

Is acceptance of disease and life satisfaction of women with postmenopausal osteoporosis dependent on BMI?

Bogumiła Górczewska¹, Elżbieta Jakubowska-Pietkiewicz²

¹Maria Konopnicka Pediatric Centre, Central Clinical Hospital, Lodz

²Department of Pediatrics, Neonatal Pathology and Metabolic Bone Diseases,
Medical University of Lodz,
Maria Konopnicka Pediatric Centre, Central Clinical Hospital, Lodz

Summary

Aim. Osteoporosis is a chronic disease and affects an increasing number of people in the ageing population. Due to its 'quiet' progress, it gradually impacts on the patient's daily functioning, resulting in reduction, then abandoning of existing forms of life activities and deterioration of mental state. The aim of the study was to analyze the levels of disease acceptance and satisfaction with life in women with postmenopausal osteoporosis depending on their body mass index.

Material and method. The study included a group of 198 women, 72.3 ± 8.59 years old, diagnosed with postmenopausal osteoporosis treated in two Osteoporosis Treatment Centers in the city of Lodz. The study used the Acceptance of Illness Scale (AIS), the Satisfaction with Life Scale (SWLS), the Visual Analogue Scale (VAS), and a self-made survey.

Results. The mean AIS score was 25.95 ± 10.20 points, which indicated a moderate level of acceptance and adjustment to the disease in the study group. The average level of satisfaction with life assessed on the SWLS was 19.37 ± 7.31 points and indicated moderate life satisfaction. The lowest acceptance of the disease (24.38 ± 11.3 points) was presented by underweight persons, while the lowest satisfaction with life (17.75 ± 7.50 points) was presented by overweight women. The subjects presented a mild level of pain according to the VAS scale (4.87 ± 2.39 points). The highest acceptance of the disease and satisfaction with life was presented by normal weight persons.

Conclusions. The levels of disease acceptance and satisfaction with life in women with postmenopausal osteoporosis do not differ statistically significantly depending on body mass index. It was indicated that greater acceptance of the disease was accompanied by greater satisfaction with life in people with osteoporosis. Psychological aspects (AIS, SWLS) should be an important component of the assessment of therapy effectiveness in women undergoing a long-term treatment for postmenopausal osteoporosis.

Key words: acceptance of illness, life satisfaction, postmenopausal osteoporosis

Introduction

Osteoporosis is currently the most common bone metabolic disease. It is estimated that over 200 million people worldwide suffer from it, 75 million of whom are recorded in Europe, the USA and Japan [1, 2]. The disease is more common in women than in men. The risk of osteoporosis increases more than seven-fold after menopause [3]. This is due to estrogen deficiency that results in bone mass loss and increases the risk of developing obesity and metabolic syndrome. There is a close connection between body mass index and bone mineral density (BMD), however, literature provides divergent reports. There are studies available on the relationship between BMD and BMI values showing a negative correlation [4, 5] and a positive correlation [6–8]. In postmenopausal women, obesity protects against hip and pelvic fractures but is associated with an almost 30% increase in the risk of fractures of the proximal humerus compared to women with normal body weight [9, 10].

The World Health Organization forecasts a rise in the number of hip fractures from 1.7 million (1990) to 6.3 million in 2050 [11, 12]. Fractures of the vertebrae and bones cause pain that can hamper everyday activities, social activity, and bring about some psychological consequences such as suffering, anxiety, stress, depression, which remain mostly unassessed during visits to osteoporosis outpatient clinics. Furthermore, bone fractures are the reason for hospitalization, require expensive treatment and long-term rehabilitation, which affects the patient's mental state.

The purpose of psychological treatment should be to minimize the impact of the illness on the patient's life in such a way so that the patient can deal with negative emotions associated with the diagnosed disease and applied treatment [13, 14]. The patient's appropriate mental state, i.e., high satisfaction with life and acceptance of circumstances, as well as the desire to combat the disease, allows to achieve better therapeutic results during the treatment. For many patients acceptance of the disease is a problem they struggle with throughout its course [15]. Patients suffering from osteoporosis do not easily accept their illness, especially changes in body structure, limitation of physical activity, loss of social roles (withdrawal from professional and family life), chronic fear associated with the risk of bone fracture, fear of long-term and expensive treatment. The levels of acceptance of the disease and satisfaction with life are very important parameters affecting the mental state and providing information on the patient's adjusting to the disease.

