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.¹⁻⁵ In addition, conditions such as pregnancy⁶ and breast-feeding,⁷ through the depletion of body reserves, will increase the aging-related complications such as osteoporosis as one of the most problematic issues of women in their aging period.⁸ On the other hand, the bone density of women is approximately 20 to 30% less than men,¹⁰ while bone resorption in women is twice then men,¹⁰ 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.⁷ 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.¹¹ 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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Although menopause, that occurs between the ages of 44 and 55, is a natural phenomenon, the lower levels of estrogen after the reduced function of ovarian causes various psychological and physical disorders that Osteoporosis is one of the most problematic of these disorders, whose complications impose high costs on the society. 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. In perimenopausal periods, this need increases to 1200mg per day. Calcium-rich foods include low-fat dairy products, dark green vegetables Such as broccoli and spinach, sardines, salmon, nuts, beans, soya, and calcium drinks.

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. 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. Calcium deficiency will lead to osteoporosis that has 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. While, through changing the lifestyle and nutritional behavior of the people many of these problems can be prevented.

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. Understanding the psychological aspects of behavior can be a useful framework for the understanding of human behavior drivers in order to develop health programs, because the most effective training programs are based on the theoretical approaches and have been derived from the patterns of behavior changing.

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. 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 have been increased in the menopausal women by the trainings based on the health beliefs model constructs.
**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 ± 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 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 diary 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; in Shojaeizadeh’s study, this amount has been 800 mg and in the study conducted by Mossalanejad et al., this amount has been less than 1200 mg for about 67.7% of women. 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 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.

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**References**

1. Edmonds E, Turner L, Usdan S. Osteoporosis knowledge, beliefs, and calcium intake of college students: Utilization of the health belief model. Open J Prev Med 2012;2:27-34.
2. Pestei KH, Alame Z. Clinical Guide to the Implementation of Health Programs for Services Menopausal Women 45-60 Years Old. 1st ed. Tehran: Publications Poone; 2008. p. 7-28.
3. Norozi E, Mostafavi F, Hasanzadeh A, Moodi M, Sharifirad G. Factors related with quality of life among postmenopausal women in Isfahan, Iran based on behavioral analysis phase of PRECEDE model. J Health Syst Res 2011;7:267-77.
4. Fallahzadeh H, Age at natural menopause in Yazd, Islamic Republic of Iran. Menopause 2007;14:900-4.
5. Davari S, Dolatian M, Maracy MR, Sharifirad G, Safavi SM. The effect of a Health Belief Model (HBM)- based educational program on the nutritional behavior of menopausal women in Isfahan. Iran. J Health Promot 2010;10:1263-72.
6. Taherghorab Z, Sharifirad GH, Moody M. Nutrition in pregnancy, breastfeeding and menopause. j.tahghighat nezame salamat (persian) 2012;8:548-58.
7. Parsai S, Reza Soliani P. Mothers and Children Health. 1st ed. Tehran: Sanjesh Publication; 2008. p. 230-50.
8. Dennerstein L, Leher H, Buger HG, Guthrie JR. New finding from non-linear longitudinal modeling of menopausal hormone changes. Hum Reprod Update 2007;13:551-7.
9. Dolatian M, Baktiheh A, Afsharmoghadam F, Abadi A. Prevalence of menopausal symptoms at premenopausal period in Kermanshah city; Nursing and Midwifery. Journal of Shahid Beheshti School of Nursing & Midwifery Jnm 2005;15:53-60.
10. McLeod KM, McCann SE, Horvath RJ, Wactawski-Wende J. Predictors of change in calcium intake in postmenopausal women after osteoporosis screening. J Nutr 2007;137:1968-73.
11. Gibbs RS, Karlan BY, Haney AF, Nygaard IE. Danforth’s Obstetrics and Gynecology. 10th ed.: Lippincott Williams and Wilkins; 2008. p. 725-40.

