

Related Factors and Osteoporosis Health Beliefs and Self-Efficacy of Women

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Abstract

Objective: This study was conducted to determine osteoporosis health beliefs and self-efficacy of Turkish women and to investigate the relationship between women's characteristics with osteoporosis health beliefs and self-efficacy.

Methods: The study was planned as descriptive and cross-sectional study design. A convenience sample of 296 volunteer women who applied to the outpatient clinic of one public hospital was recruited. Data were collected via a questionnaire form, the Osteoporosis Health Belief Scale (OHBS) and the Osteoporosis Self-Efficacy Scale (OSES). The questionnaire form and scales were completed by the participants. Since the scales used self-reports, the inclusion criteria of this study required participants to be primary school graduates and being 18 age.

Results: The participants' OHBS subscales average scores were susceptibility, 18.53±4.74; seriousness, 14.68±4.46; benefits of exercise, 23.82±5.06; benefits of calcium intake, 22.12±4.63; barriers to exercise, 16.15±4.75; barriers to calcium intake, 14.68±4.46; health motivation, 22.80±4.7. The total OHBS average score was 138.27±17.93. It was determined that the women's total OSES average score was 790.64±260.96. The subscales of OSES; OSE-Exercise Scale average score was 361.38±162.72, and the OSE-Calcium Scale average score was 429.25±147.57.

Conclusion: The levels of health beliefs and self-efficacy regarding osteoporosis of women were low. Nevertheless, women's perceived benefits scores were found higher than perceived barriers. Nursing can take part in providing education to the public about life-long bone health, and they can also provide information about how to prevent osteoporosis and fracture risk.

Key words: Osteoporosis, health beliefs, self-efficacy, woman, nursing.

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Introduction

In past three decades, modern industrial life has Osteoporosis is a disease which decreases bone density and results in a loss of bone micro structure and a higher risk of fracture (Stubbs, 2010). Throughout the world, one in five men and one in three women are at risk for osteoporotic fracture, which is estimated to occur every three seconds (IOF, 2009). It is estimated 200 million women worldwide suffer from osteoporosis (Shirazi et al., 2007). In a study conducted with 26,424 individuals by the Turkish Osteoporosis Society, half of

participants over age 50 had osteopenia, 25% of them had osteoporosis, and the women's hip fracture rate was 4.1 times higher than men's (Tüzün et al., 2012). Risk factors for osteoporosis are classified as fixed risk factors and modifiable risk factors (IOF, 2009). Fixed risk factors include age, female gender, family osteoporosis history, personal fracture history, menopause, ethnicity, rheumatoid arthritis, long-term glucocorticoid therapy, and primary/secondary hypogonadism in men. Modifiable risk factors are smoking, alcohol use, poor nutrition, low body mass index, vitamin D deficiency, insufficient exercise, frequent falls, eating disorders, and low dietary calcium intake. Fixed risk factors cannot be changed. Everyone should become aware of these risk factors, so that steps can be taken to reduce bone mineral loss. Most of the modifiable risk factors directly impact bone biology, and some of these factors increase the risk of fracture independent of the effect on bones (Stubbs, 2010). The risks which cause a decrease in cancellous bone density are higher in women with estrogen deficiency after menopause (Çakmak et al., 2012).

The most effective way to manage osteoporosis is to promote behaviors associated with healthy living and the protection of bone health (Öztürk and Şendir, 2011). A person's beliefs about osteoporosis health play a very important role in whether one wants to avoid negative health behaviors and become motivated to focus on positive health behaviors and outcomes (Spector, 2000). Although being informed about osteoporosis is important in achieving and maintaining healthy life-style behaviours, knowledge is not enough (Öztürk and Şendir, 2011). The evaluation of osteoporosis health beliefs and a person's willingness and ability to work towards the prevention of this disease are important. The individual's ability to manage their own health issues plays an important role in adopting and continuing new behaviors. Osteoporosis self-efficacy has been shown to be effective in enhancing calcium intake, staying fit and connected to an exercise program, and in demonstrating protective behaviors (Spector, 2000; Sedlak et al., 2000; Piaseu et al., 2002).

The aim of this study was to determine their health beliefs and self-efficacy regarding osteoporosis and to investigate the relationship between women's characteristics with health beliefs and self-efficacy regarding osteoporosis.

The questions explored in this study were:

- What are women's osteoporosis health beliefs and self-efficacy?
- Is there a relationship between women's osteoporosis health beliefs and self-efficacy?
- What is the relationship, if any, among women's characteristics with osteoporosis health beliefs and self-efficacy?

Material and Methods

Study Design and sample

This study was planned as descriptive and cross-sectional design. A convenience sample of 296 volunteer women who applied to the outpatient clinic of one public hospital in a northern province of Turkey. Since the scales used self-reports, the inclusion criteria of this study required participants to be primary school graduates and being the least 18 age.

Data collection

Data were collected via a questionnaire form, the Osteoporosis Health Belief Scale and the Osteoporosis Self-Efficacy Scale (Kim et al., 1991a; Kim et al., 1991b; Kılıç and Erci, 2004). The questionnaire form and scales were completed by the participants in 15-20 minutes via method face to face.