The aim of the study was to analyze the levels of disease acceptance and satisfaction with life in women with postmenopausal osteoporosis depending on their body mass index.

Material and methods

The study was conducted from June 2018 to May 2019. Patients were examined in two Osteoporosis Treatment Outpatient Clinics in Lodz. The study included 198 postmenopausal women aged 72.3 ± 8.59 years (range 51–90 years). The selection of the study sample was targeted – women who had a diagnosis of postmenopausal

osteoporosis, according to ICD 10 – M81.0, made by a doctor at the Osteoporosis Treatment Outpatient Clinics in their medical records were qualified to the study.

The researcher presented information brochures about the purposefulness and course of the survey to all women who waited for an appointment in the clinic waiting room. Women who wished to take part in the study were individually invited to a separate office at the clinic, where they granted informed consent to participation in the study and filled out questionnaires (at the same time they had an opportunity to ask questions to the researcher). Then, the researcher analyzed the medical records of the respondents and made a targeted selection of patients who had postmenopausal osteoporosis, according to ICD 10 – M81.0, diagnosis in the medical history (the main qualification criterion). Women who did not meet the main criterion were excluded from the study.

Other criteria for including women in the study group were as follows:

- consent to participation in the study;
- full completion of the AIS and SLWS questionnaires;
- no hospitalization during the last six months.
- Women excluded from the study were:
 - women with active cancer, with malignant bone metastases;
 - women who failed to complete the AIS and SLWS questionnaires in full;
 - women with secondary osteoporosis;
 - women treated with glucocorticoids;
 - women with currently broken bones;
 - women hospitalized in the last 6 months.

The research method involved a diagnostic survey applying the following tools:

1. The author's survey questionnaire, consisting of questions involving sociodemographic data (including age, marital status, place of residence, material circumstances).
2. *The Acceptance of Illness Scale* (AIS) was originally developed by Felton et al. [16]. In this study, the Polish version of the AIS was used, which was adapted by Zygryd Juczyński [17]. The AIS consists of 8 statements assessed on a 5-point scale and provides information on the patient's acceptance of the disease. To each statement, the respondent assigns one number from 1 ("I strongly agree") to 5 ("I strongly disagree"), which best describes his/her current health condition. The sum of all points obtained is a measure of the degree of acceptance of the disease. The possible score to get is between 8 and 40 points. After adding up all obtained points, interpretations are made according to three baseline scores: a score below 18 points means poor acceptance of the disease, a value in the range of 19–29 means moderate acceptance of the illness, and obtaining more than 29 points is a determinant of full acceptance and adaptation to the disease [18]. Summing up, the higher the score, the higher the acceptance of one's own condition.

3. *The Satisfaction with Life Scale* (SWLS) developed by Diener et al., adapted to Polish conditions by Zygryd Juczyński, which provides information about the subjective sense of satisfaction with life [19]. The SWLS consists of 5 statements evaluated on a 7-point scale; the respondent assigns one number from 1 to 7 to each statement. The respondent thus assesses to what extent each statement relates to his/her current life. The possible score to get is between 5 and 35 points. The higher the score, the greater satisfaction with life. For the needs of interpretation, the sten scale is applied. The values of 1–4 sten scores evidence low satisfaction with life, 5–6 sten scores – moderate satisfaction, whereas 7–10 sten scores show a high satisfaction with life.
4. *The Visual Analogue Scale* (VAS) for assessing the severity of pain.

In the statistical analysis, the respondents were divided into four groups. The division was made after calculating body mass index (BMI) according to the BMI formula = body weight [kg]/height [m²]. The patients were divided into four groups according to their body mass index: underweight (BMI <18.0 kg/m²), normal weight (BMI 18.0–24.9 kg/m²), overweight (BMI 25.00–29.9 kg/m²), obese (BMI 30–34.9 kg/m²). The proportions of the obtained groups were as follows: underweight 7% ($n = 13$), normal weight 39% ($n = 78$), overweight 38% ($n = 75$), obese 16% ($n = 32$).

Ethical issues

The survey was voluntary and was conducted according to the principles of human research specified in the Helsinki Declaration. The respondents signed an informed consent form and were advised that the study would be anonymous, according to the currently applicable regulations and the provisions of the GDPR. Before filling in the questionnaires, the patients were informed about the purposefulness of the study and instructed how to complete the questionnaires correctly. Each person qualified for the examination provided answers in an office in which they stayed together with the surveyor. Some patients asked the surveyor to read the questions aloud, which they then answered verbally, and which were circled in the questionnaires. The duration of the survey was adjusted to the individual capabilities of the examined women.

