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The Impact of the Education Based on Health Belief Model on Preventive Behaviors of Crimean-Congo Haemorrhagic Fever among rural women from the City of Sarbishe

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Abstract

Background: Crimean-Congo hemorrhagic virus fever is an acute febrile haemorrhagic disease mainly transmitted from animals to men by tick bites. There is the risk of disease transmission in humans during the slaughter of infected animals or a short period after that, following the contact with the skin or carcasses of the animal. Since rural women are the first group who are at risk of developing the disease, this study tried to determine the effect of education based on Health Belief Model on preventive behaviors against Crimean-Congo haemorrhagic fever in rural women.

Methods: This randomized controlled field trial was carried out on 138 rural women who were divided randomly into intervention and control groups. The intervention group members participated in an educational program designed based on Health Belief Model which contained five training sessions in the form of lecture together with group and panel discussion. The data collection tool was a researcher-made questionnaire consisting of 8 parts including demographic characteristics and health belief model constructs, which was completed by the researcher before, immediately after, and three months after the intervention. Data analysis was conducted using SPSS software, version 19. Independent t-test, analysis of repeated variance, and post hoc Bonferroni test were used to compare the mean score of knowledge and model constructs and to compare the mean changes in the two groups before, immediately after, and three months after the intervention.

Results: Before the intervention, the mean score of knowledge and health belief model constructs had a significant difference between intervention and control groups in the constructs of knowledge ($p=0.005$), cues to action ($p=0.001$), and behavior ($P<0.001$), but there was no significant difference in other constructs. In the intervention group, a significant difference in mean scores of different constructs was observed before, immediately after, and three months after intervention, while in the control group, no significant difference was observed in most of the aspects of the model.

Conclusions: Considering the positive influence of the education which is based on this model on the behaviors associated with Crimean-Congo haemorrhagic fever, it is suggested that this theory be used in preventive education programs against Crimean Congo haemorrhagic fever.

Keywords: Education; Crimean-Congo fever; Health Belief Model; Women

1. Introduction

Crimean-Congo hemorrhagic fever virus is an acute febrile haemorrhagic illness which is mainly transmitted to humans from animals by the bite of ticks. In spite of the fact that this disease is an animal disease, instances and sudden epidemics of this disease are also seen in humans. The risk of disease transmission in humans exists during the slaughter of infected animals or in a short period after that, through contact with skins or carcasses of animals. Furthermore, the contact with diseased blood and tissue- especially at the stage of bleeding- or carrying out any acts that lead to human contact with blood, saliva, urine, feces and vomit causes the transmission of disease (1). The death

rate of this disease is high and reaches 30 percent (2). People who are most at risk include ranchers and farmers, slaughterhouse workers, veterinarians, and health staff (of hospitals). The disease outbreaks more in the warm season of the year, at the same time as the disease reservoirs (ticks) are active. Since the recognition of the disease in 1944, several cases of the disease have been reported in Africa, Eastern Europe, the former Soviet Union, Asia (including Pakistan, Afghanistan, India, UAE and Iran), sometimes with outbreaks of the disease (3).

During the years 2008-2011, more than 805 confirmed human cases afflicted with the disease- with 102 instances of death- have been reported in the provinces of Sistan-Baluchistan, Khuzestan, Chahar Mahal Bakhtiari, West Azerbaijan, Bushehr, Yazd, Kerman, Tehran, Golestan, and Fars- with approximately 75% of all instances in Sistan-Baluchistan province and in the two cities of Zahedan and Zabol (2, 3).

Absence of clear clinical signs in animals (such as cattle, sheep, goats and camels), rapid spread of the disease, high mortality, problems in international trade (1), the city's (Sarbishe) 110 km common border with Afghanistan, unauthorized entry of animals from the eastern border especially from the province of Sistan-Baluchistan, unauthorized slaughter of cattle, report of cases of fatal disease in South Khorasan Province, crucial role of rural women in the livestock affairs and their contact with livestock and animal products, and keeping the livestock in the living environment are among fundamental factors which double the importance of educating and empowering all the people especially rural women who play a key role in the health of the family and society. Thus, the implementation of an empowering program to increase the awareness, knowledge and self-efficacy of rural women who are constantly in contact with animals or animal products could be an important starting point for the transformation of public attitudes in society, which is a clear vision for health promotion in societies (4). Experts agree that the effectiveness of health education programs depends highly on the use of the theories and models of health education. Therefore, choosing a model (pattern) for health education is the first step in the planning process of every health education program (5).

