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OSTEOPOROSIS HEALTH BELIEF, KNOWLEDGE LEVEL AND RISK FACTORS IN INDIVIDUALS WHOSE BONE MINERAL DENSITY WAS REQUIRED

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ABSTRACT

Aim: This descriptive-relational study aims to identify osteoporosis health belief, knowledge level and risk factors in individuals whose bone mineral density was required.

Method: Target population of the study was 110 men and 126 women aged 35 and over, who applied to Atatürk University Aziziye - Yakutiye Research Hospital Nuclear Medicine Center Bone Densitometer Unit between January 2010 and October 2010. No sampling was performed, the whole target population was involved in the study. Data were collected through the Personal Information Form that included socio-demographic features, the osteoporosis health belief scale, the osteoporosis self-efficacy scale and the osteoporosis knowledge test.

Results: The osteoporosis health belief score of the participants was 139.99±14.79, osteoporosis knowledge score was 10.06±4.30, and osteoporosis self-efficacy score was 742.00±213.44. Among osteoporosis health beliefs, women's susceptibility, seriousness, barriers of exercise, and barriers of calcium mean scores were found to be higher than those of men ($p<0.001$). Men's osteoporosis self-efficacy scale and sub-dimensions mean scores were found to be higher in comparison to women ($p<0.001$). DEXA analysis results show that 57.1% of the women and 27.3% of the men were diagnosed with osteoporosis.

Conclusion: According to the Logistic regression analysis that aimed to identify the risk factors having roles in Osteoporosis diagnosis, the affecting risk factors were gender, age, and medicine use. As for women, logistic regression analysis showed that the risk factors were education level – being illiterate, medicine use, osteoporosis story in family, and 4 or more deliveries.

Keywords: osteoporosis health beliefs, osteoporosis knowledge test, osteoporosis self-efficacy, osteoporosis risk factors

INTRODUCTION

Osteoporosis is defined as decreased bone density that is accompanied by the deterioration of the microstructure of the bone tissue. Significant decrease in the circulation of estrogen and progesterone in the postmenopausal period causes an increase in bone resorption, negative calcium balance, and loss of bone volume. Clinical diagnosis is made through bone mineral density measurements (T-score of below -2.5) and osteoporosis and break story in the bones.[1,2]

As it affects both men and women, osteoporosis is acknowledged as an important public health problem which is common worldwide. Because women have longer length of life and smaller bones in comparison to men, and because bone mass losses increase after menopause, this disease is more common in women than men. However, due to risks of breaks in men with the increase in their age, Osteoporosis is encountered as a serious public health problem in men, as well.[3,4]

Besides, it is known that nearly one third of all osteoporotic fractures in the world have happened in men since 2000, and 45% of all fractures were in areas that are frequently affected by osteoporosis. Osteoporosis prevalence in the United States of America is reported to be between 13 to 18% in women aged 50 and over and 3 to 6 % in men aged 50 and over; mortality rates were found to increase in men too, especially following a hip fracture. Besides, disability is reported to increase in men following a hip fracture. For these reasons, early osteoporosis diagnosis and treatment in men have been increasingly important, and those who are at risk are recommended to have bone mineral density (BMD) screening.[5,6,7]

DEXA measurement is an important standard for osteoporosis diagnosis and treatment. It has an important place in the prevention of fractures, which is an important consequence of osteoporosis diagnosis and treatment.[8] It is reported that for osteoporosis diagnosis and fracture risk evaluation, it would be more effective to investigate osteoporosis risk factors and to assess bone mineral density with DEXA.[9]

Due to its morbidity and mortality, hip fracture is the most feared osteoporosis symptom. Osteoporotic hip fracture risk has been increasing in our country and in Europe. In their study on fractures, Tüzün et al. found that almost half of the people aged over 50 had osteoporosis, one fourth had osteoporosis, and hip fracture rates increased over the years. In our country, the number of people who experienced hip fracture was 24.000 in 2010, and it is expected to reach up to 36.000 in 2020.[10]