The study was approved by the Bioethics Committee of the Medical University of Lodz (Resolution No. RNN/215/18KE of June 12, 2018).

Statistical analysis

The results obtained from questionnaires were statistically analyzed. The values of the analyzed parameters were presented using the mean, median, standard deviation, minimum and maximum values. The Shapiro-Wilk test was applied to test the normality of the quantitative variable distribution. Correlation coefficients between quantitative variables were calculated using the Spearman's rank correlation coefficient. Comparisons between quantitative variables were made with the use of the Kruskal-Wallis ANOVA. A multivariate regression analysis was also performed. The adopted

level of statistical significance was $p < 0.05$. The statistical analysis was performed with the use of the Statistica 13 Dell Inc software (StatSoft, Poland).

Results

198 women with postmenopausal osteoporosis were included in the survey. The mean age was 72.3 ± 8.59 years old (range 51–90 years). The vast majority of study participants had abnormal body weight; the mean BMI was 25.71 ± 4.73 kg/m². Moreover, in the study group the mean body weight was 64.5 ± 11.66 kg and the mean height was 158.6 ± 6.52 cm.

Almost half of the respondents (47%, $n = 93$) were married, 36% ($n = 72$) were widows, 10% ($n = 19$) were divorced, and 7.0% ($n = 14$) had never been married. Most of the respondents had secondary (35%, $n = 70$) and higher (25%, $n = 50$) education; only 19% ($n = 37$) had vocational education and 21% ($n = 41$) had primary education. The vast majority of the survey participants (57%, $n = 112$) lived in a city of over 100,000 inhabitants, and only 9% ($n = 17$) of women – in rural areas. Out of the remaining respondents, 13% ($n = 26$) lived in a town up to 50,000 inhabitants, and 22% ($n = 43$) – in a town of 50,000–100,000 inhabitants. As many as 89.4% ($n = 177$) of the respondents were retired and only 10.6% ($n = 21$) were professionally active. Over half of the respondents (53%, $n = 105$) described their living conditions as good, 8.5% as very good ($n = 17$), and 26% ($n = 51$) as unsatisfactory and 12.5% ($n = 25$) as very poor.

In the study group, osteoporosis was diagnosed at the age of 61.82 ± 9.74 years (range 43–81 years) on average. The duration of osteoporosis among the respondents was 10.7 ± 8.53 years on average. In addition, more than 28.8% of respondents ($n = 57$) stated that osteoporosis occurred in the immediate family, of which 54% ($n = 31$) in the mothers and 21% ($n = 12$) in the sisters of the surveyed women.

The relationship between the acceptance of disease and body mass index

Women with postmenopausal osteoporosis accepted their disease at a moderate level. The mean AIS score for the whole group was 25.95 ± 10.2 points (median 26.00; min. 8.0; max. 40.0) and indicated that the respondents did not feel the negative impact of osteoporosis in a significant way and accepted their health condition.

Analyzing the level of disease acceptance using the AIS questionnaire depending on body mass index (Table 1), high acceptance and full adaptation to the disease was found in people with normal weight (median 28 points). The underweight patients experienced the lowest psychological comfort (median 21 points). Despite the noticeable differences in scores, the results are not statistically significant.

Table 1. The relationship between the acceptance of disease and body mass index

Total AIS score	Underweight	Normal weight	Overweight	Obesity	Kruskal-Wallis test
Me	21	28	24	24.5	p = 0.3373
Q1-Q3	14-36	18-37	16-34	17-36	

AIS – Acceptance of Illness Scale; Me – median; Q1 – quartile 1; Q3 – quartile 3; p – level of significance.

At the beginning, individual elements of the AIS scale were analyzed regardless of the body mass index (the interpretation of the results was based on the relationship: the fewer points, the greater the agreement with the statement). The respondents most agreed with the following statements: “I will never be as self-sufficient to the extent to which I would like to be” (mean score 2.85 ± 1.62 points), “Due to my health condition, I am not able to do what I like the most” (mean score 2.92 ± 1.60 points) and “Due to my health condition I do not feel to be a really valuable man” (mean score 2.96 ± 1.57 points). The surveyed women agreed to the least extent with the following statements: “I believe people that stay with me are often embarrassed because of my disease” (mean score 3.67 ± 1.51 points), “The disease makes me a burden for my family and friends” (mean score 3.58 ± 1.47 points) and “The disease makes me feel unwanted” (mean score 3.52 ± 1.55 points).

