

# Effect of Education on Preventive Home Accident Practices by Mothers with Toddlers: Using the Theory of Planned Behavior

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## Research article

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## Abstract

Background Home accidents are one of the causes of death and disability in toddlers. This study aimed to determine the effect of education on preventive home accident practices by mothers with toddlers with regard to the Theory of Planned Behavior (TPB). Methods This research was a quasi-experimental study conducted on 116 mothers referred to comprehensive health centers (58 mothers per experimental and control groups), who were selected using cluster sampling method. Data were collected by a researcher-made TPB questionnaire, and then educational intervention was performed based on the TPB in four 45-60 minute sessions for the experimental group. After two months, the data were recollected from the two groups and analyzed by SPSS software version 16. Results Comparing the scores of knowledge, TPB constructs (i.e., attitude, perceived behavioral control, behavioral intention, and subjective norms), and preventive home accident practices of mothers revealed no statistically significant difference between the two groups at the beginning of the study. After having the intervention, there was a significant difference between the two groups of mothers regarding knowledge, TPB constructs (except for subjective norms), and preventive home accident practices for toddlers ( $p < 0.001$ ). Conclusion Preventive home accident practices adopted by mothers with toddlers enhanced after applying the TPB ; hence, this theory-based education can be used as a proper theoretical framework for toddlers' home accident prevention.

## Introduction

Most pediatric injuries, especially those in children aged 0–6 years, occur at home<sup>(1)</sup>. Home accidents are a significant health problem in childhood<sup>(2)</sup> and are recognized as one of the most important cause of disability or death in the first five-year of children's life <sup>(3)</sup>. It is estimated that 830,000 deaths in children worldwide happens because of domestic accidents each year <sup>(4)</sup>. A national-based survey in Iran showed that, out of 307,064 domestic injuries, 25.2% were among children and 70% were among 1-5-year age group<sup>(5)</sup>.

Preventing home injuries is an essential part of child care program and one of the main responsibilities of parents and caregivers <sup>(6)</sup>. Parenting interventions can significantly decrease the possibility of unintentional injuries among children <sup>(7)</sup>. Using educational programs promotes mothers' awareness, attitude, and practices regarding injury prevention <sup>(8, 9)</sup>.

Prevention strategies are of essence with regard to the complexity of injury problems <sup>(10)</sup>. Health education programs can empower individuals to change themselves through affecting their beliefs, attitudes, and decision-making skills<sup>(11)</sup>. On the other hand, the effectiveness of the health education programs largely depends on the models/ theories used by health education professionals <sup>(12)</sup>.

Theory of Planned Behavior (TPB) founded by Ajzen (1991) is a comprehensive decision-making model, which is employed to detect health and safety behaviors <sup>(13)</sup>. It is one of the educational frameworks involved in the behavior change process. In accordance with the TPB, *attitudes*, *subjective norm* (i.e., social force for performing the behavior), and *perceived behavioral control* (perceived ability and power to

perform the behavior) are constructs that affect *behavioral intentions*, and consequently the definite *behavior*(14).

Although the TPB is an effective and comprehensive means for promoting preventive behaviors, educational interventions in the field of home accident prevention for children have been limited to other educational models (11, 12, 15, 16). Regarding the high prevalence of home injuries in toddlers and their complications and given the limited number of studies in Hamedan, this study aimed to determine the effect of education on preventive home accident practices among mothers with toddlers with regard to the Theory of Planned Behavior (TPB).

## Methods

A quasi-experimental pretest-posttest design was concerned to examine 116 mothers with toddlers referred to four comprehensive health centers affiliated with Hamadan University of Medical Sciences, Hamadan, Iran, in 2018. Mothers were non-randomly assigned to the experimental and control groups (58 persons in each group). A theory –based education of planned behavior (four 45-60 minute training sessions) was run for the experimental group; however, the control group (socio-demographically homogenous to the experimental group) received usual educational program. Our main outcome included preventive home accident practices by mothers with toddlers:

### Population of the Study:

In this study, 116 mothers with toddlers (90% power with a 2-sided significance level of  $\alpha = 0.05$ ) participated. Inclusion criteria were living in Hamadan, having at least one young child, referring to comprehensive health centers regularly, having elementary reading and writing literacy, being at an acceptable mental, physical, and cognitive health status for mothers and their children, not working at health centers for mothers or close relatives, and not being pregnant. Exclusion criteria were being absent more than one training session and changing the place of residence.