In 2010, a total number of 27.5 million people aged between 50 and 84 (5.5 million men and 22 million women) were diagnosed with osteoporosis In Europe, and the number of those diagnosed with osteoporosis is expected to reach up to 33.9 million in 2025. Besides, 3.5 million fractures were reported to have happened. Of these, 620.000 were hip fractures, 520.000 were vertebra, 560.000 were wrists, and 1.800.000 were in other areas of the body.[11] Again, in 2010 approximately 10.2 million people were diagnosed with osteoporosis in the United States of America. Of these, 8.2 million were found to happen in women and 2 million in men. 27.3 million women and 16.1 million men were diagnosed with osteoporosis. Besides, 1 in 3 women and 1 in 5 men in the world and 1 in 2 women and 1 in 5 men in the USA experience bone fracture due to osteoporosis at any stage of their lives.[12,13]

Given that the world's population is getting older, it is clear that the osteoporosis problem will grow gradually. For this reason, it will be of great importance to have early diagnosis of

osteoporosis, to identify the risk factors, and to have sufficient knowledge to prevent the development of the disease with the necessary life changes. In this regard, it is very important to assess osteoporosis health beliefs, osteoporosis self-efficacy perception, osteoporosis knowledge, and the risk factors for osteoporosis, which are assumed to be the initiators of osteoporosis-preventive behaviors.[8,14,15]

Osteoporosis Health Belief Model forms a base for changing and evaluating health beliefs, behaviors, and information about osteoporosis to prevent the illness. It is a factor that encourages individuals to avoid negative health behaviors and gain positive health behaviors. It has been reported that osteoporosis prevention education programs that aim to increase osteoporosis health perceptions (Susceptibility and seriousness perception) and perceived benefits and motivations, and decrease perception of obstacles could be effective in providing positive health behaviors.[16,17]

Research supports knowledge as a cognitive determinant in changing behaviors and preventing various chronic illnesses and reducing risks. Accordingly, osteoporosis exercise knowledge has been shown to be a cognitive determinant of exercise self-efficacy perception. In addition, osteoporosis prevention education, which includes cognitive and behavioral processes, has been shown to increase osteoporosis knowledge, osteoporosis health beliefs, self-efficacy perception and osteoporosis-preventive health behaviors.[17,18,19]

Osteoporosis is a clinical case that occurs due to multi-factorial reasons. Methods for defining the osteoporosis risk are needed because it is difficult to diagnose the disease before complications appear. One of the easiest methods is the identification of the risk factors. Some of the risk factors for osteoporosis are; Racial and genetic characteristics, gender, age, low body mass index, late menarche, early menopause, amenorrhea story, fracture story due to osteoporosis in the individual or family, insufficient sunlight exposure, calcium-poor and protein- rich diet, smoking, alcohol and coffee consumption, sedentary lifestyle, chronic diseases, cognitive function, medicine use that has effects on mood disorders and bone metabolism.[3,8,20,21]

With their modern educator roles in the health protection and improvement of this fragile population under osteoporosis risk, nurses who provide primary health care have important roles for the greater aim of creating a healthy society and achieving health goals. In this regard, it is important to identify osteoporosis risk factors, knowledge level, and health beliefs and raise awareness of osteoporosis.[14,16]

Results of the present study are considered to enable to identify studies on osteoporosis and serve as a guide by increasing awareness of nurses working in this field.

METHODS

Design and Sample

Target population of the study was 110 men and 126 women aged 35 and over, who applied to Atatürk University Aziziye - Yakutiye Research Hospital Nuclear Medicine Center Bone Densitometer Unit between January 2010 and October 2010. No sampling was performed, the whole target population was involved in the study.

Measures

Data were collected through the Personal Information Form that included socio-demographic features, The Osteoporosis Health Belief Scale, the Osteoporosis Self-Efficacy Scale and the Osteoporosis Knowledge Test.

