VILNIUS UNIVERSITY

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FEATURES OF HEALTH CARE SERVICES AND HEALTH RELATED QUALITY OF LIFE IN PERSONS WITH OSTEOPOROTIC FRACTURE

Summary of doctoral dissertation

Biomedical Sciences, Public Health (09 B)

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VILNIAUS UNIVERSITETAS

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ASMENŲ, PATYRUSIŲ OSTEOPOROZINĮ LŪŽĮ, SVEIKATOS PRIEŽIŪROS PASLAUGŲ YPATUMAI IR SU SVEIKATA SUSIJUSI GYVENIMO KOKYBĖ

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ABBREVIATIONS

BMD   – bone mineral density
BMI   – body mass index
CI   – confidence interval
DXA   – dual-energy x-ray absorptiometry
EQ-5D   – European Quality of Life – 5 Dimension questionnaire
HRQoL   – Health related quality of life
n   – the absolute number of subjects
QUALEFFO-41 – Quality of life questionnaire of the European foundation for osteoporosis
r   – correlation coefficient
SD   – standard deviation
WHO   – World Health Organization

DEFINITIONS

Quality of life

individual assessment of one's place in life in the context of culture and values system, where individual lives; it is related with his aims, expectations, standards, and interests.

Health related quality of life

a part of quality of life, influenced by health (physical and mental) and health care.

Osteoporotic fracture

fracture that occurs without any impact of external force, without injury, or results from falling from the height of own stature, from mechanical forces that would not ordinarily result in fracture, the cause of which is not related with malignant or other pathological processes in the bone.

Low energy trauma

trauma which usually does not cause fracture for healthy bone.

Non-clinical vertebral fracture

not observed during previous consultations, diagnosed only after lateral spine radiographs.

Clinical vertebral fracture

diagnosed in lateral spine radiographs upon feeling an acute pain in back area.

1. INTRODUCTION

Osteoporosis is a disease that leads to bone fractures, which cause pain, reduce physical, social functions, and worsen the well-being of a patient. Physical, psychological and social consequences of osteoporosis and fractures have a significant impact on health related quality of life. In addition, fractures cause acute and chronic pain, impair physical functions, limit mobility, cause depression and lead to social isolation, and make life significantly more complicated. In fact, deterioration in the quality of life is the main consequence of osteoporosis. The quantity and nature of health services is directly related to the size of the health problem: the higher the negative impact of osteoporotic fracture on health, the greater the health care needs and expectations of a patient.

Population aging is one of the main problems of twenty-first century. Population aging trends are also noticed in Lithuania. Therefore, it is important to ensure the health of older people. There are approximately 200 million people with osteoporosis worldwide. The most recent studies have estimated that there were 22 million women and 5.5 million men with osteoporosis in Europe in 2010. 3.5 million new fractures, 620 thousand of which were femur, 520 thousand – vertebral fractures, 560 thousand forearm and 1 million 800 thousand other fractures, were diagnosed. In Lithuania, there are approximately 180 thousand people with osteoporosis. According to the data of 2010, there were about 15 thousand of new fractures: 3 thousand femur, 2 thousand vertebral, 3 thousand forearm and 7 thousand all other fractures. 67% of all fractures occurred to women. It is estimated that by 2025 these figures will increase to 17 thousand, i.e., the number of fractures will increase by 2 thousand, i.e., by 16%. It is worth mentioning that one of three postmenopausal women is suffering from osteoporosis. Even, one of three women and each seventh man over the age of 65 have faced fractures due to osteoporosis. More than 40% of middle-aged women, living in Europe, will experience one or more osteoporotic fractures through the rest of their life.

Osteoporosis can result in fracture of any bones, however, the most common are vertebral, forearm and upper end femur fractures, which, as has been shown scientifically, have a negative impact on the quality of life. The number of studies on vertebral fracture is low as it is difficult to collect data because of the fact that they

usually do not show any clear clinical symptoms. Clinical value of distal forearm fractures is underestimated. Patients with low energy impact forearm fractures are not examined for osteoporosis, they have the potential decrease in bone mineral density diagnosed, and do not receive the appropriate treatment. Patients with femur fracture, on the contrary, have received a significant attention, the consequences and decrease of the quality of life after fractures have been thoroughly analyzed.

Osteoporotic vertebral fractures are a serious public health problem for the loss of independence indicators. Vertebral fractures result in decrease of height, deformation of spine, and eventually the internal organs are pressed. Furthermore, spinal fractures are associated with significantly increased morbidity and mortality. It should be noted that spinal fractures change person's appearance, reduce self-esteem, and take away the joy in life. Patients with vertebral fracture face the deterioration of health, quality of life, loss of working capacity and independence. In addition, osteoporotic vertebral fractures are very often left unnoticed, most of them are undiagnosed, and less than 10% of those patients are hospitalized.

The risk of distal forearm fracture for women is approximately 15%, i.e., just as common as femur or clinical vertebral fractures. Distal forearm fractures often occur as a result of falling and are the consequence of osteoporosis. The incidence of osteoporotic fractures and their negative effect on human health, working capacity and quality of life is increasing.

Decrease of quality of life is associated with vertebral and forearm fractures. After a fracture, a lot of patients face long-term health problems, they need care and aid tools. Pain causes significantly more problems than other osteoporosis-related psychological, social and physical activity issues. In addition, pain affects all three of these categories, and significantly worsens the health related quality of life.

For evaluation of health related quality of life the standardized questionnaires are usually used, covering the following dimensions: pain, physical, social functions, general health status, mental health. Evaluation of quality of life is expressed in conventional units. Thus, a comparison of surveyed groups is facilitated.

It is argued that evaluation of health related quality of life is one of the most important elements of modern treatment and care efficiency, encompassing the general health care and diverse clinical application, the need for a rational allocation of health care resources.

Since patient's perception is one of the essential factors in the current health care system, which emphasizes the patient-centered care, the studies on health related quality of life are needed for assessment and monitoring of patients' condition following osteoporotic fracture. By knowing the most important issues of quality of life of those with osteoporotic fracture and of healthy people, it would be possible to improve the medical and social care system. Lithuanian Health Programme states that the quality of life of Lithuanian residents could be improved by its continuous monitoring, by activating people's participation in public life and in development of health policy. Thus, while planning the health policy, developing the strategies, and preparing the health promotion programmes, it is important to take into account the improvement of health related quality of life shown by objective health indicators and subjectively perceived by people. Undoubtedly, attention on things that are important to patient at the level of research suggests that human welfare will remain a priority.

1.1. The aim of the research

To identify the features of health care services and to evaluate the changes in health related quality of life in persons with osteoporotic fracture.

1.2. The objectives of the research

1. To analyze the health care services, provided for persons within three years after osteoporotic clinical vertebral fracture or forearm fracture.
2. To evaluate the health related quality of life in persons with osteoporotic clinical vertebral or forearm fracture, its changes within three years after the fracture, and relationships with age, gender, income, and education.
3. To evaluate the health related quality of life in women with postmenopausal osteoporosis and in women with osteoporotic non-clinical vertebral fractures, and to compare it with quality of life women without osteoporosis.

1.3. Scientific novelty

The novelty of this study is related with the choice to examine people, especially the elderly, to analyze their medical, social, health care features and needs, and to evaluate the changes in their health status after the fracture. Foreign studies found statistically significant differences in some dimensions (not all dimensions) of quality of life. It encouraged us to carry out the research and to find out what dimensions of quality of life these changes remain in for a significantly long period of time.

The selected study is a prospective cohort one, therefore, dynamic changes in quality of life after the fracture might be considered. The data of this study supplement the knowledge of health care professionals in changes in health related quality of life and health care services, provided after osteoporotic fracture.

To our knowledge, no prospective cohort studies have been conducted for evaluation of changes in health status after the fracture in Lithuania, therefore, the results of this study will complement the results of European research, examining the patients with different fractures.

1.4. Statements to defend

1. The need of health care services remains for three years after osteoporotic vertebral or forearm fracture.

2. Osteoporotic vertebral and forearm fractures determine long-term health problems and changes in quality of life, especially for the elderly.

3. Quality of life in women with osteoporotic non-clinical vertebral fractures is worse than in women with osteoporosis, but without fracture, or women without osteoporosis.

2. SUBJECTS AND METHODS

2.1. Study population

The study was conducted in Emergency and Traumatology – Orthopaedics Departments of public institution Republican Vilnius University Hospital, National Osteoporosis Centre and Vilnius City Primary Health Care Institutions. The permissions of Lithuanian Bioethics Committee (No. 52, 04-06-2003 and No. 16, 21-06-2007) were obtained. In the study documentation (questionnaire), the patients were identified according to the assigned unique code, thus, protecting their personal data. All subjects were informed about the objective of the study, the benefits and disadvantages, and the Patient Information and Informed Consent Form was given to sign to them.

2.1.1. Study of patients with osteoporotic clinical vertebral or forearm fracture

Patients with osteoporotic clinical vertebral or forearm fracture were studied prospectively. Each survey consisted of interview and registration of data. Depending on the patient's health status, he was interviewed six times over the period of 36 months after the fracture. First interview took place within 14 days after the fracture. In case of osteoporotic vertebral fracture or complex forearm fracture, the first interview was conducted in a health care institution, where a patient was treated – Emergency and Traumatology – Orthopaedics Departments of public institution Republican Vilnius University Hospital or Vilnius City Primary Health Care Institutions. The second, third and fourth, fifth and sixth interviews were conducted by phone 4, 12, 18, 24 and 36 months after the fracture. The first interview requested to answer the questions about patient's living environment and quality of life prior and immediately after the fracture. The remaining five interviews questioned about treatment applied, medical and social services provided, and life changes within 4, 5–12, 13–18, 19–24 and 25–36 months after the fracture.

The sample of patients with clinical fracture was determined, according to the following formula:

$$n = \frac{1}{\dfrac{1}{N} + \dfrac{d^2}{s^2 z_{\alpha/2}^2}}$$, where:

d – absolute error; z_α *– critical value of α for normal distribution; N – size of population; sample variance (since EQ-5D index is between 0 and 1, it is approximated 1/12).*

In case of vertebral fractures N=2000; $\alpha = 0{,}05$; $z_{\alpha/2} = z_{0,025} = 1{,}96$; d=0.06, and in case of forearm fractures N=3000; $\alpha = 0{,}05$; $z_{\alpha/2} = z_{0,025} = 1{,}96$; d=0.06. Taking into account the mean and seeking that the absolute error would not exceed 6%, with probability of 0.95, it results that it is necessary to survey at least 86 respondents with vertebral fracture and at least 87 respondents with forearm fracture. Criteria of inclusion in the study were the following: patient's consent to take part in the study; age from 50 to 90 year-old; two or more years after menopause (only for women); osteoporotic clinical vertebral or forearm fracture. Exclusion criteria: osteoporotic non-clinical vertebral fracture; co-existence of two or more fractures; fracture due to grade 3 injury (these injuries occur as a result of strong collision in case of high speed – it include road traffic accidents; fall from great height, industrial injuries, etc.); diagnosed Paget's disease, osteomalacia, renal osteodystrophy, and other metabolic bone diseases, metastases of malignant tumours in bones; diagnosed diseases and conditions, influencing the quality of life: heart failure, uncontrolled hypertension; recent angina and myocardial infarction within six months before survey, clear signs of kidney failure, organ transplantation; other (cardiovascular, urogenital system, endocrine, hepatic, psychiatric, renal, haematological or pulmonary diseases, malignant tumours); person resides in care or nursing institution.

2.1.2. Study of patients with osteoporotic non-clinical vertebral fractures

Patients with osteoporotic non-clinical vertebral fracture often do not have complaints; therefore, an additional study was planned. In case of vertebral compression fractures which are common to female, only women following menopause were surveyed, in order to implement this task of the study. Seeking to evaluate the changes in quality of life after non-clinical vertebral fracture, 120 women were selected: group I – 40 women with non-clinical vertebral fracture(s), group II – 40 women with postmenopausal osteoporosis without fracture, and group III – 40 women without osteoporosis. Taking into account the data of literature, it might be stated that in case of

this type of studies the differences of statistical significance are obtained when a group includes at least 30 respondents. Inclusion criteria were the following: patient's consent to take part in the study; age from 50 to 90 year-old; two or more years after menopause; diagnosed osteoporosis (only for first two groups). Exclusion criteria were the same as of patients with osteoporotic clinical vertebral or forearm fracture.