One of the models that can be applied at the individual level to explain the change in health behavior is health belief model which plays a role mostly in disease prevention, the basis of which is on people's motivation for action. This model assumes the behavior to be a function of the knowledge and the attitude of the individual and with respect to its components pushes people towards healthy behaviors, i.e. it can increase the perceived susceptibility and intensity of the people about Crimean-Congo fever and with respect to the barriers and benefits perceived, guides the person towards preventive behaviors (6).

In other words, health belief model focuses on this issue that, generally, people have good reactions to health messages and disease prevention when they feel that they are at serious risk (perceived threat); it is just then that they perceive the benefit of changing their behavior (perceived benefits) and remove easily the barriers to these changes (new and healthy preventive behavior) and become confident whether to do or not to do a behavior (perceived self-efficacy). It is in this situations that educational interventions and programs are likely to be effective (7).

Several studies have been conducted in Iran to determine the effect of education based on Health Belief Model on promoting the preventive behaviors from diseases. The results suggest that the education based on HBM can promote preventive behaviors from diseases and can be effective in decreasing the risk of developing the disease.

Therefore, considering the fact that, as far as the researcher know, there has been no study on the impact of education using health belief model on preventive behavior of Crimean-Congo haemorrhagic fever in rural women of Sarbishe city, this study was conducted to explain the effect of education using health belief model on preventive behavior of Crimean-Congo haemorrhagic fever in rural women.

2. Methods

This study is a randomized controlled field trial which is done on the rural women of the villages of Gazdar and Kasrab in Sarbishe city. The population in this study are rural women living in the two villages of Gazdar and Kasrab from Sarbishe city. Randomly, a village was placed in the intervention group and another in the control group. Inclusion criteria were: at least 5 years of permanent residence in the village, age of 18 to 45 years, literacy (of reading and writing), and the ability to participate in the training sessions, and exclusion criteria was absence from participating in more than one training session. The sample

size was 47 people per group based on the formula of comparing the two averages and on the basis of the results of the study by Karimi et al (8)

$\alpha = 0.5$, $\beta = 0.1$, $S_1 = 1.19, \overline{X2} = 3.55, \overline{X1} = 2.28$

and in order to enhance the accuracy it was increased to 69.

The sampling method was like this: first on the basis of the information from the Health House, the qualified women for entering the study were extracted from the two villages and among them 69 women were selected from each village to participate in the study. The data gathering tool was a researcher-made questionnaire based on health belief model constructs. The questionnaire was completed by both groups before, immediately after and three months after the intervention under the supervision of the researcher. The questionnaire included questions related to demographic features (7 questions), knowledge questions (16 multiple-choice questions with one point for correct answers and zero point for wrong ones), perceived susceptibility construct (9 items), perceived intensity construct (7 items), perceived benefits construct (11 questions), perceived barriers construct (8 questions) and self-efficacy construct (9 items), and in all constructs, scoring was rated based on the 5-class Likert from 'strongly disagree' to 'strongly agree' with a score between one and five for each question, and the score of each construct is derived from the total score of the questions of that construct. The guide-for-action construct was also consisted of 6 two-option questions (yes or no questions) with zero and 1 scoring, and the behavior construct with 5-class Likert from 'never' to 'always' was assigned a score between 1 to 5, respectively.

To determine the content validity of the questionnaire, the method of *panel of experts* was used together with the comments of 9 professors of health education, epidemiology and infectious diseases. After affirming the validity, the questionnaires were given to 20 rural women from the city of Sarbishe who were not a part of the study population, and the internal reliabilities for the following questions (with Cronbach's alpha) were as follows:

knowledge=0.76, perceived susceptibility 0.78, perceived intensity 0.89, perceived benefits 0.86, perceived barriers 0.87, self-efficacy 0.77, guide for action 0.69, and behavior 0.75 respectively.

