



## Impacts of osteoporosis on quality of life in elderly women

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### Original Article

#### Abstract

**BACKGROUND:** Osteoporosis, the most common pathological cause of skeletal weakening and the most common metabolic bone disease, is caused by loss of bone mass density (BMD). Fractures due to osteoporosis will worsen life, increase pain, and decrease quality of life. The present study aimed to determine the impact of osteoporosis on quality of life among elderly women.

**METHODS:** In a cross-sectional study, 275 postmenopausal women (age: 50-70 years) who were referred to the Namazi Hospital (Shiraz, Iran) were included. BMD was measured according to the World Health Organization (WHO) standards. Women with BMD < -2.5 standard deviation (SD) of the average value in young adults were defined as osteoporosis cases. Women with BMD > 1 SD of the average value were defined as normal cases. Quality of life was measured by Qualeffo-41 Questionnaire and reported on a scale of 100. Data was analyzed in SPSS and P values less than 0.05 were considered significant.

**RESULTS:** The mean quality of life score was  $25.5 \pm 11.7$ . According to the definition by the WHO, 70.2% of the participants were affected with osteoporosis. Only 22.3% of osteoporotic women and 30.5% of normal subjects had good quality of life. A significant statistical difference was observed between osteoporotic and normal postmenopausal women in social activities. Overweight and low education were predictors of poor quality of life in multivariate analysis.

**CONCLUSION:** The imposed financial burden and complications of osteoporosis can affect the patients' quality of life. Health education regarding nutritional behaviors and social activities at adolescence are helpful interventions for decreasing the prevalence of the disease. Since osteoporosis has a gradual, outward, and asymptomatic trend, more attention needs to be paid to preventive and screening programs.

**KEYWORDS:** Quality of Life, Osteoporosis, Menopause, Female, Qualeffo-41 Questionnaire

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#### Introduction

Osteoporosis is the most common pathological cause of skeletal weakening.<sup>1</sup> It is also the most common metabolic bone disorder associated with decreased bone mass and quality and

increased risk of fracture.<sup>1,2</sup> Due to hormonal changes after menopause,<sup>1</sup> osteoporosis is more prevalent in women than in men.<sup>2</sup>

The gradual development of osteoporosis and the absence of warning signs prevents the patient from noticing the disease until the first fracture occurs.<sup>1,2</sup> Since osteoporosis increases the risk of fractures in femoral and hip bones and the spinal column,<sup>3</sup> it results in high

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mortality and morbidity and treatment costs. Therefore, the complications of osteoporosis, especially fractures, are major causes of reduced quality of life.<sup>4,5</sup>

The enhanced life expectancy and the overall aging of the population in the current world have increased the prevalence of osteoporosis.<sup>6,7</sup> In fact, femoral fractures are predicted to have increased by 310% in men and 240% in women until 2050. This will raise medical costs from \$131,500 in 1990 to \$348,000 in 2050.<sup>8,9</sup> Importantly, most of these fractures occur in Latin America and Asia.<sup>2,9,10</sup> According to data from the World Health Organization (WHO), more than 540 million people over 56 years old will live in Asia in 2050 which means more than 50% of fractures will happen in this region.<sup>11</sup> The lifetime prevalence of fractures due to osteoporosis in women more than 50 years old is 40% in the United States and 46% in Sweden.<sup>2</sup> A meta-analysis in Iran showed the mean prevalence of osteoporosis in Iranian women to be 18.9% (range: 1.5% to 43.0%).<sup>3</sup>

Hormonal changes, alcohol consumption, smoking, inactivity, high meat consumption, and menopause before the age of 50 have been proposed as risk factors for osteoporosis.<sup>1,2,8,12</sup> Although the impact of osteoporosis and its complications on quality of life is clear, health-related quality of life in osteoporotic women without fracture has not been adequately assessed.<sup>11,13</sup> The current study aimed to determine the impacts of osteoporosis on quality of life of 50-70-year-old women without fractures.