Instruments

Questionnaire Form

Questionnaire form was developed based on the literature review. It consisted of questions including age, height, weight, education level, husband's education level, perception of outcome, living region, marital status, menopausal status, history of osteoporosis in herself, having information about osteoporosis, having bone density measurement, history of hip fracture in family, history of hip fracture in herself, and having bone density treatment.

Osteoporosis Health Belief Scale

Osteoporosis Health Belief Scale (OHBS) was developed to measure individual's health beliefs about developing osteoporosis (Kim et al., 1991a), and was adapted for Turkish use by Kılıç and Erci. OHBS includes total 42 items and seven subscales. The OHBS consist of seven subscale including susceptibility, seriousness, benefits of exercise,

benefits of calcium intake, barriers to exercise, barriers to calcium intake and health motivation of osteoporosis. The low scores from barriers to exercise and barriers to calcium intake subscales and high scores from other subscales means that positive health beliefs. The OHBS is rated using 5-point likert scale (1: strongly disagree, 5: strongly agree). Total score of each subscale is 6 to 30. Cronbach alpha coefficients of the original seven subscales of OHBS developed by Kim et al. in 1991 were between 0.71-0.82. Cronbach alpha coefficients of seven subscales of OHBS was determined between 0.72-0.91 in this study.

Osteoporosis Self-Efficacy Scale

Osteoporosis Self-Efficacy Scale (OSES) including two subscales was developed by Kim et al. (1991a) and adapted for Turkish use by Kılıç and Erci in 2004. OSES is a 12-item tool developed to define self-efficacy about doing weight-bearing exercises and taking calcium. Its subscales: The OSE-Exercise Scale (OSEES) and the OSE-Calcium Scale (OSECS). The range of each item is 0–100, and total score of OSES is 1200. Higher scores indicate better self-efficacy level. Cronbach’s alpha was found 0.94, 0.96 and 0.98, respectively for OSES, OSECS and OSEES were 0.94, 0.96 and 0.98, respectively (Kim et al., 1991a; 1991b). In this study, Cronbach alpha 0.90 for OSEES and 0.92 for OSECS.

Data analysis

The analysis of data was used frequency, percent, arithmetic mean, maximum, minimum as descriptive statistics methods. Also, correlation analysis test, One Way ANOVA test, t test, Kruskal Wallis testi and Mann-Whitney U test and Cronbach alpha coefficient was used in the present study. Statistical significance was set at $p < 0.05$.

Results

Sample characteristics

Two hundred ninety-six women between the ages of 18 and 75 years were enrolled in this study. Their average age was 34.88 ± 12.82 years. Two hundred thirty-three participants (78.7%) were married, 37.2% were primary school graduates, 58.8% were housewives, 56.5% had a mid-level perception of income, and 63.9% of them resided in the province. It was determined that 20.3% of women were menopausal, and 10.1% of them had a

family history of hip fracture. Only four women had experienced a hip fracture in the past, and 29.4% of them were informed about osteoporosis.

OHBS and OSES scores of participants

The participants’ OHBS subscales average scores were as follows: susceptibility, 18.53 ± 4.74 ; seriousness, 14.68 ± 4.46 ; benefits of exercise, 23.82 ± 5.06 ; benefits of calcium intake, 22.12 ± 4.63 ; barriers to exercise, 16.15 ± 4.75 ; barriers to calcium intake, 14.68 ± 4.46 ; health motivation, 22.80 ± 4.7 . The total OHBS scale average score was 138.27 ± 17.93 . It was determined that the women’s total OSES average score was 790.64 ± 260.96 . The OSEES subscale average score was 361.38 ± 162.72 , and OSECS subscale average score was 429.25 ± 147.57 . Women’s total OSES, OSEES and OSECS scores were low.

Correlations between scores of subscales of OHBS and OSES of participants

There was a statistically significant negative correlation between barriers to exercise subscale scores and barriers to calcium intake subscale scores and OSEES scores (respectively, $r = -.249$, $p = .000$, $r = -.157$, $p = .000$). There was a statistically significant negative correlation between barriers to calcium intake and OSECS scores ($r = -.186$, $p = .001$), and there was a statistically significant positive correlation between benefits of exercise and health motivation and OSECS scores (respectively, $r = .122$, $p = .036$, $r = .205$, $p = .000$). There were statistically significant negative correlations between barriers to exercise, barriers to calcium intake and total OSES scores (respectively, $r = -.211$, $p = .000$, $r = -.204$, $p = .000$). There was also a statistically significant positive correlation between health motivation and susceptibility and OSECS (respectively $r = .141$, $p = .015$), (see Table 1).

