

Reliability and validity of the Turkish version of the mini Osteoporosis Quality of Life Questionnaire

Figen Yilmaz^{a,*}, Fusun Sahin^b, Beril Dogu^a, Asli Ozmaden^a and Banu Kuran^a

^aDepartment of Physical Therapy and Rehabilitation, Sisli Etfal Education and Research Hospital, Istanbul, Turkey

^bDepartment of Physical Therapy and Rehabilitation, Pamukkale University, Denizli, Turkey

Abstract. *Objective:* The purpose of this study was to develop a Turkish version of the mini Osteoporosis Quality of Life Questionnaire (mini-OQLQ), and assess its reliability and validity.

Material and method: Sixty-four women with postmenopausal osteoporosis were included in the study. Patients who were diagnosed with secondary osteoporosis through clinical and laboratory examinations were excluded from the study. After translation process, the Turkish version of the scale was applied to each participant twice with an interval of 2 weeks. For reliability study, internal consistency (Cronbach's α) of mini-OQLQ total score and test-retest intraclass correlation coefficient (ICC) were calculated. Validation study was assessed by correlating the scale with QUALEFFO 41.

Results: The mean age at menopause and age of patients were 45.61 ± 6.04 and 59.91 ± 8.69 years, respectively. Cronbach's α of the Turkish version of the mini-OQLQ was 0.898. The test-retest reliability (ICC) of the Turkish version of the mini-OQLQ was determined as 0.81 for the total score, and ranged between 0.71 and 0.84 for individual items. In terms of validity, the Turkish version of mini-OQLQ showed significant negative correlation with QUALEFFO 41 ($r = -0.756$; $p < 0.0001$).

Conclusion: The Turkish version of the mini-OQLQ was found to be reliable and valid in the evaluation of life quality of patients with postmenopausal osteoporosis.

Keywords: Mini-Osteoporosis Quality of Life Questionnaire, osteoporosis, validation

1. Introduction

Osteoporosis should not be defined only as a loss of bone mass. In fact, this entity is an important clinical syndrome, which causes many problems with respect to functional status and quality of life. In recent years, there has been a shift towards recognizing that the measurement of health-related quality of life (HRQL) provides a more complete representation of an individual's experience with osteoporosis [1]. Various questionnaires have been used to evaluate quality of life. Questionnaires assessing quality of life with gen-

eral disease-specific instruments have been also developed. Disease-specific questionnaires are more clinically sensitive and may be more responsive to detecting change [2]. Among measures specific to osteoporosis, Quality of Life Questionnaire of the European Foundation for Osteoporosis (QUALEFFO) [3], Osteoporosis Quality of Life Questionnaire (OQLQ) [4], Osteoporosis Assessment Questionnaire (OPAQ) [5], and Osteoporosis Functional Disability Questionnaire (OFDQ) [6] can be exemplified. However, their limited applicability due to their length and time for administration has restricted their use to clinical trials and highlighted the need for the development of questionnaires that are easier to administer in routine clinical practice.

Approximately 30% of women would have sustained at least one vertebral fracture by the age of 75 years [7]. Therefore, about 75% of patients who present with a

*Address for correspondence: Figen Yilmaz, Associate Professor, Fatih Sultan Mehmet Cad, Gorele Mah, Doga Sok, Doganevler Sitesi No: 18/2, Kavacik, Beykoz, Istanbul, Turkey. Tel.: +90 212 3735133; E-mail: figenyilmaz@yahoo.com.

clinical vertebral fracture will experience chronic pain. Pain in osteoporosis is not only caused by vertebral macrofracture but also occurs in microfractures. It occurs basically with the soft tissue stiffness and shortness, resulting from bone resorption and increase in the bone fragility, appearance of macro- or microfractures in vertebral bodies, or the presence of bone deformity (as increase in kyphosis). In addition, the degenerative changes and depression seen in patients with osteoporosis contribute to the chronic pain (8).

Back pain due to vertebral fractures has a significant impact on osteoporotic patients. This has a significant impact on the quality of life as well as functional impairment on the affected patients [9]. Accordingly, the pain will reduce with the treatment of osteoporosis, and the quality of life will increase (8).

