Evaluation of The Quality of Life of Patients with Postmenopausal Osteoporosis

Postmenopozal Osteoporozlu Hastalarda Yaşam Kalitesinin Değerlendirilmesi

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Abstract

Objective	In our study, we aimed to determine the postmenopausal osteoporosis (PMO) effect on quality of life using The International Osteoporosis Society Quality of Life Survey (QUALEFFO-41).
Materials and Methods	A total of 123 patients and 49 healthy women with PMO participated to our study. Bone mineral density was measured using dual energy X-ray absorptiometry (DXA). The demographic characteristics, educational status, occupational activities, age at menopause, duration, physical activity level, presence of PMO in family, fracture history in family and hospital, presence of treatment for PMO, and presence of movement system and systemic disease and chronic drug usage history of the patients were assessed. QUALEFFO-41 was used to assess the quality of life.
Results	The QUALEFFO-41 total score revealed a statistically significant correlation between exercise, age, age at menopause, menopause duration, and the t score and total score of the femur neck in DXA measurement. Age was the most important determinant of the quality of life.
Conclusion	In our study, we found that there are many factors that affect the quality of life in patients with PMO. Therefore, it will be appropriate to evaluate the patients in many ways. When planning the treatment of patients with PMO, factors affecting exercise and other quality of life should be considered in addition to drug therapy.
Keywords	Osteoporosis; Postmenopause; Quality of life.

Öz

Amaç	*Çalışmamız Uluslararası Osteoporoz Derneği Yaşam Kalitesi Anketi (QUALEFFO-41) ile postmenopozal osteoporozun (PMO) yaşam kalitesi üzerindeki etkisinin anlaşılmasını amaçlamıştır.*
Gereç ve Yöntemler	*Çalışmamıza PMO'lu toplam 123 hasta ve 49 sağlıklı kadın katıldı. Kemik mineral yoğunluğu dual energy X-ray absorptiometry (DXA) ile ölçüldü. Hastaların demografik özellikleri, eğitim durumu, mesleki faaliyetler, menopoz yaşı, süre, fiziksel aktivite düzeyi, ailede PMO varlığı, ailede ve hastanede kırık öyküsü, PMO için tedavinin varlığı, hareket sistemi ve sistemik hastalık varlığı ve kronik ilaç kullanım öyküsü sorgulandı. QUALEFFO-41 yaşam kalitesini değerlendirmek için kullanılmıştır.*
Bulgular	*Hastalarımızın demografik ve klinik verileri ile yaşam kalitesi puanları arasındaki değerlendirme sonucunda; QUALEFFO-41 toplam skoruyla DXA ölçümünde egzersiz, yaş, menopoz yaşı, menopoz süresi, femur boynu T skoru ve femur boynu toplam skoru arasında istatistiksel olarak anlamlı bir ilişki vardı. Yaş, yaşam kalitesinin en önemli belirleyicisi olarak belirlendi.*
Sonuç	*Çalışmamızda PMO'lu hastalarda yaşam kalitesini etkileyen bir çok faktör olduğunu tespit ettik. Bu yüzden hastaların çok yönlü olarak değerlendirilmesi uygun olacaktır. PMO'lu hastaların tedavisini planlarken, ilaç tedavisinin yanı sıra, egzersizde ve diğer yaşam kalitesini etkileyen faktörler de göz önünde bulundurulmalıdır.*
Anahtar Kelimeler	*Osteoporoz; Postmenopoz; Yaşam Kalitesi.*

INTRODUCTION

Osteoporosis, which is the most common bone disease, is a systemic skeletal disease characterized by low bone mass and deterioration of the microstructure of the bone tissue, leading to an increase in bone fragility and fracture risk. Bone fractures are the most important complication of postmenopausal osteoporosis (PMO), most commonly affecting the vertebra, hip, and wrist.[1,2]

Osteoporosis is more common in the elderly population and is widely related to poor quality of life.[3] In fact, 75% of fractures occurring after 45 years of age are due to PMO. Nontraumatic vertebral fractures occur in approximately 30% and 50% of women aged >75 and >85 years, respectively.[4]

Fractures associated with osteoporosis cause pain and low physical and social functions, thereby negatively affecting the quality of life.[5]

