

# Effect of selected socio-demographic, clinical and biochemical factors on self-reported quality of life among post-menopausal women with osteoporosis

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## Abstract

**Introduction:** The goal of health care with relation to women with osteoporosis is the prevention of fractures, maintenance of independence, and good quality of life. **Objective:** To discover how selected socio-demographic, clinical and biochemical factors affect positively or negatively the overall assessment of the quality of life, and to assess the quality of life in specific domains among women with osteoporosis. **Materials and methods:** The study group covered 85 women with osteoporosis. Self-reported quality of life was evaluated using WHOQOL-100. In order to determine factors affecting the self-reported of quality of life the logistic regression analysis was applied.

**Results:** The physical domain was associated with decreased height (OR=2.13; 95%CI 1.04–4.35), anxiety (OR=1.30; 95%CI 1.14–1.49) and depression (OR=1.32; 95%CI 1.09–1.59). The psychological domain was associated with previous fractures (OR=4.76; 95%CI 2.22–11.11), deformities of the back (OR=2.13; 95%CI 1.08–4.17) and anxiety (OR=1.16; 95%CI 1.02–1.16). The level of independence and of social domain were associated with performance of occupational activity, respectively (OR=0.93; 95%CI 0.88–0.97) (OR=0.96; 95%CI 0.88–0.98). The social domain was associated with decreased height (OR=2.38; 95%CI 1.12–5.26), deformities of the back (OR=1.28; 95%CI 1.02–4.35), BMI (OR=1.14; 95%CI 1.05–1.23), anxiety (OR=1.41; 95%CI 1.20–1.64) and depression (OR=1.23; 95%CI 1.03–1.49).

**Conclusion:** The factors determining poor quality of life were decreased height, deformity of the back, previous fractures, elevated FSH level, anxiety and depression. The factors determining a good self-reported quality of life were higher level of education and occupational activity.

## Key words

logistic regression analysis, postmenopausal osteoporosis, quality of life

## INTRODUCTION

Together with an intensive development of studies of the quality of life (QOL) in health sciences, as well as in medical sciences, there emerges the need for an assessment of the quality of life of patients with osteoporosis (Bone Mineral Density – BMD).

The primary goal of health care with relation to women suffering from osteoporosis is the prevention of fractures, maintenance of independence, complete efficacy, and good quality of life [1].

The factors which determine the quality of life of women with osteoporosis relate to the functional state expressed by changes of the silhouette, reduced height and pain complaints, which result in limited capabilities of performing activities associated with self-care and running a household [2, 3]. Women with osteoporosis are characterized by the occurrence of the fear of falls which increase the risk of fractures, and the presence of the symptoms of anxiety and depression, resulting in perception of own state of health in more negative terms [4, 5]. Perception of the state of health and feeling of satisfaction may be a valuable clue in the

evaluation of the effectiveness of treatment and patient care [6, 7]. Due to the diversity in defining the quality of life many research instruments have been developed. Instruments for the measurement of the quality of life may be divided, according to their structure, into global scales and disease-specific scales. Global scales refer to the general definitions and enable measurement of the general quality of life and/or investigated domains [8, 9, 10]. Specific scales serve the evaluation of the quality of life of patients with a specified disease and are usually characterized by a higher sensitivity to clinical changes [8, 11, 12, 13]. Current knowledge concerning the quality of life and its measurements, as well as experiences of many experts in the area of studies of health related quality of life (HRQOL), allow the presentation of a model of life quality conditioned by the state of health which covers four domains: physical, mental and social functioning and a subjective evaluation expressed by the patient [9].

It seemed of interest to perform a multi-factor analysis of regression among Polish women with osteoporosis in order to specify factors determining good and poor self-reported quality of life. Therefore, the objective of the presented study was to discover how selected socio-demographic, clinical and biochemical factors affect positively or negatively the overall assessment of the quality of life and to assessment the quality of life in specific domain among postmenopausal women with osteoporosis.

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## MATERIALS AND METHOD

The study group were women treated in the Menopause and Osteoporosis Outpatient Clinic of the Gynaecological-Obstetric Clinical Hospital at the Medical University in Poznań during the period of one year – from 1 August 2007 – 31 July 2008.

The study group covered 85 women with osteoporosis, who in bone densitometry test examination had the BMD value expressed by a T-score of  $\leq (-2.5)$  standard deviations (SD) [14].

The control group were 100 women, who in bone densitometry test had the BMD value expressed by a T-score of  $> (-1.0)$  standard deviations (SD). The women from the control group were also provided care in the Menopause and Osteoporosis Outpatient Clinic of the Gynaecological-Obstetric Clinical Hospital at the Medical University in Poznań during the same period.