1. Osteoporosis Health Belief Scale

Turkish adaptation, validity and reliability of the Osteoporosis Health Belief Scale developed by Kim et al[22]. was performed by Kılıç and Erci[23] . Cronbach's alpha value of the 7-dimension scale developed by Kim et al[22]. was found between 0.71 and 0.82. Kılıç and Erci[23] found the Cronbach's alpha reliability coefficient between 0.79 and 0.94. It was found between 0.70 and 0.94 in the present study. Osteoporosis Health Belief Scale was developed with a view to measuring health beliefs in relation to osteoporosis.

2. Osteoporosis Self-Efficacy Scale

Osteoporosis Self-Efficacy Scale (OSES): Turkish adaptation, validity, and reliability of the Osteoporosis Self-efficacy Scale developed by Kim et al.[22] was performed by Kılıç and Erci[23]. Cronbach's alpha value of the scale developed by Kim et al.[22] is between 0.96 and 0.98. Cronbach's alpha reliability coefficient was found between 0.96 and 0.98 in the study conducted by Kılıç and Erci[23]. It was found between 0.97 and 0.99 in the present study. Osteoporosis Self-Efficacy Scale Turkish form aims to identify the perceived confidence level in relation to calcium intake and weight bearing exercises in order to prevent osteoporosis.

3. The Osteoporosis Knowledge Test

Turkish adaptation, validity, and reliability of the Osteoporosis Knowledge Test developed by Kim et al.[22] was performed by Kılıç and Erci[23]. Kim et al.[22] found the reliability co-efficiency of the Osteoporosis Knowledge Test (KR-20) between 0.69 and 0.72. Kılıç and Erci [23] found the reliability coefficient (KR - 20) as 0.79. Total (KR-20) reliability coefficient was found 0.81 in this study. The Osteoporosis Knowledge Test Turkish form aims to assess osteoporosis knowledge in relation to various issues such as calcium intake, exercise and activity levels to prevent osteoporosis.

Data Collection

The data were collected by the researchers through one to one interview before the participants' DEXA measurements were performed. Following the DEXA measurements, the participants' DEXA results were recorded in the data collection form.

Analysis of the Data

All the collected data were evaluated using SPSS package program. The data were analyzed in computer, using frequency, percentage, standard deviation, t-test, analysis of variance (ANOVA), chi-square analysis, Spearman Brown Correlation analysis, Binary Logistic Regression Analysis and Hosmer-Lemeshow analysis methods.

Ethical Consideration

Official permission and Ethical Committee Approval were obtained prior to the study. As involving human beings in the study requires the protection of individual rights, "Informed Consent" requirement was met as an ethical principle. The purpose, plan and benefits of the study were explained to the individuals who met the research criteria, and they were asked whether they were willing to participate in the study. The study was started after their consent was obtained.

RESULTS

Average age of the participants was found 53.1±12.9. Of all the participants, 53.4% were female, 46.6% were male, and 34.7% were literate. The participants' Osteoporosis Health Belief (139.99±14.79), Osteoporosis Knowledge (10.06±4.30), and Osteoporosis Self-Efficacy (742.00±213.44) mean scores were found to be low (see Table 1,2,3).

Table 1 Comparison of Health Belief Scale Mean Scores according to Gender

Health Belief Scale	Female X±SD	Male X±SD	t	p
Susceptibility	21.99±5.46	17.67±5.58	6.005	**0.000**
Seriousness	23.33±5.86	20.65±6.34	3.362	**0.001**
Benefits of Exercise	21.27±5.14	22.38±4.61	-1.740	0.083
Benefits of Calcium	22.98±3.16	22.22±3.84	1.662	0.098
Barriers of Exercise	21.02±4.52	17.67±4.64	5.601	**0.000**
Barriers of Calcium	14.85±5.04	12.89±3.06	3.543	**0.000**
Health Motivation	22.12±3.36	20.02±3.61	0.450	0.653
Total	145.65±13.58	133.51±13.44	6.885	**0.000**

