Osteoporosis Risk Factors Associated with Nutrition and Exercise Behaviors of Menopausal Women in Turkey

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Abstract

Background: Osteoporosis may cause morbidity and mortality especially in postmenopausal women.
Aim: This study has been conducted in order to assess the risk factors of menopausal women for osteoporosis.
Methodology: The study which was conducted in a descriptive and cross-sectional style, was carried out with women in the postmenopausal period who made application to the gynecology clinic of a university hospital. The sample of the study was comprised of 331 post-menopausal women. Data were gathered through socio-demographic information form prepared in line with the literature and osteoporosis risk factors questionary form. During the assessment of the data, by means of the SPSS 16.0 packaged software, were calculated the percent and frequency values.
Results: It was determined that the average age of the participants was 54,6±5,3; 76,4% have experienced menarch within the age range of 12-14 years; 57,1% had experienced 4 pregnancies and over; 36,6% have entered the menopause within the age range of 45-49 years and that 74,6% have experienced natural menopause. It was also specified that 26,3% of the women were preferring milk and dairy products while 64,4% were preferring liquid food products such as tea and coffee containing caffeine; 18,4% consume coffee daily (up to 3 cups), almost half of the women are over-weighted; 65,6% used medicine regularly that could create a risk for orteoporosis; 12,69% of them had used long-term corticosteroids previously; 12,7% of them were mindful of taking sunbathing for 15 minutes daily and that 54,1 of them never made sports.
Conclusion: It was determined that postmenopausal women who comprised of the sample have osteoporosis risk factors such as parity, menopause period, malnutrition in terms of milk and dairy products, excessive tea and coffee consumption, being overweighted, breakage story, sedantary life, smoking, insufficient sun intake, chronic diseases and drug usage.

Key Words: Osteoporosis, risk factors, Nurse, Midwife

Introduction

Osteoporosis (OP) is the most common systemic skeletal disease, characterized by the deterioration in the micro-structure of the bone tissue, which causes low bone mineral density, increase in bone fragility and fracture risk (Meray & Peker, 2012; NIH, 2011). Osteoporosis results in fractures due to the demineralization of bone, which occurs in parallel with increasing age, and it primarily affects women (Sedlak, Doheny & Jone, 2000).

Since 80% of those experiencing osteoporosis are female, it is an important health problem for women. Osteoporosis may cause morbidity and mortality especially in postmenopausal women (Dundar et al., 2003; Klibanski, 2000). In the menopausal period, the reduction of sex steroids and estrogen hormones with the termination of ovarian function deteriorates the reconstruction frequency of the bone. The balance between bone formation and bone destruction deteriorates and osteoporosis develops (Dincer & Caglar, 2016).

The risk factors for osteoporosis are listed as being female, belonging to white race, having low body mass index (BMI), some socio-demographic characteristics, gynecological features, fracture history, type of diet, tea and coffee consumption, smoking, sedentary lifestyle, some chronic diseases and related medicine use, and cognitive and psychological problems that may lead to falling (Dincer & Caglar, 2016).

Being at an old age, alcohol consumption, experiencing early menopause, and exposure to inadequate sunlight also increase the risk for osteoporosis (Nazari et al., 2016; TSI, 2016). Osteoporosis develops in many women who face almost all of these risk factors and who do not receive sufficient health care during the menopausal period, and affects the quality of life (Dundar et al., 2003; Klibanski, 2000).

For these reasons, preventing osteoporosis, terminating its progression, receiving appropriate health care to increase the quality of life, and maintaining healthy life-style behaviors gain importance during the menopause period, which covers more than one third of women's life (Dundar et al., 2003). Early diagnosis of osteoporosis risk factors, organizing programmes aimed at preventing osteoporosis, and developing healthy life-style behaviors in order to identify risk factors are necessary to stop the progression of the disease, to prevent fractures, and to reduce health care costs (NIH, 2011).

It should be noted that osteoporosis risk factors may vary from country to country or even from region to region. The identification of women who have a risk factor for osteoporosis locally and the identification of the risk factors they are carrying will help to determine the nature of the nursing care to be given to them.