**BMD measurement.** In all the women enrolled in the study, densitometry was performed on  $L_1$ - $L_4$  lumbar spine and proximal femoral bone by the DEXA method (Dual-energy X-ray absorptiometry) using the Lunar DPX densitometer (Lunar Radiation Corporation, Madison, WI, USA).

Important criteria for enrolment into the study were: completing 50 years of age and maintaining the internal reproductive organs. Post-menopausal state was clinically determined based on the provision by respondents of a positive reply to the question: 'Has at least one year elapsed from the last menstrual period?'

Women with secondary osteoporosis due to endocrine diseases, including hyperparathyroidism, as well as those suffering from gastrointestinal, rheumatic, haematological diseases and metabolic bone disease, were excluded from the study. The diagnosis of degenerative spine disease or degenerative hip joint disease was also a criterion for exclusion from the study.

With respect to respondents of the control group, the same criteria of enrolment and exclusion from the study were applied as for women with osteoporosis.

Consent for performing the study was obtained from the Ethical Commission of the Medical University in Poznań (No. 273/06).

**Socio-demographic factors.** Socio-demographic factors were: age (50–70), education (basic, work-related, secondary, university level), marital status (married, widowed, single, divorced) and occupational status (occupational activity, retired).

**Clinical factors.** Body Mass Index (BMI) [ $\text{kg}/\text{m}^2$ ] – (BMI was calculated according to the formula:  $\text{BMI} = \text{weight}/\text{height}^2$  [ $\text{kg}/\text{m}^2$ ]):

- previous non-vertebral fractures;
- decrease in height of at least 3 cm (in order to evaluate height loss the respondents were asked about their height at the age of 40, and then compared with the present height);
- deformities of the back – self-reported (the women were asked about the occurrence of changes in the appearance of the back. According to the classification of osteoporotic spinal deformities proposed by Satoh et al. [15] the respondents were asked to evaluate their posture.

Two groups of respondents were selected: respondents with normal body posture, those with arched back or anterior pelvic tilt lordosis, or with generalized kyfosis):

- emotional status (anxiety and depression); was assessed by means of the Polish version of the Hospital Anxiety and Depression Scale (HADS) [16]. The following scoring was adopted:
  - 0 – 7: regarded as being in the normal range;
  - 8 – 10: being just suggestive of the presence of a mood disorder;
  - 21: indicating probable presence of a mood disorder.

**Selected biochemical factors.** The biochemical parameters were:

- serum total alkaline phosphatase,
- serum total calcium,
- serum inorganic phosphates,
- serum estradiol (E2),
- serum follicle-stimulating hormone (FSH).

The above-mentioned parameters were evaluated using sample preparation kits (Roche Diagnostics, Mannheim, Germany). Samples of venous blood were collected in the morning after overnight fasting. Before the analysis was performed, the centrifuged plasma was stored at the temperature of  $-20^\circ\text{C}$ . Serum levels of follicle-stimulating hormone (FSH) and estradiol (E2) were determined using automated radioimmunological methods: Elecsys FSH and Estradiol RP Gen. 2 Elecsys Kit. The serum level of total calcium was determined by means of the Cobas Integra test system, serum level of inorganic phosphates with the use of Cobas Integra PHOS2, and the serum level of total alkaline phosphatase was evaluated with Cobas Integra ALP IFCC assay.

The above-mentioned biochemical tests were performed in the laboratory at the Gynaecological-Obstetric Clinical Hospital at the Medical University in Poznań.

**Measurement of quality of life.** The subjective evaluation of the quality of life was based on the definition of the quality of life by the World Health Organization Quality of Life WHOQOL Group as: "individuals' perception of their position in life in the context of the culture and value systems in which they live and in relation to their goals, expectations, standards and concerns" [9].

Self-reported quality of life was evaluated using the Polish version of the WHO scale Quality of Life Instrument (WHOQOL -100) [10]. This scale assesses self-reported quality of life and enables the obtaining of the profile of self-reported in six domains: physical functioning, psychological functioning, level of independence, social relationships, environment and spirituality (religion and personal beliefs). Construction of the scale allows the respondent to provide replies independently on the 5-point Likert scale, the number of scores for the domains remaining within the range 4–20 scores: the higher the numerical values, the higher the quality of life. The number of scores for the domains are determined by calculating the arithmetic mean from items within individual domains.

