

## QUALITY OF LIFE IN OSTEOPOROSIS

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### SUMMARY

*Osteoporosis is a disease characterized by low bone mass and micro-architectural deterioration of bone tissue with increased fracture risk. It affects large numbers of individuals worldwide, especially the postmenopausal women. Pain, limitation of motion, and vertebral or non-vertebral fractures from osteoporosis makes daily life difficult. Due to pain, limitation of motion, and deformities patients have difficulty in being satisfied with their roles, and meeting their expectations in social relations.*

*In this study we aimed at evaluating the effects of osteoporosis on the quality of life. One hundred thirty postmenopausal women were included to the study. To exclude other diseases, which may have an effect on bone mineral density (BMD), routine biochemical, hematological, and when necessary, hormonal tests were performed. Patients with abnormal results were excluded.*

*According to BMD measurements and World Health Organization criteria, 33 women were normal (mean age 49,18±6,01; mean duration of menopause 3,42±3,99), 51 were osteopenic (mean age 54,03±7,81; mean duration of menopause 7,22±0,95), and 46 were osteoporotic (mean age 62,39±8,15; mean duration of menopause 13,77±8,17). Osteoporotic patients were further grouped according to presence of decrease in body height and history of non-vertebral fractures. Nottingham Health Profile (NHP) quality of life measurement scale was applied to each individual, and 6 scores (pain, physical activity, energy level, sleep, social isolation and emotional reaction) were evaluated.*

*All groups of postmenopausal patients, including the normal BMD group revealed interestingly higher scores in NHP scores. That is, 'quality of life' was lower in all postmenopausal patients. BMD was negatively correlated with the NHP scores; that is, quality of life was correlated with BMD results. Among the subscores, pain and physical activity scores were particularly correlated with BMD. Normal BMD group had lowest scores in general, except the emotional reaction score.*

*In our study we frequently encountered extreme scores on both lower and higher sides in NHP, and we think that NHP was affected by the characteristics of the study group to a large extent. Therefore in future studies of quality of life measurements in osteoporosis, we think that, selection of a scale that is prepared for 'osteoporosis' itself, would be more suitable. In spite of all these, NHP may be reliably used in postmenopausal osteoporosis, since it is easy to apply, and also it includes sections that effectively evaluate the clinical consequences like pain, limitation of physical activity together with emotional effects of the disease.*

**Key words:** Osteoporosis, Quality of life, Nottingham health profile

### ÖZET

#### OSTEOPOROZDA YAŞAM KALİTESİ

*Osteoporoz düşük kemik yoğunluğu ve kemik dokusunun mikroyapısal bozukluğu ve artmış fraktür riski ile karakterize bir hastalıktır. Dünyada ve ülkemizde birçok kişiyi ve özellikle postmenopozal kadınları etkiler. Neden olduğu ağrı, hareket kısıtlılığı ile vertebral veya non-vertebral kırıklar ile hastaların yaşamını zorlaştırır. Ağrı ve hareket kısıtlılığı ve deformitelerinden dolayı hastalar toplumda kendilerine verilen rolleri tam olarak yerine getirememekte ve sosyal ilişkilerde beklentileri tam olarak karşılayamamaktadırlar.*

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*Bu çalışmada biz osteoporozun yaşam kalitesi üzerindeki etkilerini araştırmayı hedefledik. Çalışmaya 130 postmenopozal bayan alındı. Kemik mineral dansitesi (KMD) üzerinde etkisi olabilecek diğer hastalıkları ekarte etmek amacıyla rutin biyokimyasal, hematolojik ve gerek görüldüğünde de hormonal incelemeler yapıldı.*

*BMD ölçümleri ve Dünya Sağlık Örgütü kriterlerine göre, 33 bayan normal (yaş ortalaması 49,18±6,01; menopoz süresi 3,42±3,99), 51'i osteopenik (yaş ortalaması 54,03±7,81; menopoz süresi 7,22±0,95) ve 46 bayan osteoporotik (yaş ortalaması 62,39±8,15; menopoz süresi 13,77±8,17) olarak değerlendirildi. Osteoporotik hastalar boy kısalması ve non-vertebral fraktür öyküsü olup olmamasına göre de sınıflandırıldı. Tüm bireylere Nottingham Health Profile (NHP) yaşam kalitesi ölçümü skalası uygulandı ve 6 skor (ağrı, fiziksel aktivite, yorgunluk, uyku, sosyal izolasyon ve emosyonel reaksiyon) değerlendirildi.*