The remaining AIS items were assessed as follows: “I have problems with adjusting to the limitations imposed by the disease” – mean score 3.11 ± 1.67 points; and “Health problems make me more dependent on others than I would like to be” – mean score 3.30 ± 1.56 points.

The relationship between satisfaction with life and body mass index

The mean result of the level of satisfaction with life assessed on the *Satisfaction with Life Scale* (SWLS) in the examined group was 19.37 ± 7.31 points (median 19.00; min. 5.0; max. 35.0). After conversion to sten units, the mean was 5.0, which indicated moderate life satisfaction in the examined group of women ($p = 0.3956$). When comparing the mean SWLS results depending on BMI (Table 2), it should be assumed that the lowest level of satisfaction with life occurred in obese women (median 16 points). In contrast, individuals with normal body weight had the highest sense of satisfaction with in the study group (median 19 points). Despite the noticeable differences in scores, the results are not statistically significant.

Table 2. The relationship between satisfaction with life and body mass index

Total SWLS score	Underweight	Normal weight	Overweight	Obesity	Kruskal-Wallis test
Me	18.00	19.00	19.00	16.00	p = 0.3956
Sten	5	5	5	4	
Q1-Q3	14-24	14-27	13-25	12-22	

SWLS – Satisfaction with Life Scale; Me – median; Q1 – quartile 1; Q3 – quartile 3; p – level of significance.

A general analysis of the SWLS questions was performed. The highest mean for individual elements of the *Satisfaction with Life Scale* was shown for the following items: "So far I have gotten the important things I want in life" (mean score 4.22 ± 1.80 points) and "I am satisfied with my life" (mean score 4.18 ± 1.84 points). The lowest mean was observed for the items: "In most ways my life is close to my ideal" (mean score 3.58 ± 1.71 points) and "If I could live my life over, I would change almost nothing" (mean score 3.60 ± 2.02 points). For the item "I am satisfied with my life" the mean score was 4.18 ± 1.82 points.

The relationship between satisfaction with life and acceptance of disease

In the further part of the study, it was decided to determine whether there was a relationship between the AIS score and SWLS. A statistically significant ($p < 0.05$) positive correlation (Spearman's $R = 0.56991$) was found, which mean that the greater the acceptance of the disease, the greater the life satisfaction of people with osteoporosis.

The relationship between pain and body mass index

Patients rated their pain as mild on the VAS. The average level obtained on the VAS was 4.87 ± 2.39 points. Analyzing the level of pain depending on body weight, severe pain was found in underweight (5.84 ± 2.30 points) and overweight (5.09 ± 2.49 points) people. The severity of pain was assessed the lowest by women with normal body weight (4.59 ± 2.28 points), followed by those with obesity (4.66 ± 2.42 points).

The relationship between pain and satisfaction with life and acceptance of disease

A correlation was made between the severity of pain measured by the VAS and the level of life satisfaction assessed on the SWLS and a correlation was found between them ($r = -0.271$; $p < 0.05$). Then the correlation between the VAS and AIS was examined and the following values were obtained: $r = -0.505$; $p < 0.05$. Negative correlations show that the higher the level of pain, the lower the level of satisfaction with life (SWLS) and acceptance of the disease (AIS).

In the next part of the statistical analysis, a multifactorial model was created using the generalized structural equation model estimation. Dependent variables were the VAS, AIS and SWLS, while the independent variable was the body mass index category (determined according to international guidelines, on the basis of the obtained, i.e. empirical, BMI value). The described statistical procedure allowed assessing the relationship of scores obtained by the subjects on the above-mentioned scales in relation to body mass index. No statistically significant correlation was found for the VAS ($p = 0.944$), AIS ($p = 0.341$) and SWLS ($p = 0.102$).

Discussion

During menopause, estrogen deficiency increases the risk of developing obesity and metabolic syndrome. In the study group, most women had abnormal body weight (BMI > 25.00 kg/m²). It is interesting to note that weight reduction is not indifferent to bone mass. Jiang et al. [8] noticed that weight loss reduces bone mass and may increase the risk of bone fracture in people over 65 years of age. According to the literature, people with osteoporosis should not lose weight drastically [20]. In the examined group, overweight women assessed their mental state the worst in terms of acceptance of the disease and satisfaction with life. Hence, psychological support, dietary help and adequate physical activity are so important in the case of women with postmenopausal osteoporosis and abnormal body weight.