2.2. Methods

2.2.1. General survey

The questionnaire, consisting of 2 parts – documentary part and standardized questionnaires – general and disease-specific – was used for the study. A documentary part of the questionnaire recorded age, height, body mass, body mass index, bone mineral density, marital status, education, social status, osteoporotic fractures of the subjects, patient's data about osteoporotic fracture, number of days he was treated in hospital, number of times he was visited by health care professionals at home, and fracture-related procedures he received. The scope of outpatient and inpatient health care services, provided to patients, was determined: the number of visits in health care institutions, surgeries and radiological examinations, undertaken as a result of fracture, frequency of doctor or nurse's visits at patient's home and their telephone consultations.

2.2.2. Instrumental measurements

Instrumental measurements were performed for women patients, included in the study of osteoporotic non-clinical vertebral fractures.

Anthropometry. After completing the questionnaire survey, the female patients were subject to anthropometric measurements during cross-sectional study. A body mass was measured in the accuracy of 50 grams with electronic medical scales (*Radwag*, Poland). A standard vertical height meter was used for height measurement (*Harpenden Stadiometer, "Holtainlimited",* Great Britain). Height was measured as the subject stood without shoes, feet close together, heels, buttocks and back to the wall, and head kept horizontally – where a line, which passes from the highest point of the ear canal through to the lowest point of the eye socket, is horizontal (the so-called Frankfort horizontal

plane). In order to assess the body composition, a body mass index (BMI), obtained by dividing a body mass in kilograms by height in meters squared, was used.

Bone mineral density test. A bone mineral density test was performed with bone mineral density machine Prodigy (*GE Lunar*, USA) by using the method of dual energy x-ray absorptiometry, DXA. Bone mineral density (BMD) of spinal vertebrae L1-L4 and T-score was assessed.

Lateral radiographs of thoracic and lumbar parts of spine. In lateral radiographs of thoracic and lumbar parts of spine, non-clinical Th4–L4 vertebral fractures were identified by standardized, semi-quantitative vertebral fracture assessment method, following H. K. Genant.

Evaluation of quality of life of patients with osteoporotic clinical vertebral or forearm fracture. A standardized instrument *EQ-5D*, prepared by EuroQol Group, was used for evaluation of quality of life in patients with osteoporotic vertebral fracture and distal forearm fracture. *EQ-5D* also includes a general health assessment scale. The time trade-off questionnaire was used, where patient was asked: "Imagine that you will live in a current health state for 10 years. You have two possibilities: either you will remain in current health for 10 years and then die, or you will be completely healthy instead of some years of life. Thus, you will live for 10 years in a current health state or for shorter time, but completely healthy". It was requested to specify the amount of time, which, according to the patient, is equivalent to 10 years under his current health state.

Evaluation of quality of life of patients, included in the study of osteoporotic non-clinical vertebral fractures. The special questionnaire *QUALEFFO-41,* prepared by working group of International Osteoporosis Foundation, was selected for the group of patients with non-clinical vertebral fractures.

2.3. Statistical methods

Patients' data were encoded and entered into *MS Excel 2010* spreadsheets. Statistical analysis was performed by using *SPSS for Windows 18.0*. In case of continuous variables, the mean and standard deviation was calculated, the confidence interval of 95 percent was calculated for interval assessment of estimate. In case of categorical variables, frequencies and percentage frequencies were calculated. The variables of age, height, body mass, body mass index, bone mineral density were

measured in the scale of relationships: marital status, social status, while osteoporotic fractures were measured in the nominal scale, and education – in the ordinal scale.

In order to verify the independence of two variables in both groups under ordinal scale, the criterion of chi-squared was used. The dependence of dichotomous variables at different moments of time was analyzed by using McNemar's test.

In order to verity the hypothesis on equality of the means in case of more than two independent samples, ANOVA and ANCOVA (covariate – age) and multiple comparisons (*Bonferroni*) were applied. ANOVA analysis of repeated measurements was performed by taking into account the age of the patients, i.e., by dividing the patients, according to their age, into 3 groups: 50–59 year-old, 60–74 year-old, 75 year-old and more. Using this method, it was examined how the studied feature (quality of life) changes in respect of patients' age.

Relationship between variables was analyzed using Pearson's correlation coefficient. In order to assess the impact of independent variables on dependent variable, a multiple linear regression analysis was performed by including all independent variables into regression model. In order to determine the suitability of the model, the coefficient of determination was estimated. F value shows whether the data are consistent with the model: if $p < 0.05$ – consistent, if $p > 0.05$ – inconsistent. Firstly, the regression analysis was performed, specifying the covariates (independent variables), which, in our opinion, may determine *EQ-5D* index assessment. As insignificant covariates were observed, only significant covariates were selected by using stepwise regression. The differences were considered as statistically significant, if the value of p, used for comparison, was lower than 0.05.

3. RESULTS

3.1. General characteristics of persons with osteoporotic clinical fracture

In total, 461 persons were included in this study: 428 women and 33 men. In order to evaluate the changes in quality of life after osteoporotic clinical vertebral fracture or forearm fracture, 341 persons were selected, including 90 persons with vertebral fracture and 251 persons with distal forearm fracture. In total, 1824 questionnaires of respondents were analyzed during prospective cohort study: 471 questionnaires of subjects with vertebral fracture and 1353 – distal forearm fracture.

The age of subjects with vertebral and distal forearm fractures was 66.1±10.21 and 67.21±8.7 year-old, there was no statistically significant difference (p=0.346). A comparative analysis of patients was performed, according to gender, living environment, occupation, and education. The general characteristics of groups are presented in Table 1.

1 Table. Social-demographic patients characteristics

Variable	Vertebral fracture, n (%)			Distal forearm fracture, n (%)		
	Women	Men	p	Women	Men	p
Number of patients	71 (78.9)	19 (21.1)	–	237 (94.4)	14 (5.6)	–
Level of education						
primary	13 (18.3)	1 (5.3)		45 (19)	1 (7.1)	
secondary	41 (57.7)	10 (52.6)	0.175	114 (48.1)	8 (57.1)	0.531
university	17 (23.9)	8 (42.1)		78 (32.9)	5 (35.7)	
Level of income						
low (less then 340 Lt)	7 (9.9)	2 (10.5)		–	–	
middle (340–1020 Lt)	51 (71.8)	11 (57.9)	0.432	153 (64.6)	6 (42.9)	0.102
high (more then 1020 Lt)	13 (18.3)	6 (31.6)		84 (35.4)	8 (57.1)	
Living environment						
live alone	21 (29.6)	5 (26.3)		81 (34.2)	2 (14.3)	
with spouse	32 (45.1)	13 (68.4)	0.103	94 (39.7)	11 (78.6)	0.04
with son/daughter	18 (25.4)	1 (5.3)		54 (22.8)	1 (7.1)	
with other relative	–	–		8 (3.4)	–	
Social status						
retired due to old age	46 (64.8)	8 (42.1)		171 (72.2)	7 (50)	
retired due to disability	1 (1.4)	1 (5.3)	0.309	18 (7.6)	2 (14.3)	0.32
unemployed	1 (1.4)	–		2 (0.8)	–	
working	23 (32.4)	10 (52.6)		46 (19.4)	5 (35.7)	

Chi-squared test was used to determine p-value between gender; n – the absolute number of subjects.

Average age of women with vertebral fracture is 66.72±10.31 year-old, while the one of those with forearm fracture – 67.57±8.73 year-old. Men are younger in both fracture groups – 63.79±9.71 and 61.93±6.32 year-old, respectively. The youngest man

and woman in both fracture groups were of 50 year-old, while the oldest subject with forearm fracture was of 86 year-old, and with vertebral fracture – 87 year-old.

Seeking to compare the education, income, living environment, social status of subjects of different genders, the criterion of chi-squared was applied, however, no statistically significant difference between men and women was found (except in the group of subjects with forearm fracture, when comparing men and women according to living conditions (p=0.04)). Upon assessing the social factors, it was determined that the majority of men and women were married, their income was average or high. The majority of respondents were with secondary or university education.

3.1.1. Analysis of health care services, provided to persons with clinical vertebral or forearm fractures

The patients usually addressed the Emergency Department of public institution Republican Vilnius University Hospital – 63 (70%) after vertebral fracture and 237 (94.4%) after distal forearm fracture. All persons were directed to radiological bone examinations. 38 (60.3%) persons after vertebral fracture and 71 (29.9%) persons after forearm fracture were hospitalized. On average, hospitalization lasted 1–10 days in the group of patients with vertebral fracture, and 1–8 days after forearm fracture. 2 (2.2%) surgeries were performed after vertebral fracture and 41 (17.1%) after forearm fracture. 25 (39.7%) and 166 (70.1%) persons of those, who addresses the hospital after vertebral and forearm fracture, were released from hospital for conservative treatment at home. Rehabilitation was prescribed for 14 (15.56%) patients after vertebral fracture, average number of days – 23.43±2.98, i.e., from 18 to 28 days, and 11 (4.4%) after forearm fracture, on average – 13.82±2.4 days, i.e., from 11 to 20 days. The patients with vertebral or forearm fracture also addressed the Primary Health Care Centres: 27 (30%) and 14 (5.6%), respectively.

Services provided by health care professionals. The study revealed the average number of health care services, provided to patients, who addressed the medical institution. Within the first four months after vertebral fracture the number of visits of patients to general practitioner was statistically significantly higher than the number of visits for the same fracture during other survey periods (p<0.001). General practitioner did not refer any patients after clinical vertebral fracture for nurse consultation, however, 4 (1.7%)

patients, who required dressing after distal forearm surgery, were referred to nurse, the number of visits ranged from 1 to 25 times. The study revealed that the number of radiological examinations was statistically significantly higher during the first four months after the fracture (p<0.001) with referral of surgeon. The analysis of frequency of radiological tests demonstrated that 1–9 radiological tests per patient were performed during the first four months. The common cause of repeated procedure was complication of bone healing after the fracture. 1–5 radiological tests were performed during the period of 5–12 months. During the first four months, 1–4 radiological tests were performed, and up to 2 tests were performed during further 5–12 months. These tests were prescribed for patients with back pain.

General practitioner referred more than a half of patients to professionals of Physical Medicine and Rehabilitation Department during the first four months after clinical vertebral or forearm fracture, 48 (57.1%) and 125 (52.1%), respectively. The general practitioner prescribed consultations of physical medicine and rehabilitation doctor, regarding physiotherapy procedures, for one fifth of patients during 13–18, 19–24 and 25–36 months. The number of prescriptions of physiotherapy procedures by physical medicine and rehabilitation doctor for patients with forearm fracture was significantly lower during the period of 25–36 months, only 3 (1.6%) respondents responded positively. What is more, the frequency of referrals for consultation of physical therapist was significantly lower during later periods of the survey. The patients after forearm fracture were significantly more often referred for consultation of occupational therapist during the first four months after the fracture.

It was calculated how many therapeutic massage and hydrotherapy procedures were prescribed to patients within 36 months after osteoporotic fracture. The average number of therapeutic massages during the first 4 months after vertebral fracture was 5–20 for 35 (41.6%) persons and 2–20 for 46 (19.2%) respondents after forearm fracture. On average, 1–12 therapeutic massage procedures were prescribed for 4 respondents during the period of 19–24 months after vertebral fracture, and the same number of procedures was prescribed for 5 respondents during the period of 25–36 months. Meanwhile, the average number of therapeutic massages after forearm fracture was 10–15 for 9 (4.7%) subjects within the period 19–24 months and 5–15 procedures for 3

persons within the period of 25–36 months. During the first four months, the pool on average was visited 10–14 times after clinical vertebral fracture and 12–16 times after forearm fracture.

In total, 1607 services were provided for patients after spinal fracture, i.e., on average, 17.9±17.28 health care services per person. In total, 5243 services were provided for persons after distal forearm fracture, including 20.9±19.93 health care services per person within three years after the fracture.

