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Effect of Health Educational Intervention based on the Educational Phase of the PRECEDE-PROCEED Model on the Promotion of Preventive Behaviors of Brucellosis in the Villagers of Minoodasht, Iran

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ABSTRACT

Aims Annually, more than half a million people worldwide are infected with brucellosis. Education is one of the basic strategies in controlling and preventing this disease. The PRECEDE model provides a clear framework for planning to change behavior. The factors affecting the behavior in the educational diagnosis stage of this model are categorized. This study aimed to determine the effect of educational intervention based on the educational phase of the PRECEDE-PROCEED model on the improvement of preventative behaviors of brucellosis.

Materials & Methods This semi-experimental study was carried out on 150 villagers of Minoodasht, Iran, in 2019. The subjects were selected by stratified sampling in two control and intervention groups. Seventy-five people were assigned to each group. Data collection tools were the valid and reliable questionnaire based on the educational structures of the PRECEDE-PROCEED model and a demographic questionnaire. Data of the two groups were collected before and three months after the educational intervention. Data were analyzed using SPSS 19 software through T, Chi-square, and exact Fisher tests.

Findings There was no significant difference between the two groups in demographic variables and enabling factors before the intervention ($p>0.05$). In contrast, there was a significant difference between the two groups in the enabling factors and preventive behaviors of brucellosis three months after the educational intervention ($p<0.05$).

Conclusions The educational intervention based on the educational diagnosis phase of the PRECEDE-PROCEED model effectively promotes brucellosis prevention behaviors in the villagers.

Keywords Educational Intervention; Prevention; Brucellosis

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Introduction

Brucellosis is a zoonotic infection with negative effects on the economy and health of a society [1]. Brucellosis is caused by the bacteria genus Brucella. The bacteria are transmitted from animals to humans by ingestion through direct contact with biological products of infected livestock, consumption of raw milk and contaminated dairy products, and inhalation of infectious aerosols [2].

Determining the prevalence of brucellosis is difficult due to the lack of complete reporting of cases. However, according to the World Health Organization, 500,000 people suffer from brucellosis annually [3]. It is one of the most common diseases in the Eastern Mediterranean region, with more than 4,500 infected cases per year [4]. The average incidence of brucellosis in Iran has been reported to be 43.24 per hundred thousand persons per year [5]. According to the Minoodasht Health and Medical Network, the prevalence of the disease was 60 persons per a hundred thousand in 2017, which revealed very high pollution of the city [6].

However, the number of livestock in each region reaches its maximum, one or two months after the breeding season; chronic cases and recurrences of this disease are seen in all seasons with almost the same probability [7]. Early symptoms of the disease included fever, headache, sweating, weakness, anorexia, muscle pain, and fatigue [8]. This disease is always considered from two economic and social dimensions due to abortion in livestock, reduction of livestock production, infertility in infected animals, and human infection with this disease [9]. The bone and joint, gastrointestinal, neurological, cardiovascular, respiratory system, genital tract complications of brucellosis occur at any disease stage [10].

Since no suitable vaccine has been developed to prevent malaria, the most important way to prevent this disease, in addition to vaccinating livestock, is to perform environmental measures in contact with livestock, pasteurizing dairy products, and correcting people's eating habits [11].

Numerous studies emphasize the effective role of education in preventive behaviors of brucellosis [12, 13]. Theories and models of health education and health promotion provide a conceptual framework for the researcher to regularly examine the factors related to health issues based on principles and logical framework [14]. The results of various studies indicate the need for planning to prevent brucellosis in all at-risk groups, including ranchers [15].

The PRECEDE model is one of the health education models in health promotion based on behavioral, epidemiology, and education science. Epidemiology and behaviors lead to a clear understanding of individuals' needs, problems, and desires through social diagnosis and behavioral factors' causes in the health area [16]. The PRECEDE-PROCEED model provides a framework by which predisposing factors (knowledge, attitudes, perceptions, beliefs, etc.), reinforcing factors (influence of others, family, peers, health workers, etc.), and enabling factors (availability of resources, skills, etc.), are determined as effective factors on behavior in educational diagnosis [17, 18]. Predisposing factors precede behavior change and motivate behavior. Enabling factors are the preconditions for behavioral or environmental change, which allow the realization of the environmental motivation or policy. Reinforcing factors lead to behavior tracking and provide ongoing awards for maintaining behavior. According to the model, people and their environment and the influential factors should be considered for investigating behavioral changes. In addition to receiving training related to behavior change, the environment should be considered to support this change [19].

