Original Article

Osteoporosis-Related Risk Factors and Health Beliefs of Women Who Are First-Degree Relatives of Turkish Nursing Students

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Abstract

Background: It is important to be aware of the risk factors, attitudes and behaviors about osteoporosis for the development of preventive health behaviors. The aim of study is to examine osteoporosis-related risk factors and health beliefs of women who are relatives of nursing students.
Methods: The study was descriptive and cross-sectional. The participants were 243 females who were first-degree relatives of nursing students attending a school of nursing. The data collection form that consist of questions aimed at determining the women's some socio-demographic characteristics and their risk of osteoporosis and "Osteoporosis Health Belief Scale" were used in the data collection.
Results: The mean age of the women participated in the study was 45.15±5.60. Women's osteoporosis health belief scale total score average was 141.64 ±15.11. Both mean subscale scores of the benefit of exercise (24.08 ± 4.00) and mean subscale scores of the benefits of calcium intake (23.56± 3.59) were found to be high mostly when considering average subscale scores of women.
Conclusion: It is important to raise women's awareness with educational programs about osteoporosis risk factors, symptoms, and prevention ways. Relevant interventions are required to planning and implementation of patient-centered.

Key Words: Osteoporosis, health belief model, nursing students, women.

Introduction

Nowadays life expectancy has extended by the developments in protective and therapeutic health services. On the other hand, while life expectancy is extending this reality brings new health, social, and economic problems together with it (Akalın et al., 2013). Osteoporosis is a disease that occurs as a result of a decrease in bone density. Its frequency is generally common among aged women (Kılıc, & Erci, 2007). It is also called a "silent thief" because it has no clear clue. When it has clues, these are mostly

decrease in body length, increase in back pain, and fracture (Burke et al., 2011).

Fracture experienced due to osteoporosis may lead to serious disability, even death, and cause economic disadvantages (Reginster & Burlet, 2006; Chen et al. 2012). The data reported by the International Osteoporosis Foundation (IOF) and the European Federation of Pharmaceutical Industry Associations (EFPIA) indicate that there are twenty-two million females and five million males with osteoporosis and that novice fracture is experienced in 3.5 million cases (Hernlund et

al., 2013). In the study called FRACTURK in Turkey with 26.424 people who were more than fifty-year age, researchers find that half of the participants experienced osteopenia, while one-fourth, osteoporosis (Tuzun et al., 2012). In another study on post-menopausal women in Turkey researchers find that 36.8% of the women have osteoporosis (Taskale & Sermez, 2010).

Fracture experienced due to osteoporosis may lead to serious disability, even death, and cause economic disadvantages (Reginster & Burlet, 2006; Chen et al. 2012). Some of the risk factors related to osteoporosis such as old age, ethnicity, family history, etc. cannot be externally controlled, but malnutrition, calcium scarcity, smoking, and other factors can be controlled (Burke et al., 2011; Taskale & Sermez, 2010). In order to avoid bone fracture and protect bone status, those with osteoporosis can adopt lifestyle changes and take other appropriate steps. Therefore, both health professionals and laymen should know the risk factors related to osteoporosis in order to develop necessary preventive behavior (Chang, 2006).

There are various psychosocial models that account for individuals' attitudes and beliefs affecting their health behavior. One of these models is the health belief model, which was developed in 1950 in the US. The model was originally developed to search for the causes of low participation in healthcare scanning and prevention programs. The model is commonly used to prevent diseases, and it accounts for individuals' preventive health behavior (Rosenthock, 1974).

In the studies that deal with awareness to osteoporosis, health professionals have found that individuals mostly have lower or medium levels of information about it (Chen Yang, et al., 2012; Gammage et al., 2012). In a gender comparison, osteoporosis information scores are higher for women than for men (Gammage et al., 2012). In another study researchers conclude that young females believe that they are at risk for osteoporosis and it is hard to avoid (Chang, 2006).

