

Access this article online

Quick Response Code:



Website:

www.jehp.net

DOI:

10.4103/jehp.jehp_1256_20

Effect of educational intervention on preventive behaviors of brucellosis among health volunteers in Rafsanjan city: Application of health belief model

Mostafa Nasirzadeh, Fatemeh Kaveh¹, Ahmad Reza Sayadi², Mohammad Asadpour³

Abstract:

BACKGROUND: Human brucellosis can be a source of problems that affect public health, social, and economic well-being of the world's population. This study was conducted with the aim of determining the effect of Educational Intervention (EI) based on Health Belief Model (HBM) on preventive behaviors against brucellosis in Health Volunteers (HVs) in Rafsanjan.

MATERIALS AND METHODS: Randomly, 104 HVs, in the intervention and control group, participated in a quasi-randomized, controlled experimental study. Variables were evaluated before and 1 month after intervention. In the intervention group, the educational program was conducted with lecture, group discussion, showing movies and related photos, booklets, and pamphlets. The program included five 45-min sessions that developed regarding the beliefs and constructs of HBM about brucellosis and its prevention methods. Data regarding HBM constructs and preventive behavior were collected using the questionnaire with 100 items by the self-report method. Finally, the data were entered into the SPSS software version 16.0, and statistical tests such as Chi-square, independent and paired *t*-test, Mann-Whitney, and Wilcoxon test were used for the data analysis at the significant level of 0.05.

RESULTS: Prior to the intervention, the mean score of the HBM constructs and preventive behaviors between the two groups did not differ significantly, but 1 month later, in the intervention group increased significantly compared to the control group ($P < 0.05$).

CONCLUSION: We recommend to health authorities and health-care providers to use HBM in EIs to create susceptibility, increase perceived severity and benefits, promote self-efficacy, uses cue to action, as well as reduce behavioral barriers, and ultimately adopt health-promoting behaviors.

Keywords:

Brucellosis, educational intervention, health belief model, health volunteers

Introduction

Brucellosis is one of the most important, well-known, and a universally wide spread zoonotic disease in the world, that created by different varieties of *Brucella* bacteria which is communicable between humans and animals, with more than half million human cases reported annually.^[1-3] According to various studies, the prevalence of brucellosis was 15.4% in Iran and relative

frequency of that, varied from 7 to 276.41 per 100,000 population.^[4,5]

Brucellosis is a multisystem infection that has a broad range of appearances, which range from acute fever, weakness, malaise, weight loss, and hepatomegaly to chronic infections that most commonly affect the central nervous, cardiovascular, or skeletal system.^[6] Brucellosis has become an important public health problem

This is an open access journal, and articles are distributed under the terms of the Creative Commons Attribution-NonCommercial-ShareAlike 4.0 License, which allows others to remix, tweak, and build upon the work non-commercially, as long as appropriate credit is given and the new creations are licensed under the identical terms.

For reprints contact: WKHLRPMedknow_reprints@wolterskluwer.com

How to cite this article: Nasirzadeh M, Kaveh F, Sayadi AR, Asadpour M. Effect of educational intervention on preventive behaviors of brucellosis among health volunteers in Rafsanjan city: Application of health belief model. *J Edu Health Promot* 2021;10:369.

Department of Health Education and Health Promotion, School of Health, Occupational Environment Research Center, Rafsanjan University of Medical Sciences, Rafsanjan, Iran, ¹Department of Health Education and Health Promotion, School of Health, Student Research Committee, Rafsanjan University of Medical Sciences, Rafsanjan, Iran, ²Department of Psychiatric Nursing and Mental Health, Social Determinants of Health Research Center, Rafsanjan University of Medical Sciences, Rafsanjan, Iran, ³Department of Health Education and Health Promotion, School of Health, Rafsanjan University of Medical Sciences, Rafsanjan, Iran

Address for correspondence:

Mrs. Fatemeh Kaveh, MS.c
Department of Health Education and Health Promotion, School of Health, Student Research Committee, Rafsanjan University of Medical Sciences, Rafsanjan, Iran.
E-mail: fateme.kave123@gmail.com

