

# Perceived threat predictor of calcium-rich foods in the women of premenopausal age Isfahan - Iran in 2013-2014

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## ABSTRACT

**Background:** During women lives, frequently face the challenge of calcium reduction and absorption. Decreased calcium absorption followed by a decrease in estrogen at perimenopausal ages, low average per capita calcium intake among women, wrong nutritional behavior, household income reductions and make them more susceptible to osteoporosis and related complications. The aim of this study was to evaluate the relationship between the health belief model constructs and consuming calcium-rich foods in menopausal age women.

**Materials and Methods:** This study was descriptive-correlation study. The questionnaires were completed by 210 menopausal women who had referred to health centers. The research data were analyzed using: Frequency distribution, mean score, Pearson correlation coefficients and multivariate regression. Significant level of  $P < 0/05$  were considered.

**Results:** The mean and standard deviation of the scores for perceived susceptibility and severity of the threats of consumption and complications of inadequate intake were respectively: (62.1 and 38.9, and 60.2 and 39.9) and (59.6 and 37.9 and 56.3 and 36.5). The relationship between the number of units of calcium intake with perceived susceptibility and severity calcium intake and complications caused by the inadequate intake of calcium were ( $P < 0.001$ ,  $r = 0.581$ ,  $r = 0.651$ ) and ( $P < 0.001$ ,  $r = 0.634$ ,  $r = 0.567$ ).

**Conclusions:** The obtained results indicate that perceived threat is the prognostic factor for the intake of calcium-rich foods and the increase of perceived threat in the health promotion programs may be associated with the increase in the consumption of calcium-rich foods in the women of premenopausal age.

**Key words:** Calcium, food, health belief model, menopause

## INTRODUCTION

Half of any population is constituted by women who experience different periods in their life each of which affect their health in a different way. The diversity of these unique conditions has made them more vulnerable than men.<sup>[1-5]</sup> In addition, conditions such as pregnancy<sup>[6]</sup> and breast-feeding,<sup>[7]</sup> through the depletion of body reserves, will increase the aging-related complications<sup>[8]</sup> such as osteoporosis as one of the most problematic issues of women in their aging period.<sup>[9]</sup>

On the other hand, the bone density of women is approximately 20 to 30% less than men,<sup>[10]</sup> while bone resorption in women is twice then men,<sup>[10]</sup> especially if they have had a long pregnancy and lactation period in their life. It has been reported that for every 100 days lactation, 2% of women's bone mass will decrease.<sup>[7]</sup> In addition, in a period of their life, women experience a stage called menopause when, through the decrease of estrogen levels, the rate of bone resorption increases extremely.<sup>[11]</sup> Through the development of health in the societies and the societies' health promotion life expectancy has increased. Thus, women's length of life has been increased despite their menopausal conditions, so that they spend about 30 years of their life in their postmenopausal period.

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Submitted: 16-Jul-14; Accepted: 05-Jun-15

### Access this article online

#### Quick Response Code:



**Website:**  
www.ijnmrjournal.net

**DOI:**  
10.4103/1735-9066.170006

Although menopause, that occurs between the ages of 44 and 55,<sup>[12]</sup> is a natural phenomenon, the lower levels of estrogen after the reduced function of ovarian causes various psychological and physical disorders<sup>[8]</sup> that Osteoporosis is one of the most problematic of these disorders,<sup>[9]</sup> whose complications impose high costs on the society.<sup>[13]</sup> While the reduction of bone density is inevitable after the age 35, adequate calcium intake can significantly reduce its speed. The daily needs of body to calcium are different in different age groups.<sup>[14]</sup> In perimenopausal periods, this need increases to 1200mg per day.<sup>[15]</sup> Calcium-rich foods include low-fat dairy products, dark green vegetables Such as broccoli and spinach, sardines, salmon, nuts, beans, soya, and calcium drinks.<sup>[15]</sup>

Regarding the latest statistics about Iranians food basket, the daily consumption of dairy is 139g for every individual that is very low in comparison with the right amount of dairy consumptions as the optimal level of dairy consumption is considered to be about 225 to 240g.<sup>[16]</sup> According to the low per capita income of Iranian families, dairy products and other calcium-rich foods are omitted from their food baskets. Nutritional status of Iranian women and girls are also affected by these conditions.<sup>[17]</sup> Calcium deficiency will lead to osteoporosis that have been seen in about 2/5 million Iranians. According to the results, osteoporosis has led to 200 to 400 thousand fractures in Iran that imposes more than four million dollars on the country each year.<sup>[18,19]</sup> While, through changing the lifestyle and nutritional behavior of the people many of these problems can be prevented.<sup>[20-22]</sup>

Nutritional behaviors, like other health-related behaviors, are influenced by many factors that recognizing them can be helpful in predicting behaviors and development of health-promotion programs. People's perception of the threatening conditions is a psychological factor that can affect individuals' performances.<sup>[23-25]</sup> Understanding the psychological aspects of behavior can be a useful framework for the understanding of human behavior drivers in order to develop health programs,<sup>[26]</sup> because the most effective training programs are based on the theoretical approaches and have been derived from the patterns of behavior changing.<sup>[19,27]</sup>