Oruji *et al*. revealed improvement in the effectiveness of brucellosis prevention programs using this model [20]. Also, other studies, including the study of the Doshmangir *et al*. on the quality of life in the elderly, and the results of the study of Rajabzadeh *et al*. regarding the factors affecting the consumption of fruits and vegetables in students, indicate the effectiveness of this model [21, 22]. The proper educational planning should be done to improve preventative behaviors, considering the effective role of preventive behaviors in preventing multiple complications and mortality of brucellosis [9] and the vulnerability of villagers to brucellosis.

Regarding the lack of a comprehensive study on the role of education in promoting brucellosis prevention behaviors in Minoodasht city, this study aimed to determine the effect of educational intervention based on the educational phase of the educational phase PRECEDE-PROCEED model on improvement of preventative behaviors of brucellosis between villagers.

Materials and Methods

This semi-experimental study was carried out on villagers of Minoodasht, Iran, in 2019. The subjects were determined to be 62 (n=124) using the study of Oruji *et al*. [20] with 95% confidence level and 80% statistical power and using the sample size calculation formula. Considering the maximum statistical drop of 20%, the statistical sample was calculated to be 75 people in each group (n=150). Out of 6 comprehensive rural health service centers, two centers with higher prevalence were selected using stratified sampling, and one of these centers was accidentally considered an intervention group and the other as a control group. Then, the desired number of samples from each health center under the Comprehensive Health Center was determined using stratified sampling with proportional allocation; and participants were selected by systematic sampling method. The inclusion criteria were living in the village, having livestock, and being over 18 years old.

Exclusion criteria included migration from the village during the study period, participant death, absence of more than one session in training classes, and dissatisfaction with the continuation of the participation.

Data were collected using the questionnaire of Hajari *et al.* [23]. The items of the questionnaire were classified into three parts. The first part was demographic information with eight items, including age, gender, occupation, marital status, education level, number of children, history of brucellosis in the family, and history of brucellosis in the individual. The second part included the structures of the educational phase of the PRECEDE-PROCEED model. Predisposing factors were assessed by 27 items related to awareness using questions such as "brucellosis microbe can enter the body through damaged skin," which the correct and false answers were given a score of 1 and zero, respectively (score range 0-27), and 15 questions related to the field of attitude, with questions such as "local dairy, is tastier than pasteurized" (score range 15-75). The reinforcing factors were assessed using five items such as " "I have access to pasteurized dairy at my place of residence" (score range 5-25), and enabling factors were assessed using nine items, such as "my family members encourage me to consume pasteurized dairy products" (score range 9-45). Answers in model structures were categorized based on the 5-point Likert scale from strongly disagree to strongly agree. The options of totally agree, agree, no opinion, disagree, totally disagree were scored by 5, 4, 3, 2, and 1, respectively. The third part of the questionnaire related to the area of behavior was designed using 11 items such as "do I use gloves to chop livestock meat". The answers were considered from always to never (always=4, often=3, sometimes=2, rarely=1, and never=0) that the score range was 0-44 [23]. The validity of the questionnaire was assessed using the opinions of 10 experts in the field of infectious diseases and health education, and the content validity index and content validity ratio were determined using the Lawshe table. Also, the reliability of the questionnaire, which was confirmed through the implementation of the pilot phase between 30 people identical to the intervention group and using Cronbach's alpha coefficient (0.786), its reliability was re-evaluated using filling out by 30 villagers who did not enter the main study (α=0.76 for awareness, α=0.85 for attitude, α=0.77 for enabling factors, α=0.82 for reinforcing factors and α=0.80 for behavior).

