The Effects of Education on Promoting Knowledge, Beliefs and Preventive Behaviors on Brucellosis among Women: Applying a Health Belief Model

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Abstract

Introduction: Brucellosis is one of the most common zoonosis diseases in the developing and undeveloped countries, with the adverse socio-economic status. This study aimed to assess the effect of health education intervention based on health belief model on promoting knowledge, beliefs, and preventive behaviors on brucellosis among women.

Methods and Materials: In this quasi-experimental before-after study, 282 homemakers living in the west of Isfahan were chosen based on the inclusion and exclusion criteria. They were divided randomly into the case and control groups. The data were collected through questionnaires and checklists. Then, educational contents were designed and executed. It included five sessions using lecture, question, and answer session, group discussion and role-playing based on HBM constructs. Data were analyzed using SPSS 18 by Mann-U Whitney, *t*-student and paired *t*-test and $p<0.05$ was considered significant.

Results: The results showed that before training, there was no significant difference between demographic variables and knowledge scores, performance and health belief model constructs between the two groups ($P> 0.05$). But immediately after and one month after the educational program based on Health Belief Model there was significant differences among the two groups ($p<0.001$).The scores for knowledge and other components of health belief model in experimental group significantly increased after intervention compared to the control group.

Conclusions: The results showed that the HBM-based educational intervention could promote knowledge, attitude, and behavior on prevention of brucellosis. Therefore, this model can be used as a framework for designing and executing educational intervention for prevention of brucellosis.

Keywords: Education, knowledge, belief, behavior, brucellosis, educational models.

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Introduction

Brucellosis is a common zoonosis disease mainly transmitted from cattle, sheep, pigs, and camels. In human, the symptoms include fever, perspiration, weakness, lethargy, and weight loss (1). It can also cause localized infection in the liver, spleen, bones and in some other organs (2). It may be transmitted through mouth, respiratory tract, skin, and eyes and transmitted to humans through the placenta even inoculum. Consuming unpasteurized milk and other dairy products is one of the most frequent ways of transmission in endemic countries (3). WHO has reported that the number of identified patients is 10 to 25 times lower than they are in reality (4). In the Mediterranean and the Middle East, the annual emergence of brucellosis is somewhere between 1 to 78 in every 100,000 people (2, 5). In the US, only 4 to 10% of the total cases are diagnosed and reported (6). Some of the regions in the south of Iran provinces have had the highest emergence rate (98 to 130 in every 100,000 people) (1). The disease is more common among men than women and most widely-spread in rural than urban areas (5).Due to the abortion in cattle, reduced milk production, sterility, and loss of economic value of animal, severe, and incurable infectious diseases in human, the economic and health aspects of the issue are significant(7). In order to stay away from diseases, individuals and societies need instruction on correct behaviors. Therefore, the role of health education is of significant importance (8). Increasing the effectiveness of health education needs an appropriate use of relevant theories and models (9). Increasing knowledge and raising consciousness on brucellosis and identifying obstacles of preventive behaviors, enable us to combat with this diseases. Health belief model (HBM) concepts can be used in designing and implementing educational interventions to prevent diseases (10). Applying constructs that consider important dimensions of behavior change is one of the advantages of HBM (11). The constructs include perceived susceptibility, perceived barriers, perceived benefits, perceived self-efficacy, and cues to action (12). Many studies have proved the effectiveness of HBM (13, 14). Studies show that rural women are empowered in terms of HBM to promote preventive behaviors against brucellosis (15). Freidan city with a cold climate and is located 140 km west of Isfahan province. The residents mainly work in agriculture and animal husbandry fields. Studies show that from 2009 to 2112 prevalence of brucellosis in this area is 90 per 100,000 people. The present study aimed to assess the effect of health education intervention based on health belief model on promoting knowledge, beliefs, and preventive behaviors on brucellosis among women in Freidan.

Methods and Materials

This is a quasi-experimental before and after study, designed based on Health Belief Model (HBM), and conducted on housewives in the Damaneh city(west of Isfahan) from 2011 to 2012. The sample size for both the intervention and control groups was calculated using the following formula, $[n= (Z_1+Z_2)*2S^2/D^2]$ with a confidence interval of 95% (α=0.05).

Based on this formula, each group was calculated to have a sample size of 98 homemakers. Taking into account a 50% probable loss of samples during the study, the calculated sample size was increased to 150 patients for each group. The sampling method was simple random selection. Finally, 282 homemakers were randomly divided into the case and control groups (each with 141 homemakers).