**Statistical analysis.** The population groups in the study and variables were analyzed by the following measures of descriptive statistics: mean, median, standard deviation, frequencies and percentages. While investigating differences



between groups, parametric and non-parametric tests were used.

In order to determine the effect of the analyzed characteristics on the self-reported quality of life and to evaluate the level of their significance and variance explained by these factors, the method of logistic regression analysis was applied. In accordance with algorithm for calculating the quality of life according to the WHOQOL-100 scale, higher mean values reflect a better quality of life; median of the WHOQOL-100 scale results was a cut-off point, values below median evidence a poor quality of life, while values above median decide about good life quality.

In the model of the analysis of regression all factors which might have been associated with QOL were used as predictors.

The following factors were introduced into the model: age, education level, occupational status, BMI (kg/m<sup>2</sup>), previous non-vertebral fractures, decreased height, self-reported deformities of the back, anxiety and depression. In addition, the effect of the levels of selected biochemical parameters was analyzed: FSH, E2, total alkaline phosphatase, total calcium, and inorganic phosphate.

Factors such as age, education level, occupational status, the BMI index, levels of FSH and E2, total calcium, inorganic phosphates, and total alkaline phosphatase in respondents' blood were continuous quantitative variables, whereas the factors: previous non-vertebral fractures, decreased height, self-reported deformities of the back, anxiety and depression were determined as categorical, dichotomous variables.

The p values p<0.05 were considered statistically significant. The entire statistical analysis was performed with the use of statistical package SPSS Windows Version 20 (SPSS Inc., Chicago, IL, USA).

## RESULTS

**Socio-demographic characteristics.** The respondents with osteoporosis were older; mean age 59.9 ± 5.2) than women from the control group; mean age 55.51 ± 5.11. More than 57% of respondents possessed secondary school education. The largest group of respondents were married, more than 80% of them were retired, over 75% lived together with other people.

For the lumbar spine, the mean BMD value in women with osteoporosis was 0.80 ± 0.08 g/cm<sup>2</sup>, and the T-score value: -3.11 ± 0.45. For the femoral bone, the BMD value was 0.59 ± 0.06 g/cm<sup>2</sup>, and the mean T-score value: -3.10 ± 0.44. Among women in the control group, the mean BMD value for the lumbar spine was 1.10 ± 0.11 g/cm<sup>2</sup>, and the mean T-score value: -0.16 ± 0.80, while for femoral bone the BMD mean value was 0.86 ± 0.07 g/cm<sup>2</sup>, and the mean T-score value: -0.13 ± 0.57 (Tab. 1).

The mean age at menopause in the respondents with osteoporosis was 49.7 ± 4.50, and in control group - 49.21 ± 3.52.

The mean values of the BMI in respondents with osteoporosis were lower, compared with the value of the BMI among women in the control group.

**Previous fractures.** Eighteen (21.2%) women with osteoporosis, had a previous non-vertebral fracture; 10 women experienced fracture of the wrist or forearm bones, 2 respondents suffered fracture of one rib, 3 women experienced fracture of the clavicle, and 3 - fracture of the humeral bone.

**Table 1.** Comparison of socio-demographic and clinical characteristics between osteoporotic patients and controls (n=185).

Characteristics	Osteoporotic patients (T-score ≤ -2.5) n=85	Controls (T-score > -1.0) n=100	P
Age (mean ± SD), years	59.90 ± 5.20	55.51 ± 5.11	<0.001
Age at menopause (mean ± SD), years	49.70 ± 4.50	49.21 ± 3.52	<0.135
Body Mass Index (BMI) (mean ± SD), (kg/m <sup>2</sup> )	22.30 ± 3.10	26.11 ± 3.92	<0.001
Education (n,%):			0.246
Basic	2 (2.4)	2 (2.0)	
Work-related	10 (11.8)	17 (17.0)	
Secondary school	49 (57.6)	52 (52.0)	
University level	24 (28.2)	29 (29.0)	
Marital status (n,%):			0.531
Married	55 (64.7)	65 (65.0)	
Widowed	13 (15.3)	14 (14.0)	
Single	7 (8.2)	10 (10.0)	
Divorced	10 (11.8)	11 (11.0)	
Occupational status (n,%):			<0.001
Occupational activity	16 (18.8)	75 (56.9)	
Retired	69 (81.2)	57 (43.1)	
T-score L <sub>1</sub> -L <sub>4</sub> , mean (SD)	-3.11 (0.45)	-0.16 ± 0.80	<0.001
T-score femoral neck, mean (SD)	-3.10 (0.44)	-0.13 ± 0.57	
Previous non-vertebral fractures (n, %)	18 (21.2)	0	
Decreased height (n, %)	36 (42.4)	0	
Deformity of the back (n, %)	38 (44.7)	0	
Anxiety (n, %)	17 (20.0)	18 (18.0)	0.124
Depression (n, %)	19 (22.3)	17 (17.0)	0.102

Student's t-test (age, age at menopause, BMI, BMD); chi<sup>2</sup> test (marital status); Mann-Whitney U test.

