and its inconvenience (perspiration,

reduced hearing, and sight limitation) while wearing, are among serious barriers (20). Jonathan states heat as a reason for not wearing the helmet (21). The least risky behavior of the motorcycle riders is attributed to "Intentionally ride against the legal direction". According to the reports from Soltani and et al (22), the second factor of motorcycle deaths in Yazd is riding against the legal direction. Saving fuel, time, and cost are main reasons for this behavior.

Sometimes the offending motorcyclists knowing that the police under any circumstances, do not permission to the pursued and drive against the legal direction, attempt to do high-risk behavior and escape of low. In other hand, Lack of supervision and control by police are the causes of prevalence these risky behaviors among motorcyclists consciously.

Promote safe driving culture, reinforce motorcyclist's beliefs and attitudes about the philosophy of traffic rules, create negative public atmosphere and don't social support of trespassing riders can be one of the control mechanisms for this problem. Of course other Strategies such as building U-turns in boulevards, appropriate design and construction of the streets and roads, increasing invisible police on streets Furthermore intersections can enhance the safe behavior of motorcyclists. Because if motorcycle will be likely to detect his violations, he try refused. As expected, a significant negative correlation was found between self-efficacy, response efficacy, and risky behavior of motorcycle riding. The negative correlation shows that the more a person believes in adaptive behaviors (safe motorcycle riding) facing road accidents, the more the suggested behavior can reduce maladaptive behavior and their outcomes. In this investigation, a significant negative correlation was identified among Perceived susceptibility, perceived severity and risky motorcycle riding. It demonstrates that the more a person believes in danger, its consequences, and the seriousness of health danger, the less risky he will ride.

There was a significant negative correlation between risky motorcycle riding and fear.

This study showed a significant positive correlation between perceived reward and perceived costs with risky motorcycle riding. The positive correlation between risky motorcycle riding and perceived rewards means that the more perceived rewards of maladaptive behavior (arriving sooner at destination, others people's encouragement and satisfaction, self-confidence, dexterity and excitement), the less motivation the person will have to do adaptive behavior and consequently the person will lessen his protective behavior. Moreover, the more the perceived costs of adaptive behavior are (being disrespected, arriving late, high cost and time), the more maladaptive behavior (risky motorcycle riding and its outcomes) will increase. Greening et al (23) showed a positive correlation between ridings under influence of alcohol with perceived rewards and perceived costs, and a significant negative correlation with

perceived severity, perceived susceptibility, and perceived response efficacy. These results accord with the current study. In the studies conducted by Morowatisharifabad et al. (9), there was a positive correlation between unsafe riding with perceived rewards and perceived costs, and a negative correlation between self-efficacy, response efficacy, perceived susceptibility, perceived severity, and fear.

In this study, there was a significant correlation between age and perceived costs, perceived rewards, risky behaviors, protection motivation, coping appraisal and threat appraisal. Others constructs don't have significant coloration with age. Risky behaviors in motorcyclists less than 25 years had higher mean. With increasing age, high risk behaviors motorcyclists reduced. And threat appraisal increased. Researchers have also shown significant differences between age groups and risky driving behavior. Fernandez et al (24) also stated that young riders are more likely to exceed speed and specifically overtake other vehicles. Some other behaviors are also more prevalent in young riders including: not observing the standard distance rule, not letting the other cars joins the traffic flow, not letting the passersby cross the street. this finding is in accordance with Hagh-Shenas (25), Morowatisharifabad (9).

In this study the single motorcycle riders were reported to have performed more risky behaviors. this is in consistency with Morowatisharifabad (9) and Zamani-Alavijeh (17). However, the mean perceived self-efficacy, response efficacy, severity, and fear were higher in married people and mean perceived reward was higher in single ones. It seems logical completely that coping appraisal in married subjects is of higher mean than in single ones. Receiving social and spiritual supports from society, making better social connection, and sense of commitment and responsibility in married people for their spouse and children make them behave more safely.

we found no significant relationship between education level and motorcycle riding and this has also been shown in the study of Amado et al (26) they confirm that safe driving does not increase by education level. While in the study of Morowatisharifabad et al., (9) there was a significant direct relationship between risky driving and education level. In the study by Hagh-Shenas (25), a significant direct relationship is shown between education level and the level of errors and illegal behaviors. This shows the homogeneity of the participants in the study based on education level (64% of the participants have diploma or less).

Motorcycle riding experience has no significant relationship with risky behaviors which is in accordance with Malekpour (27), while Borowsky (28), Zamani-Alavijeh (19), and Morowatisharifabad report a significant relationship (29).

