



# Preventive Behaviors of Malta Fever in Country Women: A Family-Based Empowerment Model

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## ABSTRACT

**Aims** Brucellosis (Malta fever) is one of the most common zoonosis diseases. The role of the family in preventive behaviors against brucellosis is important, so this study was conducted to determine the relationship between preventative behaviors of brucellosis and family-based empowerment models in women in families with brucellosis patients in Iran.

**Instrument & Methods** 200 people participated in this descriptive study through the multi-stage cluster method. Data were collected through demographic questionnaires, awareness, attitude, self-efficacy, and self-esteem and behavior. Data were analyzed using SPSS software and independent T-tests, one-way analysis of variance, and Pearson and Spearman correlation and regression.

**Findings** 96 (48%) participants had a history of brucellosis, 174 (87%) had a history of contact with livestock, 131 (65.5%) had a history of consumption of unpasteurized dairy products ( $r=-0.218$ ,  $p=0.003$ ). Based on the independent t-test, a significant relationship was observed between pasteurized dairy consumption and housekeeping with preventive behavior ( $p=0.039$ ) ( $p=0.455$ ). Variance analysis test showed a significant relationship between the level of education and preventive behavior ( $p=0.002$ ). According to the linear regression model, the relationship between self-efficacy and behavior was significant ( $p=0.001$ ), and self-efficacy had more predictive power than other constructs.

**Conclusions** In countrywomen, self-efficacy plays an important role in predicting behavior. In order to promote preventive behaviors against brucellosis, people's self-efficacy should be improved.

**Keywords** Brucellosis; Preventive behavior; Self-efficacy; Empowerment

## CITATION LINKS

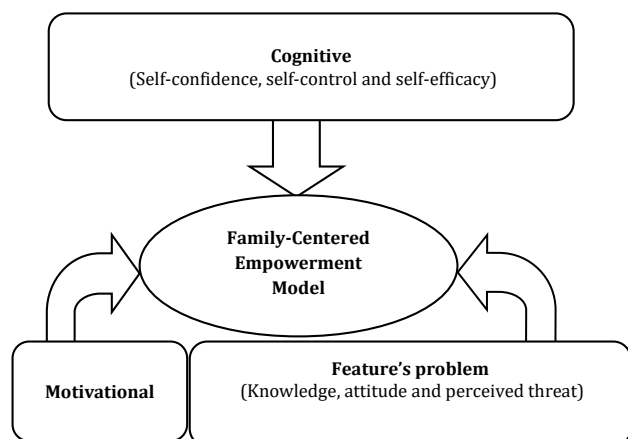
[1] A familial cluster of human brucellosis attributable ... [2] Brucellosis—regionally emerging zoonotic ... [3] Health-seeking behaviour of human brucellosis ... [4] Improvement and advancement of early ... [5] Preventive behaviors of brucellosis in Khash ... [6] Associated factors of delayed ... [7] Epidemiological characteristics and trend ... [8] Determine the effect of intervention on the ... [9] Quality of life of ... [10] The effect of family-centered empowerment ... [11] Comparison of the impact of education ... [12] A systematic review of studies on the ... [13] Prediction of risk behaviors in HIV-infected ... [14] Effect of education program on students ... [15] Developing theory-and evidence-based ... [16] Community-based powerful tools intervention ... [17] Esperanza familiar: A university-community ... [18] The effect of family-centered empowerment ... [19] The effect of family-centered empowerment ... [20] The effect of education on promoting self-efficacy ... [21] Association of life style and self-esteem among ... [22] Effect of educational intervention based ... [23] Validity and reliability of Rosenberg self-esteem scale ... [24] Epidemiological of brucellosis in Shahrekord city ... [25] Brucellosis knowledge and preventive practices among ... [26] Factors influencing preventive behavior ... [27] Risk, knowledge and preventive measures of smallholder ... [28] Understanding the role of disease knowledge and risk ... [29] The effectiveness of educational intervention based ... [30] A multifaceted risk model of brucellosis at the ... [31] Assessment of preventive behavior for cervical ... [32] Health behavior and health education: Theory ...