Help of family and friends. Seeking to evaluate the health care services provided to patients, it was analyzed whether they got help in house works, whether the relatives helped them. The respondents stated that care by relatives within the recent four weeks after the interview was required for from 2 to 49 hours per week at an average. One third of patients with vertebral fracture specified that they were subject to care of relatives for from 4 to 49 hours per week 4, 12 or 36 months after the fracture. No significant changes in time were identified. Patients after forearm fracture were more independent, the care of relatives was necessary for 7% of respondents at an average, while the number of hours ranged from 2 to 40 hours per week. It was found that family and friends do not tend to give up their job for care of a relative. These cases were not reported in our study.

3.1.2. Changes in health related quality of life within three years after vertebral or forearm fracture

F. Borgström et al, reported quality of life during the first 4 months after fracture observed in the International Costs and Utilities Related to Osteoporotic fractures Study (ICUROS) for 18 months (Borgström et al, 2013). In this study, patients from Lithuania with vertebral and forearm fracture were interviewed 24 and 36 months after the fracture. The responses of patients with osteoporotic fractures were analyzed, the problems, faced in mobility, self-care, usual activity, pain, and anxiety, were assessed. It was found that the majority of patients assessed their health before the fracture as having no problems or having slight problems. In order to determine statistical significance, McNemar test was applied. The data are presented in Table 2.

Table 2. Evaluation of quality of life according to dimensions of *EQ-5D* questionnaire, in the groups of patients with problems and without problems after osteoporotic fracture
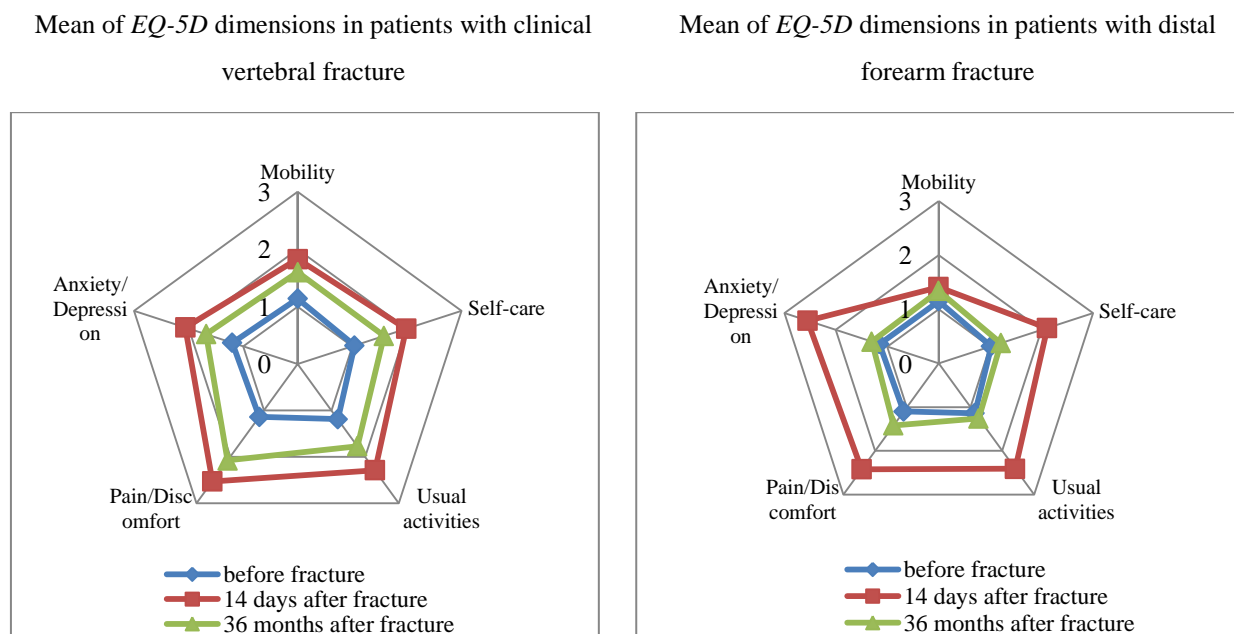
Dimension of *EQ-5D*	Time	Vertebral fracture, n (%)			Distal forearm fracture, n (%)		
		No difficulties	With difficulties	p	No difficulties	With difficulties	p
Mobility	Before fracture	77 (85.6)	13 (14.4)	–	213 (84.9)	38 (15.1)	–
	14 days	34 (37.8)	56 (62.2)	<0.001*	151 (60.2)	100 (39.8)	<0.001*
	4 months	37 (44)	47 (56)	<0.001*	184 (76.7)	56 (23.3)	0.001*
	12 months	42 (50)	42 (50)	<0.001*	183 (76.2)	57 (23.8)	0.001*
	18 months	44 (54.3)	37 (45.7)	<0.001*	184 (76.7)	56 (23.3)	0.002*
	24 months	29 (43.3)	38 (56.7)	<0.001*	129 (67.5)	62 (32.5)	<0.001*
	36 months	29 (44.6)	36 (55.4)	<0.001*	129 (67.5)	62 (32.5)	<0.001*
Self care	Before fracture	86 (95.6)	4 (4.4)	–	245 (97.6)	6 (2.4)	–
	14 days	24 (26.6)	66 (73.3)	<0.001*	5 (2)	246 (98)	<0.001*
	4 months	35 (41.7)	49 (58.3)	<0.001*	204 (85)	36 (15)	<0.001*
	12 months	45 (53.6)	39 (46.4)	<0.001*	220 (91.7)	20 (8.3)	0.003*
	18 months	43 (53.1)	38 (46.9)	<0.001*	220 (91.7)	20 (8.3)	0.003*
	24 months	33 (49.3)	34 (50.7)	<0.001*	154 (80.6)	37 (19.4)	<0.001*
	36 months	32 (49.2)	33 (50.8)	<0.001*	154 (80.6)	37 (19.4)	<0.001*
Usual activities	Before fracture	74 (82.2)	16 (17.8)	–	216 (86.1)	35 (13.9)	–
	14 days	8 (8.9)	82 (91.1)	<0.001*	4 (1.6)	247 (98.4)	<0.001*
	4 months	12 (14.3)	72 (85.7)	<0.001*	120 (50)	120 (50)	<0.001*
	12 months	30 (35.7)	54 (64.3)	<0.001*	161 (67.1)	79 (32.9)	<0.001*
	18 months	37 (45.7)	44 (54.3)	<0.001*	163 (67.9)	77 (32.1)	<0.001*
	24 months	19 (28.4)	48 (71.6)	<0.001*	146 (76.4)	45 (23.6)	0.01*
	36 months	22 (33.8)	43 (66.2)	<0.001*	147 (77)	44 (23)	0.014*
Pain/ Discomfort	Before fracture	77 (85.6)	13 (14.4)	–	226 (90)	25 (10)	–
	14 days	1 (1.2)	89 (98.9)	<0.001*	3 (1.2)	248 (98.8)	<0.001*
	4 months	8 (9.5)	76 (90.5)	<0.001*	89 (37.1)	151 (62.9)	<0.001*
	12 months	11 (13.1)	73 (86.9)	<0.001*	152 (63.4)	88 (36.7)	<0.001*
	18 months	19 (23.4)	62 (76.5)	<0.001*	161 (67.1)	79 (32.9)	<0.001*
	24 months	8 (11.9)	59 (88.1)	<0.001*	116 (60.7)	75 (39.3)	<0.001*
	36 months	9 (13.8)	56 (86.2)	<0.001*	117 (61.3)	74 (38.7)	<0.001*
Anxiety/ Depression	Before fracture	73 (81.1)	17 (18.9)	–	214 (85.3)	37 (14.7)	–
	14 days	29 (32.2)	61 (67.8)	<0.001*	6 (2.4)	245 (97.6)	<0.001*
	4 months	36 (42.9)	48 (57.1)	<0.001*	136 (56.7)	104 (43.3)	<0.001*
	12 months	46 (54.8)	38 (45.2)	<0.001*	162 (67.5)	78 (32.5)	<0.001*
	18 months	50 (61.7)	31 (38.3)	<0.001*	166 (69.2)	74 (30.8)	<0.001*
	24 months	24 (35.8)	43 (64.2)	<0.001*	139 (72.8)	52 (27.2)	<0.001*
	36 months	28 (43.1)	37 (56.9)	<0.001*	140 (73.3)	51 (26.7)	<0.001*

* statistically significant difference from the before fracture value. The McNemar test was used to determine p-value; n – the absolute number of subjects.

Patients felt significantly better before the fracture than 36 months after the fracture in respect of all dimensions. Patients indicated that they felt best 18 months after the fracture (in comparison with estimate immediately after the fracture). More slight and severe problems remained in the group of patients with vertebral fracture than in the group of patients with distal forearm fracture. During the prospective study, performed by H. Hagino with joint authors the similar changes were observed. Wrist fractures cause pain and loss of function, but fracture healing and regain of function are usually favourable. P. Dolan et al. observed considerable loss in the first 3 months, but recovery was fast, and the HRQoL impairment was small; these findings are similar are

compatible with authors observations (Hagino et al, 2009; Dolan et al, 1999). Our study results show significant decrease immediately after the fracture and slow recovery in 36 months after the fracture.

Upon assessing the patients' responses whether working capacity and other physical activity got back to the one before the fracture, statistically significant difference was found in the dimension of pain, in the group of patients with vertebral fracture. One fifth of patients noted that they felt pain after 36 months. More than a half felt anxiety, which limits the restoration of physical health and the ability to handle everyday works without any problems. Figure 1 show the five dimensions of *EQ-5D* estimated before fracture, just after and 36 months after fracture, where 1 means "no problems" and 3 means "severe problems".

Mean of *EQ-5D* dimensions in patients with clinical vertebral fracture

Mean of *EQ-5D* dimensions in patients with distal forearm fracture

Fig. 1. Mean of *EQ-5D* dimensions evaluation in patients with vertebral and forearm fracture

It was found out that patients with vertebral fracture rated their health in the dimension of pain immediately after the fracture by 2.53±0.52 scores. The pain persisted 36 months after the fracture and was equal to 2.08±0.59 scores, i.e., did not achieve the status prior to the fracture, when the pain was felt and rated on average by 1.14±0.35 scores. In the group of patients with forearm fracture, the most prominent changes immediately after the fracture were found in the dimensions of pain and anxiety, in comparison with estimate before the fracture, 2.42±0.52 and 2.55±0.55 scores,

respectively. The changes remained in the dimensions of pain and anxiety 36 months after the forearm fracture and were equal to 1.41±0.54 scores in the dimension of pain, and 1.29±0.5 scores in the dimension of anxiety, i.e., did not reach the status prior to the fracture, when the pain was felt and assessed by 1.1±0.3 scores, and by 1.5±0.36 scores in the dimension of anxiety.

Statistically significant differences were found between women and men in the dimension of self-care 24 and 36 months after vertebral fracture. Women assessed their health worse than men in the groups of both fractures. It was revealed that women assessed themselves better in the dimension of usual activity 12 and 18 months after the fracture. Women with vertebral fracture noted that they are most worried about and the most problems are found in the dimensions of usual activity, pain and anxiety 36 months after the fracture. 36 months after vertebral fracture men usually complained about pain, almost a half of them face problems in the dimensions of anxiety and mobility, for a half of them it is still difficult to handle in the dimension of usual activity, and one fifth of them faced problems in the dimension of self-care.

Statistically significantly higher number of women had mobility problems immediately after the fracture and 24, 36 months after forearm fracture then men. Men more often faced problems in self-care and usual activity than women. Meanwhile, women reported facing more problems in the dimension of mobility. Men did not complain about pain before the fracture. All surveyed persons specified that pain is felt immediately after the fracture, and it persisted for one fifth of surveyed men within 36 months after the fracture.

The results of our study reveal that patients with forearm fracture assessed their health better in all dimensions of quality of life than patients with vertebral fracture; men assessed their health better than women 36 months after the fracture. Study by O. Ström shows that health related quality of life increases 18 months after vertebral and distal forearm and hip fractures, but does not reach the same level as before the fracture (Ström et al, 2008). According to our data, the quality of life did not achieve the same evaluation at 36 months as was before the fracture.

Seeking to evaluate the changes in quality of life in time, *EQ-5D* index values were calculated. They are presented in Table 3, according to fracture localization.