A decrease in height by at least 3 cm was observed in 36 (42.4%) of the respondents with osteoporosis. Deformity of the back was reported by 38 (44.7%) of the respondents with osteoporosis.

Table 2 presents the levels of hormones, blood ions and total alkaline phosphatase activity.

**Table 2.** Biochemistry in patients with osteoporosis and controls.

Biochemistry (range)	Osteoporotic patients (T-score ≤ -2.5) n=85 Mean ± SD	Controls (T-score > -1.0) n=100 Mean ± SD	P
Serum FSH (mIU/ml) (25.8-134.8)	71.71 ± 17.87	57.22 ± 34.75	0.001
Serum estradiol (pg/ml) (5.0-54.7)	19.10 ± 30.44	36.57 ± 48.52	0.001
Serum total alkaline phosphatase (U/l) (35-104)	68.77 ± 33.13	74.60 ± 24.36	0.213
Serum total calcium (mmol/l) (2.15-2.55)	2.40 ± 0.17	2.41 ± 0.18	0.492
Serum inorganic phosphates phosphate (mg/dl) (2.7-4.5)	3.68 ± 0.49	3.61 ± 0.46	0.264

Significance by t-test for independence.

In both women with osteoporosis and those in the control group, the levels of FSH, E2, calcium, inorganic phosphates and total alkaline phosphatase remained within

the range of normal values. However, in respondents with osteoporosis, statistically higher levels of FSH and inorganic phosphates were found, compared to the women in the control group.

Table 3 and Figure 1 demonstrate independent predictors of self-reported quality of life in individual domains of the WHOQOL-100 scale. The domain of physical health was associated with decreased height (OR=2.13), anxiety (OR=1.30) and depression (OR=1.32).

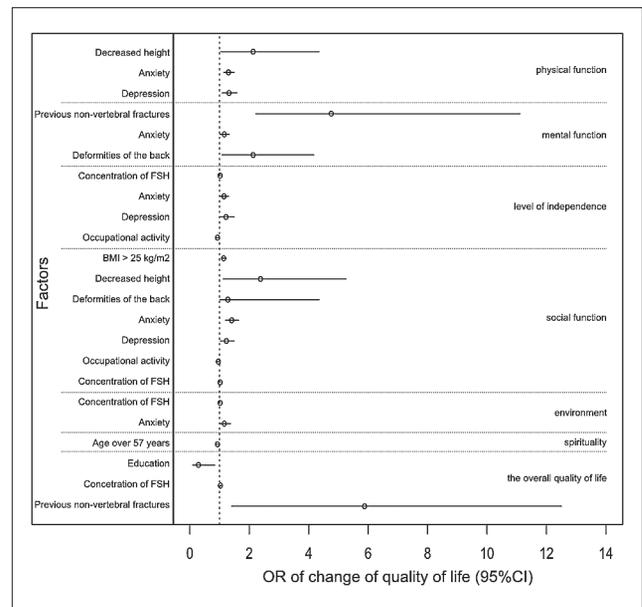
**Table 3.** Factors associated with quality of life (WHOQOL-100) evaluated by multiple logistic regression analysis (n=85).