The results of the study show that both Mediator-cognitive processes of threat appraisal and coping appraisal could determine 48% of the variance of the observed current behavior. The role of threat appraisal was more, while in most studies using PMT to predict the safe behavior, coping appraisal process was stronger than threat appraisal. For example, Plotnikoff and Higginbotham (30), Aspinwall (31), Floyd et al. in a metaanalysis study on 65 study based on PMT in 20 fields of health showed that generally the prediction power of coping appraisal is stronger than threat appraisal. This difference in result can be due to the nature of the examined behaviors (14). The nature of the risky riding behaviors is seeing the risky behavior consequences and threat appraisal can be a predictor for doing recommended behaviors and has more influence on doing the recommended behavior and coping appraisal has no impact on recommended behavior. The results of the current study showed that the PMT constructs could only predict 48.6% of the variance of the behavior. In the study of Morowatisharifabad, the health belief model could predict only 5.6% of the variance of risky behavior of riding (32). In another research, he illustrated that PMT constructs could predict 36.5% of the variance of the driving behavior.(9) PMT was more successful in prediction of risky behavior of motorcycle riding. In the study of Greening et al., (23) reward, cost, susceptibility and perceived self-efficacy could predict the intention of riding under influence of alcohol . Fernandez et al (33) Reported that public and private perceived susceptibility and perceived cost could predict the fast riding behavior. Morowatisharifabad et al. stated that predicted constructs of specific perceived susceptibility, perceived cost, and perceived benefits could predict riding if tired. (9, 23). Our study has several limitations. Data collection for unsafe riding behavior carried out through self- reporting, which is not always reliable. But, no alternative seems to eradicate this shortcoming. In addition, cross-sectional study has its own limitation. To determine the exact influence of PMT constructs on risky motorcycle riding, other studies are recommended to be conducted and designed in an interventional way.

Conclusion

The results of this study suggest the effectiveness of PMT in predicting risky behaviors of motorcycle riders. Therefore, this theory can be used as a framework for planning educational programs to promote riding style and reduction of traffic accidents. Intentional violation also plays a significant role in road accidents; therefore it is recommended that proper intervention programs be considered to prevent these violations and minimize their side effects and damages, especially for young adult and single males. In this study, the role of self-efficacy and perceived reward is approved in adopting safe behaviors of motorcycle riding. Increasing perceived threat, consequences of

traffic accident and reducing unsafe motorcycle riding rewards of motorcycle riders could be effective lead to accept the safe behavior. This could a main principle in education planning.

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References

1. Rowden PJ, Watson BC, Haworth NL. Risk taking by motorcyclists: rider training and stages of change. 2012.
2. Tan-Torres Edejer T, Aikins M, Black R, Wolfson L, Hutubessy R, Evans DB. Cost effectiveness analysis of strategies for child health in developing countries. *bmj*. 2005;331(7526):1177.
3. Mohan D. Traffic safety and health in Indian cities. *Journal of Transport and Infrastructure*. 2002;9(1):79-94.
4. municipality Y. a survey about accident factors for motor cycle drivers In Yazd and presentation of a scientific strategic to reduce damages.
5. police. annual report of Police in Yazd Province 2012.
6. Peden M, Scurfield R, Sleet D, Mohan D, Hyder A, Jarawan E. World report on road traffic injury prevention. Geneva: World Health Organization, 2004.
7. Maddux JE, Rogers RW. Protection motivation and self-efficacy: A revised theory of fear appeals and attitude change. *Journal of Experimental Social Psychology*. 1983;19(5):469-79.
8. Helmes AW. Application of the protection motivation theory to genetic testing for breast cancer risk. *Preventive Medicine*. 2002;35(5):453-62.
9. Morowatisharifabad MA, Momeni Sarvestani M, Barkhordari Firoozabadi A, Fallahzadeh H. Predictors of Unsafe Driving in Yazd City, Based on Protection Motivation Theory in 2010. *Quarterly of Horizon of Medical Sciences*. 2012;17(4):49-59.
10. Trifiletti LB, Gielen AC, Sleet DA, Hopkins K. Behavioral and social sciences theories and models: are they used in unintentional injury prevention research? *Health education research*. 2005;20(3):298-307.
11. Bunna F, McGuire M, Eapen K, Ferraro A. Research on preventing road traffic injuries in developing countriesis needed *BMJ*. 2004;328(7444)::895.