The mini-OQLQ is a specific, short HRQL questionnaire for women with vertebral fractures due to osteoporosis. It is based on a selection of the two highest impact items from each of the five domains of the OQLQ. Therefore, it is composed of 10 items grouped into the same five HRQL dimensions (symptoms, physical function, activities of daily living, emotional function, and leisure) [10]. Each item has seven response options ranging from 1 (worse HRQL) to 7 (better HRQL).

The aim of this study is to translate mini-OQLQ into Turkish, to adapt it for Turkish population, and to determine its reliability and validity.

2. Material and method

2.1. Patients

A total of 64 female patients with postmenopausal osteoporosis, who had vertebral fractures being followed at the outpatient clinic of the PMR department of our hospital, were enrolled in our study. The vertebral fracture diagnosis was made with the dorso lumbar lateral x-ray that were taken at the beginning of the study. No patient was suffering from an acute or increasing back pain in the last 6 months. So, we thought that the vertebral fractures are chronic fractures.

Osteoporosis was diagnosed by using dual-energy X-ray absorptiometry (DXA), based on the criteria established by World Health Organization (WHO) (spine or hip t -scores < -2.5) [11]. The patients had at least one vertebral fracture (reduction of anterior, middle, or posterior vertebral height of more than 20% on clinical reading). The participants without any evidence of dementia were required to be able to read and write

in Turkish. Patients diagnosed with physical examination and laboratory tests as secondary osteoporosis, endstage renal failure, heart failure, and those having any malignancy were excluded. After completion of the translation procedure, the participants filled up the questionnaire two times at 2-week intervals. The second investigation was performed 2 weeks later to retest the participant. The patients were asked to sign a written informed consent form at the beginning of the study.

To test reliability, internal consistency of mini-OQLQ total score (Cronbach's α) and test-retest intraclass correlation coefficient (ICC) were calculated. Validity was evaluated by determining the essential similarity to QUALEFFO 41, for which the reliability and validity of its English version have already been established.

2.2. Parameters of evaluation

On the first physical examination, patient's age, menopausal age, level of education, profession, presence of nocturnal pains, and pain on movement and/or during rest were interrogated and recorded. Likert scale was used for the assessment of pain (1 = no pain, 2 = mild, 3 = moderate, 4 = severe, 5 = unbearable).

Patient's quality of life was evaluated using QUALEFFO questionnaire. This form is one of the osteoporosis-specific quality of life scales, whose Turkish version has been fully investigated and validated [12]. In the Turkish reliability study, internal consistency (Cronbach's α) was between 0.70 and 0.96, and the validity rates of domains were between 89 and 100% [11]. QUALEFFO questionnaire consists of 41 questions in total at subscales of pain (5 questions), physical function (17 questions), social function (7 questions), general assessment of general health state (3 questions), and mental function (9 questions). For total scores and subscale scores, "0" represents "good" and 100 denotes worst health condition [12].

2.3. Translation procedure

Translation and cross-cultural adaptation of the mini-OQLQ into Turkish were based on the recommendations of Guillemin et al. [13], Baeton et al. [14], and the EORTC Quality of Life Group [15].

As the first step, two specialists (a physiatrist and a rheumatologist) who were a native Turkish speaker fluent in English translated the English version into Turk-

ish. The differences in-between was resolved during a session with the participation of a third translator.

As the second step, back-translation was realized. The Turkish version of the scale was translated by two English-speaking linguists who were blinded to the original scale and the aim of the study. The differences were resolved and a satisfactory concordance with the original scale was achieved.

2.4. Reliability and validation study

To examine the reliability, internal consistency of mini-OQLQ total score (Cronbach's α) and test-retest ICC were estimated. To test reliability of the Turkish version of mini-OQLQ final version was applied on 64 participants. For test-retest study, the same procedure was repeated 2 weeks later and ICC was estimated.

For mini-OQLQ total score, Cronbach's α value for test-retest ICC and Spearman's correlation were estimated.

To estimate the converging validity, mini-OQLQ was correlated with QUALEFFO. As validation of the Turkish version of osteoporosis-specific quality of life scale, i.e., QUALEFFO questionnaire was realized previously, we have used this form in our study. The converging validity of mini-OQLQ using QUALEFFO questionnaire was determined.