*Normal KMD grubu da dahil olmak üzere tüm gruplarda NHP skorları yüksek bulundu. Yani postmenopozal hastalarda yaşam kalitesi düşüktü. KMD ile NHP skorları arasında negatif korelasyon vardı, yani yaşam kalitesi KMD ile orantılı idi. Alt skorlar arasında ağrı ve fiziksel aktivite skorları BMD ile özellikle ilişkili idi. KMD'si normal olan grupta emosyonel reaksiyon skoru hariç diğer tüm skorlar düşüktü.*

*Çalışmamızda NHP'in tavan ve taban değerlerinin sıklığı nedeniyle testin çalışmadaki hasta grubunun özelliklerinden çok fazla etkilendiği düşünüldü. Bu nedenle postmenopozal osteoporozlu hastalarda yapılacak daha sonraki çalışmalarda osteoporoz hedeflenerek hazırlanmış olan yaşam kalitesi ölçütlerinden birinin kullanılmasının daha uygun olacağı düşünüldü. Buna rağmen, uygulama kolaylığının yanısıra hastalığın ağrı, hareket kısıtlılığı ve emosyonel etkilerini değerlendirecek bölümleri içerdiğinden NHP'in osteoporozda güvenle kullanılabileceğini düşünüyoruz.*

**Anahtar Kelimeler:** Osteoporoz, Yaşam kalitesi, Nottingham health profile

## INTRODUCTION

Osteoporosis is a disease characterized by low bone mass and microarchitectural deterioration of bone tissue with increased fracture risk (1,2). It affects large numbers of individuals worldwide, especially the postmenopausal women. Vertebral and non-vertebral fractures associated with osteoporosis can be crippling, causing considerable pain, limitation of motion and disability (3). The patients frequently have difficulty in being satisfied with their roles in day-to-day lives/daily life and also have trouble in meeting the expectations in their social relations. Consequently, social regression, isolation, feeling of worthlessness, decrease of self-confidence and self-esteem may be seen, and this might be quite psychologically destructive for the patients.

Medically treating the osteoporosis patients does not necessarily indicate their relief of those abo-

ve-mentioned problems. In addition, the decisions about which patients are to be treated medically or which treatment options are to be given are usually made according to clinical, laboratory and bone mineral density evaluations. Unfortunately, these measures may be inappropriate, and the complaints of the patients and the difficulties that they face in daily life due to osteoporosis are rarely considered as a part of routine clinical evaluation. However, it is very important to take the complaints of the patients into consideration and to determine or measure their effects on daily life.

In this study we used Nottingham Health Profile (NHP), which is a widely used generic quality of life measure, in postmenopausal patients (4). We investigated the impact of osteoporosis on the quality of life in postmenopausal patients, which were divided into 3 groups as normal, osteopenic and osteoporotic due to BMD measurements.

## MATERIALS AND METHODS

One hundred and thirty postmenopausal patients were included to the study. In the patient selection, a detailed clinical and laboratory investigations were made and to exclude systemic diseases and secondary causes of bone loss. Other exclusion criteriae were: Psychiatric, emotional, language, or cognitive difficulties which might prevent reliable completion of the questionnaire, another diagnosis other than osteoporosis that might explain the patient's back pain, and a concomittant illness that would substantially influence the patients' quality of life.

Body mass index (BMI) of each patient was calculated by dividing bodyweight (kg) to the square of height (m). The patients were evaluated as "normal" (when the BMI values were between 18,5 and 24,9 kg/cm<sup>2</sup>), "overweight" (BMI between 25-29,9 kg/cm<sup>2</sup>), "obese" (BMI between 30-39,9 kg/cm<sup>2</sup>) and morbid obese (BMI over 40 kg/cm<sup>2</sup>) (5).