After completing the questionnaire, before the intervention in the two groups, the intervention group, based on health belief model, participated in five 60-minute educational sessions in 15- to- 20- people groups made by the researcher. At the first meeting, as well as distributing educational pamphlets, issues were expressed concerning the disease *CCHF*, the importance of the disease, condition of the disease in Iran and the world with emphasis on the constructs of susceptibility and perceived severity. In the second session, the symptoms of the disease and the ways of its transmission was discussed with emphasis on the constructs of perceived benefits and barriers. The third session was about the reservoirs of the disease and at risk groups. The fourth meeting was about ways of disease prevention. And the fifth session focused on reviewing the issues from previous sessions and answering possible questions. All of the training sessions were hold by the researcher through presenting a lecture accompanied by group discussion, questions and answers, and the use of PowerPoint, pamphlets and educational posters. Questionnaires were completed immediately and 3 months after the intervention in both groups. In order to comply with ethical standards, a training session was held by the researcher for the control group at the end of the research. The protocol for this project was approved with *IR.BUMS.REC.1394.105* code at the Ethics Committee of Birjand University of Medical Sciences, and national codes of ethics in biomedical research were also taken into consideration. The data were put in the software *SPSS-19* and with regard to the fact that the data enjoyed a normal distribution they were analyzed with the statistical tests of Chi-square, independent t-test, repeated ANOVA, and Bonferroni testing (α=0.05).

3. Results

This study was conducted on 69 rural women in the intervention group and 69 ones in the control group. The average age of the women in the intervention group and the control group were estimated to be 29.4±1.9 and 32±9.6, respectively (p=0.11), and no significant difference was observed in terms of age in the two groups. The two studied groups were also similar in terms of employment, education and status of keeping livestock (**Table 1**).

In the intervention group, the average score of knowledge, Perceived susceptibility, perceived severity, perceived benefits and barriers, and self-efficacy increased significantly immediately after and three months after the intervention, while in the control group the mean score of knowledge, perceived severity, perceived benefits and barriers, self-efficacy, and cues to action showed significant

statistical differences immediately and three months after the intervention than before the intervention; and as for the construct of perceived susceptibility, in the control group, the mean score decreased significantly (Table 2). Also, the comparison of the average changes of the various scores of the health belief model construct before and after three months of intervention showed that in all constructs except in cues to action construct the average score changes in the intervention group was significantly higher than in the control group (Table 3).

Table 1: Comparison of frequency distribution of employment, educational level and status of keeping livestock in intervention and control groups

Variable		Group		
		Intervention N=69 Frequency (Percent)	Control N=69 Frequency (Percent)	P Value Chi-square or exact Fisher test
Keeping livestock at home	Yes	48 (69.6)	38 (55.1)	P=0.08
	No	21 (30.4)	31 (44.9)	
Educational level	Illiterate	15 (21.7)	20 (22.5)	P=0.055
	Elementary	43 (62.4)	41 (46.1)	
	Secondary school	11 (15.9)	23 (25.8)	
	High school or above	0 (0.0)	5 (5.6)	
Employment	Housekeeper	36 (52.2)	46 (66.7)	P=0.083
	Employed	33 (47.8)	23 (33.3)	

Table 2: comparison of mean scores of various constructs of health belief model in intervention and control groups at different times