Received: 03-10-2020
Accepted: 01-02-2021
Published: 29-10-2021

by interaction between humans, animals, and the environment that can be a source of problems that affect public health, social, and economic well-being of the world's population.^[7,8] Moreover, it has a significant negative impact on the social and economic aspects (such as the length of treatment, absence from work, and economic costs on the family) in the Mediterranean, Central Asia, and especially in the rural areas of developing countries where animal husbandry and dairy production are very important for family income.^[9,10]

There are several strategies with a special focus and emphasis on first-level prevention such as animals' vaccinations, disinfection of stables, elimination of infected animals, education to avoid consuming unpasteurized milk and milk derivatives to prevent the occurrence, and control of this disease.^[11] Since the best and most practical way to control brucellosis is to educate people and change their behavior and lifestyle to prevent the disease, and on the other hand, diagnosis and treatment after infection do not have much effect on disease control. Therefore, one of the most effective ways to deal with brucellosis is to teach and education preventive behaviors, especially to high-risk groups.^[3,10] The outcome of education depends on the suitable use of the models and theories of behavioral science, so selecting a model for health education is the first period in the educational arrangement process.^[12] Theories and models of health behavior explain behaviors and suggest ways to achieve behavior change and can suggest strategies to prevent relapse and enhance maintenance of recommended practices for high-risk individuals. One of the models used at the individual level to explain the improvement of health performance is Health Belief Model (HBM).^[13] It was developed to answer the very practical question, why did people not seek a behavior and practice, when it was available to them? The model specifies that individuals will engage in a health behavior or take a recommended action when they believe that doing so can diminish a threat that is both probable and would have severe consequences.^[13] Expectancy and value apply to the health threat (perceived likelihood and severity of harm) and the health behavior (perceived benefit of and barriers to taking action). Cues to action may be as diverse as medical symptoms, a doctor's recommendation, mailed notices from a health plan, or a media campaign. Self-efficacy, a construct proposed well after the model was formulated and is a robust predictor of many health behaviors.^[13,14] Hence, HBM has been useful with varying triumph to problems of explaining, predicting, and impelling behavior^[15] and hypothesizes that messages will attain optimum behavior change if they magnificently target perceived barriers, benefits, self-efficacy, and threat.^[16] Education based on HBM has been used in various studies to prevent brucellosis elsewhere and different populations

with different effects^[17-19] and used to improve the preventive behaviors of nurses against cardiovascular diseases.^[20] Hence, considering that Brucellosis is still one of the most challenging problems for health and the economy in many developing countries such as Iran.^[5] It is necessary to provide appropriate education on the human brucellosis and considering that health volunteers (HVs) are an active group in the field of health and in linking with the people and are familiar with the customs and culture of the people, Empowering them seems essential. Therefore, this study was conducted with the aim of determining the effect of Educational Intervention (EI) based on the HBM on preventive behaviors against brucellosis in HVs in Rafsanjan in 2017–2018.

Materials and Methods

Study design and setting

This study is a quasi-experimental intervention study with two groups of intervention and control. The statistical population of this study is all HVs of Rafsanjan city in 2017–2018 urban health centers of Rafsanjan city.

Study participants and sampling

The sample size was estimated using the sample size determination formula and similar studies of 47 people in each group and to be more confident 60 people entered the study in each group. The sampling method was simple random, and four out of nine centers were selected and two centers were randomly assigned to the intervention and two to the control group. Entry criteria include active HVs interested in attending training sessions between the age group of 20 and 50 years and minimum primary education and exclude criteria include more than two absences, dissatisfaction with attending the study, participation in similar training sessions during 1 year ago and withdrawal from continuing to attend training intervention sessions. In the present study, three people in the intervention group and 13 individuals in the control group were excluded from the study due to the absence of more than two sessions, failure to answer posttest questions, or incomplete answers to the questions.

Data collection tool and technique

Data collection tools in this study were a three-part questionnaire taken from the study of Ramezankhani *et al.* and Babazadeh *et al.* questionnaire with Cronbach's α coefficients of 0.71–0.86 and 0.77–0.87, respectively.^[17,18] Includes demographic data section (age, marital status, education status, job, and place of residence), section of HBM constructs (knowledge 62 questions with answer scale yes (score 2), I don't know (score one) and no (score zero) with score range from zero to 124, constructs perceived susceptibility, severity, benefits, barriers, and

self-efficacy with 6, 7, 7, 8, and 10 questions, respectively, with a Likert scale 5 Options from: I totally agree Score 5 to completely disagree Score 1, with score range from 6–30, 7–35, 7–35, 8–40, and 10–50, respectively. Moreover, cue to action questions with options yes (score 1) and no (score 0) with a score range of 0–15. Furthermore, the behavior includes eight questions with a 5-point Likert scale answer scale from ever (score 5), to never (score 1), with score range from 8 to 40. With the exception of the constructs of perceived barriers, higher scores on other constructs indicated better perception.