Ethics observations of the study were considered, including receiving the code of ethics from the research council of the Golestan University of Medical Sciences, a description of the nature and objectives of the study for participants, obtaining informed consent from the participants. The participants were assured that all requested information would be used confidentially. Questionnaire information was collected through face-to-face interviews. In the pre-test stage, educational content was adjusted after determining the most important predictors of preventive behaviors through a linear regression test, which included enabling factors and attitude. Then the target group was randomly divided into intervention and control groups. The intervention group was received a training program during four training sessions (one session of 1.5 hours per week). The intervention group was also divided into three groups of 25 people to participate in the training sessions, and the control group received a normal program. The explanations about the rules and regulations of the training sessions, the purpose of the study, and the participants' duties were presented during the first session. Information on brucellosis, its symptoms, risk factors, and preventive behaviors were presented to improve the participants' knowledge and attitude through the question, answer, and group discussion. The training booklets were provided to the subjects, and motivational messages were read to them at the beginning and end of each session to improve participants' attitudes. In the second session, a brucellosis family conference was held by inviting the friends and family of the participants and the health workers of the comprehensive health service centers, and the importance of supporting and encouraging people to use prevention behaviors was taught discussed. In the third session, the importance of using personal protective equipment in contact with livestock, acquiring skills in the application of prevention behaviors, and skills training were educated through tutorial videos to improve the structure of enabling factors. The supportive policies and laws and the removal of obstacles for the prevention and control of the disease were considered through cross-sectoral and extra-sectoral coordination to intervene in policies by raising the issue of the high prevalence of this disease in the population of Minoodasht city in the City Health and Food Safety Working Group and the Common Human and Animal Diseases. In the fourth session, while inviting persons, who had successful experiences in applying self-care behaviors, the strategies to overcome the obstacles of preventive behaviors were discussed through the brainstorming method. Data were collected through face-to-face interviews three months after the educational intervention.

Data were analyzed using SPSS 19 software through descriptive statistics (frequency distribution, mean±standard deviation). Kolmogorov-Smirnov test was used to determine the normality of the data. Due to the normality of the data, quantitative data inference was performed using a T-test. Chi-square test and Fisher's exact test were used to determine the relationship between qualitative variables in the two groups. The significance level was also

considered 0.05.

Findings

The average age of the subjects in the control and intervention groups was 37.48±9.80 and 34.93±9.14, respectively (p=0.071). The mean±SD of Number of children in the control and intervention groups was 4.01±1.09, and 4.57±1.41 respectively (p=0.511). There was no statistically significant difference between the two groups regarding demographic variables based on the independent Chi-square and t-tests (Table 2).

Table 2) Comparison of demographic characteristics of control and intervention groups (N=150)

Variable	Control	Experimental	p-value
	N (%)	N (%)	
Gender			
Man	36 (48.0)	40 (53.3)	0.415*
Female	39 (52.0)	34 (45.3)	
Level of Education			
illiterate	4 (5.3)	1 (1.3)	0.081*
Primary	16 (21.3)	13 (17.3)	
First High School	18 (24.0)	9 (12.0)	
Diploma	25 (33.3)	34 (45.3)	
Higher education than the diploma	12 (16.0)	18 (20.0)	
History of brucellosis			
Yes	3 (8.0)	0	0.283**
No	72 (90.7)	75 (100)	
Family history of brucellosis			
Yes	13 (17.3)	4 (5.3)	0.060*
No	62 (82.7)	71 (94.7)	

*Chi-square; **Fisher's exact test

Table 3) Comparison of mean±SE scores of variables in the experimental and control groups before and after intervention

Variables	Before	After	p-value
Knowledge			
Control	21.08±3.07	21.83±3.12	0.822
Experimental	21.35±4.17	23.98±4.94	0.000
p-value	0.490	0.022	-
Attitude			
Control	55.61±4.66	56.13±4.33	0.052
Experimental	53.87±5.18	57.84±4.66	0.000
p-value	0.701	0.042	-
Enabling			
Control	16.96±3.72	17.12±2.93	0.813
Experimental	17.63±3.00	18.65±2.74	0.102
p-value	0.0434	0.122	-
Reinforcing			
Control	31.35±6.04	32.01±4.47	0.841
Experimental	30.72±6.13	34.98±4.55	0.000
p-value	0.733	0.031	-
Behavior			
Control	13.19±4.52	13.90±5.42	0.702
Experimental	13.01±5.96	15.60±6.27	0.000
p-value	0.371	0.012	-

The results showed no significant difference between the two groups in the studied structures except the structure of enabling factors before the educational intervention (p<0.05), and there was a statistically significant difference except in the structure of enabling factors between the variables three months after the educational intervention (p<0.05). No significant difference was observed in the mean of the variables in the control group, before and after the intervention (p<0.05; Table 3).