Table 1. Correlations between subscales of OHBS and OSES

Subscales of OHBS	OSES	OSES	Total OSES
	Exercise	Calcium	
	r	r	r
Perceived susceptibility	-0.051	0.027	-0.017
Perceived seriousness	-0.063	0.021	0.109
Benefits of exercise	0.064	0.122 [†]	0.109
Benefits of calcium intake	0.063	0.103	0.098
Barriers to exercise	-0.249 [‡]	-0.097	-0.211 [‡]
Barriers to calcium intake	-0.157 [‡]	-0.186 [‡]	0.495 [‡]
Health motivation	0.041	0.205 [‡]	0.141 [†]
Total OHBS	-0.092	0.057	-0.025

r; Pearson correlation test, [†] $p < 0.05$, [‡] $p < 0.01$

Osteoporosis health beliefs and self-efficacy of women

Comparisons of OSES scores according to women's sociodemographic and other characteristics

OSES subscales scores according to women's sociodemographic characteristics were compared (see Tables 2-3). The OSEES scores of women who had higher education ($p=.006$), were students

($p=.033$), had "good" income perception ($p=.001$), were premenopausal ($p=.044$), had information about osteoporosis ($p=.027$), and had a hip fracture in the past ($p=.035$) were higher than other women's scores.

Table 2. Comparisons of OSES scores according to women's sociodemographic characteristics (n=296)

Women's socio-demographic characteristics	OSES and subscales		
	OSES Exercise Mean \pm SD	OSES Calcium Mean \pm SD	Total OSES Mean \pm SD
Age groups (years)			
25 and lower	382.67 \pm 144.20	428.1 \pm 130.83	810.81 \pm 222.83
26-35	355.68 \pm 161.85	432.42 \pm 144.20	788.10 \pm 244.00
36-45	381.73 \pm 154.30	437.11 \pm 147.24	818.84 \pm 270.47
46 and higher	324.12 \pm 189.05	419.52 \pm 175.01	743.65 \pm 319.41
<i>P values</i> [†]	0.127	0.926	0.367
Education level			
Primary school	335.63 \pm 175.28	420.63 \pm 160.65	756.27 \pm 296.82
Secondary school	330.00 \pm 149.57	406.74 \pm 163.12	736.74 \pm 237.19
High school	374.00 \pm 151.87	423.90 \pm 136.75	797.90 \pm 231.60
University	429.30 \pm 147.18	486.27 \pm 105.74	915.58 \pm 211.67
<i>P values</i> [†]	0.006	0.047	0.003
Occupation			
Working	381.13 \pm 164.40	460.50 \pm 137.60	841.64 \pm 243.75
House wife	341.66 \pm 170.67	421.20 \pm 154.41	762.87 \pm 277.65
Student	404.88 \pm 107.35	404.41 \pm 129.82	809.30 \pm 204.95
<i>P values</i> [†]	0.033	0.071	0.074
Perception of income			
Low	285.75 \pm 180.21	390.75 \pm 179.53	676.50 \pm 316.74
Middle	358.32 \pm 151.81	422.57 \pm 140.93	780.89 \pm 232.43
Good	401.12 \pm 163.34	459.10 \pm 139.98	860.22 \pm 266.31
<i>P values</i> [†]	0.001	0.034	0.001
Living region			
Village	322.24 \pm 164.25	414.08 \pm 150.59	736.32 \pm 274.54
Town	387.93 \pm 161.44	435.51 \pm 150.60	823.44 \pm 266.22
City	363.38 \pm 161.67	431.26 \pm 146.39	794.65 \pm 254.97
<i>P values</i> [†]	0.110	0.721	0.214
Marital status			
Married	353.86 \pm 166.02	430.47 \pm 151.55	784.33 \pm 267.85
Single	389.20 \pm 147.81	424.76 \pm 132.86	813.96 \pm 234.24
<i>P values</i> [‡]	0.126	0.786	0.425
Husband's education level			
Illiterate	275.00 \pm 174.48	340.83 \pm 166.54	615.83 \pm 289.99
Primary school	357.65 \pm 173.97	447.34 \pm 140.39	805.00 \pm 277.03
Secondary school	360.73 \pm 161.76	402.43 \pm 168.87	763.17 \pm 272.84
High school	346.49 \pm 154.55	434.28 \pm 136.27	780.77 \pm 239.05
University	364.14 \pm 188.69	447.31 \pm 174.05	811.46 \pm 304.75
<i>P values</i> [§]	0.484	0.117	0.177

[†]One-Way ANOVA, [‡]t test, [§]Kruskal Wallis test, SD; Standard deviation

Table 3. Comparisons of OSES scores according to women's some characteristics (n=296)