12. Rabiei M, Akbari H, Dvati A, Moghaddamnia M. Investigate the factors that influence mood changes during and after menopause entourage around hospital affiliated with the university of Shahed. JOGI 2012;15:8-15.

13. Berek JS, Berek and Novack’s Gynecology. JanL.Shifren&Isaac Schiff; 15th ed; 2012. p. 1233-46.

14. Mossalanejad L, Shahsavari S. Calcium intake and bone mineral densitometry in patient referring to Shiraz Bone Densitometry Center (2003). JRUMS 2005;4:146-51.

15. Love Your Bones. Principal of Calcium Intake. Islamic Republic of Iran Ministry of Health Medical Deputy of Health, Endocrinology and Metabolism Research Institute;2011. p. 8-18.

16. Ahmadnea E, Mehdizadeh S. Mokhtari P. Association between calcium intake and body mass index in adolescent girls. JQUMS 2014;18:60-7.

17. Azadbakht L, Shirani F, Esmaeil Zadeh A. Dietry intake and habits of female students of Isfahan University of Medical Sciences. Isfahan, Iran. j.tahghighat nezame salamat (persian) 2012;8:876-86.

18. Abdoli S. Evaluation of Using Preventive Factors of Osteoporosis in Postmenopausal Women Referred to Health Centers Dependent to Tehran University of Medical Sciences. Thesis for M.Sc in Nursing Education, Faculty of Nursing and Midwifery. 2001.

19. Azar FE, Solhi M, Zohoor AR, Hosseini MA. The effect of health belief model on promoting preventive behaviors of osteoporosis among rural women of Malayer. JQUMS 2012;16:58-64.

20. Mahamed F, Karimzadeh Shirazi K, Pourmahmoudi AA, Mousavi AM. The effects of education on preventive behaviors toward osteoporosis based on behavior intention model (BIM) on female students. OAJI 2009;14:117-25.

21. World Health Organization. Global Health Risks Mortality and Burden of Disease Attributable to Selected Major Risks. Geneva: WHO; 2009.

22. Mehdi B. Physical inactivity and inactive life-style. Iranian Journal Endocrinology and Metabolism 2012;13:537-9.

23. Cano F. Epistemological beliefs and approach to learning: There change through secondary school and their influence on academic performance. Br J Educ Psychol 2005;75:203-21.

24. Kadivar P, Tanha Z, Farzad V. The Relationship between epistemological beliefs, learning approaches, reflective thinking and academic achievement. J Psychol 2012;16:251-65.

25. Al Seraty WH, Ali WG. The impacts of health belief model based intervention for osteoporosis prevention among female students in Al Dawadmi, Applied Medical Science, Shaqraa University, Saudi Arabia. JBAH 2014;4:125-31.

26. Rahimi T, Dehdari T, Ariaeian N, Gohari MR. Survey of breakfast consumption status and its predictors among Qom students based on the Pender’s health promotion model constructs. Iranian Journal of nst 2012;7:75-84.

27. Ghaffari M, Sharifirad GH, Akbari Z, Khorsandi M, Hassanzadeh A. Health belief model-Based education and reduction of cesarean among pregnant women: An interventional study. J Health Syst Res 2011;7:200–8.

28. Rafiei SH, Ahmadzad AS, Sharifi M. Systematic Health Education to Patients. 1st ed. published Mehr Avish: Mehr Ravish; 2005. p. 17-70.

29. Safari M, Shogaeizadeh D. Theories, Models and Methodology of Health Education, Health Promotion: Sobhan; 2009. p. 53-63.

30. Glanz KA, Rimer BA, Viswanath K. Health Behavior and Health Education Theory, Research and practice. 4th ed. San Francisco: Josey-Bass Publisher; 2008. p. 8-30.

31. Swaim RA, Barner JC, Brown CM. The relationship of calcium intake and exercise to osteoporosis health beliefs in postmenopausal Women. Res Social Adm Pharm 2008;4:153-63.