## Materials and Methods

This cross-sectional study was conducted on 50-70-year-old women who referred to Namazi Hospital (Shiraz, Iran) during 2008. After bone mineral density (BMD) measurements, women with BMD more than 2.5 standard deviations (SD) below the mean value for young healthy women (a T-score of < -2.5 SD) were considered as osteoporotic.<sup>2,14</sup> Women with BMD less than one SD below the mentioned mean value

(T-Score > -1 SD) were considered as normal.<sup>14</sup> Women with osteopenia, chronic kidney diseases, cancers, respiratory and heart disorders, diabetes, uncontrolled hypertension, and hearing and visual disorders were excluded from the study. Finally, 275 eligible women were included in the study.

The Quality of Life Questionnaire of the European Foundation for Osteoporosis (QUALEFFO-41) was used for data collection.<sup>15-17</sup> QUALEFFO-41 has 41 items and measures five aspects of quality of life (pain, physical function, leisure and social activities, general health perception, and mental function). Each item is scored as one-five where one shows the best situation and five shows the worst, i.e. higher scores reflect poorer quality of life. The obtained quality of life scores were compared between osteoporotic and normal women. Since the maximum final score is 100, the quality of life is categorized as good, moderate, and poor if the scores are < 25, 25-75, and > 75, respectively. The reliability of QUALEFFO-41 has been reported as 0.78-0.96 by previous studies.<sup>16,18-21</sup>

The collected data was entered into SPSS for Windows (version 16.0, SPSS Inc., Chicago, IL, USA) and analyzed by Student's t-test, and chi-square and Mann-Whitney nonparametric tests.

## Results

The mean age of the subjects was  $58.20 \pm 5.99$  years. The majority of the participants (87.6%) were married and living with their spouse. While most subjects (70.4%) held a high school diploma, 19.3% had not finished high school and 10.9% were university graduates. Osteoporotic women constituted 70.2% of the study sample.

The mean score of quality of life was  $31.6 \pm 9.58$  (range: 5.56-72.83). As table 1 shows, osteoporotic women had higher quality of life scores than normal ones ( $P > 0.05$ ). Although the mean score of social activities subdomain was significantly higher in osteoporotic women than in the other group ( $P = 0.002$ ), the two groups had no significant differences in other aspects (pain,

**Table 1. Body mass index (BMI), age, and scores of quality of life and its aspects in osteoporotic and healthy elderly women**

Variables	Osteoporotic (n=193)		Normal (n=82)		P
	Median	Mean $\pm$ SD	Median	Mean $\pm$ SD	
BMI (kg/m <sup>2</sup> )	28.1	28.1 $\pm$ 4.4	25.2	25.7 $\pm$ 4.1	< 0.001*
Age (year)	58.0	59.3 $\pm$ 6.1	54.0	55.5 $\pm$ 4.7	< 0.001*
Quality of life score	31.3	32.2 $\pm$ 9.9	31.1	30.3 $\pm$ 8.5	0.247
Domain of quality of life					
Pain	35.0	37.5 $\pm$ 16.6	35.0	33.6 $\pm$ 15.9	0.123
Physical function	10.2	13.1 $\pm$ 14.4	10.2	9.9 $\pm$ 7.9	0.262
Leisure and social activities	37.8	34.8 $\pm$ 15.1	31.7	28.8 $\pm$ 13.7	0.002*
General health perception	33.3	37.9 $\pm$ 15.7	41.6	40.9 $\pm$ 15.6	0.115
Mental function	36.1	37.3 $\pm$ 7.4	38.8	38.4 $\pm$ 10.1	0.268

\*Statistically significant; BMI: Body mass index

physical function, general health perception, and mental function). However, there were significant differences between the two groups regarding age ( $P < 0.001$ ) and body mass index (BMI) ( $P < 0.001$ ).

Table 2 shows the relationship of qualitative variables with osteoporosis. As it is seen, while marital status was not significantly related with osteoporosis ( $P = 0.456$ ), significant relationships existed between osteoporosis and education ( $P < 0.001$ ) and BMI ( $P < 0.001$ ). Good quality of life was detected in 22.3% and 30.5%

of the osteoporotic and healthy women ( $P = 0.302$ ).

We used a logistic regression model to adjust the effects of confounding factors in comparisons between subjects with good and moderate quality of life and those with subjects with poor quality of life. According to table 3, being overweight (odds ratio: 3.26; 95% confidence interval: 1.20-8.70) and having low education (odds ratio: 3.43; 95% confidence interval: 1.51-7.79) were predictors of poor quality of life.

