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Application of the Protection Motivation Theory in Predicting Preventive Behaviors from Children's Accidental Falls in Mothers with Children Less than Three Years Old Referred to Health Centers

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Abstract

Aim: Decades named preventing injuries decade. The most sensitive and vulnerable persons against diseases and accident, especially accidental falls are children. This study aimed to determine the application of the Protection Motivation Theory (PMT) in predicting preventive behaviors from children's accidental falls (AFs) in mothers with children less than 3 years old referred to the health centers of Mashhad City.

Methods: This cross-sectional study included 140 mothers who were selected from the health centers of Mashhad City according to the inclusion criteria of the study and by cluster and systematic sampling. The instruments for data collection were valid and reliable questionnaires of demographic information, a self-administered questionnaire that is assumed to examine the structures of PMT and preventive behaviors from CAFs and were analyzed with SPSS 20. Pearson & Spearman, one way ANOVA correlation coefficient and linear regression were applied together to analyze the data.

Findings: The mean age of the subjects was 27.42+5.07 years. The results also showed that there were statistically significant relationships between the perceived susceptibility and protection motivation and preventive behaviors from CAFs ($P<0.001$). Based on regression analysis, preventive behaviors from CAFs using the structures of protection motivation was generally 66%.

Conclusion: The results showed that the mother's sensitivity and knowledge about preventive behaviors from CAFs were low. The findings of this study can be useful for designing educational interventions for prevention of CAFs by health authorities.

Keywords: Accidents, Childhood, Injury, Protection Motivation Theory

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Introduction

The current decade has been called the decade of *Prevention of Accidents*. Annually, millions of people around the world die as a result of injuries from accidents [1, 2]. Children are the most sensitive and vulnerable group against diseases and accidents [3]. Several studies show that every year, millions of children lose their lives in accidents, and many of them are permanently disabled [4]. Many of the major causes of death occur in the developed countries, even before the age of one year [3]. A fall is defined as an event that results in a person coming to rest inadvertently on the ground or floor or other lower level. Fall-related injuries may be fatal or non-fatal though most of them are non-fatal [5]. This is a major public health problem globally. Each year, an estimated of 424 000 individuals die from falls globally, over 80% of which are in the low- and middle-income countries. Falls are the second leading cause of accidental or unintentional injury deaths worldwide [5]. Around 37.3 million falls that are severe enough to require medical attention occur each year. The second morbidity occurs in children aged 15 years or younger, while nearly 40% of the total DALYs lost due to falls worldwide occurs in children [5].

The financial costs from fall-related injuries are substantial. The research and evidence from Canada suggest the implementation of effective prevention strategies with a subsequent 20% reduction in the incidence of falls among children under 10 could create a net saving of over US$ 120 million each year [5]. Iranian newborn infant mortality rate has decreased from 54 per 1,000 live births in 1990 to 30 cases in 2006; also the mortality rate for children under five years has decreased from 72 per 1,000 children in 1999 to 35 in 2006 [6]. In 2004, disorders, prenatal anomalies, and accidents were three main causes of deaths of infants under one year; it is clear that the statistics of deaths reflect only a fraction of the impact and consequence of accidents in children [7]. However, we all know that children are exposed to many dangers, and among the greatest dangers that threaten children and are less stressed are mortality and disability from accidents in the home and the street. Childhood falls occur largely as a result of their evolving developmental stages, innate curiosity to their surroundings, and increasing levels of independence that coincide with more challenging behaviors commonly referred to as 'risk taking'. While inadequate adult supervision is a commonly cited risk factor, the circumstances are often complex, interacting with poverty, sole parenthood, and particularly hazardous environments [5].

Along with the physical and cognitive development of children, the occurrence of injuries follows a particular pattern so that

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some injuries in certain ages have the highest rate: poisoning at age 12 months, fall at about nine months, burns at the age of 18 years as well as in children under 3 years [8].

Since reducing the burden of injuries is a goal for international health, thus it requires a consensus of the various scientific disciplines. The common point of all injuries whether intentional or unintentional is that they are preventable [9].

The worldwide recognition of the importance of education and ways of prevention is very important. Otherwise, it will increase the number of deaths and disabilities due to accidents and injuries among children with the persistence of risky behaviors [10].

Accidents have been identified as the leading cause of death in children after one year of age. The disability resulting from injuries is very high such that there are thousands of children living with disabilities in different degrees [11].