WHOQOL-100	Factors	Value of p	Odds ratio	95% CI
Physical functioning < 12.7 (Median)	decreased height	0.04	2.13	1.04–4.35
	anxiety	0.01	1.30	1.14–1.49
	depression	0.04	1.32	1.09–1.59
Psychological functioning <13.2 (Median)	previous non-vertebral fractures	0.001	4.76	2.22–11.11
	deformities of the back, anxiety	0.03	2.13	1.08–4.17
		0.02	1.16	1.02–1.16
Level of independence < 14.2 (Median)	concentration of FSH	0.02	1.02	1.01–1.04
	anxiety	0.05	1.15	1.00–1.30
	depression	0.03	1.22	1.03–1.49
	occupational activity	0.03	0.93	0.88–0.97
Social functioning < 14.3 (Median)	decreased height	0.03	2.38	1.12–5.26
	deformities of the back	0.02	1.28	1.02–4.35
	anxiety	0.01	1.41	1.20–1.64
	depression	0.02	1.23	1.03–1.49
	BMI >25kg/m <sup>2</sup>	0.01	1.14	1.05–1.23
Environment <13.7 (Median)	concentration of FSH	0.03	1.02	1.01–1.03
	anxiety	0.02	1.16	1.02–1.37
	occupational activity	0.02	0.96	0.88–0.98
	concentration of FSH	0.04	1.02	1.01–1.03
Spirituality <12.0 (Median)	age over 57 years	0.04	0.93	0.87–1.00
	concentration of FSH	0.04	1.02	1.01–1.03
Overall quality of life <17.0 (Median)	previous non-vertebral fractures	0.03	5.88	1.41–12.50
	concentration of FSH	0.03	1.03	1.01–1.06
	education	0.02	0.29	0.10–0.84

Nagelkerke R<sup>2</sup> =28.9 (Physical function);  
Nagelkerke R<sup>2</sup> =23.7 (Mental function);  
Nagelkerke R<sup>2</sup> =34.0 (Level of independence);  
Nagelkerke R<sup>2</sup> =37.4 (Social function);  
Nagelkerke R<sup>2</sup> =18.1 (Environment);  
Nagelkerke R<sup>2</sup> =15.3 (Spirituality);  
Nagelkerke R<sup>2</sup> =34.8 (Overall quality of life).

In the psychological domain, a relationship was observed between self-reported quality of life and previous non-vertebral fractures (OR=4.76), deformities of the back (OR=2.13) and occurrence of anxiety (OR=1.16).

A relationship was noted between the level of independence and the occurrence of depression (OR=1.22) and anxiety (OR=1.15), as well as an elevated FSH level in the blood of respondents (OR=1.02). In addition, a positive relationship was found between the level of independence and functioning in the social domain and the performance of occupational activity. The functioning in the social and environmental domains were affected by anxiety and elevated FSH level in respondents' blood. Also, the functioning in the social domain was associated with decreased height (OR=2.38), deformities of the back (OR=1.28), BMI >25 kg/m<sup>2</sup> (OR=1.14), and depression (OR=1.23).



**Figure 1.** Forest plot of results from multiple logistic regression of variables associated with quality of life.

Spirituality was related with the respondents' age; older respondents, aged over 57, evaluated their quality of life in more positive terms.

The overall quality of life was affected by previous non-vertebral fractures (OR=5.88), elevated FSH level in respondents' blood (OR=1.03), and education level (OR=0.29).

## DISCUSSION

In order to evaluate the effect of osteoporosis and its consequences, and the effect of pharmacological, surgical, and rehabilitation treatment on the respondents' quality of life, in many clinical studies disease-specific or global scales are used for the evaluation of health-related quality of life. Based on literature review, it was found that the QUALEFFO-41 scale is the most often used instrument for an objective evaluation of the quality of life of patients with decreased BMD [13, 17].

The objective of the presented study was evaluation of self-reported quality of life of respondents with decreased BMD value; therefore, a global scale was applied – a Polish version of the WHOQOL-100 scale. The majority of studies concerning the quality of life of patients suffering from osteoporosis focus on patients with fractures [18, 19, 20, 21, 22, 23].

The studies by Bianchi et al. [24] concerned patients with osteoporosis who perceived this diseases as leading to serious complications, such as: chronic pain, reduced physical efficacy, decreased social activity, poor general wellbeing and decreased mood. The loss of independence was a dominant factor related with low self-reported quality of life. In addition, the studies by Bianchi confirmed the hypothesis based on a many-year clinical experience that the sole awareness of a chronic disease, such as osteoporosis, and the awareness of the risk of bone fractures in the future, exerts a negative effect of the subjective perception of the quality of life.

In the presented study, analysis of predictors of the quality of life as perceived by the respondents enabled distinguishing

the factors responsible for positive and negative evaluations. Negative evaluations of the quality of life were reported by the respondents in whom there occurred the following variables: decreased height, deformity of the spine, past fractures, anxiety, depression, and elevated FSH level in blood. In the physical domain, the functioning of women who experienced anxiety, depression and decreased height, was worse, compared to the respondents in whom these factors did not occur. Probably, in the remaining domains of the scale, the above-mentioned variables resulted in a poor functioning of women with osteoporosis.

The factors associated with good self-reported quality of life were secondary school or university education, and occupational activity. Positive evaluations in the domain of spirituality were obtained by older women, aged over 57.