In Turkey, a limited number of studies have identified the relationship between healthy life-style behaviors and osteoporosis risk factors of women in the menopausal period. The present study was conducted to fill this gap by determining the osteoporosis risk factors of Turkish menopausal women.

Although osteoporosis is a health problem for both women and men, women in their menopause period have an increased risk of osteoporosis. Thus, to ensure homogeneity in our study, only postmenopausal women were included in our sample.

Methodolgy

Design and Participants

The study, which is a descriptive and a cross-sectional study, aimed to determine the risk factors of women in menopausal period for osteoporosis. The target population of the study is all the menopausal women who were in the age range of 45-64 years and who applied to the gynecology clinic of a training and research hospital to be examined between January 25 and March 12, 2018.

According to the literature (Nazari et al., 2016), standard deviation was set at 16, sample error at ± 2 and significance level at α = 0.05, and considering the fact that the number of women between 45-64 in Corum province in Turkey was N=48557 (TSI, 2016), the minimum sample size was determined to be 245. 331 menopausal women who were randomly selected from among the target population, who volunteered to participate in the study, who were in the age range of 45-64 years, and who were not mentally and physically disabled were included in the study.

Ethical considerations

The participants were informed about the aim of the study, and their oral and written consent was obtained by asking them to sign the participant consent form. Furthermore, written permission was received from Corum University, and ethical permission was obtained from Corum University Clinical Studies Ethical Committee. Voluntary participation was ensured.

Collection And Analysis of Data

The study was conducted with postmenopausal women who were between the ages of 40-64 and who applied to the gynecology clinic of a training and research hospital. Due to the absence of a menopausal clinic in the province, the study was conducted in the gynecology clinic. The postmenopausal women who applied to the clinic were informed about the aim and method of the study. Written and oral consent was obtained from the women who agreed to participate in the study.

The Socio-demographic Information Form (fact sheet) and Osteoporosis Risk Factors Questionnaire which were both developed by the researchers in line with the literature were used to collect data.

The questions and the options in the question forms were read by the researcher to each participant aloud and the answers given by the participants to the questions were recorded in the question form by the researcher.

Socio-Demographic Information Form: There are 12 questions in the form to reveal the socio-demographic and menopausal characteristics of women.

Osteoporosis Risk Factors Questionnaire: There are 17 questions in the questionnaire to reveal the risk factors of menopausal women.

During the analysis of the data, percentage, frequency, mean and standard deviation values were calculated using the SPSS 16.0 software.

Results

When the socio-demographic characteristics of the women in the study were examined, it was seen that the average age was 54.6±5.3. It was further revealed that 59.8% of the women were in the age range of 50-59 years; 53.5% of them were married; and 54.1% of them were secondary school-high school graduates. 91.5% of the women were not working at any job at the time of the study. It was found that monthly household income of the 55.3% of the women was between 1001-2000 TL. The average monthly household income of women was calculated as 1687,704 ± 1580,408 TL (min 400 TL and max 2500 TL) (Table 1).

As far as the gyneco-obstetric characteristics of the women in the study are concerned, it was found that 76.4% of the women had menarche between the ages 12-14, and 57.1% of them had four and more pregnancies. The average menarche age was determined as 13.3 ± 1.2 (min 10 and max 16), and the average number of pregnancies was found to be 3.7221 ± 1.16050 (min 1 and max 6) (Table 2).

It was revealed that 36.6% of the women entered menopause between the age range 45-49, and 74.62% of them experienced natural menopause. 74.3% of the women stated that women in their family entered menopause at an average age of 45 years and over. In the study, 93.35% of the women reported that they were in the menopausal period for more than 3 years, and the average age of menopause was determined as 46.4 ± 4.7 (min 38 and max 55).