In all statistical analyses, a value of correlation coefficient between 0 and 0.25 was regarded as "no or poor" correlation, a value of 0.26–0.50 was regarded as "moderate" correlation, a value of 0.51–0.75 was regarded as "good" correlation, and a value of 0.76–1.00 was regarded as "very good" correlation.

2.5. Statistical analysis

All statistical analyses were performed with the NCSS 2007 package program. In addition to descriptive statistical methods (mean \pm standard deviation, frequency) used during the assessment of data, Cronbach's α values of mini-OQLQ and QUALEFFO total and subgroups were calculated. For test-retest reliability, ICC (95% confidence interval), internal consistency (Cronbach's α), and Spearman's correlation were calculated for each item. Pearson correlation coefficients were used to calculate the convergent validity between mini-OQLQ and QUALEFFO subgroups and Likert scale. A level of $p < 0.05$ was considered as statistically significant.

Table 1
Demographic data of patients

	Mean \pm SD
Age (year)	59.91 \pm 8.69
Age of menopause (year)	45.61 \pm 6.04
BMI	26.05 \pm 4.06
Night pain (Likert)	2.41 \pm 1.29
Motion pain (Likert)	2.59 \pm 1.12
Rest pain (Likert)	1.97 \pm 1.02

BMI: Body mass index.

Table 2
Cronbach's α coefficients of mini-OQLQ and QUALEFFO total and subgroup scores

	Cronbach's α
Mini-QOL total	0.898
Symptoms	0.835
Physical function	0.83
Activities of daily living	0.785
Emotional function	0.912
Leisure	0.748
QLF-41 total	0.862
Pain	0.889
Physical function	0.940
General health	0.844
Social function	0.859
Mental health	0.861

3. Results

The mean age (\pm SD) of 64 female participants was 59.91 \pm 8.69 years (minimum of 45 years and maximum of 80 years), and the mean age of entering menopause was 45.61 \pm 6.04 years (minimum of 35 years and maximum of 57 years). The study population included housewives ($n = 54$), a worker ($n = 1$), public officers ($n = 19$), and veterans ($n = 8$). Twenty participants were literate (31.25%), 36 subjects were primary-school graduates (56.25%), and 8 were high-school (12.5%) graduates. According to Likert scale, the estimated scores for nocturnal pain, pain on movement, and pain during rest were 2.41 \pm 1.29, 2.59 \pm 1.12, and 1.97 \pm 1.02 points, respectively (Table 1).

3.1. Reliability and validity study

Internal consistency (Cronbach's α) of the mini-OQLQ total score was 0.898 (Table 2). The test-retest reliability results are shown in Table 3. For test-retest reliability assessments, the ICC of mini-OQLQ total score was 0.81, ranging between 0.71 and 0.84 points among the items (Table 3). For the test-retest reliability evaluations, the Spearman's correlation coefficient of the items varied between 0.33 and 0.73, and the total score was 0.686.

Table 3
Test-retest reliability and Spearman's correlation coefficients related to grand total scores of each mini-OQLQ item

	Test-retest reliability (intraclass correlation)		Spearman's correlation	Mean \pm SD
Mini-OQLQ 1	0.73	0.69–0.78	0.558	3.77 \pm 1.57
Mini-OQLQ 2	0.76	0.68–0.83	0.590	3.97 \pm 1.59
Mini-OQLQ 3	0.71	0.52–0.82	0.554	2.73 \pm 1.99
Mini-OQLQ 4	0.71	0.52–0.82	0.547	2.94 \pm 1.97
Mini-OQLQ 5	0.74	0.64–0.82	0.571	3.08 \pm 2.04
Mini-OQLQ 6	0.73	0.23–0.75	0.561	3.38 \pm 2
Mini-OQLQ 7	0.84	0.74–0.90	0.726	3.23 \pm 2.24
Mini-OQLQ 8	0.78	0.67–0.81	0.518	3.48 \pm 1.94
Mini-OQLQ 9	0.75	0.64–0.79	0.582	2.63 \pm 2.11
Mini-OQLQ 10	0.79	0.64–0.82	0.528	1.97 \pm 2.25
Mini-OQLQ total	0.81	0.69–0.88	0.686	3.12 \pm 1.47