Therefore, assessing the quality of life in PMO has become increasingly important. The International Osteoporosis Society Osteoporosis Quality of Life Questionnaire (QUALEFFO), which comprises five subscales, namely, pain, physical function, social function, general health assessment, and mental function, is used to assess the health status and quality of life associated with PMO.[6]

There have been many studies evaluating the effects of osteoporosis on quality of life and evaluating the effects on quality of life (13-15)[7-9]. However, the number of studies examining the factors that determine the quality of life is very low in patients with osteoporosis. In order to determine the effectiveness and risk factors of treatment for osteoporosis, the factors affecting the quality of life should be analyzed in detail.

MATERIALS and METHODS
Participants

This study is a descriptive type, cross-sectional design approved by local ethics committee (Approval date-protocol number: 17/12/2018-18992) and conforms to the principles of the Declaration of Helsinki. Informed consent was obtained from all the participants. The study was performed in the Physical Therapy and Rehabilitation Outpatient Clinic at the Bezmialem Vakif University Medical Faculty Hospital from January 2019 to April 2019. Patient selection; Postmenopausal women, secondary osteoporosis excluded, patients with Dual Energy X-ray Absorptiometer (DXA) results were included in the study. Those who had a rheumatological, orthopedic and neurological problem, osteomalacia, hyperparathyroidism, malignancy, secondary osteoporosis that may have a significant impact on quality of life, a history of menopause before the age of 40, a history of surgical menopause were excluded from the study. We included 123 consecutive female patients with osteoporosis and 49 femles with normal bone mineral density (BMD) measurements. The Inclusion criteria were as follows: female, age 45-75 years, and diagnosis of osteoporosis based on BMD measurements and World Health Organization (WHO) criteria.[10] Conversely, women diagnosed with any recent fracture, secondary osteoporosis, metabolic bone disease, malignancy, or bone metastasis were excluded.

Patients' demographic characteristics, educational status, occupational activities, smoking and alcohol use, age at menopause, menopause duration, exercise habit, PMO incidence in the family, fracture history in the family or the patient, PMO treatment history, orthopedic or systemic disease history, and chronic drug usage were questioned. Body mass index (BMI) was calculated as kg/m2 by measuring the height and body weight of the patients.

Measurements

BMD measurements of our patients were evaluated using dual energy X-ray absorptiometry (DXA) (Norland XR36, Norman Medical Systems, Inc., Fort Atkinson, USA) at the anterior–posterior projection, on the lumbar spine (L1–L4), and at proximal femur regions (consistency error

margin, 1%).

According to the WHO criteria, t scores of lower than −2.5 standard deviations in at least one of the regions to be measured (lumbar spine and hip) indicate osteoporosis, whereas those between −1 and −2.5 standard deviations suggest osteopenia. Meanwhile, t scores greater than −1 were considered normal.

We assessed the quality of life of patients using QUALEF-FO−41, one of the most widely used PMO disease assessment scales in the literature. QUALEFFO comprises 41 questions under the following five subheadings: pain (5 questions), physical function (17 questions), social activities (7 questions), general health assessment (3 questions), and mental function (9 questions). Total QUALEFFO points were obtained by adding the scores of all the questions. QUALEFFO-41 total and subscale scores were scored between 0 and 100. For each subscale and total score, 0 indicates the best, whereas 100 indicates the worst situation. The Turkish version of QUALEFFO-41 was used in our study.[6]

Statistical Analyses

Statistical evaluations were performed using the IBM SPSS 22.0 version program (IBM Corporation, Armonk, NY, USA). Descriptive statistical results were represented as Avg. ± SD and Medyan (Min-Max). The consistency of numerical variables to the normal distributions in each group was examined by Shapiro-Wilk test. The differences in numerical parameters between the PMO and normal groups were analyzed by Mann–Whitney U test. Their correlation was examined by Spearman's rho correlation analysis test. Correlation strength was rated as 0–0.49, 0.5–0.74, or 0.75–1, indicating weak, moderate, and strong relationship, respectively. Furthermore, the impact scores of the variables with the highest correlation on the quality of life of statistically significant correlations were determined by multiple regression analysis. A p value of 0.05 indicated statistical significance with 95% confidence interval.