Table 1: Socio-Demographic Characteristics of Menopausal Women

CHARACTERISTICS		
Age	**n**	**%**
Between 40-49	64	19.3
Between 50-59	198	59.8
60 years and older	69	20.8
Marital Status		
Married	177	53.5
Bachelor (Never married, Widower, Divorced)	154	46.5
Education Level	**n**	**%**
Literate- Elementary	68	20.5
Secondary School-High School	129	54.1
University	84	25.4
Occupation Status	**n**	**%**
Not working (Retired-housewife)	303	91.5
Working	28	8.5
Monthly Income	**n**	**%**
0-1000 TL	89	26.9
1001-2000 TL	183	55.3
2001 TL and over	59	17.8

Table 2: Distribution of Gyneco-Obstetrical Characterisstics of Menopausal Women

Menarche Age	n	%
At the age of 12 and below	16	4.8
Between ages 12-14	253	76.4
Age 15 and older	62	18.7
Number of Pregnancies	**n**	**%**
1-3 Pregnancies	142	42.9
4 Pregnancies and over	189	57.1
Menopause Age	**n**	**%**
Between ages 38-44	91	27.5
Between ages 45-49	121	36.6
Age 50 and older	119	36.0
Menopause Type	**n**	**%**
Natural Menopause	247	74.62
Surgical Menopause	84	25.38
The average menopause age of the women in the family	**n**	**%**
40 and below	5	1.5
Between 40-44	80	24.2
45 and older	246	74.3
Menopause Duration	**n**	**%**
1-3 years	22	6.65
4-6 years	175	52.87
7 years and over	134	40.48

Taking into consideration the data on the risk factors for nutrition-related osteoporosis among the women who participated in the study, it was found that 27.8% of the women preferred fruits and vegetables in their diet, while 26.3% of them preferred milk and dairy products. 21.8% of the women stated that they consumed cereals, and 64.4% said they consumed beverages containing caffeine such as tea and coffee in their daily meals. More than half of the women (56.2%) reported that they rarely consumed tea and coffee, while 18.4% reported that they had coffee every day (up to 3 cups). When the risk factors of women for osteoporosis were taken into account, 13.9% of the participants reported that some family members experienced hip dislocation, while 10.6% of them had a fracture history.

Although the BMI of the 48.3% women was between 25-29.9, it was observed that almost half of the women were overweight. The weight average of the women who participated in the study was found to be 73,4683±1,07594 (min 48-max 110 kg) (Table 3).

It was further revealed that 45.9% of the women had no chronic diseases and among the women who had chronic diseases, the most common diseases were thyroid, depression, and inflammatory bowel disease at 16.0%, 12.1%, and 10.2%, respectively. It was also found that 65.6% of the women took drugs regularly, and 18.0 % of them used corticosteroid previously (Table 3).

The study also revealed that 88.5% of the women did not smoke, and 91.8% of them did not use alcohol. When the risk factors related with activity were examined, it was found that 12.7% of the women paid special attention to being exposed to sunlight for 15 minutes every day, and 54.1% never did sports. 77.8% of the women who stated they did sports regularly (n = 27) did sports more than 7 hours a week. Also, 43.5% of the women reported that they walked every day for up to 30 minutes (Table 3).

Table 3: Distribution of Osteoporosis Risk Factors of Menopausal Women

Food preferred for nutrition	n	%
Milk and dairy products	87	26.3
Meat and meat products	36	10.9
Cereals	72	21.8
Bakery products and pastry	44	13.3
Fruits and vegetables	92	27.8
Preferred beverages	**n**	**%**
Caffeine-free beverages	118	35.6
Beverages containing caffeine	213	64.4
Coffee drinking frequency	**n**	**%**
Never	84	25.4
Rarely	186	56.2
Regularly drink up to 3 cups of coffee a day	61	18.4
Hip dislocation history in the family	**n**	**%**
Yes	46	13.9
No	285	86.1
Fracture history	**n**	**%**
Yes	35	10.6
No	296	86.4
Sunbathing for 15 minutes	**n**	**%**
Yes	42	12.7
No	289	87.3
Chronic disease	**n**	**%**
No	152	45.9
Yes	179	54.1
Taking medicine regularly	**n**	**%**
Yes	217	65.6
No	114	34.4
Smoking	**n**	**%**
Smoking	38	11.5
Non-smoking	293	88.5
Alcohol consumption	**n**	**%**
I do not use alcohol	27	8.2
I consume alcohol very rarely	294	91.8
Body mass index (BMI)	**n**	**%**
Normal 18.50 - 24.99	50	15.1
Overweight ≥ 25.00	160	48.3
Obese ≥ 30.00	121	36.6
Frequency of doing sports	**n**	**%**
Never	179	54.1
Sometimes	125	37.8
Regularly	27	8.2
Weekly sporting period of women who do sports regularly	**n**	**%**
Less than 1 hour a week	6	22.2
More than 7 hours a week	21	77.8
Daily outdoor walking time	**n**	**%**
Never	71	21.5
Less than 30 minutes	144	43.5
Between 30-60 minutes	78	23.6
More than 60 minutes	38	11.5