The BMD's of the patients were measured from selected regions in lumbar vertebrae and femur, using Hologic QDR-2000 dual energy X-ray absorptiometry. The patients were divided into three groups as normal (T score  $\pm 1$ , i.e. young adult reference score  $\pm 1$ ), osteopenic (T score between  $-1$  and  $-2,5$ ) and osteoporotic (T score of  $<- 2,5$ ), according to World Health Organization Study Group criteria for BMD results. Osteoporotic patients were further grouped as osteoporotic patients with history of decrease in height, and osteoporotic patients with history of non-vertebral fractures.

A Turkish version of the Nottingham Health Profile (NHP) was applied to each individual. It is a self-administered questionnaire with 38 questions divided into six areas of health: Energy (3 questions), Pain (8 questions), Emotional Reactions (9 questions), Sleep (5 questions), Social Isolation (5 questions), and Physical Mobility (8 questions). The respondent answers as "yes" if the statement

adequately reflects the current status or feeling, or "no" otherwise. The percentage of answers as "yes" in each group was found and this was assigned as the score in that group (6,7).

Statistical evaluations were performed using Spearman's correlation analysis and analysis of variance.

## RESULTS

Of the 130 postmenopausal patients, 33 were in the normal BMD group, 51 were osteopenic, and the remaining 46 had BMD's in the osteoporotic range. The characteristics of these cases are given in Table I. NHP scores and statistical evaluations of the groups are given in Tables II.

In normal BMD group there was a significantly positive correlation between BMI and pain, and physical mobility scores ( $p < 0,05$ ).

In the osteopenic patient group BMI was positively correlated with pain score ( $p < 0,01$ ) and physical mobility score ( $p < 0,05$ ).

In osteoporotic group of patients, decrease in height was present in 22, and history of non-vertebral fractures was present in 7 patients.

The mean BMI values of all groups were not significantly different, neither the mean age at menopause in all groups. The duration of menopause to the time of the study in the normal BMD group was significantly lower than all the other groups ( $p < 0,05$ ).

The pain score of osteoporotic group was significantly higher than the pain score of all other groups ( $p < 0,05$ ). This score was significantly lower in normal BMD group than other groups ( $p < 0,05$ ).

The mean physical mobility score of osteoporotic group was higher than osteopenic group ( $p < 0,05$ ), and the score of osteoporotic group was also higher than normal BMD group ( $p < 0,05$ ). That is, physical mobility decreased as the BMD decreased.

**Table I. The characteristics of patient groups according to the BMD.**

	Normal (n=33)	Osteopenic (n=51)	Osteoporotic (n=46)
Age (years)	49,18±6,01	54,03±7,81	62,39±8,15
Age at menopause	45,81±3,06	47,62±7,4	47,61±7,66
Duration of menopause (years)	3,42±3,99	7,22±0,95	13,77±8,17
Body Mass Index (gm/cm <sup>2</sup> )	30,21±4,84	29,068±4,776	29,159±0,566

**Table II. NHP scores of the groups.**

	The patients with normal BMD (n=33)	Osteopenic patients (n=51)	Osteoporotic patients (n=46)	Osteoporotic patients with history of height loss (n=22)	Osteoporotic patients with history of fracture (n=7)
Pain	38,25±5,30	41,42±3,59	52,44±3,75	50,00±5,63	44,64±10,86
NHP-1 Physical mobility	26,89±3,03	28,43±2,64	31,68±2,44	34,65±3,48	28,57±7,06
Scores Energy level	55,55±7,63	46,40±5,20	63,04±37,99	53,03±39,38	47,61±14,28
(%) Sleep	30,90±4,85	30,58±4,35	44,78±4,82	46,36±7,01	42,85±15,38
Social isolation	12,72±4,24	10,19±2,33	19,56±3,48	13,63±4,44	17,14±8,08
Emotional reaction	27,94±4,51	19,17±2,73	21,49±3,05	22,22±4,07	14,28±9,30

Regarding the energy scores, only the difference between osteoporotic and osteopenic groups was significant ( $p<0,05$ ). Osteoporotic patients had lower energy levels.

There was no significant difference in mean sleep scores between normal BMD group and osteopenic group, but the sleep score of osteoporotic patients were significantly higher than normal BMD and osteopenic patient groups ( $p<0,05$ ).