12. Lajunen T, Summala H. Can we trust self-reports of driving? Effects of impression management on driver behaviour questionnaire responses. *Transportation Research Part F: Traffic Psychology and Behaviour*. 2003;6(2):97-107.
13. Rogers RW. Cognitive and physiological processes in fear appeals and attitude change: A revised theory of protection motivation. *Social psychophysiology*. 1983:153-76.
14. Floyd DL, Prentice- Dunn S, Rogers RW. A meta- analysis of research on protection motivation theory. *Journal of Applied Social Psychology*. 2000;30(2):407-29.
15. Norman P, Boer H, Seydel ER. *Protection motivation theory*. 2005.
16. Wu Y, Stanton BF, Li X, Galbraith J, Cole ML. Protection motivation theory and adolescent drug trafficking: relationship between health motivation and longitudinal risk involvement. *Journal of pediatric psychology*. 2005;30(2):127-37.
17. Zamani Alavijeh F, Niknami S, Mohamadi E, Montazeri A, Ghofranipour F, Ahmadi F. Iranian Motorcyclists' Personal Experiences of Risky Riding. *Journal of Kermanshah University of Medical Sciences*. 2008;12(3).
18. Stanojević P, Jovanović D, Lajunen T. Influence of traffic enforcement on the attitudes and behavior of drivers. *Accident Analysis & Prevention*. 2013;52:29-38.
19. Zamani-Alavijeh F, Niknami S, Bazargan M, Mohamadi E, Montazeri A, Ghofranipour F, et al. Risk-taking behaviors among motorcyclists in middle east countries: a case of Islamic Republic of Iran. *Traffic injury prevention*. 2010;11(1):25-34.
20. Orsi C, Stendardo A, Marinoni A, Gilchrist MD, Otte D, Chliaoutakis J, et al. Motorcycle riders' perception of helmet use: Complaints and dissatisfaction. *Accident Analysis & Prevention*. 2012;44(1):111-7.
21. Finnoff JT, Laskowski ER, Altman KL, Diehl NN. Barriers to bicycle helmet use. *Pediatrics*. 2001;108(1):e4-e.
22. Soltani G, Ahmadi B, Pourreza A, Rahimi A. Investigating Prevalence of deaths from Traffic Accidents and Factors Associated with it in Yazd in 2009. *The Journal of Shahid Sadoughi University of Medical Sciences*. 2014;21(6):831-9.
23. Greening L, Stoppelbein L. Young drivers' health attitudes and intentions to drink and drive. *Journal of Adolescent Health*. 2000;27(2):94-101.

24. Fernandes R, Job R, Hatfield J. A challenge to the assumed generalizability of prediction and countermeasure for risky driving: Different factors predict different risky driving behaviors. *Journal of Safety Research*. 2007;38(1):59-70.
25. Hagh-Shenas H, Hosseini M, Jamshidi M, Azizi HR. Relation of personality traits with driving behavior in city of Shiraz in 2005. *Hakim Research Journal*. 2008;11(3):47-54.
26. Amado S, Koyuncu M, Kacaroglu G. Evaluation of factors affecting safe driving: Demographic factors, experience, personality and psycho-technical evaluation. *TURK PSIKOLOJI DERGISI*. 2004;19(53):23-+.
27. Malekpour F, Mohammadiyan Y, Malekpour A, Salimi S, SaRkArI A. Study of relationship between personality, attitudes to safety and risky behavior among motorcycle drivers in Tehran city. *Modern Rehabilitation*. 2012;2(2):61-8.
28. Borowsky A, Shinar D, Oron-Gilad T. Age, skill, and hazard perception in driving. *Accident Analysis & Prevention*. 2010;42(4):1240-9.
29. Morowatisharifabad M, Momeni Sarvestani M, Barkhordari Firoozabad A, Fallahzade H. Predictors of Unsafe Driving in Yazd City, Based on Protection Motivation Theory in 2010 *Ofogh Danesh*. 2012;17(4):49-59.
30. Plotnikoff R, Higginbotham N. Protection motivation theory and exercise behaviour change for the prevention of heart disease in a high-risk, Australian representative community sample of adults. *Psychology, health & medicine*. 2002;7(1):87-98.
31. Aspinwall LG, Kemeny ME, Taylor SE, Schneider SG, Dudley JP. Psychosocial predictors of gay men's AIDS risk-reduction behavior. *Health Psychology*. 1991;10(6):432.
32. Morowatisharifabad MA. The Health Belief Model variables as predictors of risky driving behaviors among commuters in Yazd, Iran. *Traffic injury prevention*. 2009;10(5):436-40.
33. Fernandes R, Hatfield J, Soames Job R. A systematic investigation of the differential predictors for speeding, drink-driving, driving while fatigued, and not wearing a seat belt, among young drivers. *Transportation research part F: traffic psychology and behaviour*. 2010;13(3):179-96.

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