



Original Article

The effect of education based on the Health Belief Model in mothers about behaviors that prevent febrile seizure in children



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ABSTRACT

Introduction: Fever is one of the most concerning issues in public health, which occurs fairly frequently and is a precursor for the occurrence of seizure in childhood between ages of 6 months to 6 year children. Therefore, the current study aims to determine the effect of education based on Health Belief Model (HBM) in mothers about preventive behaviors regarding febrile convulsion in children.

Methods: This study was conducted as a randomized clinical trial in which 200 mothers (were divided to intervention (case) and control groups randomly) with children 6 months to 3 years referring to health centers in Rezvanshahr participated. The data collection instruments is a questionnaire developed based on HBM. This survey included questions on knowledge, aspects of health belief model, and performance. After needs analysis that was done in the pretest, the educational program was designed and implemented in the experimental condition based on the aspects of the model.

Results: There was no significant difference between the two groups in demographic variables ($P>0.05$). The average knowledge score, aspects of the model, and performance increased significantly in the case group ($P<0.05$).

Conclusion: The results of this study indicated that the design and implementation of an educational program based on HBM and based on the predictive beliefs and culture and education of the mothers was effective in preventing febrile convulsion.

Introduction

Fever is a very common symptom of disease in children and the most common cause for parents visits to pediatricians. The prevalence of referring to a doctor due to fever in children is estimated to be between 19-50% (1). Although fever is a protective mechanism, severe reactions to high fever may lead to febrile seizure, brain damage, and even death (2). Febrile seizure is the most common neurological disorder in children aged 6 months to 6 years old and one of the rapid transient neurological disorders in

childhood (3). Epidemiologic studies show that between 2-4 % of children have experienced febrile seizure, so that 4 % of them before 6 months of age, 90 percent between 6 months of age and 3 years of age, and 6 % after 3 years of age have experienced it. Also 2 to 5 percent of children before age 5 experience fever febrile seizures at least once (4) and peak of its incidence is at approximately 18 months and never seen after 6 years of age (5). Although febrile seizure is usually self-limiting and benign, a 12-years follow-up of children who have experienced febrile seizures showed that 6 percent of children developed to epilepsy, 10 percent had neurological problems and 5% had learning disabilities (5-7). The

possibility of epilepsy in such children up to adolescence is about 3 to 12 percent, which is on average 4 times more than the possibility of epilepsy in the entire community (1.4%) (5, 8). Also the rate of relapse of febrile seizure in affected children in Iran was reported 41% of which the most cases of recurrence (about 36%) was in children under the age of one (9) whose admission and hospitalization annually imposes heavy costs on health care system. In a study, Rkain et al. showed that most parents had little information about the control and management of fever, and most parents' imaging about fever was a serious illness with severe side effects such as brain complications (10). Hideaki has also shown that seizure in children can interfere with family life, sleep, and social activity of parents, and cause anxiety and abnormal behavior, especially in mothers (11). Insufficient knowledge and high rates of recurrence of the disease lead to abnormal behaviors in mothers, and some mothers became confused and scared about their children's fever and lose their control and therefore are unable to take any action to control fever and its complications (7, 12). The best way to prevent this disease is correct control of children's fever, especially infants, and the trained mothers can prevent complications by simple prevention ,controlling fever,foot washing (with cool water) and proper use of anti-fever drugs (5, 6). Considering the above, and according to the researchers' observations in some parts of Iran, including the city of Rezvanshahr, people continue to rely on old beliefs and traditions. Therefore, this study was designed with the aim of using modern training methods by identifying the variables affecting the performance of mothers in the management of child fever based on health belief model instructions.

Methods

This study was randomized controlled trial that consisted of mothers referring to Rezvanshahr health centers with a child aged 6 months to 3 years old. The sampling method of the present study was two-step simple randomized in first step and systematic randomized (Stratified) in the second step. Based on the sample size calculation, according to Sajjadi's study (8), 200 samples (100 for the case group and 100 for the control group) was needed. Accordingly, 8 health centers (2 urban centers and 6 rural centers) in Rezvanshahr in the first step were divided randomly into intervention (case) and control groups. In the second step, in each center based on covered population, a number of samples were selected by

stratified method. Finally, 200 samples (100 in each group) were selected.