Discussion

This study aimed to determine the effect of educational intervention based on the educational phase of the PRECEDE-PROCEED model on the improvement of preventative behaviors of brucellosis on villagers. However, there was no significant difference in the mean score of predisposing factors between the two groups before the educational intervention, which is consistent with the findings of the study by Oruji *et al*. [20] on preventive behaviors of brucellosis in villagers. Since predisposing factors are effective facilitators in adopting preventive behaviors, educational booklets, tutorial videos, and motivational messages were used at the end of each training session to increase the average score of this structure. The results showed no significant difference between the two groups in reinforcing factors before the educational intervention. While the mean score of reinforcing factors in the intervention group was significantly higher than the control group three months after the educational intervention, some studies [17, 24, 25] have also confirmed this finding. Bridges *et al*. [26] also found that students' mean reinforcement scores increased significantly after the educational intervention. In this study, training sessions were held for employees of the health centers, village councils, and heads of households to increase the average score of reinforcing factors. Ongoing education to promoters of health behaviors, who play an important role in providing ongoing awards, is very effective in the continued use of brucellosis prevention behaviors by participants.

The study results showed no significant difference in the mean score of enabling factors between the two groups three months after the educational intervention. Also, there was no significant difference in the mean score of enabling factors in each group, before and after the educational intervention. Enabling factors allow the realization of motivational and environmental policy; therefore, access to resources, laws, regulations, and skills has an effective role in forming this structure [27]. Although regulation of the supportive policies and laws in the City Health and Food Safety Working Group and the Common Human and Animal Diseases were considered for the prevention and control of the disease in Minoodasht city, no significant difference was observed in the average of the structure; because achieving brucellosis prevention behaviors requires a set of factors such as interventions of regulatory and management departments to increase funding and resources required in brucellosis control

projects (livestock vaccination programs, slaughter, and compensation to livestock owners), priority and policy-making of relevant organizations regarding programs to fighting human-animal communicable diseases, and effective cooperation and coordination of organizations concerning the aims of disease control and prevention, implementation of livestock transport criteria, and correcting the price difference between pasteurized and bulk dairy products. Hazavaei *et al*. did not observe a statistically significant difference in the mean score of enabling factors regarding the nutritional behaviors of the elderly between the two groups six weeks after the educational intervention [28]. The research of Liao *et al*. [29] on promoting hand health behaviors on medical staff in Myanmar is inconsistent with the results of the present study, and the possible reasons are differences in assessment tools, study population, research implementation, and the duration of the educational intervention, as well as differences in the main purpose of the study. Considering that the prevention and control of malaria require planning and diagnosis of all modes of transmission in humans and animals, it seems that in addition to improving the skills of individuals in the use of preventive behaviors, the effective and continuous presence of health education providers is very effective to formulate policies and regulations promoting preventive behaviors of brucellosis.

The study results showed that the mean score of brucellosis prevention behaviors was significant between the two groups three months after the educational intervention. The mean of preventive behaviors in the intervention group was statistically significant before and after the educational intervention, and studies [20, 30, 31] confirm the present study's findings. The study results by Lin *et al*. [32] based on the PRECEDE-PROCEED model also showed a significant difference in infection-preventing behaviors in nurses six months after the educational intervention. When people are motivated to apply brucellosis prevention behaviors and be encouraged by their family and friends, the realization of preventive behaviors will not be unexpected. One of the limitations of the present study was the one-step follow-up of preventive behaviors after educational intervention and conducting a study in the rural population, which cannot be generalized to the entire population of Minoodasht.

The study's limitations were a one-step follow-up of preventive behaviors after educational intervention and conducting the study on the villagers that it was not impossible to generalize the results to all populations of Minoodast city. It is suggested that longer follow-up periods be considered in future studies for long-term monitoring of changes to achieve the research objectives. Collecting information by face-to-face interviews and combined educational methods in educational intervention is one of the advantages of the present study.