Table 2 Comparison of Osteoporosis Self-efficacy Mean Scores according to Gender

Osteoporosis Self-efficacy Scale	Female X±SD	Male X±SD	t	p
Exercise Self-efficacy	264.08±140.01	355.73±150.59	-4.843	**0.000**
Calcium Self-efficacy	416.18±119.49	457.00±99.43	-2.828	**0.005**
Total	680.26±211.44	812.73±193.63	-4.992	**0.000**

Table 3 Comparison of Osteoporosis Knowledge Test Mean Scores according to Gender

Osteoporosis Knowledge Test	Female X±SD	Male X±SD	t	p
Exercise Knowledge Test	5.77±3.35	6.30±3.21	-1.236	0.218
Calcium Knowledge Test	6.65±2.84	6.27±2.81	1.025	0.306
Total	9.86±4.36	10.30±4.23	-0.789	0.431

Comparison of the Health Belief scale mean scores of the participants according to gender revealed that Susceptibility, Seriousness, Barriers of Exercise and Barriers of Calcium Intake mean scores of women was higher in comparison to men ($p<0.001$). Osteoporosis Self-Efficacy scale and sub-scales mean scores of men were found to be higher in comparison to women ($p<0.05$). Comparison of the Osteoporosis Knowledge Test mean scores according to gender revealed that there were no statistically significant differences between women's and men's Osteoporosis Knowledge Test mean scores. Osteoporosis Knowledge levels were found to be low in both female and male participants. DEXA results show that 57.1% of women and 27.3% of men were diagnosed with Osteoporosis ($p<0.001$, see Table 4).

Table 4 Comparison of Dexa Results according to Gender

Dexa Results	Female		Male		Total		Significance
	S	%	S	%	S	%	
Normal	18	14.3	32	29.1	50	21.2	X^2=21.94 S.D=2 P=0.000
Osteopenia	36	28.6	48	43.6	84	35.6	
Osteoporosis	72	57.1	30	27.3	102	43.2	
Total	**126**	**100**	**110**	**100**	**236**	**100**	

Of all the participants, 10.6% had Osteoporosis story in their family, 58.9% used medicine that could cause Osteoporosis, 20.3% used cortisone for a long time, 60.2% did not have sufficient calcium intake, and 67.8% did not have physical activity (see Table 5).

Table 5 Distribution of the Features in relation to Osteoporosis Risk Factors

Osteoporosis Risk Factors	Yes		No	
	S	%	S	%
Osteoporosis story in family	25	10.6	211	89.4
Hip fracture story in family following a slight bump or fall	6	2.5	230	97.5
Fracture story in the individual following a slight bump or fall	34	14.4	202	85.6
Excessive drinking on a regular basis	5	2.1	231	97.9
Smoking more than 20 cigarettes daily	57	24.2	179	75.8
Sufficient Calcium Intake	94	39.8	142	60.2
Cortisone use for more than three months	48	20.3	188	79.7
Medicine Use (Medicine use that could cause Osteoporosis)	139	58.9	97	41.1
Physical activity	76	32.2	160	67.8
Going through menopause before 45	46	19.5	50	21.2
HRT use	20	8.5	106	44.9

Among Osteoporosis prevention behaviors, there was no difference between men and women in terms of calcium intake ($p>0.05$), but exercising as an Osteoporosis preventive behavior was found to be higher in men than women ($p<0.05$). Logistic regression analysis that aims to identify the risk factors having effects on osteoporosis indicates the risk factors as gender, age, and medicine use. Logistic regression analysis performed according to gender indicates the affecting risk factors as low education level, medicine use, osteoporosis story in family, and four or more deliveries.