An improvement in public awareness of the definition of osteoporosis, its affects on health, and its risk factors is essential to make preventive health measures more common. Studying individuals' beliefs and behavior is necessary to reveal potential problem areas. There are various studies examining the awareness levels of individuals from different age groups, ethnicity, and gender (Shanthi Johnson et al,. 2008; McLeod et al., 2011). In addition, researchers in Turkey and other countries have analyzed undergraduate students' or nursing students' beliefs about osteoporosis (Eyigor et al. 2008; Durmus et al. 2009, Akalın et al. 2013). These studies mostly emphasize the role and significance of healthcare professionals in improving preventive health behavior. The current study deals with beliefs about osteoporosis in women who are first-degree relatives of Turkish nursing students of nursing students and tries to reveal whether or not their beliefs differ from the public's beliefs. The findings of the study are believed to guide the healthcare services planned to avoid osteoporosis.

Methods

Study Design

The study was designed as a descriptive and cross-sectional research.

Setting and sample

The study was carried out between February and March 2013. The participants were 243 females who are first-degree relatives of Turkish nursing students attending a school of nursing in Ankara, in Turkey. Total of 354 data collection forms were sent to the women. Response rate was 68.6%.

Ethical consideration

Necessary legal and ethical approvals were received from the ethical committee of the education and research hospital where the study was conducted (Number: GMMA1491-118-13/1648.4-403). Oral and written permission was obtained from the participants.

Measurements

The data of the study were collected through a data collection form developed by the authors based on a review of literature. The form includes some items about the socio demographic characteristics of the participants and about the risks factors of osteoporosis. It also contains an "osteoporosis health belief scale". The Osteoporosis Health Belief Scale (OHBS) was developed by Kim, Horan and Gendler in 1991 to measure the health beliefs about osteoporosis among individuals. The OHBS was adapted into Turkish by Kılıc and Erci, who

established its validity and reliability (Kılıç & Erci B, 2004). It is composed of 42 items and seven subscales, namely susceptibility perception, seriousness perception, benefits of exercises, benefits of calcium intake, barriers to exercises, barriers to calcium intake, and healthcare motivation. The minimum score in the scale is 42 and the maximum one is 210. Higher scores in the subscales of susceptibility and seriousness perception, benefits of exercise, and healthcare motivation mean the higher the levels of individuals' control of healthcare and of their preventive behavior against osteoporosis. The subscales of barriers to calcium intake and exercise refer to the fact that individuals perceive and are aware of these barriers. Therefore, higher scores in these subscales mean that individuals are not motivated to initiate preventive health behavior. The Cronbach alpha coefficient of the scale ranges between 0.71 and 0.82. In the adaptation study it was found to be between 0.79 and 0.94 (Kılıç & Erci B, 2004). In the current study the Cronbach alpha coefficient is found to be between 0.75 and 0.93.

Data collection

The aims of the study were explained to the students. Researchers gave information to the students how will receive verbal consent from participants. Data collection form was distributed to the students to take home. The personal characteristics of the participants and their names were kept secret.

Data Analysis

The data were analyzed through the use of the SPSS 15.0 (Student Package of Social Sciences, Inc. Chicago, IL, USA). The Kolmogorov-Smirnov test was used to evaluate the distributional features of the data. The Mann Whitney-U tests were employed in the descriptive statistical analyses based on the distributional characteristics of the data.

Results

Table 1 shows some of the participants' characteristics and the risk factors relating to osteoporosis. The mean age of the participants was 45.15±5.60. In regard to educational background, 71.2% of them are primary school graduates. In addition, 15.2% of them smoke, and 61.3% do exercise sometimes. Nutritionally, 65.0% of them consumed mostly vegetables and fruits, and 39.5% of them consume calcium and vitamin D in a systematic way. Concerning previous health problems, 10.7% (n=26) reported fractures, and 20.6% of them (n=50) reported fractures in family members. In regard to osteoporosis, 9.5% of them (n=23) have the disease, and 26.3% reported (n=64) that family members have it. In addition, 72.4% of the participants said they have information about osteoporosis.