The cluster sampling method was used to select mothers with regard to the inclusion criteria of the study. Then mothers were assigned into two groups with 58 persons per group. The experimental group was trained in accordance with the theory-based education of planned behavior, and the control group received usual education. The two groups were homogenous in terms of demographic data.

### Instruments:

In order to collect data, a researcher-made questionnaire was used, which consisted of two sections addressing demographic information of mothers and children as well as questions about knowledge and constructs of planned behavior theory (i.e., attitude, perceived behavioral control, behavioral intention, and subjective norms) and preventive practices adopted by the mothers for toddlers' home accidents.

**Knowledge** was assessed using 23 items scored based on a two-point scale ranging from 0 (incorrect answer) to 1 (correct answer). Intra-class correlation reliability coefficient (ICC) of this scale was

estimated to be 0.9.

**Attitude** was measured using 16 items scored based on a four-point scale ranging from 1 (strongly disagree) to 4 (strongly agree). Intra-class correlation reliability coefficient (ICC) of the scale was estimated to be 0.85.

**Perceived behavioral control** was assessed using 10 items scored based on a four-point scale ranging from 1 (little control) to 4 (complete control). Intra-class correlation reliability coefficient (ICC) of this scale was 0.83.

**Behavioral intention** was assessed using nine items scored based on a four-point scale ranging from 1 (strongly disagree) to 4 (strongly agree). Intra-class correlation reliability coefficient (ICC) of this scale was calculated to be 0.92.

**Subjective norm** was measured using seven items scored based on a four-point scale ranging from 1 (strongly disagree) to 4 (strongly disagree). Intra-class correlation reliability coefficient (ICC) of this scale was 0.82.

**Mothers' preventive practices** for toddlers' home accidents was assessed using 35 items scored based on a two-point scales ranging from 0 (no preventive practice) to 1 (preventive practice). Intra-class correlation reliability coefficient (ICC) of this scale was 0.91.

To determine the validity of the questionnaire, qualitative content validity method was used. First, the content of the questions was determined based on the relevant books and articles (15, 16); then the questionnaire was submitted to 10 faculty members and 12 mothers. Finally, their comments were applied in the questionnaire.

#### **Intervention:**

After conducting a preliminary study and approving the study plan, the researcher referred to the comprehensive health centers in Hamadan and identified mothers with toddlers, who met the inclusion criteria. All the mothers were informed of the methods and the goals of the study, and their written consent forms were received. To limit the effect of the intervening variables, the two groups were supposed to be homogeneous in terms of demographic variables for toddlers and mothers.

At the beginning of the study, the self-reported questionnaires were submitted to the both groups of mothers and were completed. In the experimental group, the TPB was implemented by the researcher during four 45-60 minute training sessions. The sessions were run in the comprehensive health centers with regard to the TPB constructs over four weeks through using lecture, questions and answers, group discussion, and presentation of pamphlets and educational booklet in groups consisting of 10-15 mothers. The control group had usual training by family health-care personnel and received pamphlets and educational booklets at the end of the study. Finally, after two months, the data were recollected from

the two groups and analyzed using Kolmogorov-Smirnov, Wilcoxon, Mann-Whitney, and Kruskal-Wallis tests by SPSS software version 16.

## Results

According to the findings presented in Table 1, a majority of mothers and fathers in both groups had academic education, were housekeepers and self-employed, respectively. Most of toddlers were male, and the two groups were homogenous in terms of parents' level of education and occupation and toddler's gender.