DISCUSSION

Osteoporosis is seen in both males and females, and it is a disease which has a gradually increasing prevalence in society. In addition, the cost of osteoporosis and investment and labor loss for the

treatment of osteoporosis-related bone fractures has become a major problem in the agenda of countries. For this reason, risk factors should be identified before the disease develops, and the community should be trained and counseled accordingly.[24]

OKT and HBS are commonly used questionnaires in the identification of osteoporosis knowledge, and awareness and measurement of the changes after training [15]. Turkish adaptation, reliability, and validity of these questionnaires developed by Kim et al. [22] was performed by Kılıç and Erci. [23] In the present study, we aimed to identify the participants' Osteoporosis Belief and knowledge level through these scales. An analysis of the studies on osteoporosis belief, knowledge, and awareness levels indicates that Altın et al. [15] conducted a study with 96 females and 51 males and Kimberley et al. [25] involved university students (176 males, 351 females); they both found that susceptibility and seriousness perceptions were higher in female participants in comparison to males. The present study also revealed that comparison of health belief mean scores according to gender indicated female participants' higher susceptibility and seriousness perceptions in comparison to male participants. This case might result from female participants' seeing themselves at risk and showing awareness of this disease and worrying about having it. Besides, women's barriers of exercise and barriers of calcium were found to be higher than those of men. Kimberley et al. [25] and Doheny et al. [26] found that barriers of exercise and barriers of calcium were higher in women than men. This case might be explained with the differences in exercise, diet and nutrition habits between the genders. The present study also found that Susceptibility, Seriousness, Barriers of Exercise, and Barriers of Calcium mean scores were significantly higher. In their study conducted with premenopausal women, Kılıç and Erci [16] found that while Seriousness, Barriers of Exercise, Barriers of Calcium and Health Motivation mean scores were statistically significant, Susceptibility perception was not statistically significant.

Comparison of Osteoporosis Self-Efficacy mean scores indicates that male participants had higher exercise self-efficacy, calcium self-efficacy and total self-efficacy mean scores in comparison to female participants. [14,17,18] The researchers indicated that women's osteoporosis self-efficacy behaviors were low. Self-efficacy perceptions are affected in various degrees by such factors as an individual's feeling close to the disease, seeing self at risk group, and receiving encouragements and advice about achieving or not. [27] In line with this information, female participants' low self-efficacy perceptions could be associated with their beliefs and motivation.

Majority of the studies that assess osteoporosis indicates that osteoporosis knowledge level is very low. [14,15,28,29] The present study also found that knowledge test mean score was low. Besides, studies that investigate the relationship between osteoporosis knowledge level and education reported that awareness of osteoporosis was significantly higher in educated individuals. Similarly, various studies on the issue found that participants with low education level had low osteoporosis knowledge.[25,29,30,31] Çıtıl et al. [19] found that awareness of osteoporosis diagnosis methods and knowledge about the fatal nature of the disease increase with the increase in education level. Robitaille et al. [32] found that 6.9 % of those who were educated for 12 years and more were diagnosed with osteoporosis while this proportion was 10.1% in those who were educated for less than 12 years.

An analysis of DEXA results according to gender indicated that the

difference between males and females was statistically significant and 57.1% of the women and 27.3% of the men in this study were diagnosed with osteoporosis. More than half of the 120 women in our study who applied to Bone Densitometer Unit (57.1%) were diagnosed with osteoporosis. Osteoporosis prevalence was found 16.2% in the study conducted by Demir et al. [33] with 2769 postmenopausal women, 34.8% in the study conducted by Robitaille et al. [32] with 3568 people, 21.3% in the study conducted by Kutlu et al. [21] with postmenopausal women, and 10.8 % in the study conducted by Gemalmaz et al. [34] In another study conducted in Europe and North America, 6% of men and 21 % of women aged between 50 and 84 were found to have osteoporosis. In their study conducted with 209 males, Naharcı et al. [35] reported osteoporosis prevalence as 30.6%. In their study conducted with 649 male participants with an average of 69 years, Özdemir et al. [6] classified 12.6% of the participants as osteoporotic. Comparison of the aforementioned study results with this finding indicates that osteoporosis prevalence was higher in the participants of this study. This case might have resulted from the fact that the study was conducted in a Bone Densitometer Unit. Reasons for less osteoporosis prevalence in men include short life expectancy in men, high peak bone mass and absence of a phenomenon like lack of estrogen that accelerates bone destruction. Women have longer length of life, smaller bones, and more bone mass loss than men, which causes the risk of osteoporosis. [3,8,20,21,29] This study also reported that female participants had more osteoporosis diagnosis than male participants.