Table 2 presents the participants' scores on the osteoporosis health belief scale. The mean total score was found to be 141.64 ±15.11. The highest mean subscale score was for the benefits of exercise (24.08 ± 4.00) and for the benefits of calcium (23.56± 3.59). The lowest mean subscale score was for barriers to calcium intake (13.98± 4.31) and barriers to exercise (16.86± 4.47).

A comparison of the participants' characteristics and their health beliefs about osteoporosis was showed in Table 3. The findings of the study revealed that there was no statistically significant correlation between some characteristics of the participants such as marital status, smoking, alcohol consumption, frequency of exercise, social security status, fracture history in the family, and scores on the health belief scale and its subscales. On the other hand, susceptibility scores of women aged more than 50 was higher than those of women aged lower than 49, and this difference was statistically significant (z= -3.16, p=.002). The latter group was found to have a higher level of barriers to exercise. Women have higher levels of susceptibility and a lower level of barriers to calcium intake if they were high school or university graduates (z= -2.03, p=.043; z= -2.19, p=.029, respectively).

Those women who consumed calcium and vitamin D were found to have higher mean scores in health motivation (z= -2.43, p=.015). In addition, those participants who regularly took calcium and vitamin D reported fewer barriers to exercise (z= -3.72, p<0.001), and those who have fracture history were found to have higher mean scores in health motivation (z= -2.56, p=.011).

Table 1. Some of the participants' characteristics and risk factors about osteoporosis (n = 243)

Characteristic	n	%
Age (Mean± Standart deviation)	45.15±5.60	
Marital Status		
Maried	228	93.8
Single	15	6.2
Education		
Primary school	173	71.2
High school and college	70	28.8
Exercise		
None	63	25.9
Sometimes	149	61.3
Usually	26	10.7
Always	5	2.1
Nutrition habits		
Lots of fruits and vegetables	158	65.0
Low- fiber, high- protein and fat	85	35.0
Alchool consumption		
Yes	3	1.2
Smoking		
Yes	37	15.2
Regular of Consumption Calcium and ve D vit		
Yes	96	39.5
Menaupose		
Yes	64	26.3
History of fracture		
Yes	26	10.7
History of fracture in family		
Yes	50	20.6
History of osteoporosis		
Yes	23	9.5
History of osteoporosis in family		
Yes	64	26.3
Having information about osteoporosis		
Yes	176	72.4
Having a bone densitometry scan		
Yes	39	16.0

Table 2. Women' Scores in Osteoporosis Health Belief Scale and Subscales

Osteoporosis of subscales	Mean	Standart deviation	Minimum	Maximum	The score range	Cronbach alfa
Susceptibility perception	19.84	3.73	6	30	6-30	0.79
Seriousness perception	20.51	4.04	6	30	6-30	0.81
Benefits of exercises	24.08	4.00	6	30	6-30	0.93
Benefits of calcium intake	23.56	3.59	6	30	6-30	0.88
Barriers to exercises	16.86	4.47	6	30	6-30	0.78
Barriers to calcium intake	13.98	4.31	6	29	6-30	0.87
Health care motivation	22.80	3.45	6	30	6-30	0.75
Total	141.64	15.11	78	195	42-210	0.87

Table 3. Comparison of Characteristics of the Participants and Their Health Beliefs about Osteoporosis