Discussion

In our study, it was found that three out of four women had menarche within the age range of 12-14 years and the mean age for menarche was found to be 13.33 ± 1.25. Menarche age is influenced by many factors such as genetic characteristics, climatic conditions, nutrition style and lifestyle (Sirin & Kavlak, 2015). Our finding regarding the average age of menarche for women coincides with the findings of other studies conducted on the subject in Turkey (Pinar et al., 2009; Ipek et al., 2012; Kutlu, Civi & Pamuk, 2012; Uzun et al., 2014). It is suggested that early menarche is associated with higher peak bone mass due to the prolonged estrogen effect (Ho & Kung, 2005). In some studies carried out in Turkey with postmenopausal women, no significant relationship was found between menarche age and osteoporosis development (Pinar et al., 2009; Uzun et al., 2014; Baklacioglu et al., 2011). The studies conducted in other countries on the subject revealed different results. While El Maghraoui et al. (2007) and Qiu et al. (2013) found that women's menarche age did not have an effect on the development of osteoporosis, there are studies showing that delayed menarche age increased the risk of osteoporosis (Mendoza et al., 2014; Hyassat et al., 2017). In our study, the average age of menarche in women was found to be within normal limits. For this reason, there was no increased risk for osteoporosis associated with delayed menarche age for the postmenopausal women in our study.

We also found that more than half of the women had more than three births. Some studies carried out in Turkey with postmenopausal women found no relationship between the number of births and the development of osteoporosis (Kutlu, Civi & Pamuk, 2012; Uzun et al., 2014). In contrast, Peker and Tosun (2018) found that femoral bone mineral density decreases significantly as the number of parities in women increases (Peker & Tosun, 2018). In another study, it was stated that parity may be protective in the development of hip fracture (Baklacioglu et al., 2011). The studies conducted in other countries revealed different results. For instance, while Wang et al. (2016) and Hyassat et al. (2017) determined the relationship between increased parity and osteoporosis development, Hassa et al. (2005) and Sioka et al. (2010) did not find any relationship between parity and osteoporosis development (Hassa et al. 2005; Hyassat et al.,

2017; Sioka et al. 2010; Wang et al. 2016). It has been reported that calcium passing from mother to the fetus through circulation during pregnancy leads to osteoporosis in women at later ages (Karakasli, 2012). The fact that most of the women in our study had 4 or more births signifies a risk factor for osteoporosis for our sample.

In our study, it was determined that 27.5% of the women entered menopause before the age of 45 and the average menopause age was found to be 46.44 ± 4.72. These findings coincide with the findings of other studies (Pinar et al., 2009; Ipek et al., 2012; Uzun et al., 2014; Ozdemir, Kabayel & Ture, 2006). Having menopause before the age of 45 is called early menopause and is considered to be a risk factor for the development of osteoporosis (Pinar et al., 2009; Uzun et al., 2014; Onat, Delialioglu & Ozel, 2013). For this reason, in our study, menopause at the age of 45 and earlier was recorded as early menopause in line with the literature. In a study conducted with postmenopausal women in Turkey, it was found that early menopause is associated with low femoral bone mineral density (Onat, Delialioglu & Ozel, 2013). The studies conducted in other countries revealed different results. While Tian et al. (2017) and Sullivan et al. (2015) found a significant relationship between menopause age and the risk of osteoporosis (Tian et al. 2017; Sullivan et al. 2015; Hyassat et al. (2017) did not find a significant relationship between menopause age and development of osteoporosis (Wang et al. 2016). As age increases, anti-resorptive effect of estrogen on bone is lost in menopausal women, which increases the risk of osteoporosis development and fracture (Sullivan et al. 2015). Since the majority of women in our study did not have early menopause, the menopause age of women was not determined as an osteoporosis risk for our sample.