Moreover, the respondents reported mild chronic pain. Women suffering from osteoporosis present varying degrees of pain, although the mechanism is unclear [21]. Researchers are still working on pain management.

A result similar to this obtained in our study was obtained in the study by Pawlikowska-Łagód et al. [15], in which 137 women with osteoporosis were examined. Also another study, assessing disease acceptance in 207 patients treated for osteoporosis, showed a moderate level of disease acceptance [22]. In the cited works, as in our group of respondents, it was proved that the respondents are aware of the limitations associated with osteoporosis, which makes them unable to do what they like best and realize that they will never be as self-sufficient to the extent to which they would like to be.

Patients with colorectal cancer (AIS = 27.74 points) [23], lung cancer (AIS = 27.1 points) [24] and bladder cancer (AIS = 28.8 points) [25] also accept their illness at a moderate level. Therefore, it can be concluded that the level of disease acceptance in the study group is comparable to the acceptance of cancer, which means that patients with osteoporosis have little knowledge of the etiology, treatment and its complications. That is why it is so important to spread the knowledge of osteoporosis in the population and to promote a healthy and active lifestyle. According to the authors, knowledge of osteoporosis in Poland and in the population of other countries in the world is insufficient in matters related to its prevention [26]. This is confirmed by the results of the work by Janiszewska et al. [27] where it has been described that perimenopausal women perceive osteoporosis as a moderately serious health problem and do not feel particularly burdened with the risk of falling ill.

In studies conducted by Juczyński [17] in the Polish population, it was shown that patients with diabetes (AIS = 24.81 points) and women with multiple sclerosis (AIS = 24.59 points) accept their disease to a lesser extent, compared to our results in women with osteoporosis. Adapting to the diagnosis and acceptance of the disease is a very important parameter that affects the mental state of a person and can be important in the long-term treatment of osteoporosis.

There was no statistically significant ($p < 0.05$) effect of BMI on the level of disease acceptance among the respondents. The obtained values are consistent with the results of studies by Kowalska et al. [28] carried out in a group of patients

over 60 years of age staying in a rehabilitation center, in which no statistically significant correlations were found between the values of patients' somatic features (in particular BMI) and the level of disease acceptance. Olszak et al. [29] also did not observe statistical significance between BMI and AIS in patients with type II diabetes. However, it is known that higher acceptance of disease improves the cooperation between the patient and doctor, which translates into a better therapeutic effect. That is why it is so important to control the level of disease acceptance and strive to improve it.

The mean SWLS score obtained in this study was lower in comparison to healthy women in the Polish population. Juczyński, the author of the Polish adaptation of the SWLS, obtained the mean score of 21.09 points when examining healthy women [17]. Also, Buliński and Błachnio [31], in a large study of 312 healthy Poles, showed that the mean value of the SWLS above 60 years of age is 21.67 points. The study by Janiszewska et al. [22] obtained an even lower level of life satisfaction (SWLS 14.7 ± 5.6 points) in women with osteoporosis in comparison to our results. Patients with osteoporosis assessed their satisfaction with life lower compared to patients with Crohn's disease (SWLS 23.8 points), ankylosing spondylitis (SWLS 22.2 points) and polycystic ovary syndrome (SWLS 20.16 points) [32–34]. This may arise from the impact of osteoporosis on all spheres of human life, including physical activity, which results in deterioration and limitation of functioning in social life and affects the mental state. Osteoporosis gradually limits patients' independent mobility, causes fear of bone fractures, loneliness, affects the development of depression and deteriorates the quality of life [30, 35–37].

In conclusion, it should be emphasized that the level of disease acceptance and the level of life satisfaction in women with postmenopausal osteoporosis, despite noticeable differences in scores, does not differ statistically significantly depending on body mass index (BMI). It would be advisable to develop diagnostic and rehabilitation programs. The aim of these projects would be education on osteoporosis, disseminating information on healthy food and physical activity – in order to maintain an adequate body weight, and thus improve the physical and mental condition of patients. A multidisciplinary approach in treatment of women with postmenopausal osteoporosis is important rather than only the use of pharmacotherapy.

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Address: Bogumiła Górczewska,
Maria Konopnicka Pediatric Centre
Central Clinical Hospital
91-738 Łódź, Sporna Street 36/50
e-mail: bogumila.gorczevska@gmail.com