Variables	OSES and subscales		
	OSES Exercise Mean ± SD	OSES Calcium Mean ± SD	Total OSES Mean ± SD
BMI groups			
Lower than 18.5	375.26±153.88	397.89±163.86	773.15±290.47
18.5-24.9	381.79±154.50	427.51±146.17	809.31±247.55
25-29.9	343.08±176.25	437.03±142.84	780.12±276.50
Higher than 30	327.25±161.97	433.52±155.36	760.78±265.31
<i>P value</i> [†]	0.128	0.768	0.656
Menopausal status			
Yes	319.50±183.26	416.33±170.38	735.83±312.98
No	372.03±155.71	432.54±141.41	804.57±244.81
<i>P value</i> [‡]	0.044	0.499	0.118
Getting information about osteoporosis			
Yes	393.67±164.52	465.86±130.48	859.54±241.89
No	347.94±160.45	414.01±151.83	761.96±263.78
<i>P value</i> [‡]	0.027	0.006	0.003
History of osteoporosis			
Yes	380.95±188.70	423.33±182.65	804.28±310.97
No	371.96±151.54	428.23±140.79	800.20±247.13
I don't know	331.46±178.70	433.17±155.11	764.63±280.04
<i>P value</i> [†]	0.277	0.802	0.724
Bone density measurement			
Yes	368.26±174.71	448.91±146.07	817.17±280.11
No	360.12±160.76	425.64±147.85	785.76±257.58
<i>P value</i> [‡]	0.756	0.326	0.454
History of hip fracture in family			
Yes	319.50±183.26	416.33±170.38	735.83±312.19
No	372.03±155.71	432.54±141.41	804.57±244.81
<i>P value</i> [‡]	0.152	0.264	0.127
History of hip fracture			
Yes	195.00±119.02	325.00±150.00	520.00±238.18
No	363.66±162.20	430.68±292.00	794.34±259.67
<i>P value</i> [‡]	0.035	0.139	0.044
Bone density treatment			
Yes	338.88±183.36	411.66±165.68	750.55±319.23
No	362.84±161.56	430.39±146.58	793.23±257.22
<i>P value</i> [§]	0.634	0.736	0.733

Kruskal Wallis test, [†]t test, [‡]Mann-Whitney U test, SD; Standard deviation[†]

The differences were found to be statistically significant. The OSECS scores of women with a higher education level (p=.047), "good" perception of income (p=.034), and with information about osteoporosis (p=.006) were higher than other women's scores. Again, the differences were statistically significant. The total OSES scores of women with a higher education level (p=.003), better perception of income (p=.001), information about osteoporosis (p=.003), and no hip fracture in the past (p=.044) were higher than other women's scores. The differences were found statistically significant.

Comparisons and scores of OHBS subscales according to women's sociodemographic and other characteristics

OHBS and its subscales scores of certain characteristics of women were compared (see Tables 4-5). Susceptibility subscale scores of women who were older (p=.002), menopausal (p=.006), had information about osteoporosis (p=.024), had a hip fracture in the past (p=.035),

had been screened for bone density measurement (p=.000), had a history of hip fracture in their family (p=.016) and had received treatment for bone

density ($p=.000$) were higher than other women's scores and the differences were statistically significant. The seriousness subscale scores of women according to occupation ($p=.000$), education level ($p=.000$), marital status ($p=.002$), and BMI groups ($p=.041$) were significantly different. The benefits of exercise subscale scores of women according to education level ($p=.024$) and marital status ($p=.007$) showed statistically significant

differences. The benefits of the calcium subscale scores of women with a university degree ($p=.001$), information about osteoporosis ($p=.019$), an osteoporosis history ($p=.002$), and who had been treated for bone density decline ($p=.042$) were greater than other women's scores and the differences were statistically significant.

Table 4. Comparisons and scores of OHBS subscales according to women's sociodemographic characteristics (n=296)