Conclusion

Educational intervention based on the educational phase of the PRECEDE-PROCEED model has a positive effect on the promotion of brucellosis prevention behaviors in the villagers of Minoodasht.

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References

1- Luelseged A, Zeleke E, Tessema F, Getaneh B, Enbiyale G. Review on molecular epidemiology and public health significance of brucello-sis. J Anim Res Vet Sci. 2018;2(7):2-10.

2- Pal M, Gizaw F, Fekadu G, Alemayehu G, Kandi V. Public health and economic importance of bovine Brucellosis: An overview. Am J Epidemiol Infect Dis. 2017;5(2):27-34.

3- Mostafavi E, Asmand M. Trend of brucellosis in Iran from 1991 to 2008. Iran J Epidemiol. 2012;8(1):94-101. [Persian]

4- Sanaei Dashti A, Karimi A, Javad V, Shiva F, Fallah F, Alaei MR, et al. ELISA cut-off point for the diagnosis of human brucellosis: A comparison with serum agglutination test. Iran J Med Sci. 2012;37(1):9-14. [Persian]

5- Esmaeilzadeh S, Fathi B, Safari-Alamdari M, Abbasi A, Saeli E, Reisi M. Analytical review of brucellosis in Jolfa city between 2010 and 2014. Depict Health. 2015;6(3):48-53. [Persian]

6- Golestan University of Medical Sciences. Non-communicable diseases [Internet]. Gorgan: Golestan University of Medical Sciences; 2017 [cited: Unknown]. Available from: http://goums.ac.ir/. [Persian]

7- Adetunji SA, Ramirez G, Foster MJ, Arenas-Gamboa AM. A systematic review and meta-analysis of the prevalence of osteoarticular brucellosis. Plos Negl Trop Dis. 2019;13(1):7112.

8- Li MT, Sun GQ, Zhang WY, Jin Z. Model-based evaluation of strategies to control brucellosis in China. Int J Environ Res Public Health. 2017;14(3):295.

9- Khan MZ, Zahoor M. An overview of brucellosis in cattle and humans, and its serological and molecular diagnosis in control strategies. Trop Med Infect Dis. 2018;3(2):65.

10- Deng Y, Liu X, Duan K, Peng Q. Research progress on brucellosis. Curr Med Chem. 2019;26(30):5598-608.

11- Chalabiani S, Nazari MK, Davoodi NR, 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(1):132. [Persian]

12- Farzadmehr M, Ghorbani M, Sadeghi M, MosaviBazzaz SM. The effect of education based on the health belief model in reducing the risk factors of the brucellosis in Torbat