32. Alidosti M, Shahsavari S. Association between epistemological beliefs, learning approaches, reflective thinking and academic achievement. J Psychol 2012;16:251-65.

33. Alidosti M, Sharifi M, Hemate Z, Delaram M, Najimi A, Tavassoli E. The effect of education based on health belief model of nutritional behaviors associated with gastric cancer in housewives of Isfahan city. Daneshvar Med 2011;18:35-44.

34. Khorsandi M, Shamsi M, Jafari F. The effect of education based on Health Belief Model on osteoporosis preventive behaviors among postmenopausal women referred to Arak health centers. Daneshvar Med 2010;18:23-32.

35. Alidosti M, Shamsi M, Jafari F. The effect of education based on Health Belief Model on osteoporosis preventive behaviors among postmenopausal women referred to Arak health centers. Daneshvar Med 2010;18:23-32.

36. Alidosti M, Shamsi M, Jafari F. The effect of education based on Health Belief Model on osteoporosis preventive behaviors among second grade middle school girls in Isfahan. J Health Syst Res 2010;6:1-10.

37. Tussing L, Champan-Novakofski K. Osteoporosis prevention education: Behavior theories and calcium intake. J Am Diet Assoc 2005;105:92-7.

38. Alidosti M, Shamsi M, Jafari F. The effect of education based on Health Belief Model on osteoporosis preventive behaviors among postmenopausal Women. Res Social Adm Pharm 2008;4:153-63.

39. Alidosti M, Shamsi M, Jafari F. The effect of education based on Health Belief Model on osteoporosis preventive behaviors among postmenopausal Women. Res Social Adm Pharm 2008;4:153-63.

40. Alidosti M, Shamsi M, Jafari F. The effect of education based on Health Belief Model on osteoporosis preventive behaviors among postmenopausal Women. Res Social Adm Pharm 2008;4:153-63.

41. Alidosti M, Shamsi M, Jafari F. The effect of education based on Health Belief Model on osteoporosis preventive behaviors among postmenopausal Women. Res Social Adm Pharm 2008;4:153-63.

42. Alidosti M, Shamsi M, Jafari F. The effect of education based on Health Belief Model on osteoporosis preventive behaviors among postmenopausal Women. Res Social Adm Pharm 2008;4:153-63.

43. Alidosti M, Shamsi M, Jafari F. The effect of education based on Health Belief Model on osteoporosis preventive behaviors among postmenopausal Women. Res Social Adm Pharm 2008;4:153-63.

44. Alidosti M, Shamsi M, Jafari F. The effect of education based on Health Belief Model on osteoporosis preventive behaviors among postmenopausal Women. Res Social Adm Pharm 2008;4:153-63.

45. Alidosti M, Shamsi M, Jafari F. The effect of education based on Health Belief Model on osteoporosis preventive behaviors among postmenopausal Women. Res Social Adm Pharm 2008;4:153-63.

46. Alidosti M, Shamsi M, Jafari F. The effect of education based on Health Belief Model on osteoporosis preventive behaviors among postmenopausal Women. Res Social Adm Pharm 2008;4:153-63.

47. Alidosti M, Shamsi M, Jafari F. The effect of education based on Health Belief Model on osteoporosis preventive behaviors among postmenopausal Women. Res Social Adm Pharm 2008;4:153-63.

48. Alidosti M, Shamsi M, Jafari F. The effect of education based on Health Belief Model on osteoporosis preventive behaviors among postmenopausal Women. Res Social Adm Pharm 2008;4:153-63.

49. Alidosti M, Shamsi M, Jafari F. The effect of education based on Health Belief Model on osteoporosis preventive behaviors among postmenopausal Women. Res Social Adm Pharm 2008;4:153-63.

50. Alidosti M, Shamsi M, Jafari F. The effect of education based on Health Belief Model on osteoporosis preventive behaviors among postmenopausal Women. Res Social Adm Pharm 2008;4:153-63.