Women's characteristics	Susceptibility	Seriousness	Benefits of exercise	Benefitsof calcium	Barriertoe xercise	Barriertoc alcium	Health motivation
	Mean±SD	Mean±SD	Mean±SD	Mean±SD	Mean±SD	Mean±SD	Mean±SD
Age groups (years)							
25 andlower	18.02±3.86	13.72±3.68	24.19±4.76	22.32±4.49	15.20±4.57	13.72±3.68	22.19±4.39
26-35	17.58±4.66	14.52±4.47	23.04±5.44	21.84±4.91	15.56±4.02	14.52±4.47	21.91±5.37
36-45	18.80±4.73	14.36±4.78	24.07±5.28	21.46±5.03	16.00±4.58	14.36±4.78	24.00±4.68
46 and higher	20.42±5.46	16.50±4.72	24.30±4.65	22.82±3.98	18.44±5.47	16.50±4.72	24.00±4.06
<i>P values</i> [†]	0.002	0.057	0.332	0.390	0.000	0.002	0.007
Education level							
Primary school	19.00±5.50	20.00±5.55	23.12±5.35	22.14±4.60	17.54±5.27	16.28±4.45	23.20±4.69
Secondary school	16.86±4.97	19.18±4.54	22.69±5.12	19.72±4.52	14.90±3.22	14.46±4.03	21.86±4.41
High school	18.76±3.87	20.64±5.24	24.46±5.19	22.44±5.00	15.62±4.74	14.21±4.34	22.75±5.23
University	18.46±3.97	20.25±4.43	25.27±3.20	23.74±2.72	15.06±3.83	11.93±3.57	22.86±4.27
<i>P values</i> [†]	0.082	0.000	0.024	0.001	0.001	0.000	0.482
Occupation							
Working	18.50±4.27	13.64±4.01	24.24±5.57	21.88±5.14	15.87±4.02	13.64±4.01	23.00±4.83
House wife	18.64±5.24	15.74±4.60	23.37±4.82	21.95±4.47	16.46±5.17	15.74±4.60	22.94±4.84
Student	18.13±3.29	12.30±3.18	24.88±4.92	23.25±4.18	15.39±4.18	12.30±3.18	21.88±4.46
<i>P values</i> [†]	0.823	0.000	0.822	0.186	0.037	0.004	0.787
Perception of income							
Low	18.35±5.20	21.20±4.88	23.90±4.38	22.95±4.06	18.95±4.88	17.12±4.98	23.70±3.50
Middle	18.64±4.66	19.98±5.26	23.76±5.05	21.80±4.65	15.82±4.58	14.41±4.27	22.62±4.57
Good	18.37±4.72	19.94±5.05	23.91±5.40	22.35±4.81	15.51±4.63	14.10±4.26	22.74±5.61
<i>P values</i> [†]	0.865	0.376	0.973	0.317	0.000	0.001	0.442
Living region							
Village	17.73±5.24	19.71±6.01	22.97±4.22	21.08±5.01	18.14±4.94	15.93±4.54	22.65±5.20
Town	18.79±4.68	20.29±5.44	23.74±5.15	22.60±4.83	15.25±4.49	14.08±3.78	22.50±4.63
City	18.66±4.63	20.20±4.84	24.07±5.23	22.24±4.44	15.91±4.66	14.54±4.59	22.94±4.74
<i>P values</i> [†]	0.429	0.078	0.400	0.198	0.004	0.078	0.804
Marital status							
Married	18.63±4.90	19.65±5.20	23.41±5.14	21.90±4.83	16.33±4.74	15.06±4.58	22.93±4.97
Single	18.17±4.13	21.92±4.59	25.34±4.47	22.92±3.72	15.46±4.77	13.28±3.68	22.34±4.02
<i>P values</i> [†]	0.499	0.002	0.007	0.076	0.194	0.002	0.393
Husband's education level							
Illiterate	17.83±3.04	20.00±3.76	21.75±4.43	19.33±5.14	19.50±4.23	18.75±4.13	21.00±5.47
Primary school	17.87±5.66	20.07±5.17	23.57±4.18	21.54±4.84	17.50±5.28	16.00±4.07	22.93±4.71
Secondary school	18.92±5.41	19.58±5.86	22.26±6.18	21.34±5.88	15.90±4.57	14.56±5.07	23.14±5.55
High school	18.40±4.48	19.58±5.86	23.49±5.36	22.10±4.30	15.81±4.47	15.31±4.64	22.87±5.11
University	20.31±4.27	19.56±5.36	24.63±4.86	23.43±4.00	15.58±4.62	13.19±4.02	23.14±4.53
<i>P values</i> [§]	0.084	0.981	0.204	0.056	0.035	0.000	0.704

[†]One-Way ANOVA, [‡]t test, [§]Kruskal Wallis test, SD; Standard deviation

The barriers to exercise scores of women who were older ($p=.000$), housewives ($p=.037$); with a primary school education ($p=.001$); with low income ($p=.000$); who were living in a village ($p=.004$), whose husband's education level was lower ($p=.035$), who were menopausal ($p=.000$) and who had experienced a hip fracture in the past ($p=.011$) were higher than other women's scores,

and the differences were statistically significant. The barriers to calcium subscale scores of the women who were older ($p=.002$), were housewives ($p=.004$), had lower education level ($p=.000$), had low income ($p=.001$), were married ($p=.002$), whose husbands' education level was lower ($p=.000$), who were overweight ($p=.041$) and menopausal ($p=.003$) were higher than other

women's scores and the differences were statistically significant (see Table 4-5).

Health motivation subscale scores of women who were 36 years of age and older (p=.007), menopausal (p=.004) and who had been screened for bone density measurements (p=.030) were

higher than other women's scores, and the differences were statistically significant (see Table 4-5).

Table 5. Comparisons and scores of OHBS subscales according to women's some characteristics (n=29)