Table 3. The *EQ-5D* index changes in patients after osteoporotic fracture.

Quality of life evaluation	Vertebral fracture			Distal forearm fracture		
	n	Mean±SD	95 % CI	n	Mean±SD	95 % CI
Before fracture	90	0.93±0.12	0.91–0.97	251	0.95±0.09	0.94–0.97
14 days	90	0.38±0.32	0.35–0.51	251	0.4±0.23	0.38–0.44
4 months	84	0.63±0.2	0.57–068	240	0.82±0.15	0.81–0.85
12 months	84	0.71±0.19	0.66–0.75	240	0.87±0.15	0.87–0.91
18 months	81	0.7±0.26	0.64–0.77	240	0.88±0.15	0.88–0.92
24 months	67	0.62±0.27	0.55–0.68	191	0.85±0.19	0.82–0.87
36 months	65	0.63±0.27	0.56–0.7	191	0.85±0.19	0.83–0.88

CI – confidence interval, SD – standard deviation.

EQ-5D index significantly decreases immediately after the fracture and improves with each interview up to 12 months after the fracture, then again decreases and does not achieve its starting score after 36 months. F. Borgström et al. results suggest that there are differences in the magnitude of the quality of life reduction after fracture between countries (Borgström et al, 2013). This could be related to factors such as differences in management and treatment of fracture patients, different perceptions and valuations of the quality of life. The tendency remains that quality of life is worse in group with vertebral fractures in comparison with patients group with distal forearm fracture. *EQ-5D* index is quite similar to Lithuanian data in Italy where the *EQ-5D* index is 0.93 score (95% CI 0.88–0.98) before the fracture and 0.62 score (95% CI 0.55–0.69) after 4 months after the vertebral fracture. Our data show that *EQ-5D* index significantly reduces immediately after the fracture and did not achieve the initial value. The *EQ-5D* index is 0.93 score (95% CI 0.91–0.97) before the fracture and 0.63 score (95% CI 0.57–0.68) after 4 months after the fracture in the group of patients with vertebral fracture. Lower evaluations are in Austria, France, Russia, Sweden and USA. The mean *EQ-5D* index in patients with distal forearm fracture decreased from 0.95 (95% CI 0.94–0.97) before the fracture, to 0.4 (95% CI 0.38–0.44) 14 days after the fracture and then to 0.82 (95% CI 0.81–0.85) at 4 months in our study. According to P. Lips et al. prospective multicenter study data questionnaires were administered at baseline, i.e. as soon as possible after the fracture, at 6 weeks, 3 months, 6 months and 1 year after wrist fracture and *EQ-5D* index was 0.59, 0.66, 0.76, 0.78 and 0.80, respectively (Lips et al, 2010). *EQ-5D* index of our study is slightly higher; the main assumption of this was strict inclusion/exclusion criterions, which allowed enrolling younger and healthier persons. Similar tendency

remains comparing with data of other authors, fast health improvement occurs in first 3 months, followed by slower recovery process later. However, health state does not recover in one year after fracture.

In our study, in order to evaluate the relationships between patients' age and *EQ-5D* index in the individual fracture groups, correlation analysis was performed. In the group of patients with vertebral fracture, it was found out that there is a weak negative correlation between patients' age and *EQ-5D* index before the fracture, immediately after the fracture, 18 months after the fracture, 24 and 36 months after the fracture. In the group of patients with distal forearm fracture, it was found out that patients' age has weak or very weak negative correlation with *EQ-5D* index during all stages of survey, except 4 months after the fracture. The results of this analysis showed that there is negative relationship between patients' age and *EQ-5D* index: the older the patient, the lower the index. Therefore, further calculations are made by taking into account the influence of age, data are presented in Table 4.

Table 4. The *EQ-5D* index estimates, with considering of the age

| Time (period) of evaluation	EQ-5D index					
	Vertebral fracture, Age groups, years			Distal forearm fracture, Age groups, years		
	50–59 (n=23)	60–74 (n=27)	≥75 (n=15)	50–59 (n=39)	60–74 (n=109)	≥75 (n=43)
Before fracture	0.976	0.971	0.82	0.951	0.976	0.948
14 days	0.433*	0.552*	0.207*	0.44*	0.434*	0.351*
4 months	0.614*	0.667*	0.574*	0.841*	0.836*	0.832*
12 months	0.719*	0.724*	0.659*	0.913	0.902*	0.885*
18 months	0.741*	0.727*	0.633*	0.912	0.911*	0.88*
24 months	0.711*	0.649*	0.414*	0.876*	0.859*	0.822*
36 months	0.717*	0.66*	0.448*	0.882*	0.863*	0.824*

$p<0.05$; * – statistically significant difference from the before fracture value (repeated ANOVA measurements in separate age groups); n – the absolute number of subjects.

Statistically significant differences were found in the group of patients with vertebral fracture during different interviews. In the group of distal forearm fractures, significant changes were found at all-time moments, except the age group of 50–59 year-old 12 and 18 months after the fracture. 60–74 year-old patients with forearm fracture assess their status best. 50–59 year-old patients are usually able to work; the fracture disrupts their normal life. Some face difficulties in returning to usual work, especially teachers, if right arm bones are fractured, or patients, whose work is a hard physical one. S. Nawata with joint authors divided patients in their study to the following age groups: 65–69 years old, 70–74 years, 75–79 years, 80–84 years and older than 85 years. The

calculated *EQ-5D* index in these groups was decreasing accordingly: 0.86±0.17, 0.81±0.19, 0.77±0.18, 0.76±0.17 and 0.68±0.23 (Nawata et al, 2000). During our study, it was also established that evaluation of the health decreases accordingly to the increasing age of patients in both fracture groups.

In order to evaluate the changes of *EQ-5D* index between men and women, depending on fracture localization, *EQ-5D* index values were compared. In all phases of survey, *EQ-5D* index assessment by women is lower than by men in both fracture groups. The data of our study revealed that there are no significant differences between genders in the group of patients with vertebral fracture (p>0.05). Statistically significant differences were identified between *EQ-5D* index of men and women immediately after distal forearm fracture (p<0.05).

Health status was evaluated according to *EQ-5D* general health assessment scale. Statistically significant difference was found, when comparing health assessment before the fracture in the same fracture group (p<0.05, paired t-test). Data are presented in Figure 2.
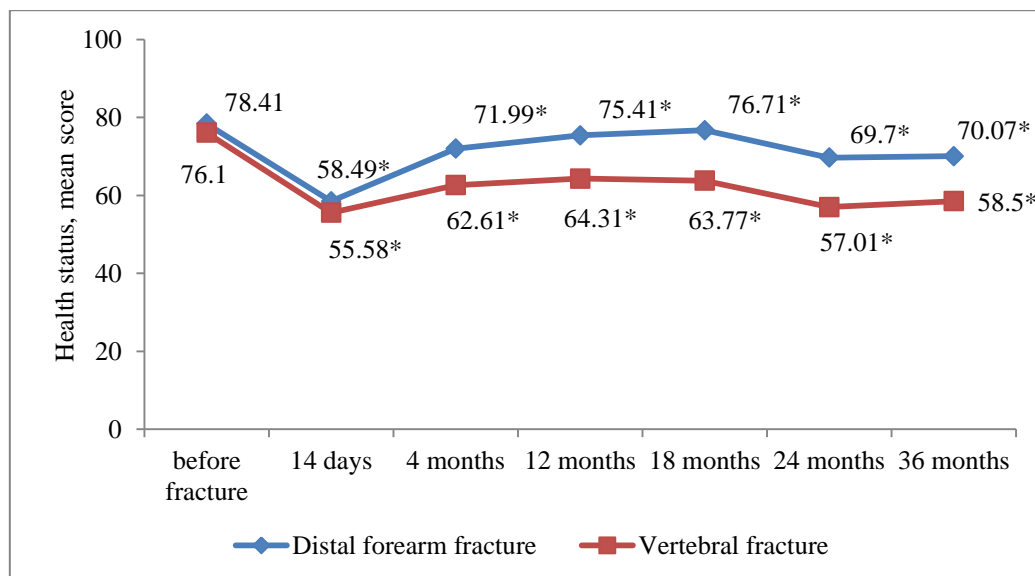
Fig. 2. Health assessment by patients with osteoporotic fracture at different points of time. p<0.05; *statistically significant difference from the before fracture value.

Patients with spinal fracture rated their health before the fracture by 76.1±9.17 scores, meanwhile, patients with distal forearm fracture assessed their health before the fracture by 78.41±9.06 scores. General health assessment was characterized by statistically significant difference in all survey periods, when comparing with status

before the fracture. Patients' health status failed to achieve its initial score 36 months after vertebral and distal forearm fracture. Health was better rated by patients with distal forearm fracture. The trend that the average score increases up to 18 months after distal forearm fracture and up to 12 months after vertebral fracture remained. During the period of 19–24 months, health status worsened again and was improving up to 36 months; however, the initial health status was not achieved.

Upon identifying the influence of age on assessment of health status, the assessment of imaginable health status was measured in different age groups. By taking into account the influence of age, statistically significant changes in health status before osteoporotic fracture were found. Data are presented in Table 5.

Table 5. The visual analogue scale estimates, with considering of the age

Time (period) of evaluation	VAS score					
	Vertebral fracture, Age groups, years			Distal forearm fracture, Age groups, years		
	50–59 (n=23)	60–74 (n=27)	≥75 (n=15)	50–59 (n=39)	60–74 (n=109)	≥75 (n=43)
Before fracture	80.87	77.04	69.53	80.95	80.06	73.14
14 days	57.7*	61.82*	44.8*	62.24*	60.29*	52.91*
4 months	67.57*	62.22*	57.33*	75.74*	73.38*	68.4*
12 months	66.52*	64.07*	63.93*	80.68	77.01*	70.54
18 months	68.3*	65.85*	59.07*	80.18	77.83	72.98
24 months	64.78*	54.07*	47.33*	73.74*	69.8*	64.7*
36 months	67.39*	56.85*	48*	74.71*	70.24*	64.35*

*$p < 0.05$; * – statistically significant difference from the before fracture value (repeated ANOVA measurements in separate age groups). VAS - visual analogue scale; n – the absolute number of subjects.

Patients aged 50–59 year-old assessed their health statistically significantly better than older ones, although *EQ-5D* index immediately after vertebral fracture is higher of 60–74 year-old patients. It might be suggested that 50–59 year-old patients are usually working people, therefore, they tend to assess their health worse as they lose their working capacity for some time after the fracture.

Patients aged 50–59 year-old with forearm fracture assessed their health statistically significantly better during all survey periods after the fracture. Irrespective of age, *EQ-5D* index was higher before the fracture and did not achieve the prior assessment 36 months after the injury. Tendentious improvement of health status over time might be observed in all three age groups.

In order to assess the influence of gender, age, education and income on *EQ-5D* index, multiple linear regression analysis was performed. First, a full model with all examined covariates included was analyzed. It was noticed that *EQ-5D* index of patients

with distal forearm fracture decreases before the fracture in case of lower income. *EQ-5D* index of patients with vertebral fracture decreases before the fracture as age increases. The results, obtained, while examining *EQ-5D* index after the fracture, revealed that *EQ-5D* index of patients with distal forearm fracture decreases after the fracture with increasing age, in case of lower education and lower income. The results demonstrated that *EQ-5D* index of patients with distal forearm fracture decreases as age increases, in case of lower education.

Data analysis revealed that not only age, but also gender, education, income influence the evaluation of quality of life in time. More changes of statistical significance are found in the group of patients with forearm fractures.

The obtained results demonstrated that not all covariates are statistically significant, i.e., the respective p value is higher than the selected significance level 0.05, therefore; only significant covariates were selected by using the stepwise regression. The results are presented in Table 6. The procedure of covariate selection, when they are included in model one by one, but the included covariate is removed from model, if it becomes insignificant after including other covariates in model.