Variable		Intervention time			
		Before intervention N=69A $\bar{X} \pm SD$	Immediately after intervention N=69A $\bar{X} \pm SD$	Three months after intervention N=69A $\bar{X} \pm SD$	P-value Repeated ANOVA followed by Bonferoni test
Knowledge	Intervention	5.82±2.3	13.36±2.02	10.21±2.77	A and B; A and C: P<0.001
	Control	7.5±2.75	7.49±2.56	6.98±2.83	C and B: P=0.33
	t-test P-value	0.005	P<0.001	P<0.001	
Perceived susceptibility	Intervention	32.27±3.87	38.98±3.48	37.07±4.29	P<0.001
	Control	33.01±5.35	32.14±5.61	30.73±4.73	A and B ،A and C , B and C
	P-value	P=0.36	P<0.001	P<0.001	P<0.001
					A and C ،B and C P<0.001
Perceived severity	Intervention	26.1±3.84	30.89±2.39	29.63±3.79	A and B ،A and C P<0.001
	Control	26.85±4.24	25.8±4.01	725.72±3.62	B and C p=0.013
	P-value	0.29	P<0.001	P<0.001	P=0.072
Perceived Barriers	Intervention	24.71±6.61	31.95±5.09	32.14±4.95	P<0.001
	Control	24.66±5.37	24.66±5.75	24.98±5.77	A and B; A and C: P<0.001
	P-value	0.97	P<0.001	P<0.001	P=0.66
Perceived Benefits	Intervention	45.23±5.56	54.68±2.67	51.72±2.69	P<0.001
	Control	45.66±5.1	45.72±4.96	44.39±6.55	A and B; B and C; A and C: P<0.001
	P-value	0.66	P<0.001	P<0.001	P=0.13
Perceived Self efficacy	Intervention	36.49±5.52	41.21±2.87	40.26±3.71	P=0.038
	Control	34.7±5.1	35 ±4.64	34.66±5.66	A and C: P<0.001
	P-value	0.051	P<0.001	P<0.001	P=0.86
Cues to action	Intervention	4.69±0.94	4.72±0.78	4.76±0.98	P=0.34
	Control	5.21±0.82	5.24±0.84	5.26±1.13	P=0.99
	P-value	0.001	P<0.001	P<0.001	
Behavior	Intervention	35.13±5.59	-	39.72±14.11	P<0.001
	Control	30.01±7.75	-	30.82±7.2	Paired t-test
	P-value	0.001		P<0.001	P=0.46

Table 3. Comparison of mean score changes of different constructs of health belief model before and three months after the intervention in

control and intervention groups

Variable	Group		
	Intervention N=69A $\bar{X} \pm SD$	Control N=69A $\bar{X} \pm SD$	P-Value Independent T-test
Knowledge score changes	4.39±3.02	- 0.07±3.11	P<0.001
Perceived susceptibility score changes	4.79±5.29	- 2.27±6.02	P<0.001
Perceived severity score changes	3.52±4.76	-1.13±4.54	P<0.001
Perceived Benefits score changes	6.49±6.53	-1.27±6.75	P<0.001
Barriers score changes	7.43±7.75	0.31±5.56	P<0.001
Perceived Self efficacy score changes	3.76±5.61	- 0.43±5.83	P<0.001
Cues to action score changes	0.07±1.27	-0.04±0.88	P<0.67
Behavior score changes	4.59±6.44	0.81±7.23	P<0.001

4. Discussion

The results of the present study showed that before the intervention in both control and experimental groups the average score of knowledge and constructs of health belief model were significantly different in the constructs of knowledge, cues to action, and behavior but there was no significant difference in other constructs. Also, there was a significant difference between the mean score of knowledge and constructs of health belief model in experimental and control groups immediately after and three months after the intervention. The findings of this study are in line with the research by Karimi et al (2010) (8).

The results of the present study showed that there was a significant difference between the mean score of knowledge, self-efficacy, susceptibility, severity, and perceived benefits and barriers in the intervention group in comparison to the time before the educational intervention. These results are consistent with the research by Karimi et al (2007) which showed that health education programs designed on the basis of health belief model has had a significant impact on the AIDS preventive behaviors of the addicts in Zarandieh Prison through raising the awareness and positively affecting the susceptibility, intensity and perceived threat (5).

In line with the results of the present study, Shojaeizadeh et al (2011) showed that, before the intervention no significant difference was observed between the mean scores of the model constructs in both groups, but after the intervention in the experimental group the mean score of knowledge and different constructs of the model (perceived susceptibility, perceived severity, perceived benefits, perceived barriers) were significantly increased (9). The results of the study by Motamedi et al (2008) showed that the mean score of knowledge, perceived threat, perceived benefits and barriers, guide to action among students before and after the training showed significant differences so that all the cases increased after training, and the results affirmed the fact that the education based on health belief model can improve the preventive behaviors in students and diminish the occurrences of this disease, which are consistent with the results of this part of the research (10).