## Introduction

Brucellosis tends to become chronic and can easily become a chronic type and impose many problems on the patient due to relapse and failure of treatment [4]. Brucellosis is known as a thousand-face disease due to its long-lasting effects [5]. The prevalence of brucellosis varies widely from country to country. The disease is endemic in many Eastern Mediterranean regions, including Iran, and Iran is ranked fourth in the world in terms of disease incidence [6]. According to the Ministry of Health report in 2016, the prevalence of brucellosis is high in Khorasan Razavi, South Khorasan, East Azerbaijan, etc. [7]. In Torbat-e-Jam city, located in Khorasan Razavi province, the incidence of brucellosis has been increasing, and the pollution in recent years is many times more than the national rate (38.2% of a thousand people; 958 patients in Torbat-e Jam and 220 patients in Balajam region in 2018) [7]. In Iran, brucellosis is considered a major health problem; because, in many areas, livestock is a source of income and employment. The economic consequences of destroying the affected animals are very high, and due to the chronic and recurrent physical and mental disabilities, it incurs many medical expenses for the country's medical organizations [8]. In the last two decades, the number of families caring for the chronically ill has been growing. The illness of a family member changes the whole family's lifestyle and upsets the balance of the family [9]. Families are the most valuable and vulnerable resource for chronic patients, and they play an essential role in supporting their patients [10]. Training the family members about disease control and its prevention can be very helpful. There is a strong link between family and members' health status, and individuals (especially in chronic diseases) are dependent on their family members, and the family affects even their attitudes [11]. Risky behaviors are the most important factor in endangering the health of society. The combination of high-risk behaviors leads to risky lifestyles [12]. In the case of brucellosis, high-risk behaviors, including inappropriate behaviors such as consumption of unpasteurized dairy products, lack of personal protective equipment such as masks and gloves when working in the barn and warehouse, and contact with livestock secretions of infected animals, which are completely related to insufficient knowledge and awareness of people, their self-efficacy status and attitude [5]. Preventing high-risk behavior depends on increasing the level of awareness and improving the level of attitudes and beliefs, and a prerequisite for disease prevention is to understand the reasons for the formation of high-risk behavior in individuals [13]. Training can be one of the most effective and cost-effective primary prevention approaches. Training depends on its effectiveness and changing or creating health behaviors [14]. The most effective educational programs, based on

theory-based approaches that are rooted in patterns of behavior change. These templates are useful for application designers; because they suggest special aspects for training interventions [15].

One of the models used to change health behaviors in patients is the family-centered empowerment model. Health educators emphasize empowerment measures as a major practical way to improve the health of patients and their families [16]. Family empowerment means helping the family to make a power of change. So to help the family to succeed, they must be guided to change the lives of each member of their family [17]. The main purpose of the family-based empowerment model is to empower the family system (patient and other family members) to improve the level of health [18]. The family-based empowerment model has been designed in three motivational and psychological dimensions (self-confidence, self-control, and self-efficacy) based on the characteristics such as knowledge, attitude, and perceived threat, emphasizing the role of the individual and other family members [19]. In this model, perceived threat means understanding the complications and problems caused by a particular disease or health condition, the probability of infection or the level of risk to the patient, and preventive behaviors as appropriate reactions. Self-efficacy means a person's confidence in being able to perform self-care tasks optimally [20]. Finally, self-esteem encompasses beliefs about oneself an individual's subjective evaluation of their worth [21] (Figure 1).



**Figure 1)** Family-Centered Empowerment Model

Various studies, including a cross-sectional study on cognitive factors related to preventive behaviors of brucellosis in patients (application of the empowerment model) by Babazadeh *et al.* [22], confirmed the importance of identifying the factors influencing preventive behaviors.

Given the importance of brucellosis and the role of families and caregivers of patients, and the importance of identifying the factors affecting preventive (or high-risk) behaviors, it is necessary to

identify the most effective factors involved in forming these behaviors. Therefore, this study aimed to determine the predictive factors of preventive (high-risk) behaviors among rural women based on the family-based empowerment model.