The inclusion criteria were 18-55 years of age, and consent to participation in all training sessions. The data were collected using the questionnaire in Karimi et al.'s study (15), with some modifications in the structure of the HBM concepts and the checklist. The questionnaire consisted of 4 demographic questions, 15 questions to assess awareness, and 27 questions on HBM (7 questions on perceived susceptibility, 5 questions on perceived severity, 5 questions on perceived barriers, 4 questions on perceived benefits, and 6 questions on perceived self-efficacy). The checklist included five items for measuring performance. The responses were marked on a five-score Likert scale from strongly agree (4 scores) to strongly disagree (0 score). The responses on the awareness and performance sections were binary (i.e. 0 or 1)

Validity and reliability of the questionnaire in Karimi et al.'s study was confirmed and Cronbach alpha coefficient was reported 0.91 for awareness, 0.87 for health belief model constructs, and 0.79 for performance section (15). Reliability of instrument in this study was confirmed by health education specialists and diseases control experts and Cronbach alpha coefficient was reported to be 0.88 for awareness, 0.72 for perceived susceptibility, 0.78 for perceived severity, 0.84 for perceived barriers, 0.76 for perceived benefits, and 0.72 for perceived self-efficacy. The data were gathered through self-reporting and interviewing. After initial tests, educational contents were designed and executed for case group.

The content of educational program consisted of five 30-45 minutes sessions based on HBM constructs presented through lectures, question and answer method, group discussion, role-playing and brainstorming. The content included different definitions and concepts related to brucellosis in the first session, the causing factors of the disease and the symptoms in the second session, prevention and reduction strategies of the disease in the third session, behavioral obstacles and the benefits of prevention of this disease in the fourth session, and correct practical behaviors such as boiling the milk, and a wrap-up of all sessions were presented in the final session. Then, immediately after and with one-month interval, the post-test was conducted. The control group was not exposed to any educational program during the research, but because of the ethical issues after the research, a pamphlet and two educational sessions were presented to them. The data were analyzed using SPSS (Version18) and Mann-Whitney Utest, independent and paired *t*-tests, and *chi*-square test. The importance of the subject and its objectives were clearly explained to the patients to encourage their active participation in the study, and they were reassured that their information will remain confidential.

Results

According to the inclusion criteria, 206 participants were equally divided into intervention (n=103) and control (n=103) groups. Table 1 shows the basic demographic characteristics of the homemakers. The results showed that 39.8% of the participants in the intervention group and 36.8% in the control group were high school graduates and there was no significant difference between the two groups (p>0.05). The mean age of the participants in the intervention group was 35.21±7.2 and in the control group 34.81± 6.9, and there was no significant difference between two groups (p>0.05).

The mean scores of the HBM constructs before the intervention were similar in both the interventional and control groups and there were no significant differences (p>0.05, Table 2). However, the mean score of perceived susceptibility construct in the intervention group increased from 12.68±4.9

before the intervention to 23.7±2.4 after the intervention , which was calculated to be statistically significant. The mean score of perceived severity construct increased from 9.72±4.4 before the intervention to 17.71±2.1 after the intervention (p<0.001). The mean score of perceived barriers construct increased from 8.43±2.81 before the intervention to 16.64±2.2 after the intervention (p<0.001). The mean score of perceived self-efficacy construct increased from 11.7±3.1 before the intervention to 21.2±2.8 after the intervention (p<0.001). There was no significant difference between the scores of the control group before and after the intervention (p>0.05), whereas the difference in the intervention group was significant (p<0.001).

There was a significant difference between the two groups one month after the intervention (p<0.001). On the other hand, one month after the intervention, the scores on the investigated variables had a slight decrease, but compared to the scores before the educational sessions, they were significantly higher (p<0.05).

Table1: Comparison of demographic characteristics between the two groups

Variable		Case group		Control group		PV
		Number	Percent	Number	Percent	
Marriage	Married	87	84.5	89	86.4	
	Single	12	11.6	11	10.7	P>0.05
	Widow	4	3.9	3	2.9	
Education	Elementary	25	24.2	22	21.3	
	Secondary	32	31.06	37	35.9	
	Diploma	41	39.8	38	36.8	P>0.05
	Academic degree	5	4.8	6	5.8	
Number of participants		103	50	103	50	

Table2: Comparison of mean scores of the two groups before and immediately after intervention

Variable	Group	Mean & SD before	Mean & SD after	PV
Knowledge	Intervention	7.45±5.2	12.34±2.6	<0.001
	Control	7.81±4.9	8.21±5.1	=0.6
Perceived susceptibility	Intervention	12.68±4.9	23.7±2.4	<0.001
	Control	11.91±5.1	12.31±5.7	=0.53
Perceived severity	Intervention	9.72±4.4	17.71±2.1	<0.001
	Control	10.61±3.9	11.2±3.7	=0.56
Perceived benefits	Intervention	6.41±2.25	14.25±1.7	<0.001
	Control	7.14±2.13	8.22±2.48	=0.6
Perceived barriers	Intervention	8.43±2.81	16.64±2.2	<0.001
	Control	8.58±2.41	9.35±2.8	=0.58
Perceived self-efficacy	Intervention	11.7±3.1	21.2±2.8	<0.001
	Control	10.4±3.8	11.1±2.7	=/6
Performance	Intervention	7.42±3.7	15.33±2.4	<0.001
	Control	7.68±2.9	8.36±3.1	=0.58