Zigheimat et al (2007) with the purpose of evaluating the effect of education within the format of health belief model on health beliefs, knowledge and behaviors of the patients undergoing coronary artery bypass graft surgery at two hospitals in Tehran- showed that in the experimental group a significant increase was observed in the average perceived barriers. In the control group, there was a significant difference in the increase of average knowledge and diagnosis of disease and also in the decrease of average perceived barriers. Training within the framework of HBM increases the awareness of self-care behaviors and the perceived threat and perceived benefits and decreases the perceived barriers in patients undergoing coronary artery bypass graft. The results of this study were in line with the results of the present study in the part of the results of the variable of perceived barriers and did not show consistency in the part of the results associated with the variable of

knowledge and disease diagnosis and the decrease of perceived barriers in the control group (11).

Taghdisi et al (2011) conducted a research with the aim of assessing the effects of education based on health belief model on improving the preventive behavior of urinary infections in pregnant women referred to health centers in the city of Behbahan. The results showed that there was a significant difference between the working pregnant women and house-keeping ones. Also, there was a significant difference between the mean score of knowledge of pregnant women with different levels of education. A significant difference was obtained between the mean score of knowledge and all constructs of the model before and after educational intervention. The findings showed that health education program based on Health Belief Model is highly effective in the enhancement of the preventive behavior of urinary infection (12). Some of these results i.e., the existence of a significant difference between mean score of knowledge and all of the constructs of the model before and after the training intervention are consistent with the results of present study.

The results of present study showed that there is a significant difference between the mean score of knowledge in the three periods (stages) of time in the intervention group. There is a significant increase in average score of perceived susceptibility, intensity of perception, perceived benefits in the three stages of time in the intervention group. Also, there is a significant difference in the average score of the perceived barriers and self-efficacy and guide for action in the three stages of time in the intervention group. Also, there is a significant increase in the average behavior in the two stages of time in the intervention group, in a way that this index reached from 35.13 before the intervention to 39.7 three months after the intervention. Part of the results of hypothesis 2 concerning the existence of significant difference (increase to the benefit of the case group or experimental group) between some of the factors such as knowledge in the three stages, perceived susceptibility, perceived intensity, perceived benefits, perceived barriers in the three stages, self-efficacy in three months after the intervention compared to previous stages and behavior in the two periods have been consistent with the findings of the research by Karimi et al (2010), Karimi et al (2007), Shojaeizadeh et al (2011), Mo'tamedi et al (2008), and Zigheimat et al (2007). In cases of non-significant difference, some of the health belief model constructs, including cues to action in the three stages of time and also the results of the post hoc Bonferroni test in the above-mentioned constructs in the next stage were not consistent with three months after (5, 8-12).

The results of this study showed a statistically significant difference in the mean changes of the score of knowledge and health belief model constructs in the two groups. In both groups, the mean score of knowledge, perceived susceptibility, perceived severity, perceived benefits, perceived barriers, cues to action, and self-efficacy increased three months after the intervention in comparison to the stage before the intervention. But this increase was significantly higher in treatment group than the control group. These findings have been consistent with the results of the research by Karimi et al (2010), Karimi et al (2007), Shojaeizadeh et al (2011), Motamedi et al (2008), Zigheimat et al (2007), and Taghdisi et al (2011) (5, 8-12).

5. Conclusion

Since the effect of using health belief model in educational programs approves different levels of prevention of Crimean-Congo hemorrhagic fever disease, it can be used by authorities and planners based on Health Belief Model to implement the interventions to control preventable behaviors associated with Crimean-Congo haemorrhagic fever. Other researchers are also recommended that they examine the effect of education based on health belief model on preventive behavior of Crimean-Congo fever on other groups, especially men and vulnerable groups such as slaughterhouse workers and ranchers.

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