Past fractures, deformities of the spine and anxiety were related with lower self-reported quality of life in the psychological domain. Availability and quality of health care and social welfare were considered while analysing the level of respondents' independence. The possibility of obtaining a high quality of life in this domain was lower among women who experienced anxiety and depression. Positive evaluations were obtained by women who were occupationally active. In their studies, Krajewska-Kułak et al. [25] confirmed that Polish female patients evaluated the quality of health care in more positive terms than female patients in Greece. A high BMI, anxiety and depression were accompanied by more negative subjective evaluations in the domain of social relations. Moreover, the evaluations of the quality of life in the environmental domain were lower in respondents with overweight, elevated FSH level in blood, anxiety and depression. During the period of menopause, women often complain about mood disorders. The most frequently reported symptoms are depression, insomnia, despondence, anxiety or psychical excitation. In accordance with the reports by Szkutnik-Fiedler et al. [26], who emphasize that due to the estrogen-like effect, phytoestrogen therapy considerably reduces the secretion of lutropin (LH) by the pituitary gland, and to a smaller degree – of FSH, which results in an improvement of mood and quality of life. For many years, HTZ has been a first choice therapy in the treatment of osteoporosis in postmenopausal women. In the past, the researchers reported a beneficial effect of HTZ on decreased incidence of cardiovascular diseases or dementia. Nevertheless, recent publications emphasize many undesirable effects; therefore, the use of this therapy has been limited, although in women with climacteric symptoms it seems to be a beneficial method by the reduction in the FSH level in blood, and improvement of mood and general wellbeing [27, 28].

Similar studies by Ferreira et al. [29], who also applied multiple logistic regression analysis, showed that such characteristics as: a high BMI and sedentary style of life are the most prevalent variables leading to the deteriorated quality of life with respect to pain, and physical and emotional functioning. Intensified back pain complaints were associated with a high BMI index and sedentary style of life. The characteristics responsible for poor functioning in the physical domain were a high BMI and lack of occupational activity. In the studies by Ferreira, no characteristics were found which could be related to the domain of social functioning.

In the presented study, social relationships were analyzed from the aspect of evaluation of partner relationships and

sexual activity; however, also in this area, no relationships were observed between the variables examined and social functioning. Szpak et al. [30] described an important role of the male partner in the solving of problems resulting from biological changes taking place in the organism of a woman during the menopausal period. Mutual understanding and correct relations with the partner improve the quality of sex life. Another study indicates an improvement in self-reported sex life among women who use androgen therapy, which is due to an increase in the level of testosterone in blood plasma and results in an increased libido in patients aged over 70. Furthermore, these reports confirmed that a 12-month androgen therapy exerts a significant effect on the reduction in the amount of fatty tissue in the body, which improves the self-reported quality of life [31]. In the presented study, occupational activity correlated with positive results pertaining to the perception of health and general quality of life. Occupational activity very frequently contributes to the elevation of self-esteem by being a productive person. The use of cognitive functions while performing occupational activity reduces anxiety, worries, and concerns about the development of diseases. In addition, occupational activity leads to life independence, thus improving wellbeing and the quality of life.

The analysis performed in the presented study indicate that education level exerts a significant effect on the general quality of life measured by means of the WHOQOL-100. The respondents who possessed secondary school or university education showed a high general quality of life, compared to those with elementary and elementary vocational education level.

Different results were obtained in the studies by Sezera et al. [32], who did not find any correlation between the quality of life measured by the QUALEFFO-41 scale and education level. These results, however, are consistent with respect to the lack of relationship between self-reported quality of life and biochemical parameters (except for FSH level). Nevertheless, in the studies by Tashiro et al. [33], a positive relationship was detected between vitality and social functioning, and the level of total osteocalcin in the blood of the respondents.

The results of the presented study are also consistent with reports by many researchers, for example, the results obtained by Abourazzak et al. [22], who evaluated factors affecting the quality of life of Moroccan women who evaluated factors exerting an effect on the quality of life of Moroccan women with osteoporosis and deformity of vertebral bodies. A multi-factor analysis showed a relationship between poor quality of life and low education level ( $p=0.01$ ), and deformity of vertebral bodies ( $p=0.03$ ), and non-vertebral fractures in the past ( $p=0.006$ ). Moreover, the researchers observed a poor quality of life of women with deformities of the vertebral bodies in all domains of life measured by the ECOS 16: physical functioning ( $p=0.002$ ), fear of disease ( $p=0.001$ ), and psychosocial functioning ( $p=0.007$ ).