The validity of the questionnaire in this study was measured using content validity using the opinions of experts and infectious disease, health education and health promotion specialists, and Cronbach's α coefficients of knowledge, perceived susceptibility, perceived severity, perceived benefits, perceived barriers, self-efficacy, cue to action, and behavior were 0.96, 0.76, 0.81, 0.81, 0.91, 0.82, 0.63, and 0.86, respectively.

After explaining the purpose of the research to HVs, the required number of samples was selected based on the study entry criteria, then simple randomly assigned

to two intervention and control groups. Then, the first stage of questionnaire (before the EI) was distributed among the studied samples, complete in the presence of the questioner, and it was collected. Based on the results obtained from the data analysis, EI was designed (determining the content, teaching methods, duration, and number of educational sessions). Then, based on the intervention method and the results of previous studies,^[17-20] EI based on HBM and use of related educational methods such as lecture, group discussion, showing movies and related photos, distribution of booklets, pamphlets as a workshop, 1 day per week (5 consecutive weeks) and in 5 sessions of 45 min, for participants of the intervention group, in each center was held separately. The number of participants in workshops was 28 in one center and 29 in the other. The major anticipated educational activities and programs related to each session are presented in Table 1.

Then, 1 month after the end of EI, the questionnaire, in the presence of the questioner, distributed between the studied samples, completed and it was gathered. There were also training sessions with receptions and awards. The data collected were entered in the SPSS-16

Table 1: Number of sessions, the purpose of the training program, time, educational methods and media

Session and the purpose of the training program	Time (min)	Educational methods/educational media
First session		
Provide course training program objectives	45	Lecture
Explain the importance of brucellosis		Questions and answers
Improving learners' knowledge about brucellosis, symptoms, and complications		Giving brucellosis booklet containing text and color photographs to volunteers
Second session		
Present the goals of the session and review the contents of the previous session	45	Lecture
Improving learners' beliefs and attitudes about brucellosis		Show educational teaser
Increased perceived susceptibility		Questions and answers
Increased perceived severity		Giving pamphlets to volunteers
Conclusion		
Third session		
Present the goals of the session and review the contents of the previous session	45	Group discussion
Assess the barrier, correct and improve perceived barriers		Questions and answers
Conclusion		Show educational teaser
Fourth session		
Presenting the goals of the session and reviewing the contents of the previous session	45	Group discussion
Improving the perceived benefits of learners in preventing brucellosis		Questions and answers
Conclusion		Show educational teaser
Fifth session		
Express the goals of the session and review the contents of the previous session	45	Tell the story of a successful rancher
Improving volunteer self-efficacy		Group discussion
Increase preventive behaviors and skills from brucellosis		Questions and answers
Conclusion		Show educational teaser

software (for Windows; SPSS Inc., Chicago, IL) and analyze with Chi-square, independent and paired t-test, Mann–Whitney and Wilcoxon test was used. The level of significance in the tests will be considered to be 0.05.

Ethical consideration

Ethical approval has been obtained from the Ethics Committee of Vice Chancellors for Research and Technology at Rafsanjan University of Medical Sciences (IR. RUMS. REC.1396.92 ethics code). Prior to the enrolment of participants, our research team will provide detailed information (explain the aims and detailed procedures) of the study. They will be assured of anonymity and confidentiality of any data they provide throughout the study and could be excluded from the study at any time. Informed consent was received from all the participants. Moreover, after the EI and gathering information from both groups, a training session was held for the control group.

Finding

The mean age of the participants in the intervention and control group was 44.12 ± 8.38 and 44.91 ± 9.79 years old, respectively. All of the participants reported that they lived in the city, and more than 90% of the intervention and control groups said they did not keep livestock in

their homes. Only four people reported contact with the animal. The two groups were not statistically significant in terms of demographic variables ($P > 0.05$).