### Instrument & Methods

This descriptive study was carried out between 200 women from households with at least one brucellosis patient in January and February 2017 in the Balajam area of Torbat-e-Jam city. Out of 269 people, 200 people were selected by multi-stage cluster sampling method; in such a way that each of the villages of this region was considered a cluster, and eight villages were randomly selected. Then 25 households were randomly selected. Women who lived in the disease centers were included in the study at least six months ago. People who did not consent to participate in the study were removed. The three-part questionnaire of demographic information, awareness, self-efficacy, attitude, and behavior (researcher-made) and Rosenberg self-esteem were used to collect the necessary data. In order to validate the content of the researcher-made part of the questionnaire, a team of experts, including six health educators, two epidemiologists, and two physicians, assessed the questions in terms of appropriateness, relevance, necessity, and usefulness. After applying experts' opinions, one statement was excluded from the domain of awareness and two statements from the domain of attitude (due to the low content validity ratio), and a self-efficacy statement (due to the low content validity ratio and index). The questionnaire was completed experimentally by 15 women (these individuals were not among the 200 main participants and were excluded from the main study). The final questionnaire included demographic information (age, marital status, occupation of subjects and their spouses, education of subjects and their spouse, size of home, income of spouse, and household size (total population divided by the number of households= number of members of each household) history of brucellosis in family members, history of brucellosis in individuals, history of contact with livestock and history of consumption of unpasteurized dairy products); model constructs (awareness, self-efficacy, attitude, and self-esteem) and behavior measurement.

Knowledge about brucellosis was measured through 15 questions such as "raw and undercooked meat can be effective in transmitting malt fever" with three options of true (3 scores), no idea (2 scores), false (1 score). Its reliability coefficient was 0.75. The attitude was measured through 12 questions: "I believe that livestock vaccination is important to prevent brucellosis in humans" with three options: I agree, disagree, and have no idea with the points of 3, 2, and 1, respectively. The reliability coefficient of this area

was equal to 0.93, and obtaining a higher score shows a positive attitude. Caregivers self-efficacy questionnaire included seven questions such as "If I get sick, I can take my medication properly" through 3 options of agree, no idea, and disagree by the points of 3, 2, and 1, respectively, and its reliability coefficient was 0.97. Finally, self-esteem by caregivers of brucellosis patients was measured by the Rosenberg self-esteem scale. The self-esteem questionnaire included ten questions such as "I feel that I am a valuable person at least equal to others" through the two options of agree and disagree with scores of 2 and 1, respectively. The reliability and validity of this questionnaire have been measured in many studies, including the Rajabi study, which has an internal consistency coefficient of 0.84 [23]. Preventive measures against brucellosis with 17 questions such as "I use a mask and gloves when working in the stable and cleaning animals" was measured by the Likert scale with a score of 1 to 5 from never to always, and its reliability coefficient was 0.99.

The study was approved by the Research Ethics Committee of Mashhad University of Medical Sciences. Ethical considerations in this study include obtaining the informed consent of participants, the confidentiality of participants' information, a full explanation of research objectives for participants, and reservation of exclusion rights for participants. The subjects filled out the questionnaires by the self-report method. In cases where the person was not literate enough, the health workers asked questions from the participants. General linear regression was used to determine the effect of knowledge, attitude, self-efficacy, self-esteem, and some demographic variables on behavior.

### Findings

This study was carried out between 200 women affected by brucellosis. The mean age of participants was 39.20  $\pm$  12.52. Of the total participants, 188 (94%) were married, 192 (96%) were housekeepers, 81 (40.5%) had primary education, and 188 (94%) had incomes below one million Tomans. In addition, 96 (48%), 174 (87%), 131 (65.5%), and 156 (78%) of the subjects had a history of brucellosis, contact with livestock, unpasteurized dairy consumption, and the history of brucellosis in family members, respectively (Table 1). The results of the mean scores of the questionnaire answered by the subjects have been shown in Table 2.

The correlation test showed a significant (inversely) relationship between age and behavior, and the relationship between awareness and behavior was not significant ( $r=0.144$ ,  $p=0.055$ ). However, self-efficacy was significantly related to behavior ( $p<0.001$ ), and other variables were not significantly related to behavior (Table 3).