Kessenich et al. [34], in their studies concerning the evaluation of the quality of life of women with osteoporosis, showed that the variables such as: vertebral fractures, perception of the state of health, retirement, and the possession of friends jointly explained 65% of variance. The BMD value, Colle's fractures, fractures of the femoral bone, physical activity, material standard, age, and education level were insignificant in the evaluation of the quality of life.



## CONCLUSION

The main characteristics determining poor quality of life were decreased height, deformity of the back, past fractures, elevated FSH level in blood, anxiety and depression.

The main factors determining a good self-reported quality of life were secondary or university education level and occupational activity. The respondents' age of over 57 was associated with a good quality of life in the domain of spirituality. There was no correlation between self-reported quality of life and marital status and biochemical parameters (except for FSH level).

For orthopaedists, gynaecologists, specialists in medical rehabilitation, physiotherapists, psychologists and nurses, the evaluation of the self-reported quality of life in women with osteoporosis is important information concerning the health problems of these women. The functional state, expressed by the changes in the silhouette, reduced height, pain complaints, limited motor activity and decreased mood are the characteristics which determine a poor quality of life of women with osteoporosis.

## REFERENCES

- Raspe H. Quality of life measurement in rheumatology. In: Quality of life and health. Concepts, Methods and Applications. Blackwell Wiss-Verl, Vienna, 1995: 95–106.
- Schoor NM, Smit JH, Twisk JW, Lips P. Impact of vertebral deformities, osteoarthritis, and other chronic diseases on quality of life: a population – based study. *Osteoporos Int.* 2005;16: 749–756.
- Pluijm SMF, Tromp AM, Smit JH, Deeg DJH, Lips P. Consequences of vertebral deformities in older men and women. *J Bone Miner Res.* 2000; 15: 1564–1572.
- Silverman SL, Shen W, Minshall ME, Xie S, Moses KH. Prevalence of depressive symptoms in postmenopausal women with low bone mineral density and/or prevalent vertebral fracture: results from the Multiple Outcomes of Raloxifene Evaluation (MORE) study. *J Rheumatol.* 2007; 34: 140–144.
- Bączyk G, Opala T, Kleka P. Depresja i jakość życia kobiet z osteoporozą pomenopauzalną. *Ortop Traumatol Rehab.* 2009; 11 supl, (2): 125–126.
- Stadnicka G, Iwanowicz-Palus G, Mazurek A, Pięta B. The feeling of life satisfaction in patients after hysterectomy. *Ginekolog Pol.* 2012; 83(5): 347–352 (in Polish).
- Rechberger T, Miotła P, Skorupski P, et al. The quality of life of patients with overactive bladder after local injections of botulinum toxin A – a preliminary report. *Ginekolog Pol.* 2010; 81(1): 24–30 (in Polish).
- Post M W M. Quality of life and The ICIDH: towards an integrated conceptual model for rehabilitation outcome research. *Clin Rehabil.* 1999; 13: 5–15.
- WHOQOL Group. The World Health Organization Quality of Life Assessment (WHOQOL). Position paper from the World Health Organization. *Soc Sci Med.* 1995; 41: 1403–1409.
- Jaracz K, Wołowicka L, Kalfos M. Analiza walidacyjna polskiej wersji WHOQOL-100. In: Wołowicka L. Jakość życia w naukach medycznych. Wydawnictwo Akademii Medycznej, Poznań 2001: 291–302.
- Zawisza K, Tobiasz-Adamczyk B, Nowak W. et al. Validity and reliability of the quality of life questionnaire (EORTC QLQ C30) and its Breast cancer module (EORTC QLQ BR23). *Ginekolog Pol.* 2010; 81(4): 262–267 (in Polish).
- Nowakowska-Głąb A, Maniecka-Bryła I, Wilczyński J, Nowakowska D. Evaluation of antenatal quality of life of hospitalized women with the use of Mother-Generated Index – pilot study. *Ginekolog Pol.* 2012; 81(7): 521–527 (in Polish).
- Bączyk G, Opala T, Kleka P. Quality of life in postmenopausal women with reduced bone mineral density: psychometric evaluation of the Polish version of QUALEFFO- 41. *Arch Med Sci.* 2011; 7(3): 476–485.