Table 6. Linear multivariate stepwise regression of *EQ-5D* index, according to fracture type before and 36 months after fracture

Independent variables	B	95 % CI	SE	ß	p value	$_{adj}R^2$
Before vertebral fracture						
Constant	1.250	1.100–1.399	0.075		<0.001	0.171
Age	-0.005	-0.007– -0.002	0.001	-0.426	<0.001	
Before distal forearm fracture						
Constant	0.979	0.960–0.998	0.01		<0.001	0.052
Income (1-average, 0-high)	-0.046	-0.069– -0.022	0.012	-0.236	<0.001	
After 36 month, vertebral fracture						
Constant	1.303	0.848– 1.758	0.227		<0.001	0.121
Age	-0.010	-0.017– -0.003	0.004	-0.370	0.005	
After 36 month, distal forearm fracture						
Constant	1.161	0.938– 1.383	0.113		<0.001	0.056
Age	-0.004	-0.007– -0.001	0.002	-0.174	0.021	
Education1 (1-primary, 0-secondary, 0-university)	-0.075	-0.134– -0.016	0.030	-0.198	0.013	
Education2 (0-primary, 1-secondary, 0-university)	-0.074	-0.150– 0.001	0.038	-0.159	0.054	

B – B unstandardized regression coefficient; SE – standart error; ß – standardized regression coefficient ; adjR2 – adjusted determination coefficient.

Thus, the study revealed that patients felt significantly better in all issues before the fracture than 36 months after the fracture. Distribution of *EQ-5D* index responses of surveyed men and women was characterized by statistically significant difference 36

months after the fracture than the estimate before the fracture. Women rated their health worse than men in both fracture groups. The results of correlation analysis demonstrated that there is a negative relationship between patients' age and *EQ-5D* index, the older the patient, the lower the index. Therefore, further calculations were made in individual age groups. Employed subjects with higher education and higher income assessed their health better than unemployed 36 months after vertebral fracture (p<0.05).

3.2. General characteristics of women with osteoporotic non-clinical vertebral fracture

120 women have participated in the study. The average age of women from all three groups was similar: group I – 67.6±5.29 year-old, group II – 67.18±4.81 year-old, group III – 69.2 ±5.19 year-old. It was observed that women from group I are characterized by shortest height 157.23±5.76 cm and lowest weight 65.2±9.5 kg. However, the calculation of average body mass index (BMI) showed that it is too high in all groups. It was found out that T-score of women with osteoporosis, but without vertebral fracture, which shows the condition of bone minerals, is the worst -3.11, standard deviation equal to 0.43. Upon calculating the correlation coefficient according to *QUALEFFO-41* questionnaire, a statistically significant negative moderate linear relation between body mass and T-score was obtained – 0.504. General characteristics of group – demographic, anthropometric data, and data of bone mineral density test – are summarized in Table 7.

Table 7. Baseline women characteristics (mean±SD)

Parameters	Control group	Osteoporosis without fracture	Osteoporosis with fracture	p (ANOVA)
	1 group	2 group	3 group	
Patient number	40	40	40	–
Age, years	69.22 ± 5.19	67.18 ± 4.81	67.6 ± 5,29	0.17
Weight, kg	74.45 ± 10.32	65.53 ± 9.57	65.2 ± 9,5	<0.001
Height, cm	158.98 ± 5.31	159.25 ± 5.09	157.23 ± 5.76	0.195
BMD, kg/m^2	29.53 ± 4.19	25.84 ± 3.49	26.56 ± 3.71	<0.001
BMD T-score, L_2–L_4	-1.59 ± 0.66	-3.12 ± 0.43*	-3.04 ± 0.46*	<0.001

*p<0.05 comparing with control group. BMD – bone mineral density; SD – standard deviation.

Statistically significant difference of body mass, body mass index and T-score (p<0.001, using ANOVA) was found in the examined group. The groups of respondents did not differ by statistically significant difference by age and height. The shortest height –

157.23±5.76 cm and the lowest weight – 65.2±9.5 kg was found in patients with osteoporotic vertebral fractures. In all surveyed groups, the average body mass index is higher than 25.

3.2.1. Evaluation of quality of life in women with osteoporotic non-clinical fracture

Following *QUALEFFO-41* questionnaire and using a special scoring algorithm, the quality of life score was found (0 score– represents the best, and 100 score – represents the worst status of respondent). The best evaluation of quality of life was found in the group of patients without osteoporotic fracture – 34.11; while the worst one in the group of patients with osteoporosis, but without vertebral fractures.

Table 8 presents the indicators of different dimensions of quality of life in three groups of respondents, according to *QUALEFFO-41* questionnaire. Women with osteoporotic vertebral fracture(s) were those, who most frequently complained about back pain. What is more, women from this group are worse in dealing with activities. The dimensions of physical activity were more analyzed – it is sought to find out what dimensions are characterized by the highest influence on quality of life. Patients without osteoporosis specified that they faced most physical difficulties. Those with osteoporosis, but without vertebral fracture, are best in housework. Patients with fracture and osteoporosis faced problems in daily activity most; they also faced mobility problems (getting up from a chair, bending down, kneeling down, climbing stairs, etc.).

Table 8. Quality of life dimensions performance using *QUALEFFO-41* (mean±SD)

Quality of life dimensions	Control group	Osteoporosis without fracture	Osteoporosis with fracture	p (ANOVA)
	1 group	2 group	3 group	
Number of patients	40	40	40	–
A Pain	11.1 ± 3.47	12.2 ± 3.34	12.73 ± 4.98	0.184
BCD Physical function	29.53 ± 9.04	28.3 ± 6.04	29.53 ± 6.52	0.689
E Social function	20.53 ± 4.41	22.23 ± 4,1	22.19 ± 4.44	0.137
F General health perception	10 ± 2.08	10.58 ± 2.06	9.75 ± 2.47	0.235
G Mental function	25.8 ± 4.36	27.58 ± 5.13	25.35 ± 6.08	0.137
Quality of life score	34.12 ± 12.03	36.51±9.2	35.69 ± 11.27	0.609

SD – standard deviation.

No statistically significant differences (using ANOVA) were found among surveyed groups according to individual dimensions of *QUALEFFO-41* and while comparing *QUALEFFO-41* quality of life score. Average quality of life score in control group was equal to 34.12 (95% CI 30.27–37.96), in the group with osteoporosis, but without vertebral fractures – 36.51 (95% CI 33.56–39.45), while in the group of

respondents with non-clinical vertebral fractures – 35.69 (95% CI 32.08–39.29). N. M. van Schoor study revealed that quality of life physical function score was worse in the group of patients with multiply non-clinical vertebral fractures, and A. M. Oleksik study showed that health-related quality of life has worsened in both clinical and non-clinical repeated vertebral fractures groups (Van Schoor et al, 2005, Oleksik et al, 2005).

By using evaluation of quality of life dimensions of *QUALEFFO-41* questionnaire, correlation coefficient was calculated. Statistically significant moderate correlation was found between dimensions A (pain) and BCD (physical activity) – 0.531, between dimensions A (pain) and E (leisure, social activities) – 0.435, between dimensions BCD (physical activity) and E (leisure, social activities) – 0.657, as well as between dimensions A (pain) and F (general health perception) – 0.459.

As no statistically significant differences between subject groups were found in individual dimensions of quality of life questionnaire, the respondents with vertebral fractures were divided into two groups: with one fracture and with multiple (2–7 vertebrae) fractures. It was determined that almost a half of respondents with one vertebral fracture and one fifth of patients with 2–7 vertebral fractures complain about moderate back pain each day. Patients with multiple vertebral fractures suffer from back pain each day. Each third respondent with diagnosed osteoporosis indicated that they feel pain for 6–10 hours during day, and each fifth noted that they feel back pain all the day. One forth of patients with vertebral fracture complains about back pain during night. Pain causes significantly more problems than other osteoporosis-related psychological, social problems, and problems of physical activity restriction. Pain affects all these dimensions and causes a decrease in these abilities. Comparison of scores in the dimension A (pain) of *QUALEFFO-41* questionnaire and division of patients with osteoporosis into the groups according to number of fractured vertebrae resulted in statistically significant ($p<0.05$) differences in comparison with control group. Analysis of aforementioned group is given in Table 9.

Table 9. Quality of life dimensions using *QUALEFFO-41* (mean±SD) according to number of fractures

Quality of life dimensions	Control group	Osteoporosis without fracture	Osteoporosis with fracture		
			Total	One fracture	2–7 fracture
	1 group	2 group	3 group	4 group	5 group
Number of patients	40	40	40	28	12
A Pain	11.10±3.47	12.2±3.34	12.73±4.98	13.93±4.87*	9.92±4.19
BCD Physical function	29.53±9.04	28.3±6.04	29.53±6.52	29.79±7.19	28.92±4.81
E Social function	20.53±4.41	22.2±4.1	22.3±4.44	23.26±4.19	19.65±4.23
F General health perception	10±2.08	10.57±2.1	9.75±2.47	10.07±2.45	9±2.45
G Mental function	25.8±4.36	27.57±5.13	25.35±6.08	25.5±5.97	25±6.59
Quality of life score	34.12±12.03	36.51±9.2	35.69±11.27	37.53±11,2	31.39±10.65

*p<0.05 comparing with control group; SD – standard deviation.

Pain score was higher for women with one non-clinical vertebral fracture. No significant differences were found among fracture groups in the dimension of physical activity – patients have no problems with dressing, washing, operating a toilet, are able to prepare meals, wash the dishes. However, 58.3% of respondents from the group of patients with multiple non-clinical vertebral fractures indicated that they find it difficult to lift and carry the objects. Prospective studies showed that acute pain persists up to 2–3 weeks after the fracture, then it gradually decreases, but can persist for up to 22 years (Suzuki et al, 2008; Hasserius et al, 2005).

Statistically significant difference was found among respondents with osteoporosis when evaluating the changes in body appearance depending on number of fractures among respondents with osteoporosis (Figure 3).
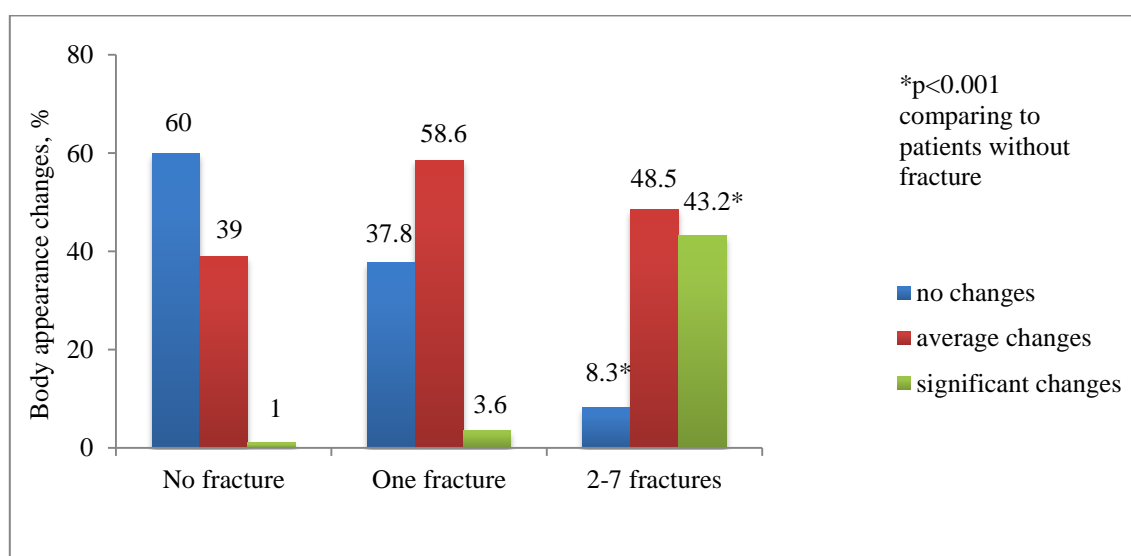
Fig. 3. Frequency of body appearance changes depending on number of fractures in patients with osteoporosis

Body appearance changed quite a bit or very much for 43.2% of women with multiple vertebral fractures and only for 8.3% it remained unchanged.

Thus, the results of this study revealed that almost a half of respondents with one vertebral fracture and each fifth with 2–7 vertebral fractures complain about moderate back pain each day. Upon dividing the respondents with osteoporosis into groups according to number of fractured vertebrae, statistically significant ($p<0.05$) differences were found between women with one vertebral fracture and control group in the dimension A (pain) of *QUALEFFO-41* questionnaire.