**Table 1)** Frequency distribution of women demographic variables in families with brucellosis patient

Variables	Subcategories	N (%)
<b>Marital status</b>	Married	188 (94)
	Divorce/widow	12 (6)
<b>Employment status</b>	Employed	1 (0.5)
	Rancher	6 (3)
	Housewife	192 (96)
	Others	1 (0.5)
<b>Spouse's Employment status</b>	Employed	6 (3)
	Unemployed	4 (2)
	Self-employment	18 (9)
	Manual worker	45 (22.5)
	Farmer	27 (13.5)
	Rancher	84 (42)
<b>Educational level</b>	Others	4 (2)
	Illiterate	54 (27)
	Semiliterate	18 (9)
	Elementary literacy	81 (40.5)
	Middle literacy	30 (15)
	High school diploma	16 (8)
<b>Spouse's educational level</b>	Academic	1 (0.5)
	Illiterate	35 (17.5)
	Semiliterate	23 (11.5)
	Elementary literacy	65 (32.5)
	Middle literacy	44 (22)
	High school diploma	18 (9)
<b>Income status (Tomans)</b>	Academic	3 (1.5)
	Less than 1 million	188 (94)
	1-2 million	10 (5)
<b>Spouse's Income status (Tomans)</b>	Higher than 2 million	2 (1)
	Less than 1 million	132 (66)
	1-2 million	36 (18)
	2-3 million	12 (6)
	3-4 million	6 (3)
<b>Family history of brucellosis</b>	Higher than 4 million	2 (1)
	Yes	156 (87)
<b>Women history of brucellosis</b>	No	44 (22)
	Yes	96 (48)
<b>Livestock contact history</b>	No	104 (52)
	Yes	174 (87)
<b>History of unpasteurized dairy</b>	No	26 (13)
	Yes	131 (65.5)
<b>Home built up area</b>	<120 meters	103 (51.5)
	>120 meters	86 (43)

**Table 2)** Mean±SD of women's family size, behavior, and the dimension of family-centered empowerment model in families with brucellosis patients

Variables	Mean±SD
<b>Family size</b>	4.84±1.69
<b>Knowledge</b>	36.37±4.17
<b>Attitude</b>	27.43±4.31
<b>Self-efficacy</b>	18.37±2.40
<b>Self-confidence</b>	17.92±1.97
<b>Behavior</b>	55.75±13.20

**Table 3)** The relationship between age, family size, and the dimension of family-centered empowerment model with preventive behaviors of brucellosis in women

Variables	Correlation coefficient	Confidence interval	p-value
<b>Age</b>	-0.218*	(-0.35, -0.08)	0.003
<b>Family size</b>	0.062**	(-0.08, 0.21)***	0.393
<b>Knowledge</b>	0.144*	(-0.003, 0.285)	0.055
<b>Attitude</b>	0.138*	(-0.008, 0.278)	0.064
<b>Self-efficacy</b>	0.506**	(0.39, 0.62)***	<0.001
<b>Self-confidence</b>	-0.086**	(-0.23, 0.05)***	0.328

\*Pearson; \*\*Spearman; \*\*\* Bootstrap confidence interval

There was a significant inverse relationship between home infrastructure (less than 120 square meters) and preventive behavior ( $p=0.006$ ), so that in houses with a smaller area, the average score of preventive behavior was higher. Consumption of pasteurized dairy products and preventive behavior showed a significant relationship ( $p=0.039$ ). The mean score of preventive behavior was higher in people who consumed pasteurized dairy products. There was no significant relationship between income below one million Tomans and preventive behavior ( $p=0.064$ ); there was also a significant relationship between housekeeping occupation and preventive behavior ( $p=0.045$ ). Indeed homemakers had higher mean scores of preventive behavior (Table 4).

