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Educational Intervention Based on Health Belief Model on the Adoption of Preventive Behaviors of Crimean-Congo Hemorrhagic Fever in Ranchers

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Abstract

Background: Crimean-Congo hemorrhagic fever (CCHF) is a fatal viral bleeding disease.
Objectives: This study conducted in 2016 and its aim was to determine the effect of education on promoting preventive behaviors in ranchers against the disease based on the health belief model (HBM).
Methods: In a quasi-experimental study, 183 subjects were selected and divided into intervention (n = 92) and control group (n = 91) using a multistage random sampling method. The data collection tool was a questionnaire, including specific and demographic questions that its validity and reliability was confirmed. At first, the data were collected in both groups and analyzed. An educational program based on the HBM, including educational content, media, and method was designed and two educational sessions were accomplished for experimental group. The data were analyzed by descriptive and analytic statistics with respect to the statistical significance level ($P \leq 0.05$).
Results: After the intervention, the mean scores of behavior (1.55 ± 2.2), perceived susceptibility (2.06 ± 3.69), severity (0.92 ± 1.96), perceived benefits (2.06 ± 5.26), self-efficacy (2.85 ± 4.69), and cues to action (0.57 ± 3.14) significantly were increased in the intervention group compared to the control group and a positive correlation was found among them and preventive behaviors ($P < 0.05$). Moreover, perceived barriers in the intervention group significantly were decreased and self-efficacy was the most important predictor for preventive behaviors ($P < 0.05$).
Conclusions: HBM and particularly cues to action is an appropriate framework for educational interventions for promoting the preventive behaviors of Crimean-Congo fever among ranchers.

Keywords: Educational, Health Belief Model, Crimean-Congo Fever, Ranchers

1. Background

Crimean Congo hemorrhagic fever (CCHF) is a hemorrhagic viral disease that is transmitted to human by an infected tick bite or squishing it on the skin, direct contact with the blood or secretions of infected animals during or immediately after slaughter (1-5).

The disease has a high case-fatality and reported as a sporadic disease in the continents of Asia, Europe, and Africa (5-9).

Throughout the time of January 2000 to September 2010, 738 established cases of CCHF and 108 related mortalities were stated in Iran (10). Also, CCHF has been reported in 23 out of the 30 provinces of Iran. Among provinces, Sistan- Baluchistan, Fars, Isfahan, and Golestan had the highest presented cases.

Sistan and Baluchistan is located in southeastern of Iran and Zabol city is located in the northern of Sistan and Baluchistan province, which has long borders with two CCHF endemic countries, Afghanistan and Pakistan (2, 10-12).

This study was carried out in Zabol villages whose inhabitants were ranchers or farmers who keep animals and these people are always at high-risk of the disease. The residents of these areas in addition to keeping the livestock and pets are also butchering the animals, as a result, they are severely exposed to the disease and thereby promoting the preventive behaviors has an important role in improving their health in this region.

From June 1999 to February 2004, 255 patients were documented in Sistan and Baluchistan (13).

Given the high morbidity and mortality in Sistan

and Baluchistan province, theory-based interventions can lead to improve preventive behaviors against the disease among ranchers and not only prevent them from infection but also prevent new fatal fates in the community (14).

Studies show that ranchers, farmers, veterinarians, butchers, slaughterhouse workers, and laboratory workers are the people who are at high-risk of the disease (14, 15).

Selecting a health training model is the first stage in the process of planning an education program to achieve educational goals before the operation of health education plans (16-19).

The HBM is a psychosocial framework, which initially developed in the1950s. Accordingly, there is a relationship between beliefs and behaviors. People will do more a healthy behavior if they feel susceptibility to a danger such as disease or cancer (perceived susceptibility), or the individuals who believe the disease is a serious danger (perceived severity), they will be familiar with more benefits of behavior change with regard to behavior change barriers, thus they gain more self-confidence for obtaining a healthy behavior and obtain a cue to action (18, 20-25).

2. Objectives

This study was aimed to determine the effect of education on preventive behaviors of CCHF among ranchers based on HBM in the Zabol city in 2016 whether the results could be used in CCHF care system planning at the local and national level.

3. Methods

3.1. Study Area

This study was conducted in the Zabol city in 2016 that is one of the southeastern cities of Iran and is located in the neighborhoods of Afghanistan and Pakistan, which the majority of the population are ranchers and farmers.

3.2. Sampling Method

This study was a quasi-experimental study and the sample size was calculated with regard to 5% alpha and 0.2 beta and standard deviation, which was calculated 86 individuals in each group. According to the possible lost in each group, the sample size was considered 100 individuals.

The sampling method was a multi-stage sampling method, first, from five rural health centers in Zabol city, two centers were randomly selected and divided into the control and experimental groups, then two primary health centers in each group randomly designated, and finally, the samples were selected and surveyed.

The inclusion criteria were living in the villages covered by the project, having contact with animals, giving written informed consent to participate in this study. The exclusion criteria were also the participants' refusal to complete the requested information and not to participate in the training program.

