

ORIGINAL ARTICLE

THE INFLUENCE OF HIP ARTHROPLASTY ON HEALTH RELATED QUALITY OF LIFE IN MALE POPULATION WITH OSTEOARTHRITIS HIP DISEASE

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ABSTRACT

Introduction: Hip osteoarthritis is a disabling disease which become substantial health-related, social, and economic issue.

The aim: To assess short term quality of life in male population with hip osteoarthritis, after total hip arthroplasty.

Material and methods: 118 male patients were included in the study, age range from 31 to 79 year-old, who underwent total hip arthroplasty. Patients quality of life was assessed using questioners: abbreviated version of WHOQoL-BREF, as well as EQ-5D-5L, and SF-36 scale. Patients condition was investigated before surgery, 6 weeks and 6 months after the surgery.

Results: The results from WHOQoL-BREF questionnaire demonstrated a statistically significant improvement of quality of life after the surgery – 6 weeks after the procedure by 4% and 21% ($p < 0.001$), after 6 months by 13% and 42% ($p < 0.001$), respectively. The most significant improvement was found in the somatic domain – by 5% after 6 weeks, and by 6% after 6 months ($p < 0.001$). The quality of life according to the EQ-5D-5L questionnaire revealed statistically significant improvement after 6 weeks, by 18-24% ($p < 0.001$), after 6 months by 41-48% ($p < 0.001$). Substantial improvement was achieved in reducing pain and improving mobility. SF-36 questionnaire showed statistically significant improvement after 6 months from the surgery in both physical (by 44%), and mental condition (by 54%) ($p < 0.001$).

Conclusions: Improvement of the quality of life – mainly less severe pain and better mobility after total hip arthroplasty in the investigated group of men was proven in 6 weeks after the procedure, while the further progress was more noticeable 6 months after the procedure.

KEY WORDS: degenerative hip disease, osteoarthritis, cementless total hip arthroplasty, Quality of Life

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LIST OF ABBREVIATIONS

QoL – Quality of Life

HRQoL – Health-Related Quality of Life

WHOQoL-BREF – World Health Organization / Quality of Life – BREF)

EQ-5D-5L – EuroQol questionnaire

SF-36 – Scale Short Form 36 questionnaire

BMI – Body Mass Index

THR – Total hip reconstruction

TKR – Total knee reconstruction

THA – Total hip arthroplasty

TKA – Total knee arthroplasty

OHS – Oxford Hip Score

WOMAC – Western Ontario and McMaster Universities Arthritis Index

BDI – Beck Depression Inventory

BAI – Beck Anxiety Inventory

HHS – Harris Hip Score

VAS – Visual Analog Scale

INTRODUCTION

Recently Quality of Life – QoL assessment has been interest to many medical disciplines. Some studies emphasis the present overall health condition, alternatively the assessment concerns the period following a disease the person suffered from. Health status analysis may be treated in *objective way*, in such a case the economic conditions, spare time, social security, housing conditions, natural environment, health, social environment are considered; or in *subjective way*, in which case assessment is made concerning individual perception of happiness, anxieties, hope, loneliness, well-being, and satisfaction. The perception of quality of life also depends from the present health condition, as diseases may have

significant influence on quality of life perception, on several levels simultaneously [1, 2].

Research evolution regarding quality of life connected with changes in health condition allowed to isolate the concept of quality of life dependent on health condition, disease processes, in reference to natural aging process. Regardless what definition assumed, research concerning quality of life should take into account such factors as: functional capacity, the way patient perceives her/his life situation, life satisfaction, well-being, as well as disease manifestations and physical condition resulting from disease processes and age. In order to correctly determine QoL, also psychosocial investigation should be considered, as well as risk factors in the period preceding the disease (age, sex, education level socio-economic status, family status), also social bonds and support, interests, and level of medical expertise [3, 4]. At present, quality of life assessment used by many authors takes into account not only the clinical assessment but also functional condition of patients [4, 5].