RESULTS

A total of 123 patients and 49 healthy women were included in the study. The median age of the patients was 63 (range, 43-85) years, and that of healthy participants was 63 (range, 43-85) years. The socio-demographic and clinical characteristics of our cases are summarized in Table 1.

Mann–Whitney U test revealed that exercise alone positively affected the quality of life (Table 2). In addition, when we grouped our cases as those with and those without osteoporosis, the presence of osteoporosis in the femoral neck region negatively affected the quality of life, whereas that in the lumbar region yielded no effect. This result was statistically significant (Figures 1 and 2).

In the analysis of correlation between demographic and clinical data and the quality of life scores of our cases, a statistically significant weak positive correlation was found among age, age at menopause, and menopause duration; and a negative correlation between height (Table 3).

In patients with PMO in our study, the level of efficacy among the parameters related to the quality of life was determined by multiple regression tests. We found that the most important determinant of the quality of life was age (p < 0.001, p = 0.025) (Table 4).

Table 1: Demographic and clinical features of the cases			
Variables	Normal (n:49)	Osteoporotic(n:123)	p
Age, years, Medyan(Min-Max)	62(47-82)	63(43-85)	0.689
Menopause age, years, Medyan(Min-Max)	46(35-58)	47(25-55)	0.936
Menopause duration, years, Medyan(Min-Max)	17(4-34)	17(1-48)	0.861
Length, meters, Medyan(Min-Max)	1,58(1,47-1,70)	1,55(1,35-1,80)	**0.015**
Weight, kg, Medyan(Min-Max)	71(47-95)	65(42-100)	**<0.001**
Body mass indexes, kg/m2, Medyan(Min-Max)	29(19-40)	27(17-39)	**0.01**
Job, n(%)			0.979
Housewife	35(71.43)	86(69.92)	
Retired	12(24.49)	32(26.02)	
Other	2(4.08)	5(4.07)	
Cigarette, n(%)			0.630
No	43(87.76)	111(90.24)	
Yes	6(12.24)	12(9.76)	
Alcohol, n(%)			0.040
No	49(100)	113(91.87)	
Yes	0(0)	10(8.13)	
Additional disease, n(%)			0.124
Hypertension	17(34.69)	56(45.53)	
Diabetes mellitus	19(38.78)	52(42.28)	
Breast cancer	6(12.24)	5(4.07)	
Hyperthyroidism	5(10.2)	9(7.32)	
No	2(4.08)	1(0.81)	
Fractured story in the family, n(%)			0.472
No	41(83.67)	108(87.8)	
Yes	8(16.33)	15(12.2)	
Previously broken story, n(%)			0.124
No	46(93.88)	105(85.37)	
Yes	3(6.12)	18(14.63)	
Previous treatment with OP, n(%)			
Bisphosphonate		80(65.04)	
Strontium		29(23.58)	
Raloxifene		3(2.44)	
Calcitonin		7(5.69)	
No drug		4(3.25)	
Exercise, n(%)			
No		95(77.24)	
Yes		28(22.76)	
BMD, mean±SD			
Lombar total score	-1.59±0.90	-3.02±0.72	**<0.001**
Femur neck t score	-1.43±0.84	-2.20±0.79	**<0.001**
Qualeffo total score, Medyan(Min-Max)	30(7-67)	33(6-77)	0.281
QUALEFFO: The International Osteoporosis Society Osteoporosis Quality of Life Questionnaire, BMD: Bone Mineral Density, OP: osteoporosis, Min: Minimum, Max: Maximum, SD: standard deviation.			