Table3:Comparison of mean scores of the two groups before and one month after intervention

Variable	Group	Mean & SD before	Mean & SD before	PV
Knowledge	Intervention	7.45±5.2	11.1±3.1	p<0.01
	Control	7.81±4.9	8.6±3.04	p=0.52
Perceived susceptibility	Intervention	12.68±4.9	20.5±4.12	p<0.001
	Control	11.91±5.1	11.8±6.1	p=0.71
Perceived severity	Intervention	9.72±4.4	15.7±3.8	p<0.01
	Control	10.61±3.9	11.1±3.1	p=0.58
Perceived benefits	Intervention	6.41±2.25	13.1±2.1	p<0.01
	Control	7.14±2.13	8.2±1.9	p=0.6
Perceived barriers	Intervention	8.43±2.81	15.7±3.9	p<0.001
	Control	8.58±2.41	9.2±1.8	p=0.6
Perceived self-efficacy	Intervention	11.7±3.1	19.6±1.8	p<0.001
	Control	10.4±3.8	11.3±4.1	p=0.62
Performance	Intervention	7.42±3.7	14.26±1.7	p<0.001
	Control	7.68±2.9	8.9±2.8	p=0.61

Discussion

This study showed that HBM can be useful in the education of preventive behaviors against brucellosis and based on the constructs of this model, the knowledge, beliefs, and performance of people could be improved. The results indicated that the knowledge of participants in both intervention and control groups was low before the educational interventions. The underlying reasons can be the inadequate dissemination of information by health authorities, or the unwillingness of the public in gaining knowledge on health issues. In the current study, the knowledge and awareness of the intervention group was enhanced significantly after the intervention compared to the knowledge of the control group. This is in agreement with the findings in several studies such as Karimi et al. (15), Orooji et al. (16), and Aliramaei (17). We suggest that in the case of educational interventions, for enhancement of motivation, audience should be stratified to categories based on their knowledge. The results of this study showed an increase in the mean scores of perceived susceptibility, perceived severity, perceived benefits and self-efficacy, and also a decrease in the mean score of perceived barriers after the implementation of the educational program on the interventional group. It is worth mentioning that despite the importance of knowledge in prevention; the participants in both groups were almost unaware of the symptoms and the period of brucellosis as well as the organs affected by the disease. These finding are consistent with the findings of Park et al.'s study (18). Although the death rate related to brucellosis is relatively low, it must be noted that the disease can be costly considering the period the patient has to stay in bed.

The mean scores of perceived barriers and perceived benefits in the interventional group after the education and discussion on the benefits and barriers of preventing the disease, increased immediately after and one month after the educational intervention (p<0.0001). These results are compatible to the results of studies by Karimi et al. (15) and Park et al. (18). According to researchers, perceiving the benefits of prevention can prepare the ground for further steps toward prevention (19, 20). For instance, Shamsi et al. (21) reported that by removing the perceived barriers, self-

medication decreased among women (21). Koch found that by ameliorating the perceived barriers, patients with diabetes took walks more often (22). Involving husbands can increase homemakers' perception on barriers and benefits.

At the beginning of the study the mean score of perceived self-efficacy construct was 11.7±3.1 and after the intervention it was 21.2±2.8 ($p<0.001$). That was a significant difference between the perceived self-efficacy and performance of participants in both groups before and after the educational course. The rise in the score after intervention was mainly due to explaining the proper way of boiling and consuming milk and other dairy products, and following the preventive strategies instructed during the sessions. These findings are in line with those of Orooji et al. (16) and Shamsi et al. (21). Finally, by using the HBM's constructs, the preventive behaviors against brucellosis can be promoted, as demonstrated in the investigations by Shamsi et al. (21), Karimi et al. (14), and Alidoosti et al. (23). One of the limitations in conducting this study was lack of proper access to homemakers, which led us to using health volunteers for resolving the problem. Not applying the "cues to action" construct of HBM was another limitation.

Conclusions

The results showed that educating people based on the HBM has strong effects on knowledge, attitude, and performances of homemakers on brucellosis. Regarding the above-reported results and the cost-efficiency of preventive programs and people empowerment in disease prevention, in general, we suggest carrying out programs based on the models and theories.

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