Table 4
Converging validity of mini-OQLQ total scores with those of QUALEFFO 41 and Likert scales for pain

	Mini-OQLQ Toplam	
Pain	<i>r</i>	–0.688
	<i>p</i>	0.0001
Physical function	<i>r</i>	–0.719
	<i>p</i>	0.0001
General health	<i>r</i>	–0.188
	<i>p</i>	0.034
Social function	<i>r</i>	–0.493
	<i>p</i>	0.0001
Mental Health	<i>r</i>	–0.484
	<i>p</i>	0.0001
QLF 41 total	<i>r</i>	–0.756
	<i>p</i>	0.0001
Likert (night pain)	<i>r</i>	–0.545
	<i>p</i>	0.0001
Likert (motion pain)	<i>r</i>	–0.472
	<i>p</i>	0.0001
Likert (rest pain)	<i>r</i>	–0.52
	<i>p</i>	0.0001

When assessed for converging validity, significant and negatively strong correlations were detected between mini-OQLQ total scores and QUALEFFO total and domains of pain, as well as physical and social functions scores ($p < 0.0001$) (Table 4). Besides, a strongly significant positive correlation between mini-OQLQ total score and nocturnal pain, pain on movement and during rest, as evaluated using Likert scale, was found ($p < 0.0001$) (Table 4).

4. Discussion

As a long-term chronic disease, osteoporosis and its complications have a considerable impact on patients' quality of life, largely due to pain, restrictions on activity, and alterations in mood [16]. HRQL refers to a patient's perceived physical and mental health over time,

and may be used by clinicians to better understand how a chronic illness interferes with a person's day-to-day life [17]. Measures of HRQL have gained increasing attention as relevant outcomes in clinical studies of osteoporosis [18]. Several instruments, both generic and disease-specific, can be used to examine the quality of life in osteoporosis and osteoporotic fractures [18, 19]. Instruments assessing the quality of life in general as well as disease-specific instruments have been developed. Disease-specific scales have higher degrees of validity, when compared with general health-related scales with regard to format and content relevant to the disease of interest [20]. Among the specific quality of life inquiry forms, QUALEFFO and OQLQ have been used in osteoporosis. Both the questionnaires discriminate between patients and controls [21]. However, longevity of these forms, which take up much more time to complete, restricts their clinical usage. QUALEFFO was translated into Turkish and validation studies of the Turkish version of QUALEFFO in osteoporotic patients with vertebral fractures had been carried out [12]. It consists of 41 questions and five domains. It takes about 10 minutes for the patient to complete [12]. Therefore, nowadays, the need for shorter, easily applicable, and more practical specific questionnaires has arisen.

The mini-OQLQ is a specific, short HRQL questionnaire for women with vertebral fractures due to osteoporosis. Short questionnaires minimize a patient's time and effort, and thus, increase a patient's willingness to complete the questionnaire. The mini-OQLQ was developed to facilitate questionnaire administration in clinical practice by the Osteoporosis Quality of Life Study Group. It is a self-administered questionnaire that takes approximately 3 minutes to complete and was designed to be administered in a clinical setting [10]. Ioannidis et al. suggested that mini-OQLQ is extreme-

ly effective because it could be self-administered and quickly completed [22]. It is based on a selection of the two highest impact items from each of the five domains of the OQLQ [10]. In our study, mini-OQLQ was completed in 4 minutes by the patients. Furthermore, Cook et al. reported that the mini-OQLQ demonstrated good discriminative and adequate evaluative properties in patients with back pain caused by vertebral fractures, and the ICC ranged between 0.74 and 0.81 [10]. Accordingly, our aim was to translate mini-OQLQ inquiry form, which is easier to use in clinical practice, to Turkish, and also perform its validity-reliability tests. In our study, the internal consistency value for the Turkish version of mini-OQLQ was found to be 0.898 by Cronbach's α coefficient. Cronbach's α values above 0.70 are agreed to be adequate for internal consistency [23]. Therefore, our result indicates that the internal consistency of the Turkish version of mini-OQLQ is high. For test-retest reliability assessments, the ICC of mini-OQLQ total score was 0.81, ranging between 0.71 and 0.84 points among the items in our study. In addition, for test-retest assessments, Spearman's correlation coefficients of each item of mini-OQLQ ranged between 0.518 and 0.726 points. When assessed for converging validity, significant and negatively strong correlations were detected between mini-OQLQ total scores and QUALEFFO total scores ($r = -0.756, p < 0.0001$).