According to one of the behavior explaining theories, when people feel that their health is threatened by a certain behavior and a particular action can prevent this threat, they will be encouraged to do that action.<sup>[28-30]</sup> This theory has been examined in explaining some behaviors. In this regard, Soaym *et al.* (2008) found out in their study that behavioral functions of calcium intake has been increased in the menopausal women by the trainings based on the health beliefs model constructs.<sup>[31]</sup>

Although many studies have shown that the application of training to improve perceived threat can lead to the improvement of nutritional behaviors,<sup>[5,32-36]</sup> it is important that the factors related to health behavior should be evaluated in the socio-cultural context of different societies. Therefore, before applying any training action, behavior explaining theories should be examined for the prediction of any behavior so that health promotion actions can be performed properly. Given the importance of using calcium-rich foods in preventing osteoporosis and also the need for a better understanding of the relevant factors, the aim of the present study is to identify the relationship between the perceived threat of osteoporosis and nutritional behaviors in taking calcium-rich foods.

## MATERIALS AND METHODS

This research is a descriptive-correlational study whose data has been collected by cross-sectional methods. Sampling was done in a group of 210 subjects and in one stage. The study's subjects consist of the women aged 44 to 55 (premenopausal women) that were selected from the women who have been referred to the health centers of Semirrom in 2013. Simple sampling method was used to select the study's sample. Inclusion criteria for the study include: Not having nutritional therapeutic regimen that limits the use of calcium-rich foods, non-existence of known mental and psychological diseases, no history of cancer, the non-existence of bone-related diseases except arthritis osteoporosis. Data collection tool was a researcher-made questionnaire which consists of three parts: The first part was dedicated to the demographic-fertility characteristics; the second part included the questions in relation with the consumption of calcium-rich foods in terms of daily consumption units (each unit equals to a glass or 250ml milk); and the third part contained the questions related to perceived susceptibility and the perceived severity of threat and was formulated in the five-point Likert scale (strongly agree, agree, no idea, somewhat disagree, disagree). The questionnaire was completed by the study's subjects and the scores were balanced based on the score 100.

The questionnaire was designed through the study of scientific books, journals and articles and its validity was evaluated using the opinions of different experts. The reliability of the questionnaire was determined at the end of the sampling and through specifying the Cronbach's alpha coefficient, and the score 0.78 was obtained for the questions. Data analysis was performed using the statistical software of SPSS20. The used statistical methods included frequency distribution, mean score, Pearson correlation coefficient and multivariate regression analysis.

### Ethical considerations

The study was approved by the Ethics Committee, Isfahan University of Medical Sciences. The patients who participated in this study received verbal and written explanation about the study process, privacy of data, their voluntary participation and right to withdraw from the study at any time. Then, an informed consent was obtained.

### RESULTS

210 women aged between 44 and 55, with the mean age of  $48.3 \pm 3.8$  participated in this study. In terms of educational level, 29 percent of the women were illiterate, 40.5 percent of the women had primary education, 10 percent of them had high school education, 9 percent with diploma, and 11.4 percent of the women had a higher level of education. In terms of job, 70 percent were housewives, 13.8 percent were employees, 3.8 percent were workers, 9 percent were teachers, and 3.3 percent had other occupations. In terms of economic level, 20 percent of them had a poor economic situation, 74.3 percent had an average economic situation, and the rest (5.7%) had a good economic situation. In terms of consumed units of calcium-rich foods, the maximum level has been 9.04 units per day and the minimum level has been 0.07 units. The most common used calcium-rich foods have been dairy products with the maximum level of 9.3 units and the minimum level of 0.07; then, have been nuts with the maximum use of 1 unit and the minimum use of 0.00; and the least consumption belonged to broccoli with the maximum daily intake of 0.43 unit and the minimum intake of 0.00 [Table 1].

The results obtained from evaluating the relationship between the number of received calcium-rich foods units and the score of perceived susceptibility the perceived severity of threat and the complications caused by inadequate intake of calcium-rich foods showed that there has been a direct and significant relationship between them ( $P < 0/001$ ):  $r = 0.651$ ;  $r = 0.581$ ;  $0.634$ ;  $0.567$  [Table 2].

According to the results, the perceived susceptibility and severity of threat have been directly and significantly related with the consumption of calcium-rich foods. Moreover, the relationship between the perceived susceptibility and severity of threat and the complications of inadequate intake of calcium has been significant. Regression line equation of calcium-rich foods with the scores of perceived susceptibility and perceived severity of threat caused by non-intake of calcium has been obtained as follows:  $Y = 1.91 + 0.014X1 + 0.015X2$ .