Although the World Health Organization (WHO) reports that accidents are in the row 10 of causes of death in children under four in the world, by controlling malnutrition and diarrhea and respiratory infections, it seems that now accidents are the leading cause of death in the developed countries (including Iran), even before the age of one year [3].

Annually, 78 million people have an accident needing treatment. Every year, millions of children around the world die of preventable causes and accidents. It has been reported that the most common accidental fall types in children are falls from furniture (38%), the fall of seats (12%) and falling down the stairs (4.10%) [12].

Falls from a height are a leading cause of injury among children globally; yet few effective prevention strategies have been developed [13]. Then prevention strategies should emphasize education and, training. Sociologists, psychologists and anthropologists have proposed ranges of theories and models to explain the factors influencing behavior. To design an effective training program to enhance safety and prevention of injuries in children, various educational health theories including Protection Motivation Theory (PMT) can be used [14].

Protection Motivation Theory (PMT), proposed by Rogers in 1975 based on the expected value model, explains the effects of fear on the attitudes and health behaviors [15]. It is used to recognize and predict the medical behavior that affects the decision-making process of an individual and the way she/he will protect him/herself in the event of malicious stimuli. PMT may particularly well-suit for understanding and addressing accidents in children [16].

A schematic representation of the cognitive mediating processes of PMT is shown in Fig. 1 [17].

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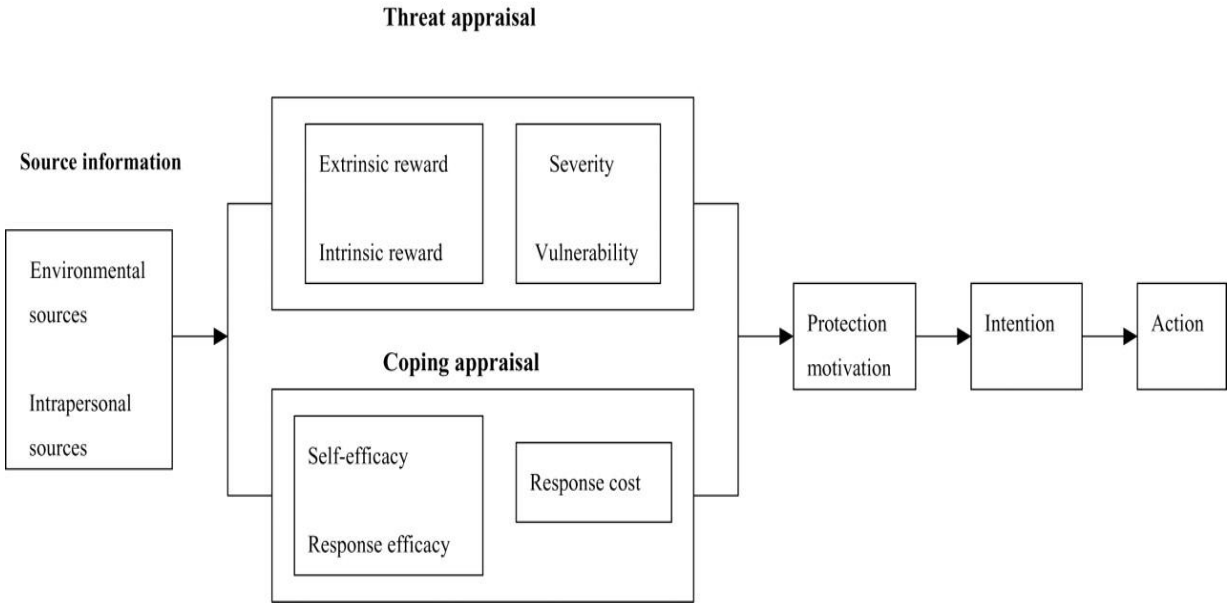


Figure 1: A schematic representation of the cognitive mediating processes of PMT [17].

Protection motivation theory represents a useful social cognitive model of individual's motivation to engage in protective behaviors. According to PMT, four factors combine to predict an individual's intention to engage in a particular behavior: perceived severity of a threat (e.g. negative health consequences of CAFs), perceived vulnerability to the threat, perceived efficacy of the preventive behavior, response efficacy; e.g. preventive behaviors from CAFs, the effectiveness of preventive behaviors from Children's Accidental Falls in improving health child, and perceived self-efficacy, or confidence in one's ability to perform the recommended behavior (e.g. confidence in engaging in preventive behaviors from CAFs. Self-efficacy is the perceived ability of the person to actually carry out the adaptive response. Self-efficacy and response efficacy have the most consistent impact on safe behavior across many safety issues [18].