Characteristics	Susceptibility perception Median (Min-Max)	z-p	Seriousness perception Median (Min-Max)	z-p	Benefits of exercises Median (Min-Max)	z-p	Benefits of calcium intake Median (Min-Max)	z-p	Barriers to exercises Median (Min-Max)	z-p	Barriers to calcium intake Median (Min-Max)	z-p	Health-care motivation Median (Min-Max)	z-p
Age														
Lower than 49	19 (9-30)	z= -3.164 **P=.002**	21 (10-29)	z= -.258 P=.796	24 (6-30)	z= -.269 P=.788	24 (6-30)	z= -1.128 P=.259	16 (9-29)	z= -2.473 **P=.013**	13 (6-29)	z= -.944 P=.345	23 (9-30)	z= -1.184 P=.237
More than 50	22 (15-30)		21 (6-30)		24 (18-30)		18 (6-27)		18 (6-27)		13 (6-27)		23 (16-30)	
Education														
Primary school	19 (10-30)	z= -2.026 **P=.043**	21 (6-30)	z= -.896 P=.370	24 (6-30)	z= -1.868 P=.062	24 (6-30)	z= -.539 P=.590	17 (9-29)	z= -.813 P=.416	13 (6-29)	z= -2.187 **P=.029**	23 (9-30)	z= -1.390 P=.164
High school and college	20.5 (9-30)		22 (8-29)		24 (14-30)		23.5 (18-30)		16 (6-24)		12 (6-24)		23 (13-30)	
Regular of Consumption Calcium and Vit D														
No	20 (9-30)	z= -.864 P=.318	21 (6-30)	z= -1.169 P=.242	24 (12-30)	z= -,690 P=.490	24 (12-30)	z=- .997 P=.319	18 (6-29)	z= -3,719 **P=.000**	13 (6-29)	z= -1,475 P=.140	23 (12-30)	z= -2,427 **P=.015**
Yes	19.5 (10-30)		21 (11-29)		24 (6-30)		24 (6-30)		15 (9-29)		12 (6-29)		24 (9-30)	
History of fracture														
No	19 (9-30)	z= -1.680 P=.093	21 (6-30)	z= -1.035 P=.301	24 (6-30)	z= -.634 P=.526	24 (6-30)	z= -1.582 P=.114	17 (6-29)	z= -1.415 P=.157	13 (6-29)	z=- .359 P=.719	23 (9-30)	z= -2.555 **P=.011**
Yes	21 (13-26)		22 (11-29)		24 (14-30)		24 (19-30)		15 (9-29)		13 (6-27)		24 (17-30)	
Menapouse														
No	19 (9-30)	z= -1.957 P=.050	21 (6-30)	z= -.348 P=.728	24 (6-30)	z= -.301 P=.764	24 (6-30)	z= -3.277 **P=.001**	16 (9-29)	z= -1.995 **P=.046**	13 (6-29)	z=- .409 P=.683	23 (9-30)	z= -2.388 **P=.017**
Yes	20 (13-30)		21 (8-30)		24 (12-30)		24 (17-30)		18 (6-29)		13 (6-29)		24 (16-30)	
History of osteoporosis														
No	19 (9-30)	z= -4.453 **P<0.001**	21 (6-30)	z= -.514 P=.607	24 (6-30)	z= -.202 P=.840	24 (6-30)	z= -1.749 P=.080	16 (6-29)	z= -3.089 **P=.002**	13 (6-29)	z= -2.091 **P=.037**	23 (9-30)	z= -.130 P=.896
Yes	23 (16-30)		22 (12-27)		24 (21-30)		24 (21-30)		19 (9-28)		15 (7-27)		23 (13-29)	
History of osteoporosis in family														
No	19 (9-30)	z= -4.840 **P<0.001**	21 (6-29)	z= -.695 P=.487	24 (6-30)	z= -.695 P=.487	24 (6-30)	z= -.018 P=.986	16 (6-29)	z= -1.289 P=.197	13 (6-29)	z= -1.267 P=.205	23 (9-30)	z= -.116 P=.908
Yes	22 (13-30)		21 (11-30)		24 (14-30)		24 (13-30)		18 (9-28)		13 (6-27)		23 (13-30)	
Having information about osteoporosis														
No	20 (12-28)	z= -.811 P=.417	21 (12-29)	z= -.295 P=.768	24 (6-30)	z= -1.804 P=.071	23 (6-30)	z= -1.889 P=.059	16 (9-29)	z= -.530 P=.596	13 (6-23)	z= -.480 P=.631	22 (9-30)	z= -3.286 **P=.001**
Yes	20 (9-30)		21 (6-30)		24 (11-30)		24 (12-30)		17 (6-29)		13 (6-29)		23 (12-30)	
Having a bone densitometry scan														
No	19 (9-30)	z= -2.589 **P=.010**	21 (6-30)	z= -.059 P=.953	24 (6-30)	z= -1.374 P=.170	24 (6-30)	z= -2.625 **P=.009**	17 (9-29)	z= -.936 P=.349	13 (6-29)	z= -1.332 P=.183	23 (9-30)	z=- 3.875 **P<0.001**
Yes	21 (12-30)		20 (8-30)		24 (17-30)		24 (18-30)		18 (6-26)		12 (6-27)		24 (18-30)	