The mini-OQLQ has been previously found to be a sensitive measure of health-related quality of life; Adachi et al. found that patients with incident vertebral fracture had lower scores on all five domains than those without fractures [24]. In a study where SF-36, EuroQual-5D, and the mini-OQLQ were used, the authors concluded that all the scales about quality of life decreased in patients with vertebral fractures due to osteoporosis, when compared with asymptomatic women [25]. Lau et al. used the mini-OQLQ for their study about the efficacy of teriparatide on the quality of life in osteoporotic women and found that teriparatide could improve the quality of life during 3 and 6 months [26].

In conclusion, the results of this study indicate that the Turkish version of mini-OQLQ is a reproducible, reliable, and validated assessment tool for the quality of life in postmenopausal osteoporosis.

References

- [1] Silverman SL, Cranney A. Quality of life measurement in osteoporosis. *J Rheumatol* 1997; 24:1218-21.
- [2] Thompson DR, Yu CM. Quality of life in patients with coronary heart disease-I: assessment tools. *Health Qual Life Outcomes* 2003; 10;1:42.
- [3] Lips P, Cooper C, Agnusdei D, Caulin F, Egger P, Johnell O, Kanis JA, Kellingray S, Leplege A, Liberman UA, McCloskey E, Minne H, Reeve J, Reginster JY, Scholz M, Todd C, de Vernejoul MC, Wiklund I. Quality of life in patients with vertebral fractures: validation of the Quality of Life Questionnaire of the European Foundation for Osteoporosis (QUALEFFO). Working Party for Quality of Life of the European Foundation for Osteoporosis. *Osteoporos Int* 1999; 10(2):150-160.
- [4] Osteoporosis Quality of Life Study Group. Measuring quality of life in women with osteoporosis. *Osteoporos Int* 1997; 7(5):478-487.
- [5] Randell AG, Bhallerao N, Nguyen TV, Sambrook PN, Eisman JA, Silverman SL. Quality of life in osteoporosis: reliability, consistency, and validity of the Osteoporosis Assessment Questionnaire. *J Rheumatol* 1998 Jun;25(6):1171-9.
- [6] Helmes E, Hodsman A, Lazowski D, Bhardwaj A, Crilly R, Nichol P, Drost D, Vanderburgh L, Pederson L. A questionnaire to evaluate disability in osteoporotic patients with vertebral compression fractures. *J Gerontol A Biol Sci Med Sci* 1995 Mar;50(2):M91-8.
- [7] Nevitt M, Chen P, Kiel DP, Reginster JY, Dore RK, Zanchetta JR, Glass EV, Krege JH. Reduced risk of back pain following teriparatide treatment: a meta-analysis. *Osteoporos Int* 2006, 17: 273-80.
- [8] Ofluoglu D, Akyuz G, Unay O, Kayhan O. The effect of calcitonin on β -endorphin levels in postmenopausal osteoporotic patients with back pain. *Clin Rheumatol* 2007; 26: 44-9.
- [9] Sedrine W, Radican L, Reginster JY. On conducting burden-of-osteoporosis studies: a review of the core concepts and practical issues. A study carried out under the auspices of a WHO Collaborating Center. *Rheumatology* 2001, 40: 7-14.
- [10] Cook DJ, Guyatt GH, Adachi JD, Epstein RS, Juniper EF, Austin PA, Clifton J, Rosen CJ, Kessenich CR, Stock JL, Overdorf J, Miller PD, Erickson AL, McClung MR, McClung BL, Griffith LE, Ionnidis G. Development and validation of the mini-osteoporosis quality of life questionnaire (OQLQ) in osteoporosis women with back pain due to vertebral fractures. *Osteoporosis Quality of Life Study Group. Osteoporos Int* 1999; 10:207-13.
- [11] World Health Organization Study Group. Assessment of fracture risk and its application to screening for postmenopausal osteoporosis. 1994 WHO Technical Report Series, No.843. WHO Geneva.
- [12] Kocyigit H, Gulseren S, Erol A, Hizli N, Memis A. The reliability and validity of the Turkish version of Quality of Life Questionnaire of the European Foundation for Osteoporosis (QUALEFFO). *Clin Rheumatol* 2003; 22(1):18-23.
- [13] Guillemin F, Bombardier C, Beaton D. Cross-culturel adaptation of the health related quality of life measures: literature review and proposed guidelines. *J Clin Epidemiol* 1993; 46: 1417-1432.
- [14] Beaton DE, Bombardier C, Guillemin F, Ferraz MB. Guidelines for the process of cross-culturel adaptation of self report measures. *Spine* 2000; 25: 3186-3191.
- [15] Cull A, Sprangers M, Bjordal K, Aaronson N, West K, Bottomley A. EORTC Quality of life Group Translation Procedure. 2002. Web site: <http://www.eortc.be/home/qol/Manuals.htm>.
- [16] Badia X, Prieto L, Roset M, Diez-Perez A, Herdman M. Development of a short osteoporosis quality of life questionnaire