Our study revealed that almost three out of four women had natural menopause. Our findings coincide with the findings of other studies conducted on the subject in Turkey (Pinar et al., 2009; Kokino et al., 2004). One of these studies found that bone mineral densities were lower in surgically menopausal patients, although not statistically significant (Akdemir et al. 2010). As an example of studies conducted in different countries, Kabir et al. (2011) revealed that women with surgical menopause had a greater risk of osteoporosis than women with natural menopause (Kabir, Jahan & Sultana, 2011). It was reported that loss of estrogen experienced

with menopause is a risk factor for osteoporosis development, and all the menopausal symptoms, including osteoporosis, have been reported to occur earlier in women experiencing surgical menopause, compared with those experiencing natural menopause (Ozdemir et al., 2009). In our study, since most of the women in the sample experienced natural menopause, the type of menopause was not specified as a risk factor for osteoporosis.

According to our findings, 93.35% of the women were in menopause for more than 3 years, and the mean duration of menopause was determined as 9.05±6.14 years. Our findings coincide with the findings of other studies carried out in Turkey (Ipek et al., 2012; Ozdemir, Kabayel & Ture, 2006). Some of these studies carried out with postmenopausal women showed that as the duration of menopause increases, the risk of osteoporosis increases as well (Baklacioglu et al., 2011; Ozdemir, Kabayel & Ture, 2006). Among the studies carried out in other countries related to the subject, Kokino et al. (2004) and Tian et al. (2017) found that the risk for osteoporosis increases as menopause duration increases (Hyassat et al., 2017; Tian et al. 2017; Kokino et al., 2004; Kabir, Jahan & Sultana, 2011; Reyes-Garcia et al., 2018; Choi et al., 2016). In our study, it was revealed that, although the women are in menopause for a short time, there is an increased risk of osteoporosis associated with increasing hypoestrogenism as the duration of menopause increases.

The women in our study mostly consumed fruits and vegetables, milk and dairy products, and cereals on a daily basis. In line with the literature, women were asked about the dairy products they consumed at meals, and not consuming any of these products was evaluated as a risk factor for osteoporosis (Sarıdogan, 2005). A study conducted in Turkey demonstrated that 42.3% of the women consumed one glass of yoghurt; 11.8% consumed one glass of ayran (cold yogurt beverage mixed with salt); 40.4% consumed one glass of milk; and 95.2% consumed one matchbox of cheese (Pinar et al., 2009). Karadag et al. (2007) found that 41.4% of menopausal women consumed milk two or three times a week (Karadag et al., 2007). As far as the studies conducted in other countries are concerned, Feskanich et al. (2003) found that women consumed one glass of milk a day on average (Feskanich, Willett & Colditz 2003). Cerrahoglu (2002) revealed that postmenopausal women