Z= Mann-Whitney U Test

Menopausal women have higher mean scores in health motivation (z= -2.39, p=.017), the benefits of calcium (z= -3.28, p=.001), and barriers to exercise (z= -1.99, p=.046). Women with osteoporosis history have statistically higher mean scores in susceptibility (z= -4.45, p=0.001), barriers to calcium, (z= -2.09, p=.037), and barriers to exercise (z= -3.09, p=.002). In addition those women whose family members have an osteoporosis history were found to have higher levels of susceptibility (z= -4.84, p=0.001), and those with information about osteoporosis were found to have higher levels of health motivation (z= -3.29, p=.001). Those women who were subject to bone densitometer process have higher mean scores in susceptibility (z= -2.59, p=.010), and health motivation (z=-3.88, p<0.001) in contrast to those who were not, and this difference is statistically significant.

Discussion

Osteoporosis is one of the most harmful public health problems, and nurses have significant roles to play in this regard. The current study deals with beliefs about osteoporosis of women who are first-degree relatives of nursing students and tries to reveal whether or not their beliefs differ from public beliefs. The data collection tool used in the study, OHBS, has high Cronbach alpha values. The scale also has high values in other studies carried out in various cultures (Sayed-Hassan et al., 2013).

In this study, the participants' mean scores are higher in the subscales of the scale, namely the benefits of exercise, the benefits of calcium, health motivation, and seriousness and susceptibility. However, participants' mean score in barriers to exercise is at the median, and in barriers to calcium intake the score is lower. McLeod and Johnson (2011) carry out a systematic review of literature. They identify common score ranges for the OHBS and find that the mean score for susceptibility is between the lower range and the median; for seriousness, between the median and the higher range; for the benefits of calcium and exercise, high; for the barriers to calcium intake and exercise, low; and for health motivation, between the median and the higher range (McLeod & Johnson, 2011). Both total scores and subscales scores of the current sample are higher than those reported in the literature (McLeod et al., 2014). Since the participants are first-degree relatives of nursing

students, their awareness about osteoporosis could be higher.

In the study, those women aged more than 50 have higher levels of susceptibility and barriers to exercise. Similarly, in the related literature we find that women and men aged more than 45 have higher levels of osteoporosis susceptibility and seriousness perception, and they also have a higher level of barriers to calcium intake and exercise (McLeod & Johnson, 2011). In another study, young women aged 25 to 45 have a lower awareness about the seriousness of osteoporosis. The authors conclude that these women think that preventive steps against osteoporosis are less effective (Chang, 2006). In a study in Taiwan, young people have medium levels of information about osteoporosis, and they rarely exhibit preventive behavior. In the same study, there is no significant correlation between information about osteoporosis and attitudes towards it and preventive behavior (Chen et al., 2012). In another study, young and aged women and men were compared, and the aged individuals have higher levels of susceptibility towards osteoporosis (Shanthi Johnson et al., 2008). The findings in other studies and in the current study of women aged more than 50 are interesting. Therefore, barriers to exercise should be investigated in detail, and healthcare personnel should assist in the development and implementation of individual exercise programs (Ryan et al., 2013).