Table 2: Comparison of quality of life in different groups										
	Normal (n:49)					Osteoporotic(n:123)				
	N	Medyan	Min-Max	Z	P*	N	Medyan	Min-Max	Z	P*
Cigarette				-0.061	0.964				-0.303	0.762
TQS of who don't smoke	43	30	9-67			11	33	6-77		
TQS of who smoke	6	33	7-52			12	37	11-74		
Alcohol									-0.162	0.871
TQS of nonalcoholic	49	30	7-67			11	33	6-77		
TQS of alcoholic	-	-	-			10	33	11-74		
Additional disease				-1.502	0.133				-1.133	0.257
TQS of without add. dis.	17	18	9-51			56	33	6-74		
TQS of with add. dis.	32	30	7-67			67	32	7-77		
Fracture history in family				0.787	0.801				-0.773	0.439
TQS of who haven't	41	30	7-67			108	33	6-77		
TQS of who have	8	29	20-45			15	37	14-65		
Fracture history of patient				0.337	0.365				-0.401	0.689
TQS of who haven't	46	30	7-67			105	33	6-77		
TQS who have	3	41	20-52			18	35	12-61		
Treated with OP				-0.622	0.534				-0.300	0.764
TQS of who treated	31	30	7-67			80	33	6-74		
TQS of who didn't treat	18	27	9-52			43	35	7-77		
Exercise				0.295	0.301				-2.437	0.015
TQS of who exercises	40	30	9-67			95	36	6-77		
TQS of who don't exercise	9	27	7-46			28	24	7-61		
*: Mann Whitney U test: OP: osteoporosis, TQS: total QUALEFFO score: Min: Minimum: Max: Maximum, p<0.05: Statistical significance level.										

Table 3: Correlation between quality of life and demographic and clinical data				
Variables	Normal (n:49)		Osteoporotic (n:129)	
Age, years, Medyan (Min-Max)	r	p*	r	p*
Age (years)	0.449	<0.001	0.443	<0.001
Menopause age (years)	-0.038	0.675	0.363	0.010
Menopause duration (years)	0.436	<0.001	0.307	0.032
Length (meters)	-0.219	0.015	-0.325	0.023
Weight (kg)	0.102	0.263	-0.103	0.482
Body mass indexes (kg/m2)	0.184	0.042	0.087	0.551
BMD				
Lomber total score	-0.042	0.646	-0.010	0.946
Femur neck T score	-0.360	<0.001	-0.232	0.108
*: Spearman rho correlation test, BMD: Bone Mineral Density, rho: Coefficient of correlation analysis, p<0.05: Statistical significance level				

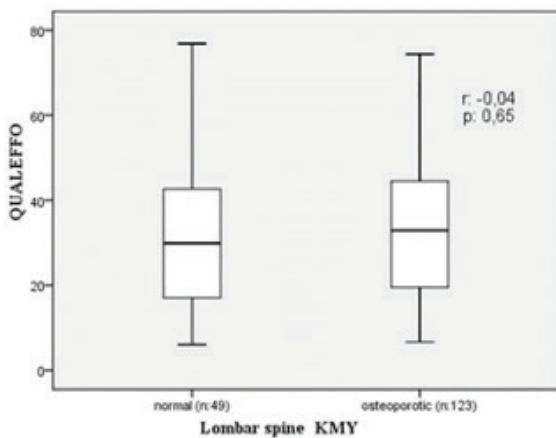| Table 4: Impact ratings of variables with the highest correlation to the quality of life of PMO patients		
Variables	Normal (n:49)	Osteoporotic (n:129)
QUALEFFO-41 (The dependent variable)		
Independent Variables	beta	p*
Age	0,463	<0,001
Menopause age	-0,125	0,137
length	-0,022	0,797
*: Multiple regression test, p<0.05: Statistical significance level.		

Figure 1. According to Lomber vertebra BMD, the quality of life relationship between the patient and control group QUALEFFO score
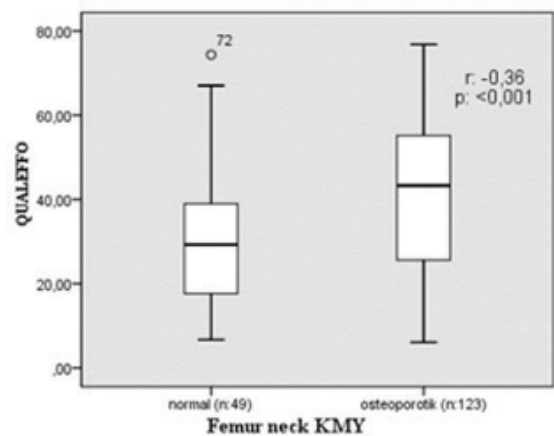

Figure 2. QUALEFFO score and quality of life relationship of patient and control group according to femur neck BMD

DISCUSSION

Reduced bone density in osteoporosis is associated with chronic pain, movement restriction, and increased fracture risk, often causing disruption in daily life activities and decrease in the quality of life of elderly patients.[11] Fractures can cause pain, deformation, disability, and even death. Spine and hip fractures are among the most destructive. Consequently, patients with fractures may develop loss of physical function and require long-term care.[12,13] Hence, this study aimed to evaluate the impact of PMO on the quality of life by employing QUALEFFO and to identify the factors affecting the quality of life of patients with such condition.