most frequently and regularly consumed milk and dairy products (Cerrahoglu et al., 2002). The women in our study consumed less milk and dairy products compared to the women in other studies. It is known that adequate calcium intake is related with maximum peak bone mass and it prevents the development of osteoporosis (Intake, 1994). Furthermore, vitamin D supplementation together with calcium prevents both bone loss and fractures in the elderly (Tang et al., 2007; Chen, et al., 2007). It is stated that vitamin D, per se, is inadequate to prevent bone fractures (Ministry of Health, 2017) The studies on the development of osteoporosis and the consumption of calcium, milk and dairy products in other countries revealed different results. For instance, Cerrahoglu et al., (2002) found in his study that postmenopausal women increased bone mineral density only in the spine region with daily calcium intake (Cerrahoglu et al., 2002; Hallstrom et al. 2006; Kutlu et al. (2012) did not find a relationship between milk, calcium and vitamin D intake and development of osteoporosis (Kutlu, Civi & Pamuk, 2012). Hyassat et al. (2017) found that calcium intake did not affect the development of osteoporosis (Hyassat et al., 2017), while Feskanich et al. (2003) reported that adequate vitamin D intake reduces the risk of osteoporotic hip fracture in postmenopausal women (Feskanich, Willett & Colditz, 2003; Similarly, Reyes-Garcia et al. (2018) found that daily milk intake enriched with calcium and vitamin D increased both vitamin D levels and femur bone mineral density in postmenopausal women (Reyes-Garcia et al., 2018). Adequate total calcium intake for women aged 51 years and over is recommended as 1200 mg/day, while daily vitamin D intake is recommended as 800-1000 IU (Cosman et al., 2014). In our study, as only one out of four women consumed milk and dairy products and calcium regularly, it can be said that our sample was under osteoporosis risk.

Our study further revealed that 64.4% of the women consumed beverages like tea and coffee containing caffeine. In a study conducted in Turkey, it was found that 91.5% of the women consumed at least one glass of tea (4.62 + 2.91 tea cups daily on average) and one cup of coffee per day (36.0%) (Pinar et al., 2009), and in another study, it was found that 16.4% of women consumed excessive amounts of tea and coffee (Umay et al., 2011). In contrast to the studies conducted in other countries in the literature, the

consumption rate of beverages like tea and coffee was found to be higher in our study. The difference may be attributed to the high consumption of tea and coffee in the Turkish culture. When the studies examining the relationship between osteoporosis development, coffee and tea consumption were examined, it was seen that while Hirata et al. (2016) and Hyassat et al. (2017) found that consumption of coffee or black tea poses a risk for the development of osteoporosis (Hyassat et al., 2017). Huang et al. (2018) found that consumption of tea and Choi et al. (2016) found that coffee consumption recovered bone strength in middle-aged and elderly women (Huang et al., 2016). In the literature, it is reported that a cup of Turkish coffee (40 mL) contains 165 mg of caffeine on average, and more than 300 mg of caffeine intake a day is considered to be high (Afifi, Rahahleh & Hadidi, 2008; Rapuri et al., 2001). Another study reports that more than 330 mg of caffeine intake a day by women especially with low calcium intake increases fracture risk (Hallstrom, Wolk, Glynn, Michaelsson, 2006). It is stated that coffee consumption may trigger osteoporosis, especially in people with inadequate calcium intake, such as the elderly, and may increase urinary excretion of calcium (Hallstrom, Byberg, Glynn, Lemming et al., 2013). Therefore, especially in elderly people, adequate calcium and vitamin D intake and 3 cups of coffee consumption on a daily basis is recommended in order to reduce the risk for osteoporosis (Kim, 2014). For this reason, as far as the caffeine intake of postmenopausal women in our study is concerned, regular consumption of two cups of coffee a day was taken into consideration. Although studies in the literature revealed different results as to the effect of tea, coffee and caffeine consumption on the development of osteoporosis, in our study, it was found that most of the women consuming tea and coffee were at risk for osteoporosis.

Our study further revealed that 13.9% of the women had fracture history in their family. In the studies conducted in Turkey, the rate of fracture history in the families of women was found to be similar to our findings (Pinar et al., 2009; Onat, Delialioglu & Ozel, 2013). In our study, it was determined that 10.6% of the women had a fracture history. In their study, Pinar et al. (2009) found that 11.4% of the women had a fracture history. Moreover, while Onat et al. (2013) reported that 2.9% of the women had a fracture