3.3. Framework and Data Collecting Tools

A researcher-made questionnaire in two sections was used for data collection. The first part included demographic characteristics and the second part consisted of questions about CCHF and HBM constructs.

To study the perceived susceptibility, severity, and benefits of the individuals there were six items, but to study the perceived barriers and self-efficacy eight items and to study the cues to action three questions were used.

Responses to perceived susceptibility, severity, benefits, barriers, self-efficacy, and cues to action questions were designed at three levels following as agree, no idea, and disagree that were scored by 3,2, and 1, respectively. Responses to the behavior questions were designed as always, sometimes, and never, which were scored 3, 2 and 1, respectively.

Content validity was used for the validity of the questionnaire, a ten expert's panel, including infectious specialists, general practitioners, and health education specialists evaluated the questions. The questions were excluded when they had a content validity index and content validity ratio scores less than 0.80 and 0.62 respectively. To determine the reliability of the questionnaire, Cronbach's alpha test was used and the alpha coefficient for the constructs was as follow: Susceptibility (90%), severity (69%), benefits (92%), barriers (74%), self-efficacy (91%), behavioral intention (91%), and the total questionnaire (88%).

3.4. Procedures

After the selection of the people who met the inclusion criteria, they were randomly divided into intervention and control groups. Then the objectives of the study were explained to the groups and written informed consent was obtained from them and the pre-test questionnaire was completed directly. Due to illiteracy or low level of literacy of the participants in the study, the data were obtained via a face to face interview.

After analyzing the data, individuals' training needs were determined and consequently, educational program was developed based on the HBM constructs.

Educational intervention consisted of two 45-minute-training sessions.

After 3 months the data were collected again and descriptive statistics and analytical tests, including percentage, mean Mann-Whitney test, Spearman correlation coefficient test, and linear regression were performed using SPSS software version 18. Finally, the training program was administered in the control group. Furthermore, the significance level of the tests was considered at 0.05 levels. This research was conducted under ethical considerations.

4. Results

In this study, 183 people were studied in the intervention (n = 92) and control (n = 91) groups. Here, 52.2% and 55.6% of the individuals in the intervention and control groups were farmers and ranchers, respectively. In general, the subjects in the two groups did not differ in terms of their demographic characteristics (P > 0.05) (Table 1).

Findings of the present study didn't show significant differences between the two groups before the intervention in the mean scores of perceived susceptibility, perceived severity, perceived benefits, perceived barrier, and self-efficacy.

But after the intervention in the intervention group a significant difference was seen between the two groups. Also there was a significant reduction in the perceived barrier construct (P = 0.001) (Table 2).

According to the results of Spearman correlation coefficient test, preventive behaviors had a positive significant relationship with perceived benefits, perceived severity, perceived susceptibility, and cues to action, but it had a negative significant correlation with perceived barriers (Table 3).

To identify the predictors of predictive behaviors, linear regression test was used. Generally, the results showed that the statistical model was significant (F = 14.3369, P = 0.001) and 0.306 of behavior changes (depended variable) was predicted through the model (adjusted R square = 0.306). However, considering to significant level self-efficacy was the only predictor for behavior change (Table 4).

5. Discussion

Based on the finding of this research, the mean score of the preventive behavior of Crimean-Congo hemorrhagic fever in the experimental group was significantly increased as the main goal of this study. Consequently, it can be concluded that this educational intervention has been successful.

Because the majority of ranchers or other occupations that have near interaction with animals such as farmers are illiterate or has elementary education, they were at high-risk for CCHF disease; therefore, preventive intervention accomplishing is a necessary health practice (14, 15).

In this study before the intervention, there was no difference between two groups in perceived susceptibility but after the intervention, it was significantly increased in the intervention group. These findings are consistent with the results of studies conducted by Masoudi et al. (26) and Katz et al. (27) and inconsistent with the results of the study of Sharifirad et al. (28).

The findings of this study showed that after the intervention the mean scores of perceived severity was significantly increased only in the intervention group, which was consistent with the results of the studies conducted by Jeihooni et al. (22) and Chang et al. (29) and inconsistent with the results of the study of Torbaghan et al. (18).

Also, after the intervention, the experimental group was perceived more benefit and lower barriers for implementing the predictive behaviors of CCHF; as a result, it can be concluded that educational intervention has increased the likelihood of health behavior change and enhanced well-being among research participations. These results are consistent with other results obtained from previous studies (22, 26-28).

The findings of the study on self-efficacy construct showed that there was a statistically significant difference between the mean scores in the two groups after the intervention; as a result, it is concluded that the participants in the experimental group in post-training stage felt that their abilities to adherence of preventive behaviors such as, wearing suitable shoes, or using plastic gloves has increased and these results are consistent with some previous studies (18, 22, 29).

The results of the study in the preventive behavior area showed that after the intervention, the mean scores of this construct was significantly increased in the case group in comparison to control group. Since these results were the main objectives of the intervention, it is concluded that the study was a successful process. Also the results of studies of Masoudi et al. (26), Chang et al. (29) and Torbaghan et al. (18) confirmed these important findings.