4. CONCLUSIONS

1. Average number of visits to health care institutions was 17.9 in case of vertebral fracture and 20.9 in case of forearm fracture within three years after osteoporotic fracture. Inpatient services were more frequently provided for persons with clinical vertebral fracture (60.3%) than for persons with forearm fracture (29.9%). Most of medical services were provided within first four months after the fracture. Almost one fourth of patients needed care of other person during the first year after the fracture.

2. The following changes in quality of life in patients with osteoporotic fractures were observed:
   – quality of life index before osteoporotic clinical vertebral fracture – 0.93 and before forearm fracture – 0.95;
   – later, within the first 14 days after the fracture, according to index, quality of life significantly decreased to 0.38 in patients with vertebral fracture and to 0.4 in patients with forearm fracture;
   – quality of life index improved with each period, however, it did not achieve its initial score even after three years, 0.63 and 0.85, respectively;
   – it was determined that the changes in QoL within three years are influenced not only by age, but also by gender, education and income. 12 and 18 months after the fracture, women assessed themselves better in the dimension of usual activity, while men – in the dimension of mobility. Three years after the fracture, men assessed their health status better than women.

3. It was found out that quality of life in the dimension of pain was significantly worse in women with osteoporotic non-clinical vertebral fracture, in comparison with quality of life in women without osteoporosis and without any fracture. Women with multiple vertebral fractures assessed their appearance significantly worse, in comparison with women with osteoporosis, but without vertebral fracture, or women without osteoporosis. No significant differences of quality of life score were found between women with osteoporotic non-clinical vertebral fractures, women with osteoporosis without fractures, and women without osteoporosis.

5. PRACTICAL RECOMMENDATIONS

1. Taking into account the results of our study, showing that quality of life in persons with osteoporotic clinical vertebral or forearm fractures did not restore within three years, and that one fourth of subjects needed the care of relatives within first year after the fracture, it is appropriate to strengthen the intersectoral collaboration of health care professionals, to improve the availability of health care professionals. In order to save time and strengths of a patient, to organize a responsive nursing and care, and timely consulting of geriatric patients with fracture. It is appropriate, at least during first months after the fracture, to provide physical therapy and occupational therapy services for geriatric patients at home. To propose to Ministry of Health to change the procedure for paying for health care services provided at home.

2. When evaluating quality of life in persons with osteoporotic fracture, it is recommended to use a simple *EQ-5D* questionnaire, which allows identifying the dynamics of health related quality of life and taking timely actions for search for factors that worsen the quality of life.

3. Seeking to achieve the physical and social health improvement, it is appropriate to promote the activity, physical activity, self-preparation, and communication with family members and the community of older people and the elderly.

4. Seeking to reduce the number of bone fractures in elderly, it is appropriate to carry out educational activity on osteoporosis, its risk factors, and disease prevention, as well as on risk factors for falls, safe environment, regular diet, and to promote self-care.

SUMMARY IN LITHUANIAN

Įvadas

Osteoporozė – tai liga, lemianti kaulų lūžimus, kurie sukelia skausmą, mažina fizinę, socialinę funkcijas ir blogina sergančiojo savijautą. Fizinės, psichologinės ir socialinės osteoporozės ir lūžių pasekmės turi didelės įtakos su sveikata susijusiai gyvenimo kokybei. Lūžiai sukelia ūminį ir lėtinį skausmą, sutrikdo fizines funkcijas, apriboja judrumą, sukelia depresiją, lemia socialinę izoliaciją ir labai apsunkina gyvenimą. Gyvenimo kokybės pablogėjimas – pagrindinė osteoporozės pasekmė. Sveikatos paslaugų kiekis ir pobūdis yra tiesiogiai susijęs su sveikatos sutrikimo dydžiu, kuo didesnis neigiamas osteoporozinio lūžio poveikis sveikatai, tuo didesni paciento sveikatos paslaugų poreikiai ir lūkesčiai.

Tyrimų apie slankstelių lūžius nėra daug, nes sunku surinkti duomenis – šie lūžiai dažniausiai nesukelia aiškių klinikinių simptomų. Dilbio kaulų distalinės dalies lūžių yra nepakankamai įvertinama klinikinė reikšmė.

Su slankstelių ir dilbio kaulų lūžiais siejamas ir gyvenimo kokybės blogėjimas. Daugelis pacientų po lūžio patiria ilgalaikių sveikatos sutrikimų, jiems reikia priežiūros ir pagalbinių priemonių. Skausmas sukelia žymiai daugiau sunkumų nei kitos su osteoporoze susijusios psichologinės, socialinės ir fizinio aktyvumo problemos. Skausmas paveikia visas šias tris kategorijas ir reikšmingai pablogina su sveikata susijusią gyvenimo kokybę.

Teigiama, kad su sveikata susijusios gyvenimo kokybės vertinimas yra vienas iš svarbiausių šiuolaikinio gydymo ir slaugos efektyvumo įvertinimo elementų, apimantis bendrą sveikatos priežiūrą bei įvairiapusį klinikinį pritaikymą, poreikį racionaliai skirstyti lėšas sveikatos apsaugai.

Kadangi paciento suvokimas yra vienas esminių veiksnių dabartinėje sveikatos priežiūros sistemoje, kurioje pabrėžiama į pacientą orientuota priežiūra, todėl vertinant ir kontroliuojant pacientų būklę po patirto osteoporozinio lūžio būtini su sveikata susijusios gyvenimo kokybės tyrimai. Žinant svarbiausius patyrusių osteoporozinį lūžį ir sveikų žmonių gyvenimo kokybės aspektus, būtų galima tobulinti medicinos ir socialinės priežiūros sistemą. Lietuvos sveikatos programoje nurodyta, kad Lietuvos gyventojų gyvenimo kokybę bus galima pagerinti nuolat ją stebint, aktyvinant žmonių dalyvavimą

visuomenės gyvenime ir formuojant sveikatos politiką. Taigi planuojant sveikatos politiką, kuriant strategijas bei rengiant sveikatos stiprinimo programas, svarbu atsižvelgti ir į objektyviųjų sveikatos rodiklių, ir į subjektyviai žmonių suvokiamos su sveikata susijusios gyvenimo kokybės pagerinimą. Paisant pacientui svarbių dalykų mokslinių tyrimų lygmenyje galima tikėtis, kad žmogaus gerovė išliks prioritetu.

Darbo tikslas

Nustatyti suteiktų sveikatos priežiūros paslaugų ypatumus asmenims, patyrusiems osteoporozinį lūžį, ir įvertinti šių asmenų su sveikata susijusios gyvenimo kokybės pokyčius.

Darbo uždaviniai

1. Išanalizuoti sveikatos priežiūros paslaugas, suteiktas asmenims per trejus metus po osteoporozinio klinikinio slankstelio lūžio ar dilbio kaulų lūžio.
2. Įvertinti asmenų, patyrusių osteoporozinį klinikinį slankstelio ar dilbio kaulų lūžį, su sveikata susijusią gyvenimo kokybę, jos pokyčius per trejus metus po lūžio ir sąsajas su amžiumi, lytimi, pajamomis bei išsilavinimu.
3. Įvertinti moterų, sergančių pomenopauzine osteoporoze, ir moterų, patyrusių osteoporozinius neklinikinius slankstelių lūžius, su sveikata susijusią gyvenimo kokybę ir palyginti ją su nesergančių osteoporoze moterų gyvenimo kokybe.

Ginamieji teiginiai

1. Asmens sveikatos priežiūros paslaugų poreikis išlieka trejus metus po osteoporozinio slankstelio ar dilbio kaulų lūžio.
2. Osteoroziniai slankstelių ir dilbio kaulų lūžiai lemia ilgalaikius sveikatos sutrikimus ir gyvenimo kokybės pokyčius, ypač senyvo amžiaus asmenims.
3. Moterų, patyrusių osteoporozinius neklinikinius slankstelių lūžius, gyvenimo kokybė blogesnė už moterų, sergančių osteoporoze be lūžio ar nesergančių osteoporoze.

Darbo mokslinis naujumas

Šio tyrimo naujumas siejamas su pasirinkimu ištirti žmones, ypač senyvo amžiaus, išanalizuoti jų medicininius, socialinius, sveikatos priežiūros ypatumus ir poreikius bei įvertinti sveikatos būklės pokyčius po lūžio. Užsienyje atliktų tyrimų metu nustatyti

statistiškai reikšmingi skirtumai ne visose gyvenimo kokybės srityse – tai paskatino atlikti tyrimą ir išsiaiškinti, kokiose gyvenimo kokybės srityse šie pokyčiai išlieka reikšmingai ilgai.

Pasirinktas tyrimas yra perspektyvusis kohortinis, todėl galima vertinti dinaminius gyvenimo kokybės pokyčius patyrus lūžį. Turimomis žiniomis, Lietuvoje iki šiol nebuvo atlikta perspektyvinių kohortinių tyrimų sveikatos būklės pokyčiams vertinti po lūžio, todėl šio tyrimo rezultatai papildys Europoje atliekamų tyrimų, kuriuose tiriami skirtingus lūžius patyrę pacientai, rezultatus.

Tirti asmenys ir tyrimo metodai

Tyrimas buvo vykdomas VšĮ Respublikinės Vilniaus universitetinės ligoninės skubiosios pagalbos ir traumatologijos–ortopedijos skyriuose, VšĮ „Nacionalinis osteoporozės centras" bei Vilniaus miesto pirminės sveikatos priežiūros įstaigose. Tyrimui atlikti gauti Lietuvos bioetikos komiteto leidimai (Nr. 52, 2003-06-04 ir Nr. 16, 2007-06-21). Tyrimo dokumentacijoje (anketoje) pacientai buvo identifikuojami pagal suteiktą individualų kodą, taip apsaugant jų asmeninius duomenis. Visi tiriamieji buvo supažindinti su tyrimo tikslu, gaunama nauda ir nepatogumais, jiems buvo įteikta pasirašyti Asmens informavimo ir informuoto asmens sutikimo forma.

Pacientus, patyrusius osteoporozinį klinikinį slankstelio ar dilbio kaulų lūžį tyrėme perspektyviai. Tyrimas padalintas į šešias fazes. Per 36 mėn. po lūžio, priklausomai nuo paciento sveikatos būklės, jis buvo apklausiamas šešis kartus. Pirma apklausa vyko per artimiausias 14 d. po lūžio. Patyrus osteoporozinį slankstelio lūžį, ar sudėtingą dilbio kaulų lūžį, pirmoji apklausa buvo vykdoma asmens sveikatos priežiūros įtaigoje, kurioje pacientas buvo gydomas – VšĮ Vilniaus respublikinės universitetinės ligoninės skubiosios pagalbos, traumatologijos–ortopedijos skyriuose arba Vilniaus miesto pirminės sveikatos priežiūros įstaigose. Antroji, trečioji ir ketvirtoji, penktoji ir šeštoji apklausos vyko telefonu praėjus 4, 12, 18, 24 ir 36 mėn. po lūžio. Pirmosios apklausos metu buvo paprašyta atsakyti į klausimus apie paciento gyvenimo aplinką bei gyvenimo kokybę prieš ir iš karto po lūžio. Kitų penkių apklausų metu buvo klausiama apie taikytą gydymą, suteiktas medicinines ir socialines paslaugas bei gyvenimo pokyčius per 4, 5– 12, 13–18, 19–24 ir 25–36 mėn. po lūžio.

Apskaičiuotas vidutinis suteiktų sveikatos priežiūros paslaugų skaičius, pacientų patyrusių osteoporozinį lūžį, ir besikreipusių į gydymo įstaigą. Kol nesuskaičiuota, kiek ir kokių paslaugų buvo suteikta, negalime žinoti (prognozuoti, numatyti, įvertinti), kiek paslaugų reikės suteikti tam, kas patirs lūžį, kiek ir kokių reikia sveikatos priežiūros specialistų konsultacijų.

Pacientai, patyrę osteoporozinį neklinikinį slankstelio lūžį, dažnai neturi skundų, todėl buvo numatytas papildomas tyrimas. Esant stuburo slankstelių kompresiniams lūžiams, kuriuos dažniausiai patiria moterys, šiam tyrimo uždaviniui įvykdyti buvo tirtos tik moterys po menopauzės.