The mean score of knowledge, constructs of perceived susceptibility, severity, benefits, self-efficacy, and cue to action of the two groups except perceived barriers before the intervention did not have a statistically significant difference. However, according to Table 2, the results of independent t-test showed a significant difference between the mean score of all of the above constructs of two groups except cue to action, 1 month after the intervention ($P < 0.05$). Furthermore, the results of Paired t-test for comparison before and after in each group showed that after the intervention, the scores of all constructs in intervention group improved significantly, and in the control group, this difference was not statistically significant. The results showed that the mean score of behavior of the two groups before the intervention did not have a statistically significant difference. However, the Mann–Whitney test showed a significant difference between the mean score of behavior of two groups after the intervention. Furthermore, the results of Wilcoxon tests for comparison before and after in each group showed that after the intervention, the scores of behavior in the intervention and control group improved significantly [Table 2].

Table 2: Mean score and standard deviation constructs of health belief model and behavior in the intervention and control group before and after the intervention

Constructs	Group	Mean±SD		P of paired t-test
		Before the intervention	After the intervention	
Knowledge (0-124)	Intervention	98±15.87	111.31±2.01	<0.001
	Control	98.57±15.5	95.64±12.42	0.30
P of t-test		0.80	<0.001	
Perceived susceptibility (6-30)	Intervention	23.34±4.01	27.54±3.53	<0.001
	Control	22.36±4.88	21.51±5.14	0.50
P of t-test		0.20	<0.001	
Perceived severity (7-35)	Intervention	24.9±5.02	32.21±5.39	<0.001
	Control	24.02±6.02	24.09±5.67	0.70
P of t-test		0.40	<0.001	
Perceived benefits (7-35)	Intervention	31.08±3.79	34.77±0.84	<0.001
	Control	31.93±3.85	32.46±3.53	0.40
P of t-test		0.20	<0.001	
Perceived barriers (8-40)	Intervention	29.69±7.73	8.0±0.0	<0.001
	Control	34.15±7.92	31.19±7.84	0.20
P of t-test		0.003	0.001	
self-efficacy (10-50)	Intervention	44.92±5.75	49.7±1.35	<0.001
	Control	46.07±5.07	46.87±4.43	0.10
P of t-test		0.30	<0.001	
Cue to action (10-50)	Intervention	5.7±1.5	6.49±1.1	<0.001
	Control	6.51±2.18	6.33±2.07	0.20
P of paired t-test		0.06	<0.60	
Behavior (8-40)	Intervention	32.9±3.09	39.89±0.55	<0.001*
	Control	33.28±2.64	39.23±1.85	<0.001*
P of Mann-Whitney		0.30	0.005	

SD=Standard deviation. *P value of Wilcoxon

Discussion

Human brucellosis is still considered as main infectious disease with a high frequency in many provinces of Iran. Disease prevention programs require the knowledge of the cause of the disease, identification of its transmission routes, risk factors and groups at risk and early diagnosis of diseases. It is necessary to implement a national brucellosis control program by increasing health education programs.^[17]

The purpose of this study was determining the effect of EI based on HBM on preventive behaviors against brucellosis in HVs in Rafsanjan. The results showed that the design and implementation of EI based on the mentioned model can make a significant difference in the preventive behaviors of brucellosis by increasing awareness, changing health beliefs, and improving self-efficacy.

In this study, there was a significant difference 1 month after the intervention, between the average score of HVs knowledge in two groups. This finding is aligned with the results of Aliremai's study, which increased the knowledge of the residents of Ganji village regarding brucellosis and its transmission and prevention^[21] and Aligol *et al.*'s study, which increased the knowledge of homemakers about preventive behaviors of brucellosis,^[22] and other studies.^[17,18,23-25] The success of the disease prevention program requires knowledge of the cause of the disease, identification of ways of transmission, and identification of risk factors and risk groups and early diagnosis of diseases.^[23] Therefore, it can be said that by increasing the awareness of the subjects, their behavior will change in future.