The intention then serves as the precursor to behavior. Protection motivation is similar to other types of motivation in that it arouses, sustains, and directs activity. The threat-appraisal process is addressed first since a threat must be perceived or identified before there can be an evaluation of the coping options [19].

Threat appraisal evaluates the maladaptive behavior. Factors comprising the threat-appraisal process are maladaptive response rewards (intrinsic and extrinsic) and the perception of threat (severity and vulnerability). Rewards will increase the probability of selecting the maladaptive response (not to protect the self or others) whereas threat will

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decrease the probability of selecting the maladaptive response. The coping-appraisal process evaluates the ability to cope with and avert the threatened danger. Factors comprising the coping appraisal process are efficacy variables (both response efficacy and self-efficacy) and response costs. Response efficacy is the belief that the adaptive response will work such that taking the protective action will be effective in protecting the self or others. Self-efficacy is the perceived ability of the person to actually carry out the adaptive response. Response costs are any costs (e.g. monetary, personal, time and effort) associated with taking the adaptive coping response [17].

Response efficacy and self-efficacy will increase the probability of selecting the adaptive response whereas response costs will decrease the probability of selecting the adaptive response. The factors associated with the preventive behaviors from CAFs within the protection motivation model can be used to design effective educational interventions. So, this study aimed to determine the application of Protection Motivation Theory (PMT) in predicting preventive behaviors from CAFs in the mothers having children less than 3 years referred to the health centers of Mashhad, 2015.

Methods

This cross-sectional study included 140 mothers admitted to the health care centers of Mashhad City (Northeast of Iran) in 2015. The sample size was determined based on the studies by [20]. Participant size was estimated 140 with the power of 80%. Therefore, 140 samples were chosen for each construct [21].

Sampling was performed through the multi-stage cluster sampling. The health centers of the city were divided into five areas. Then one health care center was chosen randomly from each area, and the samples were selected randomly from the individuals admitted to the health care centers considering the inclusion criteria of the study.

The inclusion criteria were: having children less than 3 years, being Iranian, and willingness to participate in the study. Before entering the study, the participants were provided with the necessary information about the study, and those who showed their willingness to participate through verbal consent were included in the study. The Ethics Committees of Mashhad University of Medical Sciences approved the study.

The instrument for data collection was a valid and reliable self-administered questionnaire of demographic information such as age, occupation, and formal education years to examine the structures of PMT and preventive behaviors from CAFs. The questionnaires were filled out by the participants as self-report. The content and face validity of the questionnaire were verified by a panel of experts. The

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questionnaire was developed after studying books and similar publications, and summing up the themes from the interview shield with mothers. For further modification and correction, it was submitted to 35 professors, field experts and professionals in health education, and 13 of whom gave their viewpoints and feedback. The content validity Index (CVI) calculates the three criteria of relevancy, specificity and clarity by a Likert scale (totally relevant (4), relevant (3), partially relevant (2) and irrelevant (1). In this study, the scores for the protection motivation were 0.79 and 0.84.

Moreover, for Content Validity Ratio (CVR), the necessity criterion was referred to as necessary, useful but not necessary, and not necessary, and calculated by the total number of specialists who chose" necessary". The CVR for the protection motivation was 84%. The reliability of the questionnaire was measured by Cronbach's alpha after it was completed by 20 individuals. The results were as follows: perceived vulnerability 79%, perceived severity %80, fear %81, perceived response- efficacy 76%, perceived self-efficacy 80%, perceived cost 78%, intention 80%, and behavior 76%.

The protection motivation was measured with one question: "Which statement you choose for doing preventive behaviors from CAFs?" There were five answers highlighted: 1) *I never think about "preventive behaviors from Children's Accidental Falls*"(pre-contemplation); 2) I think about "preventive behaviors from Children's Accidental Falls" (contemplation); 3) I intend to practice "preventive behaviors from Children's Accidental Falls" (Preparation); 4) I certainly doing "preventive behaviors from Children's Accidental Falls"(action); and 5) I was doing "preventive behaviors from Children's Accidental Falls" for the past six months (maintenance). All the answers were organized on the Likert scale with the degree of 5. The rate for each statement from *completely agree* to *completely disagree* was in a range of 1 to 5, and in order to calculate the score of each sub-scale, these scores were summed. As for behavior assessment, there were four questions after data collection; perceived severity was assessed by 5 questions (range 5-25); in the same way, susceptibility and perceived severity were measured with four items (range 4-20). Also perceived response efficacy was measured with five items (range 5-25) and response costs were measured with three items (range 3-15). The data were analyzed by SPSS software (ver. 20) using the Pearson & Spearman, one way ANOVA, and correlation coefficient tests together with a linear regression. The significance level was 0.05.