Tyrimui buvo naudota anketa, susidedanti iš 2 dalių – dokumentinės ir standartizuotų klausimynų – bendrinio ir ligai specifinio. Po anketinės apklausos, pacientėms momentinio tyrimo metu, buvo atliekami antropometriniai matavimai. Kūno masė matuota 50 gramų tikslumu elektroninėmis medicininėmis svarstyklėmis (*Radwag*, Lenkija). Ūgiui matuoti naudotas standartinis vertikalusis ūgio matuoklis (*Harpenden Stadiometer, "Holtain limited",* D. Britanija). Kūno sandarai įvertinti buvo panaudotas kūno masės indeksas (KMI), kūno masę kilogramais padalijus iš ūgio metrais, pakelto kvadratu. Kaulų mineralų tankio tyrimas atliktas centriniu kaulų mineralų tankio matuokliu Prodigy (*GE Lunar*, JAV) dvisrautės radioabsorbciometrijos (angl. *dual energy x-ray absorptiometry, DXA*) metodu. Vertinome stuburo L1–L4 slankstelių kaulų mineralų tankį (KMT) ir T-lygmenį. Stuburo krūtininės ir juosmeninės dalių šoninėse radiogramose neklinikiniai Th4–L4 slankstelių lūžiai buvo nustatyti pusiau kiekybiniu standartizuotu slankstelių lūžių vertinimo metodu pagal *H. K. Genant*. Tiriant pacientų, patyrusių osteoporozinį slankstelio lūžį ir dilbio kaulų distalinės dalies lūžį, buvo naudotas EuroQol grupės sukurtas *EQ-5D* standartizuotas bendrinis klausimynas gyvenimo kokybei vertinti. Pacientų grupei su neklinikiniais slankstelių lūžiais pasirinktas Tarptautinio Osteoporozės Fondo darbo grupės sudarytas specialusis klausimynas – *QUALEFFO-41*.

Pacientų duomenys buvo koduojami ir įrašyti į *MS Excel* 2010 elektronines lenteles. Statistinė analizė atlikta naudojant statistinį paketą – *SPSS for Windows 18.0*. Tolydžių kintamųjų atveju buvo skaičiuojamas vidurkis ir standartinis nuokrypis, apskaičiuotas 95 proc. pasikliovimo intervalas. Kategorinių kintamųjų atveju buvo apskaičiuoti dažniai bei procentiniai dažniai.

Dviejų kintamųjų nepriklausomumui abiejose grupėse tikrinti, esant rangų skalei, naudotas chi kvadrato kriterijus. Dvireikšmių kintamųjų priklausomybė skirtingu laiko momentu tirta taikant Maknemaro kriterijų.

Hipotezei apie vidurkių lygybę tikrinti daugiau negu dviejų nepriklausomų imčių atveju taikyta *ANOVA* bei *ANCOVA* (kovariantė – amžius). Atlikta pakartotinių matavimų *ANOVA* analizė, atsižvelgiant į pacientų amžių. Tarpusavio ryšiai tarp kintamųjų vertinti naudojant Pirsono koreliacijos koeficientą. Siekiant įvertinti nepriklausomų kintamųjų poveikį priklausomam kintamajam, atlikome tiesinę daugialypę regresinę analizę. Skirtumai laikyti statistiškai reikšmingais, jeigu palyginimui naudoto kriterijaus p reikšmė buvo mažesnė už 0,05.

Rezultatai

Iš viso į tyrimą, patyrusių klinikinį slankstelio ar dilbio kaulų lūžį, įtrauktas 461 asmuo, iš jų 428 moterys ir 33 vyrai. Siekiant įvertinti gyvenimo kokybės pokyčius, nustačius osteoporozinį klinikinį slankstelio lūžį ar lūžus dilbio kaulams, buvo atrinktas 341 asmuo. Iš jų: 90 asmenų, patyrusių slankstelio lūžį, ir 251 asmuo, patyręs dilbio kaulų distalinės dalies lūžį. Iš viso perspektyviojo kohortinio tyrimo metu nagrinėtos 1824 respondentų anketos: 471 anketa, patyrusių stuburo slankstelio lūžį ir 1353 – dilbio kaulų distalinės dalies lūžį.

Tiriamųjų, patyrusių stuburo ir dilbio kaulų distalinės dalies lūžius, amžius buvo 66,10±10,21 bei 67,21±8,70 metai, statistiškai reikšmingai nesiskyrė (p=0,346). Pacientų lyginamoji analizė atlikta pagal lytį, gyvenamąją aplinką, užimtumą bei išsilavinimą. Moterų, patyrusių slankstelio lūžį, amžiaus vidurkis 66,72±10,31 metai, patyrusių dilbio kaulų lūžį – 67,57±8,73 metai. Vyrai abiejose lūžių grupėse jaunesni atitinkamai – 63,79±9,71 bei 61,93±6,32 metai. Jauniausias vyras ir moteris abiejose lūžių grupėse buvo 50 metų, vyriausiam tiriamajam, patyrusiam dilbio kaulų lūžį, buvo 86 metai, stuburo slankstelių lūžio lūžį – 87 metai.

Siekiant palyginti skirtingų lyčių tiriamųjų išsilavinimą, pajamų lygį, gyvenamąją aplinką, socialinę padėtį, buvo taikytas chi kvadrato kriterijus, tačiau reikšmingas skirtumas tarp vyrų ir moterų nenustatytas (išskyrus tiriamųjų grupėje po dilbio kaulų lūžio, lyginant vyrus ir moteris pagal gyvenimo sąlygas, (p=0,04)). Įvertinus socialinius

veiksnius, nustatyta, kad dauguma vyrų buvo vedę, o moterys ištekėjusios, pajamos vidutinės arba didelės. Dauguma apklaustųjų buvo įgiję vidurinį ar universitetinį išsilavinimą.

Pacientai po lūžio dažniausiai kreipėsi į VšĮ Respublikinės Vilniaus universitetinės ligoninės skubiosios pagalbos skyrių – 63 (70 proc.) po slankstelio lūžio ir 237 (94,4 proc.) po dilbio kaulų distalinės dalies lūžio. Visiems asmenims po lūžio buvo atlikti radiologiniai kaulų tyrimai. Po stuburo slankstelio lūžio buvo hospitalizuoti 38 (60,3 proc.) asmenys, o po dilbio kaulų – 71 (29,9 proc.) asmuo. Hospitalizacijos vidutinė trukmė buvo 1–10 dienų, slankstelio lūžį patyrusių grupėje, ir 1–8 dienas, po dilbio kaulų lūžio. Atliktos 2 (2,2 proc.) operacijos po slankstelio lūžio bei 41 (17,1 proc.) po dilbio kaulų lūžio. Iš besikreipusių į ligoninę po stuburo slankstelio ir dilbio kaulų lūžio, konservatyviai gydytis namuose išleista 25 (39,7 proc.) ir 166 (70,1 proc.) asmenys. Reabilitacija paskirta 14 (15,56 proc.) pacientų po slankstelio lūžio, vidutinis dienų skaičius – 23,43±2,98, tai yra nuo 18 iki 28 dienų, ir 11 (4,4 proc.) po dilbio kaulų lūžio, vidutiniškai – 13,82±2,4 dienų, tai yra nuo 11 iki 20 dienų. Pacientai, patyrę slankstelio ar dilbio lūžį kreipėsi ir į pirminės sveikatos priežiūros centrus 27 (30 proc.) ir 14 (5,6 proc.), atitinkamai. Nedarbingi po slankstelio lūžio buvo 16 žmonių, vidutiniškai 24,81±6,9 dienų ir po dilbio kaulų lūžio 18 žmonių, vidutiniškai 26,83±3,6 dienas.

Pacientai į šeimos gydytoją per pirmuosius keturis mėnesius po slankstelio lūžio statistiškai reikšmingai dažniau kreipėsi nei per kitus apklausos laikotarpius dėl to paties lūžio (p<0,001). Šeimos gydytojas nesiuntė nė vieno paciento po klinikinio slankstelio lūžio slaugytojo konsultacijai, tačiau į slaugytoją buvo nukreipti 4 (1,7 proc.) pacientai, kuriems buvo reikalingi perrišimai po atliktų dilbio kaulų distalinės dalies operacijų, negyjančių žaizdų, apsilankymų skaičius buvo nuo 1 iki 25 kartų. Tyrimo metu nustatyta, kad reikšmingai daugiau radiologinių tyrimų atlikta per pirmuosius keturis mėnesius po lūžio (p<0,001), chirurgui nukreipus. Išnagrinėjus atliekamų radiologinių tyrimų dažnumą, nustatyta, kad po dilbio kaulų lūžio per pirmuosius keturis mėnesius buvo atlikta 1–9 radiologinių tyrimų vienam pacientui. Dažniausia procedūros kartojimo priežastis buvo lūžio gijimo komplikacija. Per 5–12 mėnesių laikotarpį buvo atlikta 1–5 radiologinių tyrimų. Po slankstelio lūžio per pirmus keturis mėnesius buvo atlikta 1–4 radiologiniai tyrimai, per tolimesnius 5–12 mėnesių – iki 2 tyrimų. Šie tyrimai buvo skiriami pacientams jaučiantiems skausmą nugaros srityje.

Į fizinės medicinos ir reabilitacijos skyriaus specialistus per pirmuosius keturis mėnesius po klinikinio slankstelio ar dilbio kaulų lūžio šeimos gydytojo nukreipta daugiau nei pusė pacientų, atitinkamai 48 (57,1 proc.) ir 125 (52,1 proc.). Penktadaliui pacientų, patyrusių slankstelio lūžį, šeimos gydytojas skyrė fizinės medicinos ir reabilitacijos gydytojo konsultacijas dėl fizioterapinių procedūrų per 13–18, 19–24 bei 25–36 mėnesius. Fizinės medicinos ir reabilitacijos gydytojas pacientams, patyrusiems dilbio kaulų lūžį, per 25–36 mėnesių laikotarpį fizioterapinių procedūrų, skyrė ženkliai rečiau, tik – 3 (1,6 proc.) apklaustieji atsakė teigiamai. Kineziterapeuto konsultacijai pacientai buvo nukreipiami reikšmingai rečiau vėlesniais apklausos laikotarpiais. Ergoterapeuto konsultacijai reikšmingai dažniau buvo nukreipti pacientai po dilbio kaulų lūžio per pirmus keturis mėnesius po lūžio.

Gydomojo masažo procedūrų vidutiniškai atlikta 5–20 kartų per pirmus 4 mėnesius po slankstelio lūžio 35 (41,6 proc.) asmenims, ir 2–20 kartų 46 (19,2 proc.) respondentams po patirto dilbio kaulų lūžio. Po slankstelio lūžio per 19–24 mėnesių laikotarpį 4 respondentams gydomojo masažo procedūrų vidutiniškai atlikta 1–12 procedūrų, tiek pat procedūrų skirta ir 5 respondentams per 25–36 mėnesių laikotarpį. O po dilbio kaulų lūžio gydomojo masažo procedūrų vidutiniškai atlikta 10–15 procedūrų per 19–24 mėnesių laikotarpį 9 (4,7 proc.) tiriamiesiems ir 5–15 procedūrų 3 asmenims per 25–36 mėnesių laikotarpį. Per pirmus keturis mėnesius baseine vidutiniškai lankėsi 10–14 kartų po klinikinio slankstelio lūžio ir 12–16 kartų po dilbio kaulų lūžio.

Iš viso stuburo lūžį patyrusiems pacientams suteikta 1607 paslaugų, vidutiniškai 17,9±17,28 asmens sveikatos priežiūros paslaugos vienam asmeniui. Patyrusiems dilbio kaulų distalinės dalies lūžį iš viso suteikta 5243 paslaugų, iš jų 20,9±19,93 asmens sveikatos priežiūros paslaugos vienam asmeniui per trejus metus nuo patirto lūžio. Nustatyta, kad dauguma pacientų prieš lūžį savo sveikatą vertino, kaip neturintys sunkumų arba turintys nedidelių sunkumų. Pacientai visais klausimais statistiškai reikšmingai geriau jautėsi prieš lūžį nei praėjus 36 mėnesiams nuo patirto lūžio. Pacientai pažymėjo, kad geriausiai jautėsi praėjus 18 mėnesių po lūžio (lyginant reikšmes su įverčiu iš karto po lūžio). Pacientų po stuburo slankstelio lūžio grupėje išliko daugiau nedidelių ir didelių sunkumų negu dilbio kaulų distalinės dalies lūžį patyrusių pacientų grupėje. Gyvenimo kokybės indeksas nustatytas prieš patiriant osteoporozinį klinikinį slankstelio lūžį – 0,93 ir prieš dilbio kaulų lūžį – 0,95. Vėliau, per pirmąsias 14

dienų po lūžio, gyvenimo kokybė, atsižvelgiant į indeksą, statistiškai reikšmingai pablogėjo, atitinkamai iki 0,38 ir 0,4. Su kiekviena apklausa gyvenimo kokybės indeksas gerėjo, tačiau ir po trejų metų nepasiekė savo pradinio balo, atitinkamai 0,63 ir 0,85.