The preventive behaviors in ranchers had a positive correlation with mean scores of perceived susceptibility, perceived severity, perceived benefits, cues to action and perceived self-efficacy but had a negative correlation with perceived barriers score, which these findings were similar to other conducted studies (26, 29). Multiple linear regression analysis showed that the cues to action was the only predictor variable for predictive behaviors, which was consistent with the results of another study (30).

Self-report responding and low level of literacy of the subjects were the most important limitations in this study,

Table 1. Demographic Characteristics of the Participants in the Studied Groups[a]

Variable	Intervention (N = 92)	Control (N = 91)	P Value[b]
Gender			0.21
Male	81 (88)	85 (93.4)	
Female	11 (12)	6 (6.6)	
Education			0.91
Illiterate	39 (42.4)	41 (45.1)	
Elementary	25 (27.2)	23 (25.3)	
Guidance	18 (19.6)	17 (18.7)	
Diploma and above	10 (10.9)	11 (12.1)	
Occupation			0.22
Rancher	15 (16.3)	22 (24.2)	
Farmer	33 (35.9)	29 (31.4)	
Housewife	11 (12)	9 (6.6)	
Employee/worker	12 (13.1)	7 (7.7)	
Other	21 (22.8)	24 (26.4)	
Experience of livestock slaughter			0.59
Yes	60 (65.2)	58 (63.04)	
No	38 (34.8)	33 (31.86)	

[a]Values are expressed as No. (%).
[b]Chi-square test.

Table 2. Comparison of Mean and Standard Deviation Scores of Health Belief Model Constructs in the Two Research Groups[a]

Variable	Before Intervention	After Intervention	P Value
Behavior			
Intervention	10.16 ± 1.98	11.71 ± 1.43	0.02
Control	10.07 ± 2.26	10.08 ± 2.32	0.21
Perceived susceptibility			
Intervention	14.79 ± 3.67	16.85 ± 2.20	0.001
Control	14.71 ± 3.71	14.75 ± 3.67	0.82
Cues to action			
Intervention	6.57 ± 1.82	7.15 ± 1.93	0.001
Control	6.20 ± 2.08	5.74 ± 2.10	0.207
Perceived severity			
Intervention	16.46 ± 2.17	17.39 ± 1.15	0.001
Control	16.36 ± 2.13	16.45 ± 2.17	0.77
Perceived barriers			
Intervention	16.14 ± 4.64	10.90 ± 3.55	0.003
Control	17.17 ± 4.59	14.74 ± 4.60	0.88
Perceived benefits			
Intervention	15.45 ± 3.41	17.52 ± 3.57	0.001
Control	15.20 ± 3.79	15.48 ± 3.35	0.37
Self-efficacy			
Intervention	19.31 ± 4.10	22.17 ± 2.72	0.001
Control	19.80 ± 4.94	19.78 ± 4.94	0.09

[a]Values are expressed as mean ± SD.

which completing the questionnaires through individual interviews and also these problems were relatively resolved with designing a simple training program.

The findings of this study showed that the use of HBM was effective in adopting preventive behaviors of Crimean-Congo fever in ranchers.

Therefore, given that in this intervention cues to action was the predictive construct for preventive behaviors of Crimean-Congo fever, it is recommended that educational programs must be conducted with an emphasis on cues to action.

Table 3. Spearman Correlation Coefficient Between HBM Constructs in the Intervention Group After the Intervention

Relationship	Behavior	Benefits	Barriers	Severity	Susceptibility
Behavior					
Benefit	r = 0.213[a]				
Barriers	r = -0.432[a]	r = - 0.253[a]			
Severity	r = 0.245[a]	r = 0.205[b]	r = -0.319[a]		
Susceptibility	r = 0.445[a]	r = 0.310[a]	r = -0.550[a]	r = 0.453[a]	
Cues to action	r = 0.490[a]	0.254[a]	-0.683	0.145[a]	0.483[a]

[a] Significance at the level of 0.01.
[b] Significance at the level of 0.05.

Table 4. Predictive Variables Based on Linear Regression Coefficient Test in the Intervention Group After the Intervention

Model	Unstandardized Coefficient		Standard Coefficient	*t*	Sig
	B	Std. Error	Beta		
Construct	5.174	2.882		1.795	0.076
Susceptibility	r = 0.117	0.083	0.178	1.408	0.163
Severity	0.084	r = 0.130	r = 0.067	0.645	0.520
Benefits	r = 0.011	r = 0.039	0.028	1.0292	0.771
Barriers	-0.003	0.062	-0.007	-0.049	0.961
Self-efficacy	0.550	0.076	0.104	0.717	0.475
Cues to action	0.243	0.095	0.327	2.550	0.013

5.1. Conclusions

In rural areas, where the majority of people are rancher or have near interaction with animals such as farmers, the population is at high-risk for CCHF disease. Preventive intervention, especially structured programs are very necessary. This study found that the health belief model, especially keys to action construct has an effective role to promote the preventive behaviors in CCHF and enhance the individual and community health.

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Footnotes

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