Inclusion criteria of the study

- 1) Mothers having a child aged 6 months to 3 years
- 2) Mothers of Rezvanshahr ethnicity
- 3) Mothers with literacy (Reading and writing)
- 4) Unemployed mothers in medical and paramedical professions

Data Collection tools

In this study, data collection tool was a researcher-made questionnaire based on a similar study of Sajjadi, including 2 sections, the first part of demographic information such as age, occupation, education level, income and place of residence of the parents. The second part of the questionnaire consisted of knowledge questions, the third part included the questions of health belief model instructions and the fourth part included a performance checklist. The health belief model instructions include perceived susceptibility, 5 questions (including how much a mother knows her child prone to febrile seizure), perceived intensity questions, 5 questions (including questions about the complications for the child in the effect of febrile seizure, etc.), perceived benefits questions, 5 questions (including questions about the benefits of controlling fever, such as preventing treatment costs, etc.), perceived barriers, 7 questions (including such as Mothers' unfamiliarity with the proper methods of home-based therapy, such as the correct way of foot washing with cool water, how to use a mercuric thermometer, proper use of anti-fever agents, etc.) and the self-efficacy of 8 questions (the ability to use anti fever agents and mercuric thermometers correctly, etc.), external and internal practice guidelines (including sources propel mothers to do desired behaviors include a physician, midwife, spouse, relatives, etc., or a feeling of inner peace of the mother about timely and effective preventive behaviors, etc.). In the section of susceptibility, intensity, perceived benefits and barriers, and self-efficacy, the range of points for each question varied from 1 to 5 in such a way that the answer I totally disagree with takes point 1, opposing 2, I have no idea 3, I agree 4, and I fully agree with 5 points and the maximum score of the mother was calculated from 100 points.

Validity and reliability of the questionnaire

Validity and reliability of the questionnaire were determined by the researcher. In this study, for validation verification of content, this questionnaire was given to 15 specialists (3 Ph.D. and Masters of Science in pediatric nursing, 2 PhD and Masters of Science in health nursing of community, 2 Ph.D. in Health Education and Health Promotion and 1 Masters of Science in Midwifery education and 7 Ph.D. and s of Science in Nursing, Internal Medicine and Surgery) and after calculating the CVR score, the value of validity of the content of the 3 question was less than 0.49, which was eliminated and the CVI was equal to 1.

Reliability of data collection tools

Reliability includes the ability to obtain consistent and similar results each time the tool is used (65). In next step, in order to determine the reliability of the data collection tools, after validation, the questionnaire was given to 20 mothers with a child aged 6 months to 3 years old (similar to the researched population) referred to the urban and rural health centers of Rezvanshahr. To measure the reliability of the knowledge questions, the test re-test method was used, so that first the questionnaire was given to 20 mothers and the following week, the test was performed again, with Pearson's correlation coefficient at 0.87. Cronbach's alpha coefficient was used to measure the structural questions. The Cronbach's alpha coefficient for perceived intensity structure was 0.78, perceived susceptibility 0.83 perceived benefits 0.78, perceived barriers 0.74 and self-efficacy 0.89. The training program was held during four 45-minute training sessions and every week one session was held. The educational content of the sessions included general information about febrile seizure, the causes and methods of preventing febrile seizure and the correct control of fever, and in order to enhance the perceived benefits, high cost of

treatment, drug side effects to control febrile seizures and complications of febrile seizures were mentioned and to mothers were given the opportunity to discuss about barriers to the use of basic methods of controlling fever and tried to eliminate barriers and increase the confidence of mothers in order to increase self-efficacy. For mental and psychological preparation and sensitization of the researched units, two posters were prepared and at the place of the training classes were exposed to the direct observation. At the end of each session, the pamphlets prepared from the educational contents were given to mothers and each mother also had a mercury thermometer in order to remove existing barriers.