Įvertinus pacientų atsakymus, ar darbingumas ir kitokia fizinė veikla sugrįžo į buvusią prieš lūžį, nustatytas statistiškai reikšmingas skirtumas skausmo srityje, slankstelio lūžį patyrusių pacientų grupėje. Penktadalis pacientų pažymėjo, kad po 36 mėnesių jautė skausmą. Daugiau nei pusė jautė nerimą, kuris riboja fizinės sveikatos atstatymą ir gebėjimą be sunkumų susitvarkyti kasdienius darbus.

Nustatyta, kad pacientai, patyrę slankstelio lūžį, iš karto po lūžio savo sveikatą skausmo srityje vertino 2,53±0,52 balo, skausmas išliko ir po 36 mėnesių nuo patirto lūžio ir siekė 2,08±0,59 balo, t. y. nepasiekė iki lūžio buvusios būklės, kai skausmą jautė ir vidutiniškai šią būklę vertino 1,14±0,35 balo. Pacientų grupėje, patyrusių dilbio kaulų lūžį, ryškiausi pokyčiai iš karto po lūžio nustatyti skausmo ir nerimo srityje lyginant su įverčiu prieš lūžį, atitinkamai 2,42±0,52 ir 2,55±0,55 balo. Skausmo ir nerimo srityse pokyčiai išliko ir po 36 mėnesių nuo patirto dilbio kaulų lūžio ir siekė 1,41±0,54 balo skausmo srityje ir 1,29±0,5 balo nerimo srityje, t. y. taip pat nepasiekė iki lūžio buvusios būklės, kai skausmą jautė ir būklę vertino 1,1±0,3 balo bei nerimo srityje būklė įvertinta 1,5±0,36 balo.

Mūsų tyrimo rezultatai rodo, kad pacientai, patyrę dilbio kaulų lūžį, savo sveikatą vertino geriau visose gyvenimo kokybės srityse, nei pacientai, patyrę slankstelio lūžį; praėjus 36 mėnesiams nuo lūžio vyrai savo sveikatą vertino geriau nei moterys.

EQ-5D indeksas reikšmingai sumažėja iš karto po lūžio ir su kiekviena apklausa gerėja iki 12 mėnesių po lūžio, po to vėl mažėja ir po 36 mėnesių nepasiekia savo pradinio balo. Stuburo lūžį patyrę pacientai savo sveikatą prieš lūžį vertino 76,1±9,17 balo, o dilbio kaulų distalinės dalies lūžį patyrę pacientai savo sveikatą prieš lūžį vertino 78,41±9,06 balo. Statistiškai reikšmingai skyrėsi bendras sveikatos vertinimas visais apklausos laikotarpiais, palyginti su būkle prieš lūžį. Pacientų sveikatos būklė neatsistatė praėjus 36 mėnesiams po stuburo slankstelio ir dilbio kaulų distalinės dalies lūžio. Savo sveikatą geriau vertino pacientai, patyrę dilbio kaulų distalinės dalies lūžį. Išliko tendencija, kad balo vidurkis didėjo iki 18 mėnesių po dilbio kaulų distalinės dalies lūžio ir iki 12 mėnesių po stuburo slankstelio lūžio, 19–24 mėnesių laikotarpiu sveikatos būklė vėl pablogėjo ir iki 36 mėnesių gerėjo, tačiau nepasiekė pradinės sveikatos būklės.

Norint įvertinti lyties, amžiaus, išsilavinimo ir pajamų įtaką *EQ-5D* indeksui, buvo atlikta daugialypė tiesinė regresinė analizė. Pastebėta, kad pacientų, patyrusių dilbio kaulų distalinės dalies lūžį, *EQ-5D* indeksas prieš lūžį mažėja esant mažesnėms pajamoms. Pacientų, patyrusių slankstelio lūžį, *EQ-5D* indeksas prieš lūžį mažėja, didėjant amžiui. Nagrinėjant *EQ-5D* indeksą po lūžio, gauti rezultatai parodė, kad pacientų, patyrusių dilbio kaulų distalinės dalies lūžį, *EQ-5D* indeksas po lūžio mažėja didėjant amžiui, esant žemesniam išsilavinimui ir mažesnėms pajamoms. Rezultatai parodė, kad pacientų, patyrusių dilbio kaulų distalinės dalies lūžį, *EQ-5D* indeksas po 36 mėn. mažėja didėjant amžiui, esant žemesniam išsilavinimui. Atlikus duomenų analizę, nustatyta, kad gyvenimo kokybės vertinimui laike, įtakos turi ne tik amžius, bet ir lytis, išsilavinimas, pajamos. Statistiškai reikšmingų pokyčių daugiau nustatyta dilbio kaulų lūžį patyrusių pacientų grupėje.

Taigi tyrime nustatyta, kad prieš lūžį pacientai visais klausimais jautėsi statistiškai reikšmingai geriau, nei praėjus 36 mėnesiams nuo lūžio. Tirtų vyrų ir moterų *EQ-5D* indekso atsakymų pasiskirstymas reikšmingai skyrėsi praėjus 36 mėn. po lūžio, palyginti su įverčiu prieš lūžį. Moterys savo sveikatą vertino prasčiau nei vyrai abejose lūžių grupėse. Koreliacinės analizės rezultatai parodė, kad yra neigiamas ryšys tarp pacientų amžiaus ir *EQ-5D* indekso, kuo vyresnis pacientas, tuo indeksas mažesnis. Todėl tolimesni skaičiavimai atlikti atskirose amžiaus grupėse. Dirbantys, įgiję aukštąjį išsilavinimą ir gaunantys didesnes pajamas, apklaustieji, praėjus 36 mėnesiams nuo patirto slankstelio lūžio, savo sveikatą vertino geriau nei nedirbantys (p<0,05).

Apibendrinant atlikto darbo rezultatus, galima teigti, kad gyvenimo kokybė blogesnė tų pacientų, kurie patyrė klinikinį slankstelio lūžį, *EQ-5D* indeksas sumažėjo iš karto po lūžio ir nepasiekė pradinio įvertinimo praėjus 36 mėn. abiejose tiriamųjų grupėse. Fizinės funkcijos: mobilumas, savęs priežiūra, įprasta veikla – sumažėjo tik po lūžio, abiem lūžių atvejais nepavyko pasiekti pradinio rezultato praėjus 36 mėn.

Visų trijų grupių moterų, įtrauktų į momentinį tyrimą, amžiaus vidurkis buvo panašus: I gr. – 67,6±5,29 metai, II gr. – 67,18±4,81 metai, III gr. – 69,2 ±5,19 metai. Pastebėta, kad I grupei priklausančių moterų buvo mažiausias ūgis 157,23±5,76 cm ir mažiausia kūno masė 65,2±9,5 kg. Tačiau apskaičiavus kūno masės indekso (KMI) vidurkį, jis nustatytas per didelis visose grupėse. Paaiškėjo, kad moterų, sergančių osteoporoze be slankstelių lūžių, T-lygmuo, atspindintis kaulų mineralų būklę,

prasčiausias –3,11, standartinis nuokrypis lygus 0,43. Paskaičiavus koreliacijos koeficientą, gautas statistiškai reikšmingas neigiamas vidutinio stiprumo tiesinis sąryšis tarp kūno masės indekso ir T-lygmens –0,504. Tirtose grupėse buvo nustatytas statistiškai reikšmingas kūno masės, kūno masės indekso ir T-lygmens skirtumas (p<0,001, taikant ANOVA). Respondenčių grupės statistiškai reikšmingai nesiskyrė pagal amžių ir ūgį. Gyvenimo kokybės rodiklio vidurkis kontrolinėje grupėje buvo 34,12 (95 proc. PI 30,27–37,96), sergančiųjų osteoporoze be slankstelių lūžių – 36,51 (95 proc. PI 33,56–39,45), o respondenčių, patyrusių neklinikinius slankstelių lūžius, grupėje – 35,69 (95 proc. PI 32,08–39,29).

Palyginus *QUALEFFO-41* klausimyno A (skausmas) srities įvertinimus, paskirsčius sergančias osteoporoze pacientes į grupes pagal lūžusių slankstelių skaičių, nustatyti statistiškai reikšmingi (p<0,05) skirtumai, palyginti su kontroline grupe. Skausmo rodiklis buvo didesnis moterų, patyrusių vieną neklinikinį slankstelio lūžį. Nenustatyta reikšmingų skirtumų tarp lūžių grupių fizinės veiklos srityje – pacientės nesunkiai savarankiškai apsirengdavo, nusiprausdavo, susitvarkydavo tualete, galėdavo paruošti valgį, suplauti indus. Tačiau daugybinius neklinikinius slankstelių lūžius patyrusių pacienčių grupėje 58,3 proc. respondenčių nurodė sunkiai pakeliančios ir nešančios daiktus.

Išvados

1. Per trejus metus po osteoporozinio klinikinio slankstelio lūžio vidutinis apsilankymų skaičius asmens sveikatos priežiūros įstaigose buvo 17,9, patyrusių dilbio kaulų lūžį – 20,9. Stacionarinio gydymo paslaugos dažniau suteiktos asmenims, patyrusiems klinikinį slankstelio lūžį (60,3 proc.), nei asmenims, patyrusiems dilbio kaulų lūžį (29,9 proc.). Daugiausia medicininių paslaugų suteikta per pirmuosius keturis mėnesius po lūžio. Per pirmuosius metus po osteoporozinio lūžio kito asmens priežiūros reikėjo beveik ketvirtadaliui pacientų.

2. Stebėti tokie asmenų, patyrusių osteoporozinį klinikinį slankstelio ar dilbio kaulų lūžį, gyvenimo kokybės pokyčiai:
   – gyvenimo kokybės indeksas nustatytas prieš patiriant slankstelio lūžį – 0,93, dilbio kaulų lūžį – 0,95;

- vėliau, per pirmąsias 14 dienų po lūžio, gyvenimo kokybė, atsižvelgiant į indeksą, statistiškai reikšmingai pablogėjo, atitinkamai iki 0,38 ir 0,4;

- su kiekviena apklausa gyvenimo kokybės indeksas gerėjo, tačiau ir po trejų metų nepasiekė savo pradinio balo, atitinkamai 0,63 ir 0,85;

- nustatyta, kad gyvenimo kokybės pokyčiams per trejus metus įtakos turi ne tik amžius, bet ir lytis, išsilavinimas bei pajamos. Praėjus 12 ir 18 mėnesių po lūžio moterys geriau save vertino įprastos veiklos srityje, o vyrai – judėjimo srityje. Praėjus trejiems metams po lūžio vyrai savo sveikatos būklę vertino geriau nei moterys.

3. Vieną osteoporozinį neklinikinį slankstelio lūžį patyrusioms moterims nustatyta statistiškai reikšmingai blogesnė gyvenimo kokybė skausmo srityje, palyginti su nesergančių osteoporoze ir nepatyrusių lūžio moterų gyvenimo kokybe. Daugybinius slankstelių lūžius patyrusios moterys blogiau vertino savo išvaizdą, negu sergančios osteoporoze be lūžio ar nesergančios osteoporoze moterys. Nerasta bendro gyvenimo kokybės rodiklio reikšmingų skirtumų tarp moterų, kurioms nustatyti osteoporoziniai neklinikiniai slankstelių lūžiai, moterų, kurios serga osteoporoze be lūžių, ir moterų, kurios neserga osteoporoze.

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