**Table1. Comparison of Qualitative demographic variables in the two groups**

Variable	Levels of variable	Experimental group	Control group	Significant level *
		N (%)	N (%)	
Mothers' education	Elementary	7 (12%)	7 (12%)	0.973
	Under Diploma	9 (16.6%)	9 (16.6%)	
	Diploma	16 (28.6%)	18 (33.3%)	
	Academic education	26 (42.8%)	22 (38.1%)	
Mothers' occupation	Housekeeper	46 (79.4%)	41(70.7%)	0.147
	Employed	12 (20.6%)	17(29.3%)	
Fathers' education	Elementary	6 (10.3%)	7 (12%)	0.555
	Under Diploma	14 (24.1%)	13 (22.4%)	
	Diploma	12 (20.6%)	17 (29.3%)	
	Academic education	26 (45%)	21 (36.3%)	
Fathers' occupation	Unemployed	4 (6.6%)	3 (5.1%)	0.562
	Worker	11 (18.7%)	9 (15.5%)	
	Self-employed	27 (46.3%)	25 (43.1%)	
	Employed	16 (28.4%)	21 (36.3%)	
Gender of toddler	Girl	26 (44.8%)	25 (43.1%)	0.852
	Boy	32 (55.2%)	33 (56.9%)	

\* Chi-square test

As shown in Table 2, the means and standard deviations of parents' age, toddlers' age, family size, and birth order of toddler are compared in the two groups. According to the comparative analyses, the two groups had no significant difference in terms of the aforementioned variables ( $P > 0.05$ ).

**Table 2: Comparison of quantitative demographic variables in the two groups**

Variable	Experimental group	Control group	Significant level *
	Mean ± (SD)	Mean ± (SD)	
Age of mother	34.60 ± (2.12)	29.91 ± (5.92)	0.084
Age of father	35.19 ± (5.61)	40.44 ± (4.83)	0.923
Age of toddler	2.15 ± (0.98)	1.98 ± (0.99)	0.058
Family size	4.00 ±(0.81)	3.55 ± (0.91)	0.064
Birth order	1.67 ± (0.72)	1.43 ± (0.88)	0.054

\* Mann Whitney test

As presented in Table 3.3, there was no significant differences between the knowledge scores, the TPB constructs (i.e., attitude, subjective norms, perceived behavioral control, and behavioral intention of mothers) and mothers' preventive home accident practices in the two groups before training sessions ( $p > 0.05$ ); however, the scores of knowledge, most of the TPB constructs (namely attitude, perceived behavioral control, and behavioral intention) and preventive home accident practices by mothers significantly increased in the experimental group following the training sessions ( $p < 0.001$ ).

**Table3. Comparison of knowledge, and constructs of TPB\* in two groups before and after educational intervention**

Constructs of model	Range	Group	Before intervention	After intervention	P value***
			Mean ± (SD)	Mean ± (SD)	
knowledge	0-23	Experimental	18.4 ± (1.50)	20.2 ± (3.27)	<0.001
		Control	18.84 ± (1.73)	18.86 ± (1.45)	0.864
		P value**	0.212	<0.001	
Attitude	16-64	Experimental	17.86 ± (6.62)	23.2 ± (6.82)	<0.001
		Control	19.33 ± (5.86)	18.7 ± (5.68)	0.213
		P value**	0.105	<0.001	
Subjective norms	7-28	Experimental	15.4 ± (5.76)	15.3 ± (4.72)	0.738
		Control	16.1 ± (5.09)	16.5 ± (5.41)	0.109
		P value**	0.430	0.694	
Perceived behavioral control	10-40	Experimental	10.4 ± (2.75)	13.6 ± (4.47)	<0.001
		Control	10.5 ± (3.78)	10.3 ± (3.91)	0.354
		P value**	0.259	<0.001	
Behavioral intention	9-36	Experimental	22.2 ± (3.90)	26.6 ± (4.74)	<0.001
		Control	23.2 ± (3.90)	23.2 ± (4.16)	0.353
		P value**	0.154	<0.001	
Practice	0-35	Experimental	24.2 ± (3.16)	27.3 ± (3.54)	<0.001
		Control	24.86 ± (3.55)	24.2 ± (3.26)	0.552
		P value**	0.039	<0.001	

\*Theory of Planned Behavior

\*\* Results of Mann Whitney test

\*\*\*Results of Wilcoxon test

## Discussion

This study aimed to determine the effect of TPB on preventive home accident practices adopted by mothers with toddlers. The results showed mothers' knowledge, attitude, perceived behavioral control, behavioral intention, and preventive home accident practices promoted following the implementation of the TPB.