Women's characteristics	Susceptibility	Seriousness	Benefits of exercise	Benefits of calcium	Barrier to exercise	Barrier to calcium	Health motivation
	Mean±SD	Mean±SD	Mean±SD	Mean±SD	Mean±SD	Mean±SD	Mean±SD
BMI groups)							
Lower than 18.5	18.10±4.54	13.15±4.43	22.78±5.42	21.15±5.34	16.21±4.46	13.15±4.43	22.47±5.37
18.5-24.9	17.94±4.57	14.43±4.90	23.53±5.40	22.05±5.21	15.80±4.97	14.43±4.80	22.48±5.24
25-29.9	19.53±4.70	14.83±4.02	24.79±5.00	22.83±3.61	15.93±4.64	14.83±4.02	23.58±3.76
Higher than 30	18.78±5.20	15.72±3.99	23.50±5.35	21.54±3.95	17.45±4.27	15.72±3.99	22.60±4.65
<i>P values</i> [†]	0.282	0.041	0.423	0.272	0.066	0.041	0.575
Menopausal status							
Yes	21.48±5.23	20.66±5.87	24.78±4.08	23.05±3.75	18.78±5.45	16.18±4.67	24.38±3.98
No	17.78±4.31	20.00±4.96	23.58±5.26	21.88±4.81	15.48±4.32	14.30±4.33	22.40±4.89
<i>P values</i> [‡]	0.000	0.375	0.102	0.083	0.000	0.003	0.004
Getting information about osteoporosis							
Yes	19.49±5.16	19.54±5.28	21.41±5.05	23.10±4.38	16.87±4.77	14.73±4.61	23.54±4.49
No	18.13±4.51	20.38±5.09	23.58±5.06	21.71±4.68	15.85±4.73	14.66±4.41	22.50±4.88
<i>P values</i> [‡]	0.024	0.198	0.200	0.019	0.092	0.902	0.089
History of osteoporosis							
Yes	23.90±5.47	17.85±5.85	25.52±4.40	24.85±3.05	16.09±4.88	15.14±4.90	24.4±5.33
No	17.66±4.53	20.04±5.03	23.70±5.18	21.69±4.78	15.96±4.61	14.70±4.34	22.51±4.89
I don't know	19.20±4.02	20.93±5.11	24.19±4.98	22.43±4.38	16.59±5.08	14.51±4.67	23.07±4.31
<i>P values</i> [‡]	0.000	0.072	0.735	0.002	0.532	0.793	0.099
Bone density measurement							
Yes	21.41±5.85	19.52±6.08	24.06±5.26	22.67±4.83	17.26±5.24	15.60±4.28	24.21±4.05
No	18.00±4.32	20.25±4.97	23.78±5.03	22.02±4.59	15.94±4.64	14.51±4.48	22.54±4.87
<i>P values</i> [‡]	0.000	0.446	0.730	0.383	0.085	0.127	0.030
History of hip fracture in family							
Yes	20.50±5.02	21.03±4.73	25.36±4.09	22.83±3.16	16.26±4.66	13.86±4.43	24.06±3.43
No	18.31±4.67	20.03±5.19	23.65±5.14	22.04±4.76	16.13±4.77	14.77±4.46	22.66±4.90
<i>P values</i> [‡]	0.016	0.317	0.079	0.378	0.890	0.290	0.129
History of fracture in herself							
Yes	18.25±2.36	18.50±5.19	25.50±2.51	23.25±2.62	21.75±2.06	17.50±3.87	21.25±2.06
No	18.53±4.77	20.16±5.16	23.80±5.09	22.10±4.65	16.07±4.73	14.64±4.46	22.82±4.81
<i>P values</i> [‡]	0.962	0.463	0.514	0.859	0.011	0.145	0.149
Bone density treatment							
Yes	23.94±5.50	18.50±5.75	2.33±4.53	24.05±3.50	16.61±4.88	15.44±4.98	24.00±5.49
No	18.18±4.48	20.24±5.10	23.85±5.10	22.00±4.67	16.12±4.75	14.63±4.43	22.73±4.73
<i>P values</i> [‡]	0.000	0.241	0.452	0.042	0.806	0.448	0.126

[†]Kruskal Wallis test, [‡] t test, [§]Mann-Whitney U test, SD; Standard deviation

Discussion

The current study examined women's osteoporosis health beliefs and osteoporosis self-efficacy. Results of the women's OHBS subscales average scores were as follows: perceived susceptibility, 18.53±4.74; perceived seriousness, 14.68±4.46; benefits of exercise; 23.82±5.06; benefits of calcium intake, 22.12±4.63, barriers to exercise, 16.15±4.75; barriers to calcium intake, 14.68±4.46; health motivation, 22.80±4.7, and the total OHBS scale average score, 138.27±17.93. In

addition, women's perceived benefit scores were higher than their barrier scores. When the perceived benefit of certain behaviors is deemed positive to one's health, this can be the impetus for women to adopt new behaviors which would protect their osteoporosis health (Kılıç and Erci, 2007). Altın and colleagues (2014) found that women's susceptibility average score was 16.8±5.0; seriousness average score, 17.6±5.4; benefits of exercise average score, 24.4±3.7; benefits to calcium intake average score, 21.7±3.5; barriers to exercise average score,

14.1±4.5; barriers to calcium intake average score, 12.4±3.9; and health motivation average score was 21.3±4.2. Aslan and Kılıç (2017) indicated that the total OHBS scale average score was 145.65±13.58. The results of this study are similar to the literature (Altın et al., 2004; Kılıç and Erci, 2007; Aslan and Kılıç, 2017).

A previous study found similar scores regarding health beliefs and statistically significant differences in the degree of susceptibility, seriousness, health motivation, family income, and in the degree of barriers to exercise according to education (Altın et al., 2014; Shin and Kang, 2002). In a review study reported that individuals generally have low to moderately high health beliefs about osteoporosis (McLeod and Johnson, 2011). This means that some women may believe that they do not have much control over their osteoporosis status, while others are firm in the belief that they can indeed positively influence their osteoporosis health (McLeod and Johnson, 2011). In this study, the results are also similar to the findings of earlier studies (Altın et al., 2014; Shin and Kang, 2002).