Perceived susceptibility and severity imply a person's belief in the probability of contracting the disease and its consequences that can play an important role in changing health behavior.^[13] The findings showed that after the implementation of EI, a significant difference was observed between the mean score of perceived susceptibility and severity of the two groups. It is consistent with the results of Eskandari *et al.*'s study in traditional ranchers in Hamedan rural areas,^[19] Karimy *et al.* in rural mothers,^[26] and Ramezankhani *et al.*'s study in Ghaenat and Zirkuh residents.^[17] An important factor that increases people's perceived sensitivity and severity is increasing their knowledge about brucellosis. In this study, in order to create perceived susceptibility and increase the perceived severity, were explained the importance of dairy products to prevent of brucellosis, the spread of the disease and its symptoms and the aftermath of the disease in physical, social, economic, and psychological dimensions. Even with a high level of knowledge about the characteristics of a disease, it will

be difficult to change their attitudes and behaviors until people should not expose themselves to a disease and the more people have an understanding of an issue, the more likely it is that behaviors will be promoted to prevent it. Therefore, by providing education to individuals, it is possible for everyone to develop the disease if they do not follow the principles of prevention. Moreover, training on the severity of the symptoms of the disease and the costs of diagnosing and treating it can provide the basis for behavior change. Moreover, it has taken an important step in leading people to adopt preventive behaviors against brucellosis. Another constructs that is considered to be the determining factor in preventive behaviors regarding brucellosis is perceived benefits and barriers. In this study, after the implementation of EI, a significant difference was observed between the mean score of benefits and the perceived barriers of the two groups. It is consistent with the results of Babaei *et al.*'s research in ranchers Charoimaq of East Azerbaijan^[23] and also the results of Shahnavaizi *et al.*'s research in Khash cattle breeders^[24] that with model-based education has increased benefits and decreased barriers to changing risky behaviors.

The benefits of boiling milk, vaccinating animals, protective measures during childbirth and proper disposal of reproductive waste, problems of proper disposal of animal waste and teaching its proper method, cost-effectiveness such as preparing and using masks, and not consuming suspicious products were discussed. Attitude is related to one's beliefs about the consequences of that behavior. In other words, when a person believes that a behavior will have valuable consequences for him, he will have a positive attitude toward that behavior and vice versa.^[13] In fact, to facilitate the use of the constructs of perceived benefits or perceived severity, health educators must identify the exact behavior that needs to be performed and to highlight the benefits of that particular action or work. Lower perceived barriers also facilitate the process of performing the proposed behavior. To help reduce perceived barriers, the question and answer method can be used. That is, to ask what barriers they think may exist in the recommended course of action, or show them a list of barriers to action, then discuss the solution to each one and choose the best answers.^[13]

Self-efficacy defined as perceived capability to perform a target behavior^[27] and refers to positive and negative emotions and people's judgment about their capability of mastering a situation.^[28] In the present study, after the implementation of EI, a significant difference was observed between the mean score of self-efficacy of HVs in the two groups. With the results of the study of Ramezankhani *et al.*^[17] and Aligol *et al.*,^[22] this shows that the effect of HBM on increasing the self-efficacy of rural

mothers regarding behaviors that prevent brucellosis is consistent. When the form of behavior correctly and actively be taught and people see themselves as capable of doing those behaviors, they are expected to do the right thing if they are confronted with demanding situations. In this regard, in the educational content, it was tried to present preventive behaviors (such as boiling milk, avoiding eating fresh cheese, using safety equipment to isolate suspicious livestock, and vaccinating livestock) to people in a few simple and precise ways to create a sense of self-efficacy and empowerment in them.

Another influential factor in adopting behavior is the importance of others and the influence of internal and external stimuli and individual perceptions in this regard. In this study, before and after the implementation of EI between the mean score of the cue to action (receiving information from health-care workers and the media), there was no significant difference between the HVs in the two groups. In the intervention group, the mean score of cue to action after the intervention had a statistically significant increase compared to before the intervention, but this difference was not significant in the control group. The study of Shahnavaei *et al.*^[24] and Babaei *et al.*^[29] confirmed the effect of the education based of HBM model on increasing the cue to action score of rural mothers regarding brucellosis. Ramezankhani *et al.* also reported that education based on the HBM model was accompanied by an increase in the cue to action score of the residents of Qaenat and Zirkuh.^[17]

When people receive correct and accurate information from competent authorities or continuous information from the media such as television or social networks and be encouraged to engage in preventive behaviors, ease of behavior is facilitated. In the present study, it also tried to provide maximum information. Due to the presence of a number of participants in the training class who themselves or their relatives had previously brucellosis, they were asked to share their experiences (physical, mental, social, and economic) with the participants.