One of the findings of this study is that mothers' knowledge should be promoted to prevent toddlers' home accidents in the experimental group. This finding is in line with another study conducted in Iran, in which the knowledge of mothers with below six-year-old child improved after using the TPB with the aim of preventing self-medication (17). In a similar study, the TPB had effects on students' knowledge regarding prevention of road traffic injuries (18). A study in Brazil showed that educational intervention increased mothers' knowledge regarding to prevent falling, drowning, and intoxication in children (19); hence, it can be concluded that increasing mothers' knowledge through educational interventions is of necessity in order to prevent home accidents in childhood. .

In this study, attitude, perceived behavioral control, and behavioral intention toward home accident prevention increased among mothers after the TPB. These findings are also consistent with previous studies indicating that health education could significantly improve mothers' attitude and behavioral intention to prevent home accidents among 2-5-year-old children (20). Furthermore, there was an improvement in attitudes and behavioral intentions of Iranian boy students following the Theory-based education of Planned Behavior in a Police-Assistant Program (18). In a similar quasi-experimental study, attitude and perceived behavioral control were found out to be significant predictors of parents' intention to participate and select sun protective behaviors for their children (21).

In the present study, the mean scores of subjective norms were the same before and after the TPB. A review of studies revealed some contradictory findings. Similarly, in a road safety education program in Belgium, the workshop of traffic risks based on the TPB could not also affect the subjective norms of female students(22). In contrast to the findings of the present study, the other studies documented the effect of subjective norms on parents' pool safety behaviors (23). This variable could also predict parents' sun-protective behaviors for their children(24). Subjective norms are perceived as social pressure from others. It is a main predictor for care-giver safety decision-making and particularly influence on parents' intentions(25); hence, the influence of peers, friends, parents, and health care workers on mothers' preventive home accident practices for toddlers must be more highlighted in this study.

The last finding of this study was that the TPB affected mothers' preventive home accident practices of in toddlers. Similarly, a study in Australia revealed that the constructs of the TPB (namely attitude, subjective norm, and perceived behavioral control) determined parents' behavior in protecting their 2-5-year-old children from the sun (26). In another randomized controlled trial study, the app-based intervention, developed in accordance with the TPB principles, improved caregivers' safety behaviors such as testing water temperature before bathing their children, storing sharp devices and medicines or cleansers safely among the preschoolers (27). In a similar experimental study, the application of a conceptual TPB framework improved safety car seat of mothers with newborns(28). The results of our study is in line with a randomized controlled trial study conducted in Hong Kong, in which mothers with children aged below three years got free access to a technology-based injury prevention program encompassing behavioral components based on the TPB. The self-reported data indicated that this program affected their behaviors regarding home safety practices(29). To conclude, the health

educational intervention promoted the mothers' intention and perceived behavioral control to follow the behavior towards preventing accidents in their toddlers.

The limitation of the study design was that the mothers' preventive home accident practices among toddlers could not be observed directly. This study used a self-reporting data collection technique, even though; the mothers received necessary explanations regarding the importance of careful completion of the questionnaire.

## Conclusion

To sum up, the research results showed that the TPB was effective in promoting the preventive home accident practices in mothers with toddlers through affecting mothers' knowledge, attitude, perceived behavioral control, and behavioral intention. It is thus recommended to implement the TPB in order to improve parents' decisions to prevent home accidents among toddlers.

## Declarations

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### Competing interests:

None declared.

### Ethical approval:

This study was approved by the Ethics Committee of Hamadan University of Medical Sciences (IR.UMSHA.REC.1397.218).

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