This study revealed that women's total OSES average score was 790.64±260.96. The OSEES subscale average was 361.38±162.72, and OSECS subscale was 429.25±147.57. This study indicated that increasing exercise self-efficacy reduced both the exercise and calcium intake barriers scores. In addition, there was a positive effect on the women's health motivation and seriousness regarding osteoporosis self-efficacy. Furthermore, when women became totally committed to osteoporosis self-efficacy, exercise barriers and calcium intake barriers decreased. In the previous study found that there was a statistically significant correlation between calcium intake behavior and health motivation among the osteoporosis health beliefs (Song and So, 2000). Other study noted that a positive correlation between calcium intake and health motivation with high levels of calcium intake was associated with a high motivation to become healthy and improve osteoporosis health (Edmonds et al., 2002). Swaim et al. (2008) found that self-efficacy of both exercise and calcium had significant positive correlations with calcium intake behavior. Furthermore, a woman's self-efficacy of exercise was significantly and positively related to actual exercise behavior (Swaim et al., 2008). Contrary to the findings of this study, in previous study found that a positive correlation between osteoporosis self-efficacy and barriers to exercise and a negative correlation between osteoporosis self-efficacy and health motivation (Shin and Kang,

2002). This study's results showed significantly better osteoporosis self-efficacy of women with a higher education level, "good" income perception, information about osteoporosis, and no past history of hip fracture. A previous study found a positive correlation between education level and regular exercise in the OSEES scores (Arslan et al., 2015). Similarly, there was a positive correlation between the OSEES score and education level and regular exercise. There was a positive correlation between OSECS average scores and education level, but there was no significant correlation between OSECS average scores and doing regular exercise (Arslan et al., 2015).

It is very important that individuals become informed regarding their actual as well as perceived susceptibility to osteoporosis as these factors have been shown to be a strong indicator of health behavior (Nayak et al., 2010). The current study revealed that several factors affected a woman's susceptibility to osteoporosis: if she were older, menopausal, knowledgeable about osteoporosis, had a history of past hip fracture, previous screening for bone density measurement, a family history of hip fracture, and presently receiving treatment for bone density. Similarly, an earlier study revealed that a personal and family history of osteoporosis, being female, and undergoing testing for osteoporosis were factors affecting osteoporosis susceptibility (Nayak et al., 2010). This study found that the seriousness scale scores were higher for osteoporosis in women who were housewives, single, overweight, and who had a higher education than other women. A previous study related to severity of osteoporosis revealed that older ages, family history of osteoporosis, and testing for osteoporosis were significantly associated with osteoporosis severity (Nayak et al., 2010). The results of this study differed from those in the literature (Nayak et al., 2010). These differences may be due to the fact that participants were solely women, different measurement tools were used, and there was a difference in the average age of the individuals in this study.

The current study investigated factors affecting the barriers to exercise and barriers to calcium intake of OHBS. Affecting factors for women on barriers to exercise were being older, being menopausal, being a housewife, having a low education level, having a low-income perception, living in a village, having a past hip fracture, and having a husband with a low education level. In addition, affecting factors on barriers to calcium intake were older ages, being a housewife,

menopausal, low education level, low income perception, being married, low education level of husband, and being overweight. In a study was found the health belief scale scores of women to be higher than men (Altın et al., 2014). This situation is thought to be associated with a woman's family history of osteoporosis or with her own personal health history. These findings are consistent with the literature.

Limitations of the study are that it was a convenience sample and a small sample size confined to specific Turkish women. The data were collected only a public hospital in the northern region of Turkey; therefore, further studies are needed in order to determine whether these findings can be generalized to participants in other areas. As the findings are based on data from a cross-sectional design, data from prospective survey are needed to infer causal effects.

Conclusions

The results of this study revealed that the levels of health beliefs and self-efficacy regarding osteoporosis of women were low. Nevertheless, women's perceived benefits scores were found higher than perceived barriers. This is encouraging news. When women can clearly understand the perceived benefits of taking care of their osteoporosis, they may become more motivated to do all possible to achieve positive outcomes.

The help to work towards these goals should come from nurses, doctors and other health care professionals who should be educated about osteoporosis and fully informed in the osteoporosis health beliefs and self-efficacy of their patients. Nurses, in particular, should have a thorough knowledge regarding bone health throughout a person's entire life. They can be instrumental in educating the public about life-long bone health, and they can also provide information about how to prevent osteoporosis and fracture risk.

In conclusion, when women can access reliable and up-to-date information and education about osteoporosis, they may then become more motivated to develop self-efficacy in the prevention of this very common and sometimes debilitating disease.

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Ethical considerations: Approval for this study was obtained written permission from the institution to do research before initiation of the study. Information about the purpose of the research before starting the study were given to participants. If the participants agreed, the researcher provided detailed information regarding the study, and received written informed consent from volunteered to participate in the study. Confidentiality and anonymity of data of participants were guaranteed. The study was carried out a proper research to Helsinki Declaration Principles.