**Table 2. The relationship between osteoporosis and marital status, obesity, and education level in elderly women**

Variable		Osteoporotic women (n = 193)	Normal women (n = 82)	P
Marital status	Single	171 (88.6)	70 (85.4)	0.456
	Married	22 (14.6)	12 (11.4)	
Weight	Normal (BMI < 25 kg/m <sup>2</sup> )	94 (48.7)	14 (17.1)	< 0.001*
	Overweight (25 $\leq$ BMI < 30 kg/m <sup>2</sup> )	72 (37.3)	46 (56.1)	
	Obese (BMI $\geq$ 30 kg/m <sup>2</sup> )	27 (14.0)	22 (26.8)	
Education	Lower than high school diploma	52 (26.9)	1 (1.2)	< 0.001*
	High school diploma	122 (63.2)	70 (85.4)	
	University degree	19 (9.8)	11 (13.4)	
Quality of life	Good	43 (22.3)	25 (30.5)	0.302
	Moderate	99 (51.3)	40 (48.8)	
	Poor	51 (26.4)	17 (20.7)	

\* Statistically significant; Values are n (%); BMI: Body mass index

**Table 3. Predictors of poor quality of life in logistic regression model**

Variables		B	P	OR	95% CI for OR
Body mass index	< 25 kg/m <sup>2</sup>	0	-	1.00	-
	25-30 kg/m <sup>2</sup>	1.18	0.018	3.26	1.20-8.70
Education level	Lower than high school diploma	1.23	0.003	3.43	1.51-7.79
	College degree	0	-	1.00	-

OR: Odds ratio; CI: Confidence interval

## Discussion

Osteoporosis is an important health-related problem that reduces quality of life and imposes great financial burden on patients by causing fractures.<sup>12</sup> Due to the gradual and asymptomatic nature of osteoporosis,<sup>13</sup> the disease seems not to affect the quality of life in osteoporotic patients without fracture. In the present study, osteoporotic patients had significantly lower scores in the leisure and social activities subdomain of QUALEFFO-41. In other words, these patients had problems in sports, entertainment, visiting friends, sexual activities, and recreation and were hence in need of help. However, since the disease is asymptomatic in nature,<sup>13</sup> we did not observe any differences between osteoporotic patients and healthy subjects in other aspects of quality of life. Therefore, lack of awareness about the irreversible consequences of the osteoporosis disease with physical and psychological changes due to menopause yields decreasing in daily activities and increasing the risk of fractures in elderly women.<sup>6,7,22</sup>

In the present study, the two groups were not significantly different in terms of good quality of life (22.3% vs. 30.5%). In contrast, Bianchi *et al.* reported a significant difference in this regard (41% vs. 11%).<sup>19</sup> Other studies have also indicated a significant relationship between osteoporosis and quality of life.<sup>16,18,19,23</sup> However, osteoporosis is a multidimensional systemic disease that can affect different aspects of life.<sup>16</sup> Martin *et al.* discussed that poor quality of life of osteoporotic women can be caused by their fear of future fractures or changes in their lifestyle to prevent fractures.<sup>13</sup>

There was no significant relationship between osteoporosis and mental activities in the current study, i.e. physical inactivity did not decrease mental activity. The same results were found in other studies.<sup>24,25</sup> On the other hand, although we failed to observe a relationship between osteoporosis and general health perception, Silverman confirmed such a relationship.<sup>26</sup>

According to the results of regression

analysis, being overweight and having low education could increase the odds of osteoporosis by three times. Hence, increased awareness of people, especially elderly women, may reduce the incidence of osteoporosis. Moreover, since the improved life expectancy and demographical changes in Iran will increase the elderly population in the country, appropriate and continuous screening programs are essential to prevent osteoporosis and its complications.<sup>27</sup>

## Conclusion

Osteoporosis without fractures affected only the social activities aspect of quality of life. However, the financial burden due to osteoporosis can affect the quality of life because synergic effect of menopause consequences and osteoporosis complications. Health education about nutritional behaviors and social activities at adolescence will be helpful interventions to decrease the future incidence of osteoporosis. In addition, public sport programs in local parks, periodical visits, and enlivening camping can promote the quality of life in elderly people.

## Conflict of Interests

Authors have no conflict of interests.

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