After the implementation of EI, the mean behavior score in the intervention group was significantly higher than before the intervention and control group, which is consistent with other studies such as Babaei *et al.*^[23] and Shahnavaei *et al.*^[24]

Conclusion

The study's findings showed that knowledge, susceptibility, severity, perceived benefits, self-efficacy, as well as behavior increased after five training sessions on preventive behaviors of brucellosis and reduced perceived barrier. Increased perceived susceptibility and severity indicate that individuals can be helped to

more accurately assess the susceptibility to brucellosis, to understand the risks of the disease. It is recommended that health centers make greater efforts to prevent brucellosis and to change the susceptibility, severity, benefits, and barriers to understanding these diseases by providing comprehensive and effective training. However, these perceptions are among the factors that can be effective in adopting preventive behaviors.

Due to the frequency of brucellosis as well as the widespread symptoms of the disease, there is an urgent need to increase the knowledge and performance in the field of preventive behaviors. Therefore, by using this model as a theoretical framework, health-care providers can guide people to truly assess the risk of infection and identify positive strategies that can prevent the disease.

Acknowledgment

In the end, we appreciate Rafsanjan University of Medical Sciences authorities, especially the Vice Chancellor for Research and Technology, the Vice Chancellor for Health and the HVs of the health centers who helped us in the quantitative and qualitative implementation of this research. The results were extracted from the research project of Vice Chancellors for Research and Technology at Rafsanjan University of Medical Sciences (IR. RUMS. REC.1396.92 ethics code and research project with the number 756/2017).

Financial support and sponsorship

This project was supported by Deputy of Research and Technology, Rafsanjan University of Medical Sciences.

Conflicts of interest

There are no conflicts of interest.

References

1. Bagheri H, Tapak L, Karami M, Amiri B, Cheraghi Z. Epidemiological features of human brucellosis in Iran (2011-2018) and prediction of brucellosis with data-mining models. *J Res Health Sci* 2019;19:e00462.
2. Yang H, Zhang S, Wang T, Zhao C, Zhang X, Hu J, *et al.* Epidemiological characteristics and spatiotemporal trend analysis of human brucellosis in China, 1950-2018. *Int J Environ Res Public Health* 2020; 17 (7):2382.
3. Marvi A, Asadi-Aliabadi M, Darabi M, Abedi G, Siamian H, Rostami-Maskopae F. Trend analysis and affecting components of human brucellosis incidence during 2006 to 2016. *Med Arch* 2018;72:17-21.
4. Chalabiani S, Khodadad Nazari M, Razavi Davoodi N, Shabani M, Mardani M, Sarafnejad A, *et al.* The prevalence of brucellosis in different provinces of Iran during 2013-2015. *Iran J Public Health* 2019;48:132-8.
5. Mirnejad R, Jazi FM, Mostafaei S, Sedighi M. Epidemiology of brucellosis in Iran: A comprehensive systematic review and meta-analysis study. *Microb Pathog* 2017;109:239-47.
6. Wang M, Zhu Q, Yang Q, Li W, Wang X, Liu W, *et al.* Intestinal brucellosis associated with celiac artery and superior mesenteric artery stenosis and with ileum mucosa and submucosa thickening:

- A case report. *Medicine (Baltimore)* 2017;96:e5893.
7. Burgos S, Slingsenbergh J. Thoughts on human-animal-ecosystems interface. *Transbound Emerg Dis* 2011;58:372-3.
 8. Abd El-Wahab EW, Hegazy YM, El-Tras WF, Mikheal A, Kabapy AF, Abdelfatah M, *et al.* A multifaceted risk model of brucellosis at the human-animal interface in Egypt. *Transbound Emerg Dis* 2019;66:2383-401.
 9. Barua A, Kumar A, Thavaselvam D, Mangalgi S, Prakash A, Tiwari S, *et al.* Isolation & characterization of *Brucella melitensis* isolated from patients suspected for human brucellosis in India. *Indian J Med Res* 2016;143:652-8.
 10. Ali S, Akhter S, Neubauer H, Melzer F, Khan I, Abatih EN, *et al.* Seroprevalence and risk factors associated with bovine brucellosis in the Potohar Plateau, Pakistan. *BMC Res Notes* 2017;10:73.
 11. Brucellosis in Humans and Animals. WHO Guidance. Geneva: World Health Organization. [Cited 2/9/2021] Available from: [Brucellosis.pdf/](#).
 12. Karimyan K, Khezeli M, Latifi A. Effect of student's empowerment program on brucellosis prevention: An application of extended health belief model. *J Prev Med Hyg* 2020;61:E25-30.
 13. Glanz K, Rimer B, Viswanath K. *Health Behavior: Theory, Research, and Practice*. 5th ed. New Jersey, United States, John Wiley & Sons; 2015. p. 512.
 14. Carpenter CJ. A meta-analysis of the effectiveness of health belief model variables in predicting behavior. *Health Commun* 2010;25:661-9.
 15. Rosenstock IM, Strecher VJ, Becker MH. Social learning theory and the Health Belief Model. *Health Educ Q* 1988;15:175-83.
 16. Jones CL, Jensen JD, Scherr CL, Brown NR, Christy K, Weaver J. The Health Belief Model as an explanatory framework in communication research: Exploring parallel, serial, and moderated mediation. *Health Commun* 2015;30:566-76.
 17. Ramezankhani A, Jahani H, Hatami H, Sharifzadeh GS. Determine the effect of intervention on the adoption of preventive behaviors of the brucellosis was based on the health belief model. *J North Khorasan Univ Med Sci* 2016;8:33-45.
 18. Babazadeh T, Banaye Jeddi M, Shojaeizadeh D, Moradi F, Mirzaeian K, Gheysvandi E. Effect of educational intervention based on family-centered empowerment model in high risk behavior modification among patients with brucellosis. *Jorjani Biomed J* 2017;4:81-91.
 19. Eskandari Z, Bashirian S, Barati M, Soltanian AR, Hazavehi SM. The effect of educational program based on the health belief model on brucellosis preventive behaviors among traditional ranchers in rural areas of Hamadan province. *J Educ Community Health* 2017;3:16-23.
 20. Amraei SG, Malekshahi F, Goudarzi F, Ebrahimzadeh F. Using an educational program based on health belief model to improve the preventive behaviors of nurses against cardiovascular diseases. *J Educ Health Promot* 2020;9:100.
 21. Aliramaei N. A study on the effect of education on the level of knowledge of Ganji village dwellers about brucellosis. *Nurs Midwifery J* 2008;6:75-80.
 22. Aligol M, Nasirzadeh M, Hafezi Bakhtiari M, Eslami AA. The effects of education on promoting knowledge, beliefs and preventive behaviors on brucellosis among women: Applying a health belief model. *Jundishapur J Health Sci* 2014;6:343-9.
 23. Babaei V, Garmaroodi G, Batebi A, Alipour D, Shahbaz M, Babazadeh T. The effectiveness of an educational intervention based on the health belief model in the empowerment of stockbreeders against high-risk behaviors associated with brucellosis. *J Educ Community Health* 2014;1:12-9.
 24. Shahnavazi M, Gholamreza M, Ansari-Moghadam A, Raeisy D, Varnamkhasi Khashei F. Preventive behaviors of brucellosis in Khash city ranchers based on health belief model. *Iran J Health Educ Health Promot* 2017;4:281-8.
 25. Mangolian Shahrabaki P, Asadi A, Imani Z, Khanjani N. The effect of training on students regarding the prevention of Brucellosis. *Rep Health Care* 2014;1:25-9.
 26. Karimy M, Montazeri A, Araban M. The effect of an educational program based on health belief model on the empowerment of rural women in prevention of brucellosis. *J Arak Univ Med Sci* 2012;14:85-94.
 27. Williams DM, Rhodes RE. The confounded self-efficacy construct: Conceptual analysis and recommendations for future research. *Health Psychol Rev* 2016;10:113-28.
 28. Rogowska AM, Zmaczyńska-Witek B, Mazurkiewicz M, Kardasz Z. The mediating effect of self-efficacy on the relationship between health locus of control and life satisfaction: A moderator role of movement disability. *Disabil Health J* 2020;13:100923.
 29. Babaei V, Babazadeh T, Kiani A, Garmaroodi G, Batebi A. The role of effective factors in preventive behaviors of brucellosis in stockbreeder of Charaoymaq county: A health belief model. *J Fasa Univ Med Sci* 2016;5:470-8.