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References

- Altın E, Karadeniz B, Türkyön F, Baldan F, Akkaya N, Şimşir Atalay N et al. Kadın ve erkek yetişkinlerde osteoporoz bilgi ve farkındalık düzeyinin karşılaştırılması. [The comparison of knowledge level and awareness of osteoporosis between women and men]. *Turkish J Osteoporosis*, 2014; 20, 98-103.
- Arslan SA, Daşkapan A, Atalay DK, Tüzün EH, Korkem D. Kırıkkale'de yaşayan kadınların osteoporoz bilgi düzeyi. [Osteoporosis knowledge level of the women living in the city of Kırıkkale]. *Turk J Physiother Rehabil*, 2015;26:120-127.
- Aslan G, Kılıç D. Osteoporosis health belief, knowledge level and risk factors in individuals whose bone mineral density was required. *Belitung Nursing Journal* 2017;3(3):162-173.
- Çakmak B, İnanır A, Öztürk GT. The comparison of bone mineral density between postmenopausal women and elderly women. *Turkish J Osteoporosis*, 2012;18: 86-88.

- Edmonds E, Turner LW, Usdan SL. Osteoporosis knowledge, beliefs, and calcium intake of college students: Utilization of the health belief model. *Open Journal of Preventive Medicine*, 2012;2:27-34.
- International Osteoporosis Foundation (IOF). What is osteoporosis? Retrieved from <https://www.iofbonehealth.org/what-is-osteoporosis>, 2009. (Accessed 2 November 2018).
- Kılıç D, Erci B. Osteoporoz sağlık inanç ölçeği, osteoporoz öz-etkililik/yeterlik ölçeği ve osteoporoz bilgi testi'nin geçerlilik ve güvenilirliği [The reliability and validity of the osteoporosis health belief scale, osteoporosis self-efficacy scale and osteoporosis knowledge test]. *Atatürk Üniv Hemşirelik Yüksekokulu Dergisi*, 2004;7: 89-102.
- Kılıç D, Erci B. Premenopozal dönemdeki kadınlara verilen eğitiminin osteoporozla ilişkin sağlık inançları ve bilgi düzeylerine etkisi [The impact of the planned health education given to premenopausal women on the osteoporosis health beliefs and knowledge levels] *Atatürk Üniv Hemşirelik Yüksekokulu Dergisi*, 2007;10:34-44.
- Kim, K., Horan, M., Gendler, P. Osteoporosis knowledge tests, osteoporosis health belief scale, and osteoporosis self-efficacy scale. Allendale, MI: Grand Valley State University, 1991a.
- Kim K, Horan ML, Gendler P, Patel MK. Development and evaluation of the osteoporosis health belief scale. *Res Nurs Health*, 1991b;14: 155-163.
- McLeod KM, Johnson CS. A systematic review of osteoporosis health beliefs in adult men and women. *J Osteoporos*, 2011;1-11.
- Nayak S, Roberts MS, Chang CCH, Greenspan SL. Health beliefs about osteoporosis and osteoporosis screening in older women and men. *Health Educ J*, 2010; 69: 267-276.
- Öztürk A, Şendir M. Evaluation of knowledge of osteoporosis and self-efficacy perception of female orthopaedic patients in Turkey. *J Nurs and Healthcare Chronic Illness*, 2011;3: 319-328.
- Piaseu N, Schepp K, Belza B. Causal analysis of exercise and calcium intake behaviors for osteoporosis prevention among young women in Thailand. *Health Care Women Int*, 2002;23:364-376.
- Sedlak CA, Doheny MO, Jones SL. Osteoporosis education programs: changing knowledge and behaviors. *Public Health Nurs*, 2000;17:398-402.
- Shin KR, Kang YM. A study on the relationships between osteoporosis knowledge, self-efficacy and health belief of women in an island. *J Korean Acad Nurs*, 2002;32: 89-99.
- Shirazi KK, Wallace LM, Niknami S, Hidarnia A, Torkaman G, Gilchrist M et al. A home-based, transtheoretical change model designed strength training intervention to increase exercise to prevent osteoporosis in Iranian women aged 40-65 years: a randomized controlled trial. *Health Educ Res*, 2007;22: 305-317.
- Song HR, So HY. Effects of the knowledge, health belief, and self-efficacy about osteoporosis on calcium intake behavior for postmenopausal osteoporosis patients. *J Korean Acad Nurs*, 2000;19:763-774.
- Spector RE. The health belief model. Mehalk C, ed. *Cultural Diversity in Health & Illness*. Fifth Edition. Prentice-Hall New Jersey, UK, 2002:12-16.
- Stubbs B. Osteoporosis and falls: some further considerations for the nursing profession. *Br J Nurs*, 2010;19:1431-1431.
- 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;4:153-163.
- Tuzun S, Eskiuyurt N, Akarirmak U, Saridoğan M, Senocak M, Johansson H, et al. Turkish Osteoporosis Society. Incidence of hip fracture and prevalence of osteoporosis in Turkey: the FRACTURK study. *Osteoporos Int*, 2012;23:949-955.