Osteoporosis generally affects the quality of life.[14] In our study, in the correlation analysis between demographic and disease-specific parameters and quality of life, a significant correlation was found among age, age at menopause, menopause duration, height, and quality of life.

Old age plays a role in the development of PMO and reduces the quality of life. Advanced age has a negative impact on the quality of life, particularly because it increases the prevalence of vertebral fractures in patients with PMO.[15, 16] Age of >65 years was associated with the loss of balance and increased risk of falls.[17] Therefore, osteoporosis should be treated, especially considering the increased risks in the elderly population. In our study, we considered variables with the highest correlation with quality of life as a regression model to reveal the effect levels of the parameters that determine the quality of life. As a result of this analysis, the primary determinant of the quality of life in women was "age." Thus, older age has a negative effect on the life quality of patients with PMO. In other studies, weight gain is considered as another factor that negatively affects the quality of life.

In participants with obesity, the quality of life worsened as their BMI increased.[18] In women with PMO, weight gain and the quality of life were negatively correlated.[19] In our study, BMI affected the quality of life in normal individuals, but in patients with PMO, no relationship was identified. Hence, our case could be owing to narrow BMI range. Most patients with PMO have one or more chronic diseases owing to old age. Chronic diseases, such as DM, HT, and hyperthyroidism, can cause deterioration in the quality of life. Van Schoor et al. found that patients with PMO presenting with chronic disease had a lower quality of life than those without chronic disease.[20] In our study, the presence of chronic disease did not affect the quality of life in patients with PMO.

Menopause was also considered in this study. In postmenopausal women, estrogen levels decrease. This decrement has a direct effect on BMD, triggering osteoporosis.[21] In our study, the long menopausal period negatively affected the patients' quality of life, consistent with previous studies.[22]

The presence of low BMD is one of the most important risk factors causing fractures.[23] Hip fractures is a common condition in patients with osteoporosis and has a negative effect on mortality and morbidity. It may also create additional burden for both patients and caregivers. In our study, low t score values of the femur neck had a negative impact on the quality of life. However, relationship was found between the L1–4 T score and the quality of life. In women with PMO, low BMD values of the femur neck and lumbar vertebrae negatively impact the quality of life.[24,25] Therefore, in patients with PMO in the hip area, the quality of life is affected more than that in patients with osteoporosis in the vertebral region.

Various exercise programs are recommended for patients with osteoporosis. Aerobic, weight-bearing, and resistance exercises increase vertebral bone density in women with PMO. These activities are proven effective in improving bone density and reducing the risk of falls.[26,27] Mack et al. reported that physical activity has a strong positive relationship with the quality of life.[28] In our study, partici-

pants who did not exercise had a significantly lower quality of life than those who exercised. Therefore, physical activity has a positive effect on PMO.

Although the number of participants included in our study was high, there were some limitations. The control patients included in our study were relatively low. Anti-depressant and serum vitamin D levels that could affect the quality of life of the participants were not evaluated. It has also not been evaluated for diseases such as osteoarthritis and fibromyalgia, which may affect patients' quality of life. Our study included a limited number of patients compared to larger multinational investigations, but it is among first to explore this public burden in our country. This is important, as nutrition varies differently among races and geographical areas, and dietary intake of minerals and vitamins, especially Ca, P and vitamin D, is important for bone metabolism.

CONCLUSION

When planning the treatment of patients with PMO, apart from drug therapy, exercise and other factors affecting their quality of life should be considered.

This study is a descriptive type, cross-sectional design approved by local ethics committee (Approval date-protocol number: 17/12/2018-18992) and conforms to the principles of the Declaration of Helsinki.

Conflict Report

There is no conflict of interest between the authors during the preparation and publication of this writing.

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