In this equation, Y refers to the number of times calcium-rich foods are used. 1.91 is the fixed coefficient

**Table 1: The daily intakes of calcium and the mean perceived threat score of HBM for using calcium-rich foods and the complications caused by the inadequate intake of calcium-rich foods in the premenopausal women**

	Average	Standard deviation
Calcium-rich foods intake		
Dairy foods	2.4	1.3
Nuts	0.05	0.12
Vegetables and broccoli	0.02	0.06
Calcium-rich foods generally	2.46	1.3
The threat perceived of health belief		
Perceived susceptibility of the threat consumption	62.1	38.9
Perceived severity of the threat consumption	60.2	39.9
Perceived susceptibility of the threatening complications of inadequate consumption	59.6	37.6
Perceived of the severity threatening complications of inadequate consumption	56.3	36.5

**Table 2: Pearson correlation coefficient between the units of calcium-rich foods and the perceived threat score of using calcium-rich foods and the complications caused by the inadequate intake of calcium-rich foods in the premenopausal women**

Variable	Number of calcium-rich foods	
	r	P
Perceived susceptibility of the threat consumption	0.651	<0/001
Perceived severity of the threat consumption	0.581	<0/001
Perceived susceptibility of the threatening complications of inadequate consumption	0.634	<0/001
Perceived of the severity threatening complications of inadequate consumption	0.567	<0/001

of the equation. X1 and X2 also respectively refer to the perceived susceptibility and severity of taking calcium-rich foods. As it is obvious, although there is a close relationship between the variables of perceived susceptibility and severity with the rate of using calcium-rich foods, the greatest impact on the calcium-rich foods has been by X2 as the perceived severity of threat and then by X1 as the perceived susceptibility. Moreover, regression line equation of calcium-rich foods with the scores of perceived susceptibility and perceived severity of threat caused by the inadequate intake of calcium has been obtained as follows:  $Y = 2.01 + 0.027Z1 + 0.02Z2$ .

In this equation, Y refers to the number of times calcium-rich foods are used. 2.01 is the fixed coefficient of the equation. Z1 and Z2 also respectively refer to the perceived susceptibility and severity of threat caused by inadequate intake of calcium-rich foods. As it can be seen,

although there is a close relationship between the variables of perceived susceptibility and severity of threat caused by the inadequate intake of calcium with the rate of using calcium-rich foods, the greatest impact on the calcium-rich foods has been by Z1 as the perceived susceptibility and then by Z1 as the perceived severity of threat.

## DISCUSSION

According to the results of the study, the intake of dairy and calcium-rich foods is to a great extent close to the level recommended for this age that is three IU. Indeed, calcium-rich vegetables should be used more, but according to the specific food habits of the area and less access to these kinds of foods and also according to the consumption barriers, they have been used less than normal. It seems that one of the main reasons for the relatively good consumption of calcium-rich foods is the access to the various kinds of dairy products in this area and also the affordable price of these products compared with the meat products.

This amount of dairy consumption is in line with other researches in other areas of Iran. In the research conducted by Torshizi, daily intake of calcium has been 821-900 mg;<sup>[37]</sup> in Shojaezadeh's study, this amount has been 800 mg;<sup>[38]</sup> and in the study conducted by Mossalanejad *et al.*, this amount has been less than 1200 mg for about 67.7% of women.<sup>[14]</sup>

In the study of Swaim *et al.* (2008), in the area of preventive behavior and in terms of calcium-rich foods, the results showed that 64% of menopausal women have used about 1000-1200 mg calcium<sup>[31]</sup> that their results have been in line with the results of the current study. The results also showed that, by increasing the scores of perceived susceptibility and perceived severity of threat, the consumption of calcium-rich foods has increased. According to the theory of health belief model, the greater the perceived susceptibility and perceived severity of threat, the less will be the barriers of calcium consumption, and vulnerable people will try to correct inappropriate behaviors and change them into the appropriate healthy behaviors. The results of this study are in agreement with the theories of health belief mode. According to the results of this study, the structures of perceived susceptibility and perceived severity of threat in health belief model can be a good model for predicting the nutritional behavior of using calcium-rich foods and can be helpful in explaining factors that need to be emphasized more.

Current study can be a useful guide in applying health belief model to prevent diseases, and understanding the vision and beliefs of people about the health-threatening illnesses, particularly the so-called silent and asymptomatic diseases that in turn can lead to the health programs for

the promotion of healthy behaviors and leaving unhealthy behaviors.

## CONCLUSION

From the findings of this study and other similar studies, it can be concluded that perceived threat can be a good predictor of behavior and, since half of the population of any society are women that according to their key role in the family and society need to be more considered in terms of nutritional behavior, therefore, using different training methods, especially the mentioned model, premenopausal women should be motivated to use more calcium-rich foods. Doing this, disabilities and mortalities caused by the non-consumption of calcium-rich foods can be prevented.

## ACKNOWLEDGMENTS

This article was derived from master thesis of Marjan Hoseini with project number 392398, Isfahan University of Medical Sciences, Isfahan, Iran. The researchers of this study would like to thank the Research Center of the Faculty of Nursing and Midwifery of Isfahan University of Medical Sciences, the collaborators, and the participants for their cooperation.

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**How to cite:** Bahadoran P, Hoseini M, Kazemi A. Perceived threat predictor of calcium-rich foods in the women of premenopausal age Isfahan - Iran in 2013-2014. *Iranian J Nursing Midwifery Res* 2015;20:676-80.

**Source of Support:** Isfahan University of Medical Science, **Conflict of Interest:** Nil.