- World Health Organization Study Group. Assessment of fracture risk and its application to screening for post-menopausal osteoporosis. In WHO Technical Report Series, 1994, No, 843 WHO, Geneva.
- Satoh K, Kasama F, Itoi E, Tanuma S, Wakamatsu E. Clinical features of spinal osteoporosis: spinal deformity and pertinent back pain. *Contemp Orthop.* 1988; 16: 23–30.
- Majkowicz M. Praktyczna ocena efektywności opieki paliatywnej – wybrane techniki badawcze. In: de Walden-Gałuszko K, Majkowicz M. Ocena jakości opieki paliatywnej w teorii i praktyce. Akademia Medyczna Gdańsk, Zakład Medycyny Paliatywnej, Gdańsk, 2000.
- Lips P, van Schoor N M. Quality of life in patients with osteoporosis. *Osteoporos Int.* 2005; 16: 447–455.
- Oleksik AM, Ewing S, Shen W, van Schoor NM, Lips P. Impact of incident vertebral fractures on health related quality of life (HRQOL) in postmenopausal women with prevalent vertebral fractures. *Osteoporos Int.* 2004; 19: 861–870.
- Oleksik A M, Lips P, Dawson A. Health-Related Quality of Life (HRQOL) in postmenopausal women with low BMD with or without prevalent vertebral fractures. *J Bone Miner Res.* 2000; 15: 1384–1392.
- Miyakoshi N, Itoi E, Kobayashi M, Kodama H. Impact of postural deformities and spinal mobility on quality of life in postmenopausal osteoporosis. *Osteoporos Int.* 2003; 14: 1007–1012.
- Jahelk B, Dorner T, Terkula R, et al. Health-related quality of life in patients with osteopenia or osteoporosis with and without fractures in a geriatric rehabilitation department. *Wien Med Wochenschr.* 2009; 159: 235–240.
- Abourazzak FE, Allali F, Rostom S, et al. Factors influencing quality of life in Moroccan postmenopausal women with osteoporotic vertebral fracture by ECOS 16 questionnaire. *Health Qual. Life Outcomes* 2009; 7:23 doi: 10.1186/1477-7525-7-23.
- Fechtenbaum J, Cropet C, Kolta S, et al. The severity of vertebral fractures and health-related quality of life in osteoporotic postmenopausal women. *Osteoporos Int.* 2005; 16: 2175–2179
- Bianchi ML, Orsini MR, Saraifogor S, et al. Quality of life in postmenopausal osteoporosis. *Health Qual Life Outcomes* 2005; 3: 78–84.
- Krajewska-Kułał E, Chilicka M, Kułał W, et al. Assessment of physician- patient trust in the obstetrics and gynecology department in Poland and Greece. *Ginekolog Pol.* 2011; 82(12): 905–910 (in Polish).
- Szutnik-Fiedler D, Jędrzejczak M, Grześkowiak E, et al. The role of phytoestrogen therapy in relieving postmenopausal symptoms. *Ginekolog Pol.* 2010; 81(12): 929–934 (in Polish).
- Dallanezi G, Nahas EAP, Freire BF, et al. Quality of life of women with low bone mass in postmenopause. *Rev Bras Ginecol Obstet.* 2011; 33: 133–138.
- Milewicz T, Krzysiek J, Rogatko I, et al. The somatotrophic axis in postmenopausal women Turing six month of transdermal continuous 17β-estradiol administration combined with oral medroxyprogesterone. *Ginekolog Pol.* 2011; 82(4): 254–258 (in Polish).
- Ferreira NO, Arthuso M, Silva R, et al. Quality of life in women with postmenopausal osteoporosis: Correlation between QUALEFFO 41 and SF-36. *Maturitas* 2009; 62: 85–90.
- Szapak R, Folwarczny W, Drozdol A, et al. Partner relationships In menopausal period. *Ginekolog Pol.* 2010; 81(2): 115–119 (in Polish).
- Perzyło K, Kulik – Rechberger B, Gałczyński K, Rechberger T. Intracrinology and dehydroepiandrosterone – a new perspective for the use of androgens In hormone replacement therapy In postmenopausal women. *Ginekolog Pol.* 2011; 82(9): 690–695 (in Polish).
- Sezer N, Tomruk-Sutbeyaz S, Kibar S, Koseoglu F, Aras M. Determinants of quality of life in postmenopausal osteoporosis. *F T R Bil Der J P M R Sci.* 2009; 12: 19–25.
- Tashiro A, Kakuta H, Tanaka N, Takeuchi Y. Relationship between health-related quality of life domains and bone status in postmenopausal Japanese women. *Menopause* 2006; 13: 846–849.
- Kessenich CR, Guyatt GH, Rosen CJ. Health-related quality of life and participation in osteoporosis clinical trials. *Calcified Tissue Int.* 1998; 62: 189–192.