**Table 4)** The Mean±SD of brucellosis prevention behaviors in women at different levels of explanatory variables

Variables	Number	Mean±SD	t-value	p-value
<b>Family history of brucellosis</b>				
Yes	156	55.28±13.16	-0.954	0.341
No	44	57.52±13.35		
<b>Home built up area</b>				
<120 meters	103	58.16±13.52	2.79	0.006
>120 meters	86	52.87±12.26		
<b>Women history of brucellosis</b>				
Yes	96	57.44±12.43	1.68	0.094
No	104	54.22±13.74		
<b>Livestock contact history</b>				
Yes	174	55.16±12.87	-1.74	0.082
No	26	60.47±15.05		
<b>History of unpasteurized dairy</b>				
Yes	131	54.34±13.19	-2.07	0.039
No	69	58.51±12.87		
<b>Marital status</b>				
Married	188	55.97±13.25	0.925	0.356
Divorce/widow	12	52.18±12.25		
<b>Employment status</b>				
Housewife	192	56.16±13.20	2.01	0.045
Others	8	46.62±9.79		
<b>Income status (Tomans)</b>				
Less than 1 million	188	55.31±13.04	-1.86	0.064
1-3 million	12	62.90±14.27		
<b>Spouse's Income status (Tomans)</b>				
Less than 1 million	132	56.04±13.53	0.096	0.923
1-3 million	68	55.83±12.70		

**Continue of Table 4)** The Mean±SD of brucellosis prevention behaviors in women at different levels of explanatory variables

Variables	Number	Mean±SD	t-value	p-value
<b>Spouse's Employment status</b>				
Unemployed	6	52.20±10.82	0.625	0.644
self-employment	38	55.24±12.76		
manual worker	45	58.61±13.29		
Farmer	27	54.61±12.96		
Rancher	84	55.50±13.70		
<b>Educational level</b>				
Illiterate	54	50.90±11.96	4.321	0.002
semiliterate	18	49.94±13.08		
Elementary literacy	81	57.98±13.32		
Middle literacy	30	58.85±11.81		
High school & academic	17	60.64±13.51		

Analysis of variance test showed a significant relationship between education level and preventive behavior ( $p=0.002$ ); so that the average score of preventive behavior in people with a diploma and higher education was much higher. In addition, a significant difference was observed between the mean of the behavior of illiterate people and people with the Literate of reading and writing with people with a diploma and higher education ( $p<0.05$ ; table 4).

According to the linear regression model, only the relationship between self-efficacy construct and behavior was significant, and self-efficacy had more predictive power than other structures ( $p<0.001$ ; Table 5).

**Table 5)** The simultaneous relationship of structures on preventive behaviors of brucellosis using multiple regression model in rural women

Variables	Regression coefficient	Standard regression coefficient	Test statistics	p-value
Knowledge	-0.036	-0.012	-0.162	0.871
Attitude	0.226	0.073	0.995	0.341
Self-efficacy	2.75	0.508	7.208	0<0.001
Self-confidence	-0.535	-0.076	-0.084	0.280

Coefficient of determination=0.273

## Discussion

This study aimed to determine the preventive behaviors of brucellosis in rural households with brucellosis patients based on the family-based empowerment models. Nearly half of the participants had a history of brucellosis, and a high percentage of people had a history of contact with livestock. Contact with livestock is one of the most important risk factors for brucellosis, consistent with the results of a study by Sudjani *et al.* [24]. In addition, more than half of the participants had a history of consuming unpasteurized dairy products. Consumption of

unpasteurized dairy products has been identified in most studies as a major risk factor for the disease, and the results of the study by Soodjani *et al.* [24] are consistent with these results.

The majority of participants had a history of brucellosis in family members, which was quite expected given the inclusion criteria in this study. Also, family members usually behave similarly in the same circumstances because of similarity of attitudes. Therefore, it is quite normal for members of a family to become a disease. The mean score of preventive behavior of brucellosis in women was not high, and due to their low level of knowledge, attitude, self-esteem, and self-efficacy, this was expected, and various studies such as Babazadeh *et al.* [22] have confirmed these results.

The results of this study showed a significant but inverse relationship between age and behavior. Younger people were more likely to follow preventive behaviors, and this is consistent with the study of Babazadeh *et al.* [22] and Bath-Jordan and Chang [25] and is inconsistent with the study of Choi *et al.* [26] because the target groups of the studies are different and in the mentioned study, the target group is the patients.