Osteoporosis prevalence is reported to be higher in women who have osteoporosis story in family. Robitaille et al. [32] reported that 34.8% of the women with osteoporosis had at least one person with osteoporosis in their family, and 18.5% of those who did not have osteoporosis had someone with osteoporosis in their family. Pınat et al. [3] found that osteoporosis was higher in those who had osteoporosis story in their family. Altın et al. [15] reported that osteoporosis story was lower in the male group, both in the males themselves and in their families. Osteoporosis story was found to be higher in the female group, both in the females themselves and in their families. In this study, there was a significant relationship between osteoporosis story and bone mineral density.

Due to the increased calcium need, there is an increased bone loss in pregnancy. Although there is an increase in calcium absorption as an adaptation mechanism, there is also an approximately 3 % decrease in the bone mass. A study that investigated the relationship between number of deliveries and bone mineral density reported that femur neck did not affect the mineral density, but vertebra, trochanter and Ward's triangle BMD was found to be lower. [36] Studies conducted by Odabaşı et al. [37] and Umay et al. [8] reported that 5 or more deliveries were associated with osteoporotic fracture. The present study also found that four and more deliveries was an associated risk factor. However, Kutlu et al. [21] reported that there was no such relationship.

Some medicines, particularly corticosteroids, antiepileptic and diuretics, could accelerate osteoporosis development. In their study conducted with postmenopausal women aged over 45, Pınar et al. [3] found that 20.9% of women used medicine that could increase osteoporosis risk. Umay et al. [8] also indicated that medicine use had effects on bone mineral density. In their study conducted with 1000 female patients, Karahan et al [38] revealed the use of drugs affecting bone metabolism (proton pump

inhibitors, beta blockers, selective serotonin reuptake inhibitors (SSRIs), antacid medicine containing aluminum, systemic steroids, loop diuretics, thyroid hormones, methotrexate, aromatase inhibitors, warfarin, anticonvulsant drugs, antidiabetic drugs in the tiazolidinedione group, Immunosuppressive), which are the medicine groups with identified effects on bone metabolism. Again, Onat et al. [2] and Cosman et al. [12] found that BMD values were higher in patients who used steroid, cyclosporin, diuretic, anticoagulant, and anticonvulsant drugs, which constitute a risk factor for osteoporosis in comparison to patients who did not use these medicines. The present study also identified medicine use on bone mineral density.

LIMITATION OF THE STUDY

This study was limited with individuals who applied to the Nuclear Medicine Center Bone Densitometer Unit in only one hospital. In this regard, the study results can be generalized only to this group.

CONCLUSION

In conclusion, the participants' osteoporosis knowledge, health belief and preventive behaviors were found to be low in the present study. According to DEXA results, women received more osteoporosis diagnosis in comparison to men. Osteoporosis risk factors included gender, age, and medicine use. It is important to increase osteoporosis knowledge levels in elderly generation, in young people who have not reached peak bone mass yet, and particularly in elderly women who form an important risk group. This way, it could be possible to take protective precautions. In this regard, training programs should be organized with a view to increasing the awareness of the community on this issue. Initiatives should be planned with a view to realizing health beliefs and behaviors. Osteoporosis risk factors should be identified at early periods and preventive precautions should be taken. Solution to the problem could be provided by giving protective trainings, identifying risk groups through screening, and referring patients to hospitals for diagnosis and treatment.

Declaration of Conflicting Interest

None declared.

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Authorship Contribution

Authors equally contributed in this study.

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