history, Ipek et al. (2012) found that 9.9% of the women had less serious fracture history (Pinar et al., 2009; Ipek et al., 2012; Onat, Delialioglu & Ozel, 2013). The studies conducted in different countries showed that women had similar fracture histories to those in our study (Hyassat et al., 2017; Chen, Miller, Barrett-Connor, Weiss, Sajjan, Siris, 2007). The existence of osteoporosis or osteoporotic fracture history in the family is indicated as a risk factor for osteoporosis development (Pinar et al., 2009; Ozdemir, Kabayel & Ture, 2006). In some studies, no statistically significant relationship was found between osteoporosis or osteoporotic fracture history in a family and osteoporosis (Kutlu, Civi & Pamuk, 2012; Onat, Delialioglu & Ozel, 2013). According to our study, the fact that women had fracture histories at both family and individual level is a risk factor in terms of osteoporosis development.

BMI of the most of the women in our study (84.9%) was determined to be higher than ≥25 kg/m^2 and the average BMI was 28.88 ±4,21. In line with the literature, in our study, women whose BMI was ≤18,5 were classified as thin, and those within the range of 18.5-24.9 were classified as having ideal weight, and those within the range of 25-29.9 were classified as overweight. Those whose BMI was ≥30 were classified as obese [51]. Other studies conducted in Turkey reached similar results regarding the BMI of the women (Pinar et al., 2009; Akdemir et al., 2010; Kilincer et al., 2013). In a study done in Turkey, it was determined that postmenopausal women's BMI was not associated with osteoporosis development (Pinar et al., 2009; Peker & Tosun, 2018). In another study, a significant relationship was found between BMI and femur neck bone mineral density, and it was stated that body weight may be effective in avoiding osteoporosis (Yanık, Atalar, Külcü, Gokmen, 2007). Studies in different countries revealed that increased BMI of postmenopausal women increases the risk of osteoporosis (Hyassat et al., 2017; Tian et al. 2017; Asomaning, Bertone-Johnson, Nasca, Hooven, Pekow, 2006; Mazocco & Chagas, 2017). Since the majority of women in our study were overweight, they were found to be at risk for osteoporosis.

In our study, more than half of the women in the menopausal period (54%) were found to have a chronic disease that increased the risk for osteoporosis. Other studies conducted in Turkey

reported similar rates in terms of the women with a chronic disease (Pinar et al., 2009; Onat, Delialioglu & Ozel, 2013). In those studies, chronic diseases other than osteoporosis were questioned. Since our study aimed to determine the risk factors for osteoporosis, during the data collection phase, chronic diseases were recorded as the diseases which posed a risk of osteoporosis and for which women were routinely undergoing doctor-controlled treatment. According to our findings, more than half of the women (54.1%) were at risk due to the presence of chronic disease which posed a risk for osteoporosis. In our study, 65.6% of the women were found to be on regular medication. The women were asked about the medication posing a risk for osteoporosis such as medical agents like thyroid, epilepsy, cancer, and cortisone drugs; proton pump inhibitors, antacids, and selective serotonin re-uptake inhibitors. It was revealed that women had the most common history of corticosteroid use (18.0%). In the literature, it was reported that osteoporosis should be prevented in individuals receiving at least 7.5 mg of prednisone on a daily basis for at least 3 months (Briot & Roux, 2013). In their study, Chen et al. (2007) found that 37.3% of the women used medicine that could lead to osteoporosis (Chen et al., 2007). According to our findings, more than half of the women (65.6%) are at risk in terms of osteoporosis development because of taking medicines.

When smoking habits of the women in our study were examined, it was seen that 11.5% of the women were smoking. Other studies conducted in Turkey reported similar findings in terms of the smoking rate of menopausal women (Pinar et al., 2009; Onat, Delialioglu & Ozel, 2013; Yurdakul, Eker, Kaya, 2007; Ugurlu et al., 2016). In many studies conducted in Turkey, a meaningful relationship was found between smoking and osteoporosis development (Pinar et al., 2009; Ugurlu et al., 2016; Tasoglu, Ozdemir & Kutsal, 2011; Altunbayrak et al., 2008), while in another study, no relationship was found between smoking and osteoporosis development (Hyassat et al., 2017). It has been indicated in the literature that there is a direct relationship between tobacco use and decreased bone density. Besides, studies conducted on the effects of smoking have indicated that smoking increases fracture risk and has a negative effect on bone healing after fracture (NIH, 2011). Since no studies addressing the effect of the amount of daily cigarette consumption on osteoporosis was found, the data regarding smoking in our study was handled as smoking and non-smoking women.