Haydariyeh. J Torbat Heydariyeh Univ Med Sci. 2019;6(4):47-56. [Persian]
13- Bayhan GI, Epçaçan ZK, Ertugrul Y, Sarihan MH, Ersari SS, Makal G, et al. Is the level of knowledge on brucellosis sufficient in the highly endemic region? J Pediatr Infect. 2019;13(1):8-13.
14- Najafi A, Nadrian E, Bakri G, Nadrian H, Fathipour A. Skin cancer preventive behaviors and its determinants among high school students in Sanandaj, Iran: An application of PRECEDE model. J Educ Community Health. 2017;4(1):1-11. [Persian]
15- Shahnavasi M, Masoudi G, Ansari-Moghadam A, Raeisy D, Varnamkhasti Khashei F. Preventive behaviors of brucellosis in Khash city ranchers based on health belief model in 2015. Iran J Health Educ Promot. 2016;4(4):281-8. [Persian]
16- Hazavehei SMM, Sabzmakan L, Hassanzadeh A, Rabiei K. The effect of PRECEDE Model-based educational program on depression level in patients with coronary artery bypass grafting. J Inflamm Dis. 2008;12(2):32-40. [Persian]
17- Moshki M, Dehnoalian A, Alami A. Effect of precede–proceed model on preventive behaviors for type 2 diabetes mellitus in high-risk individuals. Clin Nurs Res. 2017;26(2):241-53.
18- Barasheh N, Shakerinejad G, Nouhjah S, Haghighizadeh MH. The effect of educational program based on the precede-proceed model on improving self-care behaviors in a semi-urban population with type 2 diabetes referred to health centers of Bavi, Iran. Diabetes Metab Syndr. 2017;11 Suppl 2:759-65.
19- Oruogi MA, Bayt Asghari A, Charkazi A, Jvaheri J. Survey on effect of health education intervention on reduction of brucellosis incidence in rural areas of Khomein based on PRECED framework. J Health Hyg. 2012;3(2):50-8. [Persian]
20- Oruoji MA, Hashemi SJ, Hazavehei SM, Chrkazi A, Javaheri J, Moazeni M. The positive impact of educational intervention program based on Precede model on preventive behaviors to reduce brucellosis in the rural people of Khomein. J Res Dev Nurs Midwifery. 2012;9(1):51-60. [Persian]
21- Doshmangir P, Shirzadi S, Tagdisi MH, Doshmangir L. The effect of educational intervention according to PRECEDE model on the regular physical activity in elderly people. J Educ Community Health. 2014;1(2):1-9. [Persian]
22- Rajabzadeh R, Jafari Y, Hakkak HM, Panahi R, Sarvi M, Hosseini SH, et al. The status of fruit and vegetables consumption and its related factors among female high school students in Bojnurd city based on the educational diagnostic stage of the PRECEDE model. J Health Field. 2019;7(2):11-20. [Persian]
23- Hajari A, Shams M, Afrooghi S, Fadaei Nobari R, Abaspoor Najafabadi R. Using the precede-proceed model in needs assessment for the prevention of brucellosis in rural areas of Isfahan, Iran. ARMAGHANE DANESH. 2016;21(4):396-409. [Persian]
24- Omidi S, Farmanbar R, Mokhtarpour S. The effect of educational intervention based on PRECEDE-PROCEED model on promoting traffic safety behaviors in primary schools students of Tabriz in 2014. J Educ Community Health. 2016;2(4):48-56. [Persian]
25- Bazpour M, Gheibizadeh M, Malehi AS, Keikhaei B. The effect of a training program based on the PRECEDE-PROCEED model on lifestyle of adolescents with beta-thalassemia: A randomized controlled clinical trial. Int J Hematol Stem Cell Res. 2019;13(1):12-9.
26- Bridges LS, Sharma M, Lee JHS, Bennett R, Buxbaum SG, Reese-Smith J. Using the PRECEDE-PROCEED model for an online peer-to-peer suicide prevention and awareness for depression (SPAD) intervention among African American college students: Experimental study. Health Promot Perspect. 2018;8(1):15-24.
27- Nejad MM, Nejad GS, Tavakol H, Cheraghi M. The effect of the training program on the quality of life in patients with asthma based on the Precede model in Ahvaz, Iran. Postepy Dermatol Alergol. 2017;34(3):216-23.
28- Hazavehei M, solaymani P, Moeini B, Soltanian A, Rahman KH. The effect of nutrition education intervention based on BASNEF model on the promotion of healthy eating behaviors in the elderly. J Neyshabur Univ Med Sci. 2017;5(1):39-51. [Persian]
29- Liao CD, Lin LF. Application precede-proceed health promotion model to enhance the implementation and execution rate of the treatment staff wash their hands. J Oslo Univ Med Sci. 2014;41(1):1-5.
30- Jeihooni AK, Harsini PA, Kashfi SM, Rakhshani T. Effect of educational intervention based on the PRECEDE-PROCEED model on preventive behaviors of cutaneous leishmaniasis among housewives. Cad Saude Publica. 2019;35(7):158818.
31- Chiang LC, Huang JL, Lu CM. Educational diagnosis of self-management behaviors of parents with asthmatic children by triangulation based on PRECEDE–PROCEED model in Taiwan. Patient Educ Couns. 2003;49(1):19-25.
32- Lin H, Wang X, Luo X, Qin Z. A management program for preventing occupational blood-borne infectious exposure among operating room nurses: An application of the PRECEDE-PROCEED model. J Int Med Res. 2020;48(1): 23-34.