Data analysis

After data collection, using SPSS software version 21 and according to the requirements and conditions of applying the tests and the number of samples, statistical analysis of the data was performed. First, to determine the use of parametric and nonparametric tests using the Kolmogorov Smirnov test, normality of the research community was measured, then were analyzed according to the normal distribution of the research community using descriptive statistic methods (mean and standard deviation) and based on variables by parametric tests (independent t, paired t-test and regression and chi-square). In this study, the significance level of the tests was considered ($p < 0.05$).

Results

The demographic data of the studied subjects is presented on Table 1. Findings of demographic variables showed that mean age of the mothers in the case and control groups were respectively (27 ± 3.55) and (26.55 ± 3.42) years where there was no statistically significant difference ($P > 0.05$). In terms

Table 1: comparison of demographic data of the studied subjects

Groups Variables	Sub-index	Case	Control	P value
Age of mothers	-	27±3.55	26.55±3.42	-
Education level	Primary	0 (0)	0 (0)	0.566
	Middle	22 (22%)	27 (27%)	
	Under diploma	36 (36%)	38 (38%)	
	Diploma	37 (37%)	33 (33%)	
	University degree	5 (5%)	2 (2%)	
Insurance coverage	Yes	87 (87%)	81 (81%)	0.24
	No	13 (13%)	19 (19%)	
Type of housing	personal	77(77%)	72(72%)	
	Rental	23 (23%)	28 (28%)	
Place of residence	Urban	40 (40%)	40 (40%)	1.0
	Rural	60 (60%)	60 (60%)	
Previous training about fever	Yes	14 (14%)	7 (7%)	0.1
	No	86 (86%)	93 (93%)	

of educational level, no statistically significant difference was observed between two groups ($P>0.05$). The job for all participating mothers in intervention and control groups was housewife and working mothers did not participate in the study since training classes were held in the morning. As shown in Table 2, regression test was used to determine predictive value and provide educational content. By making a regression between the knowledge and the constructs of the health belief model as an independent variable, knowledge (0.422) and self-efficacy constructs (0.184) and perceived benefits (0.151) and then perceived barriers (0.065) with the highest amount of beta, had the most predictive power to change behavior and performance. As shown in table 4, most of mothers in the intervention and control groups after intervention also maintained their external performance guidelines 51% and 37%, respectively. Using Chi-square homogeneity test, there was a significant difference in the

Table 2: predictive power of knowledge and structures of health belief model in performance

Regression test	STD β	P value
Knowledge	0.422	0.0001
Perceived susceptibility	-0.101	0.105
Perceived intensity	-0.82	0.249
Perceived benefits	0.151	0.29
Perceived barriers	0.065	0.301
Self-efficacy	0.184	0.014

Discussion

Findings of demographic variables showed that mean age of the mothers in the case and control groups was respectively 27 ± 3.55 and 26.55 ± 3.42 years where there was no statistically significant

Table 3: Comparison of health belief model structures in intervention and control groups

Variable	Case	Control	P value
Knowledge	96.3 \pm 5.63	51.84 \pm 16.31	$P<0.0001$
Perceived susceptibility	87.61 \pm 5.64	65.97 \pm 7.23	$P<0.0001$
Perceived intensity	89.64 \pm 4.53	75.11 \pm 8.47	$P<0.0001$
Perceived benefits	92.53 \pm 3.89	74.9 \pm 9.12	$P<0.0001$
Perceived barriers	36.67 \pm 6.97	66.34 \pm 9.05	$P<0.0001$
Self-efficacy	86.15 \pm 4.82	77.76 \pm 14.13	$P<0.0001$
Mothers performance	84.94 \pm 11.73	39.05 \pm 11.75	$P<0.0001$

frequency distribution of external performance. guidance about the prevention of febrile seizure after intervention in both intervention and control groups, respectively ($p<0.0001$) that this difference was in the choice of other options, such as choosing a nursing option by mothers in the intervention group rather than other mothers, but still has the greatest impact as an external performance guideline for practitioners. As shown in table 5, it is seen that most of mothers in both intervention and control groups after intervention, mentioned their internal performance guidelines still fearing the complications of febrile seizure in the intervention group (75%) and in the control group (36%). By Chi-square homogeneity test, there was no significant difference in the frequency distribution of internal performance guidance about the prevention of febrile seizure after intervention in both intervention and control groups, respectively ($p>0.05$).