Although the relationship between consciousness and behavior was direct, it was not significant. In other words, knowledge and awareness do not necessarily lead to preventative behavior. This result is in accordance with the study of Tabog *et al.* [27], but it is not in accordance with the study of Arts *et al.* [8]. In these studies, preventive behavior has increased in line with the increase of awareness. In this case, this result can be attributed to the difference in the samples. In addition, other factors have a synergistic effect with awareness and lead to desirable behavior. For example, self-efficacy showed a significant relationship with preventive behavior, and those who showed the most behavior change had higher self-efficacy to perform the behavior. Many studies such as Babazadeh *et al.* [22], Babaei *et al.* [29] have confirmed this relationship.

There was a significant relationship between home infrastructure and preventive behavior, so that the less infrastructure, the more preventive behavior. This issue can be attributed to the impossibility of keeping livestock at home and therefore no contact with livestock and observing desirable preventive behaviors. Consumption of pasteurized dairy products was significantly associated with preventive behaviors. Those who care about their health avoid many of the risk factors for brucellosis. The consumption of unpasteurized dairy products is one of the most important risk factors for brucellosis. These results are in accordance with the study of Abdul Wahab *et al.* [30]. There was an inverse significance between income and preventive behavior. The higher the income of individuals, the lower the rate of preventive behaviors. People's high income is usually related to their busy schedule, and

this factor can be effective in making less important preventive behaviors. The results of the present study are consistent with the study of Babazadeh *et al.* [22]. There was also a significant relationship between housekeeping and preventive behavior, and the rate of preventive behavior was higher in homemakers. However, most participants were housewives, and it is practically impossible to compare with other occupations. Some studies have shown the opposite results.

Indeed, occupation as a risk factor depends entirely on the relationship between livestock and animal husbandry. In rural communities where animal husbandry activities are mostly performed by housewives, these people are more exposed to common diseases between humans and animals, including brucellosis. Soodjani *et al.* [24] showed that the highest frequency of the disease is related to homemakers, which means that preventive behaviors are not observed in the subjects.

Analysis of variance test showed a significant relationship between education level and preventive behavior.

So that the average score of preventive behavior in people with a diploma and higher education was much higher. There was a significant difference between the mean behavior of illiterate and literate people in reading and writing with people with the diploma and higher education. The relationship between education and knowledge of individuals and its effect on behavior has been observed in many studies, including Babazadeh *et al.* [22] and Babaei *et al.* [29]. Furthermore, the relationship between self-efficacy structure and behavior was significant, and this relationship has been studied and confirmed in many studies, including Shirazizadeh *et al.* [31]. According to the results, self-efficacy had more predictive power than other structures, and this result is in accordance with the results of the study of Babaei *et al.* [29].

The results of this study showed that self-efficacy is the only predictor of preventative behavior of malt fever.

Studies have shown that self-efficacy has a strong effect on health behaviors, and self-efficacy increases ability, competence, and adequacy. It is the strongest and most powerful structure and tool in preventing behavior change and increasing mastery of self-efficacy behavior [31]. In studies, self-efficacy has been one of the most important factors influencing behavior. For example, in the study of Babazadeh *et al.* in determining the effect of educational intervention based on the family-centered empowerment model in correcting high-risk behaviors in patients with brucellosis, self-efficacy has been reported as one of the most important factors in predictability [22].

The strengths of this study are the use of the family-centered empowerment model; because family-centered care is a philosophy in which the

importance of the family unit is recognized as the focus of all health care and leads to the empowerment of individuals and their families in disease management. The limitation of the present study was the collecting of responses and information by a self-reported method. Considering a significant relationship between preventative behavior and self-efficacy of women in families affected by brucellosis, it is suggested that in training interventions for caregivers of brucellosis patients, special attention be paid to education and income status to improve self-efficacy, care skills, and provision of the training.

## Conclusion

In rural women, self-efficacy plays an important role in predicting behavior. Therefore, in order to promote prevention behaviors of malt fever, people's self-efficacy should be improved.

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