- by equating items from two existing instruments. *Journal of Clinical Epidemiology* 2002; 55: 32-40.
- [17] National Center for Chronic Disease Prevention and Health Promotion Health-related quality of life 2004 Web site: <http://www.cdc.gov/hrqol/index.htm>. 5-13-2004.
- [18] Lips P, van Schoor NM. Quality of life in patients with osteoporosis. *Osteoporos Int* 2005, 16(5): 447-55.
- [19] Peasgood T, Hermann K, Kanis JA, Brazier JE. An updated systematic review of Health State Utility Values for osteoporosis related conditions. *Osteoporos Int* 2009, 20(6): 853-68.
- [20] Thompson DR, Yu CM. Quality of life in patients with coronary heart disease-I: assessment tools. *Health Qual Life Outcomes* 2003; Sep 10;1:42.
- [21] Badia X, Diez-Perez A, Alvarez-Sanz C, Diaz-Lopez B, Diaz-Curiel M, Guillen F, Gonzalez-Macias J. Spanish GRECO Study Group. Measuring quality of life in women with vertebral fractures due to osteoporosis: A comparison of the OQLQ and QUALEFFO. *Quality of Life Research* 2001; 10: 307-17.
- [22] Ioannidis G, Gordon M, Adachi JD. Quality of life in osteoporosis. *Nurs Clin North Am.* 2001; 36(3): 481-9.
- [23] Granger CV, Cotter AC, Hamilton BB, Fiedler RC, Hens MM. Functional assessment scales: a study of persons with multiple sclerosis. *Arch Physical Med Rehab* 1990; 71(11): 870-5.
- [24] Adachi JD, Ioannidis G, Olszynski WP, Brown JP, Hanley DA, Sebaldt RJ, Petrie A, Olszynski WP, Brown JP, Hanley DA, Sebaldt RJ, Petrie A, Tenenhouse A, Stephenson GF, Papaioannou A, Guyatt GH, Goldsmith CH. The impact of incident vertebral and non-vertebral fractures on health related quality of life in postmenopausal women. *BMC Musculoskeletal Disorders* 2002,3:11.
- [25] Salaffi F, Cimmino MA, Malavolta N, Carotti M, Di Matteo L, Scendoni P, Grassi W. Italian Multicentre Osteoporotic Fracture Study Group. et al. The burden of prevalent fractures on health-related quality of life in postmenopausal women with osteoporosis: the IMOF study. *J Rheumatol* 2007; 34(7): 1551-60. Epub 2007 May 15.
- [26] Lau AN, Ali SH, Sawka AM, Thabane L, Papaioannou A, Gafni A, Adachi JD. Improvement in health-related quality of life in osteoporosis patients treated with teriparatide. *BMC Musculoskeletal Disorders* 2009. Web site: <http://www.medscape.com/viewarticle/584956>.

Copyright of Journal of Back & Musculoskeletal Rehabilitation is the property of IOS Press and its content may not be copied or emailed to multiple sites or posted to a listserv without the copyright holder's express written permission. However, users may print, download, or email articles for individual use.