Results

In this study, the subjects' mean age was

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27.42+5.07 years, and the children's mean age was 11.2±7.8 months. Other information is given in Table 1.

Frequency distribution and percentage of specifications of people based on the mother's protection motivation about preventive behaviors from CAFs are given in Table 2.

The mean behavior from CAFs of mothers and protection motivation theory structures on PBFCAF are shown in Table 2. Perceived severity had the highest score, and perceived cost had the lowest score (Table 3).

Table 1: Frequency distribution and percentage of specifications of females in the study (n=140)

Variable		N	%
Education	Elementary school	10	7.1
	Middle school	32	22.9
	High school dropout	74	52.9
	High school diploma and higher	24	17.1
Occupation	Employed	12	8.6
	Housewife	128	91.4
	Employee	16	16
	Housekeeper	45	45
Number of children	1	77	55
	2	35	25
	3 and more	28	20
History of children's accidental falls	Yes	34	24.3
	No	106	75.7
History of reading letter about accidental falls	Yes	49	35
	No	91	65

Table 2: Frequency distribution of the participants based on their mother's protection motivation about preventive behaviors from Children's Accidental Falls (PBFCAF)

Protection motivation from PBFCAF		N	%
Pre-contemplation	I never think about "preventive behaviors from Children's Accidental Falls".	14	10
Contemplation stage	I think about "preventive behaviors from Children's Accidental Falls".	22	15.7
Preparation stage	I intend to practice "preventive behaviors from Children's Accidental Falls".	22	15.7
Action	I certainly do "preventive behaviors from Children's Accidental Falls".	70	50
Maintenance phase	I was doing "preventive behaviors from Children's Accidental Falls" for the past six months.	12	8.6

Table 3: Mean and standard deviation structures of protection motivation theory (PMT)

Sub-scale	Mean	SD
Perceived vulnerability	15.8	3.02
Perceived severity	22.23	2.5
Fear	10.8	2.10
Perceived response-efficacy	19.95	3.4
Perceived self-efficacy	18.6	3.5
Perceived cost	6. 4	2.05
Intention	21.6	3.1
Behavior	17.02	2.7

Table 4 includes descriptive statistics and correlations among the study variables. The

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results indicated higher perceived severity and vulnerability related protection motivation. Higher efficacy for preventive behaviors from CAFs, and lower costs of PBFCAF are related behaviors from CAFs. Also there was a positive correlation between protection motivation (r = 0.643) and perceived self-efficacy and PBFCAF (r = 0.488) (P<0.05). The results suggested that perceived self-efficacy had a positive correlation with perceived severity, perceived vulnerability, perceived efficacy, protection motivation and PBFCAF.

Table 4: Correlation of the structures of PMT in PBFCAF in participants

Variable	1	2	3	4	5	6	7	8	9
1. Age of child	-								
2. Perceived severity	r =-0.173*	1							
3. Perceived vulnerability	r =0.026	r = 0.551*	1						
4. Fear	r =0.035	r = 0.301	r = 0.02	1					
5. Perceived efficacy	r =0.131	r = 0.302*	r = 0.453*	r = 0.36	1				
6. Perceived self-efficacy	r =0.123	r = 0.283*	r = 0.36*	r = 0.53	r = 0.421*	1			
7. Perceived cost	r =0.063	r = 0.026	r = -0. 012	r = 0.048	r = -0.059	r = -0.094	1		
8. Protection motivation	r =0.166	r = 0.395*	r = 0.252*	r = 0.148	r = 0.433*	r = 0.591*	r = -0.094	1	
9. Behavior	r =-0.387*	r = 0. 025	r = 0. 012	r = 0.03	r = 0.231	r = 0.488*	r = 0.05	r = 0.643*	1

*P<0.05

According to Table 5 based on Regression analysis, preventive behaviors from CAFs, prediction rate, using the structures of protection motivation, was generally 66%. In this study, linear regression indicated that protection motivation structure had the most predicting power in preventive behaviors from CAFs. The findings of the study showed a significant relationship between perceived response efficacy and protection motivation (P<0.05 & r=0.59). No significant relationship was observed between age and PMT using the regression test among the married participants (P>0.05). But Spearman's coefficient indicated a significant relationship between education and the PMT constructs (P<0.05).