As far as sun exposure is concerned, 12.7% of the women in our study reported sunbathing regularly for 15 minutes. Another study conducted in Turkey found that 58.1% of menopausal women over 45 years sunbathe regularly by exposing their legs and arms to sunlight every day (Pinar et al., 2009). The difference between the percentages may be due to the fact that the data in our study was collected during the winter period. In another study conducted in Turkey, it was revealed that women who prefer to cover themselves were found to be more prone to vitamin D deficiency (Demirbag, Guldiken, Ture, Ozdemir, 2003; Kutsal, Ozguclu & Karahan, 2011). The fact that many women in the Turkish society prefer to cover themselves due to their religious beliefs may be a reason behind the low rate of women who are regularly exposed to sunlight on a daily basis, compared to other studies. In the literature, exposure to sunlight is defined as 10-15 minutes per day for adults, with the hands, face and arms not covered (Hyassat et al., 2017; Kutsal, Ozguclu & Karahan, 2011). Vitamin D, which is a steroid hormone, affects the activity of osteoblasts, osteoclasts and osteocytes, and is important in skeletal health and mineral metabolism since it affects bone formation, bone resorption and bone quality (Umay et al., 2011). In the studies conducted so far, a significant relationship has been found between inadequate exposure to sunlight and the development of osteoporosis (Pinar et al., 2009; Hyassat et al., 2017; Wang et al. 2016; Kabir, Jahan & Sultana, 2011). According to our results, women are at risk in terms of osteoporosis development since they receive inadequate sunlight.

Our study further revealed that 8.2% of the menopausal women did regular exercise. While the rate of women doing exercises in our study coincides with the findings of other studies (Pinar et al., 2009; Yurdakul, Eker & Kaya, 2007), it was found to be lower than the rate in other countries (Abedzadeh-Kalahroudi et al., 2012). The frequency of women doing exercises varies from country to country and even from one region to another in a country. The difference may be attributed to geographical and cultural differences. It is thought that since the data was collected during the winter months in our study

and since the women were less active physically due to the weather conditions, the rate of women doing regular exercise was found to be low. Another study conducted in Turkey revealed a positive correlation between the duration of exercise and bone mineral density (Demirbag, Guldiken, Ture & Ozdemir, 2003). Yet another study reported that both exercise and vitamin D supplement increased physical function and muscle mass in the elderly (Mazocco & Chagas, 2017). According to our results, women are at risk for osteoporosis since they are not active enough physically.

Conclusion and Recommendations

In our study, nutrition style, type of consumed beverages, fracture history, sunbathing, doing regular exercise, existence of chronic diseases, use of corticosteroid, smoking and alcohol consumption, BMI, menopause age and menopause age of family members were found to be among the osteoporosis risk factors of the women.

For this reason, nurses working in Corum province should inform the women in the postmenopausal period about the nutrition and exercise programs that could prevent or slow down the development of osteoporosis, about the effects of tea/coffee consumption and smoking, and about the management of chronic diseases. Nurses should also include the women in the postmenopausal period in the protection programs.

It is recommended that postmenopausal women with many births should be informed about the effect of parity on the development of osteoporosis; the women with excessive tea and coffee consumption, low vitamin D and calcium intake, and risk factors associated with nutrition should be included in a healthy nutrition program in order to reduce the risk factors; and the overweight women and the women with insufficient physical activity should be included in exercise programmes in order to ensure weight control and to increase mobility. Besides, raising awareness of the public on the effects of sunbathing, vitamin D and calcium intake on the development of osteoporosis, informing postmenopausal women about the effects of smoking and alcohol consumption on the development of osteoporosis, encouraging them to give up smoking, and giving training and consultancy to help them take the osteoporosis risk factors under control are also recommended.

Acknowledgments

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