Patients in the osteoporotic BMD group got the

highest social isolation scores ( $p<0,05$ ). That is, social isolation was more common in osteoporotic patients.

The highest emotional reaction score was seen in normal BMD group ( $p<0,05$ ). The differences between other groups were insignificant.

## DISCUSSION

The perception of the effects of the disease by the patient, e.g. their health related quality of life,

nowadays forms an integral part of scientific investigations concerning the effects of the diseases and their treatment (8).

In general, the place of simple subjective informations in the traditional criteriae of a scientific investigation is limited. However, psychometry, and in parallel, instruments that have emerged in the recent years to assess the patients' experiences of illnesses were included in the scientific investigations and they are being used together with radiological and laboratory studies in the selection of interventions and treatments. In contrast to decades ago, patients are now seeking more control over their own health.

NHP is a "generic" instrument of Quality of Life assessment. It has been applied in various diseases and in different populations, and has shown to be a quite reliable, valid and responsive test.

NHP appears to demonstrate health status in a wide range of conditions. It has originally been designed for preparing a health profile in the society, but later on, it has been used to evaluate the results of various clinical practices (6,9).

In this study, we used NHP to assess health-related quality of life. NHP is designed to capture and record accurately some aspects of the feelings and perceptions of patients with respect to their health status. This instrument includes domains on pain and physical limitation, which are the known general clinical findings of osteoporosis. NHP can be easily administered within 10-15 minutes. The development and use of the Turkish version of NHP has been shown previously (7).

We didn't encounter difficulties or problems intervening the administration of the questionnaire. However, we observed that during the test, especially to the end of the test, some of our patients became emotionally sensitive. We thought that, these patients might be emotionally affected from the

preceding questions that they had just answered. This might be related to the previously reported correlation between the questions, although they are answered separately (10).

Another observation was that, floor or ceiling effects (zero or 100% results) were not unusual in our study. This might be related to small number of questions in the questionnaire. Because some questions, which might effect the results both positively or negatively, are sifted during the development of questionnaire, to improve the applicability. This phenomenon had even been seen in the patient group with normal BMD's. So it is necessary to pay attention to this disadvantage of NHP in both administration and evaluation.

There is a co-variation between the domains of NHP, and between the questions within any given domain, and this creates some difficulties (6). In this study we have also seen this difficulty.

In our study all scores, except the emotional reaction score were found to be significantly higher in osteoporotic patient group. Emotional reaction scores were relatively higher in all groups but the score of the normal BMD group was significantly higher than the others.

In various studies it is found that there is a transition period between the ages 40-49. People become physically, socially and emotionally more sensitive to the states they are in. People older than this age group see their problems not as a sign of their health status, but as a consequence of aging. They tend to evaluate their health status according to their reduced expectations (11). In our study the mean age and duration of menopause was significantly lower in the normal BMD group, and we believed that these patients are in the above-mentioned transition period. So the reason of higher emotional reaction scores in this group may be related to this. BMI's were not significantly diffe-

rent in three groups, so we believe that this is not a factor affecting the NHP scores.

Osteoporosis has a significant impact on the interpersonal relations and the social roles. The 'dependency' due to osteoporosis affects close relations because the patients with osteoporosis cannot readily respond to these relations. Briefly, osteoporosis is a psychologically and socially crippling condition (12,13).

It is quite necessary to use a generic health assessment instrument to discover emotional and social aspects of the disease, and NHP is acceptable in this regard.

In previous studies it has been shown that more symptoms are present in patients with severe than in patients with milder osteoporosis, or those without the disease. However, in our study, symptoms and resultantly the scores were found to be higher also in the osteopenic patients.

Quality of life scores are generally low in postmenopausal women with low BMD's. However, it has also been seen from this study that postmenopausal women with normal BMD's have various problems.

NHP-1 can be used as an instrument for general health status-quality of life assessment. But the interpretation of results is difficult due to co-variati- ons between the domains of NHP, and also between the questions in any domain. There is a certain possibility of producing floor (zero result) or ceiling effects (result of 100%).

NHP is an easily administered instrument and includes domains on evaluation of pain, physical mobility and emotional status that are all the clinical consequences of osteoporosis.

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