difference. In terms of educational level in case and control groups, education level of mothers in case group was respectively primary 0, middle 22%, under the diploma 36%, diploma 37% and university degree 5% and in control group it was respectively primary 0, middle 27%, under diploma 38%, diploma 33% and university degree 2% and no statistically significant difference was observed between two groups. The job for all participating mothers in intervention and control groups was housewife and working mothers did not participate in the study since training classes were held in the morning. There was also no significant difference between the two groups in other demographic variables. Table 2 shows predictive power of education level and structures of health belief model in relation with preventive behaviors for seizure caused by fever and providing educational

Table 4: Frequency distribution of external performance guidance about the preventive behaviors of febrile seizure after intervention in two groups

Groups Variables	Sub-index	Case	Control	P value
External performance guidelines (encouraging febrile seizure preventive behaviors)	Family	1 (1%)	27 (27%)	P<0.0001
	Other mothers	0 (0)	1 (1%)	
	television	1 (1%)	4 (4%)	
	Doctor	51 (51%)	37 (37%)	
	Nurse	17 (17%)	0 (0)	
	Health Center staff	24 (24%)	26 (26%)	
	Health volunteers	1 (1%)	2 (2%)	

Table 5: Frequency distribution of internal performance guidelines for febrile seizure behaviors after intervention in two groups

Groups Variables	Sub-index	Case	Control	P value
Internal performance guidelines (Encouraging febrile seizure preventive behaviors)	Fear of complications	75 (75%)	36 (36%)	P<0.0001
	The inner peace of timely action	20 (20%)	22 (22%)	
	The inner peace of timely action	2 (2%)	10 (10%)	

content. With regression between level of literacy and structures of health belief model as independent variable, literacy (0.422) and self-efficacy structures (0.184) and perceived benefits (0.151) and then perceived barriers (0.665) with highest beta had the most predictive power to change behavior and performance. In terms of determination and comparison of the mean of education level in the intervention and control groups, we observe that the mean score of education level in the intervention group was significantly higher than the control group. In this regard, Sajjadi et al. reported a similar increase in the average score of mothers' level of education after the intervention. The average score education increased from 34.4 to 68.3 which has been statistically significant (8). The effect of education was significant in another study which was carried out by Kharqani et al. with the aim of examining the effect of education on Health Belief model for the prevention of drug abuse in women and led to increased education level of units under study (13). Also, it was observed in the study of Haairian et al. with the aim of comparing the effect of oral health education on women's literacy and attitudes that the level of literacy increased significantly which is in line with this study (14). Perhaps the reason for the existence of significant difference is the formation of

and the observed differences may be attributed to the difference between the studied populations and the economic and cultural status of the studied communities. However, the mother's education level can change based on training provided by the health center staff, the media, and people in each region. Based on the results of Table 3, we can observe that the score of perceived sensitivity structure in the intervention group was significantly increased. In the study of Sajjadi et al. perceived sensitivity of mothers increased after intervention. The average perceived sensitivity score increased from 42.2 to 72.8 in the test group (8). The results of other studies were also consistent with our study (15-18). It seems that education based on the health belief model increases the perception of individuals and reduces their sensitivity to the subject. Also in the present study in the intervention group, mothers did not have the impression of risk of seizure in their children with a fever in their child because of their full health which is in line with other studies (8, 15-18). However, no change in the sensitivity of the intervention group was observed in the study of Pirzad (19) and the changes were not statistically significant in the study of Vickramarachi and from the perspective of researcher perhaps this observed difference can be due to study type, difference of investigated