The results of this study revealed that a direct relationship exists between PMT and preventive behaviors from CAFs so that PMT could predict 66% of preventive behaviors from CAFs.

Table 5: Generalized linear regression model and factors influencing preventive behaviors from Children's Accidental Falls

Independent variable	Beta	P	R^2	Dependent variable
Perceived vulnerability	-0.07	0.11	0.66	Preventive behaviors from Children's Accidental Falls
Perceived severity	0.10	0.18		
Fear	-0.012	0.04		
Perceived response cost	-0.093	0.02		
Perceived efficacy	-0.048	0.247		
Perceived self-efficacy	0.03	0.00		
Protection motivation	0.497	0.00		

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Discussion

In this study, similar to the study of Maymanatabadi, there was a significant relationship between perceived vulnerability and perceived severities, and the most damage caused by accidents was among the children under 5 years [10].

There was also a statistically significant relationship between perceived vulnerability and protection motivation (p=0.01) similar to the study of Wartcle et al. [22].

This means that mothers believed *Accidental Falls* had been the most intention of doing protective behaviors such as (*Do not use the scooter, Do not put the child in high and unprotected places,* and *Put the protector on the stairs and windows*). The current research showed a significant relationship between perceived response efficacy and protection motivation (p<0.001 and R= 0.43), and a positive correlation between perceived response efficacy protection motivation; this finding confirms the report by Plotnikoff et al. [23].

In the study of Shekhi et al., perceived vulnerability and self-efficacy constructs played the most significant role in predicting behavior [24]. Thus, training of mothers should target these two structures. In this study, there was a relationship between protection motivation and preventive behaviors from CAFs. Pearson's regression showed a positive relationship between perceived vulnerability and protection motivation; this result is consistent with the results of similar studies [22-26].

The research results showed that the mothers' sensitivity and knowledge about preventive behaviors from CAFs were low, while in Fathi Shekhi et al.'s research [24], the average knowledge of mothers was moderate. Also, in the study of Rezapur-Shaholia et al. titled "Home-related injuries among under-five-year children and mothers' care regarding injury prevention in rural areas among PRECEDE model constructs, there was a statistically significant correlation between mothers' knowledge and injury severity among children [27].

It was also found that mothers' knowledge about preventive behaviors from CAFs is low, and it is better to reduce the accidental falls. The study of Morrongiello et al. [13] on "parents' perspectives on preschool children's in-home falls: implications for injury prevention" revealed that parents were surprised about the frequency of serious falls affecting young children. They recognized that children falling from heights (stairs and off furniture) posed risk of head injury; however, they had different beliefs about preventability of falls.

Also, Gabriella Santagati's study highlights a clear need for public health educational programs for parents regarding the prevention

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of unintentional injuries in children as a valuable tool to increase safety and injury prevention and to reduce risks, because the majority of such injuries occur at home; this finding is consistent with the results of this study [28].

Among the constructs of PMT, protection motivation was the most significant predictive for preventive behaviors from CAFs. Therefore, the findings of this study can be considered when designing educational interventions for prevention of CAFs by health authorities.

Accordingly, it is advised that any training intervention should be developed in accordance with PMT to promote preventive behaviors from CAFs.

Collecting information on preventive behaviors from CAFs through self-report was of this study's limitations, which decreases accuracy, but we cannot alleviate this limitation. Additionally, the cross-sectional nature of this study is another limitation. To exactly determine the influence of PMT on preventive behaviors from CAFs, it is recommended that some studies be designed and carried out in an interventional manner.

Due to the positive correlation between perceived susceptibility, perceived self-efficacy and perceived response efficacy and motivation for preventive behaviors from CAFs, the program will attempt to strengthen the beliefs of mothers. The results of this study are consistent with the results of various studies, which have shown that self-efficacy and perceived response efficiency are crucial factors in promoting health behaviors [18, 29].

It is suggested that in addition to peer education to promote awareness and understanding of the effects and consequences of the accidental falls and effective practices, individual and face- to- face counseling should also be used. The results showed that the motivation of mothers to prevent accidental falls rate is 58.6.

Conclusion

Hence, we suggest holding more training courses in this field to improve the mother's motivation attempt. Also, according to the recommendation of WHO for children [5], effective interventions include multi-faceted community programs; engineering modifications of nursery furniture, playground equipment and other products; and legislation for the use of window guards. Other promising prevention strategies include use of guard rails/gates, home visitation programs, mass public education campaigns, and training of individuals and communities regarding the appropriate acute pediatric medical care.

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