In the study carried out by Plawecki and Chapman-Novakofski, a bone health program was developed based on a health belief model, and the researchers find that the Theory of Reasoned Action positively contributes to the calcium and vitamin D intake by aged people (Plawecki & Chapman-Novakofski, 2013). Such preventive health behaviors as a diet rich in calcium and vitamin D and exercise may prevent individuals from osteoporosis if these are a regular part of their lifestyles. Research suggests that more educated women have higher levels of susceptibility and a lower level of barriers to calcium intake, and at least three-fourths of them have information about osteoporosis.

Chang argues that there is a correlation between women's educational background and calcium intake (Chang, 2006). Similarly, in the current study those women who consume vegetables and fruits rich in fiber and calcium and vitamin D regularly, as well as those women who have

information about osteoporosis, have higher levels of health motivation. In another study, health professionals predict that young people with information about osteoporosis would have a higher level of calcium consumption (Gammage et al., 2011). In another study, the author investigates the effects of educational background on osteoporosis using the Health Belief Model. The study concludes that the subjects' scores in susceptibility, seriousness perception, benefit perception, and obstacle perception become higher following training (Shojaeizadeh et al., 2012). Therefore, health behavior modification training aiming at improving bone health can lead to permanent changes in the lifestyles of women when it is administered in a patient-centered way (Ryan et al., 2013). In the current study, the author believes that since the participants are first-degree relatives of nursing students, their awareness about osteoporosis and their health motivation are higher.

The findings of this study show that health motivation and health beliefs about the benefits of calcium among the menopausal women are higher. In addition these participants have a higher level of barriers to exercise. Given that most of these women are aged more than 50, this level seems to stem from their age. In the post-menopausal women, regular calcium and vitamin D intake and physical exercise decrease bone loss and fracture and inhibit primary osteoporosis. However, Rizzoli, Abraham, and Brandi reports that calcium and vitamin D consumption among these women is not sufficient. In this regard, some foods including milk can be produced in ways to enrich their calcium content (Rizzoli et al., 2014).

Exercise is a step to maintain a healthy life because it reinforces bone mass and strengthens bone. For osteoporosis exercises with weight bearing (like walking, climbing stairs, tennis, and dancing), aerobics as well as water exercises are useful (Demirdal, 2012). In another study carried out by Naharcı et al., the authors determine that osteoporosis is less prevalent in older men who have regular physical activity (Naharcı et al., 2010). In a study of the effects of 12-week aerobics program on bone mass in lumbar and the femur among obese post-menopuasal women, those women who did these exercises had significantly increased bone mass in the femur (Behestani, 2012). However, before

using such programs, barriers should be analyzed.

In the current study, those participants who have an osteoporosis history or those whose family members have an osteoporosis history have higher levels of susceptibility. Similar findings are reported in other studies (Chang, 2006; Werner et al., 2003; Nayak et al., 2010; Endicott 2013). Among post-menopausal women, osteoporosis history in family or osteoporotic fracture history are risk factors related to their development of the disease (Ozdemir et al., 2006). Women whose family members have an osteoporosis history should be given guidance in early diagnosis and treatment, and they should be observed by healthcare professionals. In addition, individuals should be encouraged to engage in exercise since it has positive effects on bone health. Nurses may provide such health education programs.

This study has some limitations. One of the them is that the findings of the study cannot be generalized since its sample is limited. Another limitation is that the calcium and vitamin D intake of the women was evaluated through a dichotomous question. In addition, the data collection tool used in the study does not include any items about perceptions to vitamin D intake. In future studies, calcium and vitamin D intake among women can be evaluated through more objective tools, and beliefs about vitamin D intake should be analyzed.

Conclusion

The findings of the study suggest that information about osteoporosis increases women's awareness and, therefore, influences their health beliefs. Therefore, in the prevention of osteoporosis, a condition that causes deterioration of health and life quality of women, healthcare professionals have a responsibility that starts even when they are students to promote protective health behaviors in themselves and in others. Training programs can be employed to increase awareness in women about osteoporosis-related risk factors and necessary steps. Such interventions should be patient-centered. It is important to raise women's awareness with educational programs about osteoporosis risk factors, symptoms, and prevention ways. Relevant interventions are required to planning and implementation of patient-centered.

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