population or ethnic and cultural differences. In the end, the results of this study showed that after training based on health belief model, the level of mothers' perceived sensitivity in terms of risks and febrile seizure significantly increased in the intervention group which might indicate the impact of model-driven learning. The perceived severity score for prevention of febrile seizure significantly increased in the intervention group ($P < 0.0001$). This finding was consistent with the results of studies by Sajjadi, Mansourian, Hashemi Parast, Razi and other similar studies (8, 15-18, 20). Of course, in the study of Sohrabi Vafa et al., perceived severity level significantly decreased in the control group and the intervention group after training (20). Also, in the study of Vickramarachi et al., Changes in the perceived severity did not show a significant difference after the intervention in the intervention group (21). As it can be observed, perceived severity of the risks and consequences of the disease increased and significantly differed from the control group in most studies after the intervention. From the perspective of the researcher, education based on the health belief model can increase the perceived severity so that individuals can reach an internal attitude and belief so that they can believe that proper behaviors in the subject is essential for health. In the recent study, many mothers did not know the febrile seizure complications or had false beliefs about febrile seizure and its complications. We tried to increase the perceived severity of mothers using effective educational methods which is in line with other studies (8, 15-18). However, no change in perceived severity was made in the study of Sohrabi vafa (20). Other Health Belief Model Structures (Perceived benefits, perceived barriers, perceived self-efficacy, and mothers' function) also increased in this study in intervention group. Other studies have also confirmed such findings. (8) (16, 17). In fact, education based on health belief model somewhat reduced "Perceived barriers" of individuals in the subject and helps the understanding of individuals' physical, psychological, financial and other barriers in preventive behavior to be minimized. Also, in the present study, measures were taken using effective educational methods to eliminate the barriers of mothers (such as having no opportunity to spray the child or ineffectiveness of spray, not having thermometers at home and lack of proper skill in using the thermometer to measure body temperature of child, lack of knowledge to for proper use of fever medicines and beliefs in society where mothers do not embrace their children with fever). In the present study, education based on health belief model has improved the performance and health behavior of

individuals in the subject. Its reason was practical instruction in controlling fever in a replica as well as practical teaching for mothers in the presence of researcher and correcting the mistakes and errors of mothers in controlling febrile seizure. Frequency distribution of external practice guidance in both intervention and control groups showed that most mothers introduced their external practice guide to be the doctor (39%). However, a significant increase and difference was observed in the intervention group. In this regard, mothers in the study of Sajjadi et al considered doctors as the most important guides for external practice which is consistent with this study (8). Also, Movahed et al. reported the guide for external action to be effective on the correct functioning of the doctor which is in line with this study in this regard (22). Information from the present study and other studies show that doctors can have an effective role in the adoption of health behavior by individuals. Doctors play a more important role in health education in addition to identifying other effective sources of information to the community. Despite the explanation for controlling febrile seizure, the majority of mothers in both intervention and control groups stated their internal practice guide to be fear of febrile seizure complications (in the intervention group (75%) and in the control group (36%)). In this regard, mothers in Sajjadi et al. (8) also stated ear of complications before the training intervention which is consistent with the above-mentioned study.

Conclusion

The results of this study, which was implemented using the Health Belief Model on mothers, indicate the positive effect of this educational model on the performance and behavior of mothers and promises to promote the health of the children in the region. Based on the obtained results, others under study lacked enough knowledge and had a poor performance in adopting their febrile cares to control febrile seizure. So, considering the sensitivity and vulnerability of children, the need to provide a basic solution and explicit planning in the prevention and teaching self-care to mothers who are the first caregivers in the family is quite obvious in the field of child care and other diseases.

Ethical disclosure

Before performing the research, it was explained to the participants. An informed consent was obtained from all participants included in the study.

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Author Contributions

All the authors have accepted responsibility for the entire content of this submitted manuscript and approved submission.

Conflict of interest

The authors declare that they have no conflict of interest.

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