Hip osteoarthritis is one of the most common diseases affecting skeletal system, causing a serious health, social, and economic threat. Hip osteoarthritis, affects around 4% of the population, according to statistics. It affects mainly people over 60 years of age, although it may also occur in younger patients [6, 7].

Hip osteoarthritis is a progressive disease. It develops slowly, while intense pain and limited mobility in joint leads to disability and reduced quality of life. In the circumstances where pain occurs at rest and at night, and mobility is severely reduced in the hip, the possibility of performing arthroplasty should be considered. Surgical treatment is a treatment of choice, recommended for patients in advanced stages of the disease, for whom symptomatic treatment failed to give satisfactory results [8, 9].

THE AIM

The aim of the study was assessment of short term quality of life in male population with hip osteoarthritis disease, after total hip arthroplasty.

Table 1. Clinical characteristics of the studied population of patients.

	Mean /percent	SD
age [in years]	58	11
work experience [in years]	34.3	10.4
body mass [kg]	89.8	14.5
height [cm]	174.7	7.47
BMI index value [kg/m ²]	29.2	5.24
duration of degenerative disease [in years]	6.0	5.21
percentage of town dwellers [%]	66.7	
percentage of blue collar workers [%]	85	
cardiovascular system diseases [%]	97	
diabetes [%]	19.7	
percentage of patients operated on the right side [%]	52	

MATERIAL AND METHODS

Study included male patients, qualified for total hip arthroplasty, in the District Hospital of Orthopaedics and Trauma Surgery between 01/01/2018 and 01/01/2019. On admission to the ward, patient's clinical history was taken and physical examination was performed. The surgical intervention was performed under subarachnoid anaesthesia or general anaesthesia by the senior high volume hip surgeon.

In total, 118 patients participated in the study, age between 31 and 79 years (mean age 58 years). Inclusion criteria for the study: male sex (due to the specification of orthopaedic department), primary degenerative hip joint osteoarthritis, patients age between 30 and 80 years old, and patient's consent for taking part in the questionnaire study. Exclusion criteria were as follows: female sex, femoral neck fracture, as well as absence of patient's consent for taking part in the questionnaire study.

In the study authors used available Quality of Life (QoL) questionnaires and assessed that patient condition during short follow-up period, before the surgery, 6 weeks and 6 months after hip arthroplasty. The questionnaire was anonymous, and participation in the study was voluntary. The abbreviated version of the WHOQoL-BREF (World Health Organization / Quality of Life – BREF) was used, consisting of 26 questions concerning overall quality of life, self-assessment of health condition and other spheres of life in the last four weeks; the EuroQol – EQ-5D-5L questionnaire, assessing the health condition on the day of examination, in which the questions referred to mobility, self-service abilities, performing everyday activities such as: work, education, household chores, experiencing pain/discomfort, as well as anxiety / depression; and the SF-36 questionnaire, assessing 8 dimensions of health: physical functioning, social functioning, role limitation regarding physical problems, role limitation regarding emotional problems, mental health, vitality, and general health assessment [10-12].

Bioethics Committee of the Silesian Medical Chamber on 30 July 2018 notified that mentioned study do not require the consent of the Bioethics Committees of the Silesian Medical Chamber. (ŚIL/KB/1044p/18). All qualified patients signed a written consent for participation in this study.

STATISTICAL ANALYSIS

For the purpose of statistical analysis, Statistica 12 PL and MS Excel 2016 have been used. Measurable values have been presented as arithmetic mean with standard deviation (SD). Chi-squared test was used for assessing quality variables. The Shapiro-Wilk test was used to assess the distribution normality, while Levene's test was used to check the equality of variances. For the sake of comparing the results in particular time points the T-test for dependent variables or Wilcoxon test were used. As threshold for statistical significance, the level of $p < 0.05$ was assumed for changes observed.

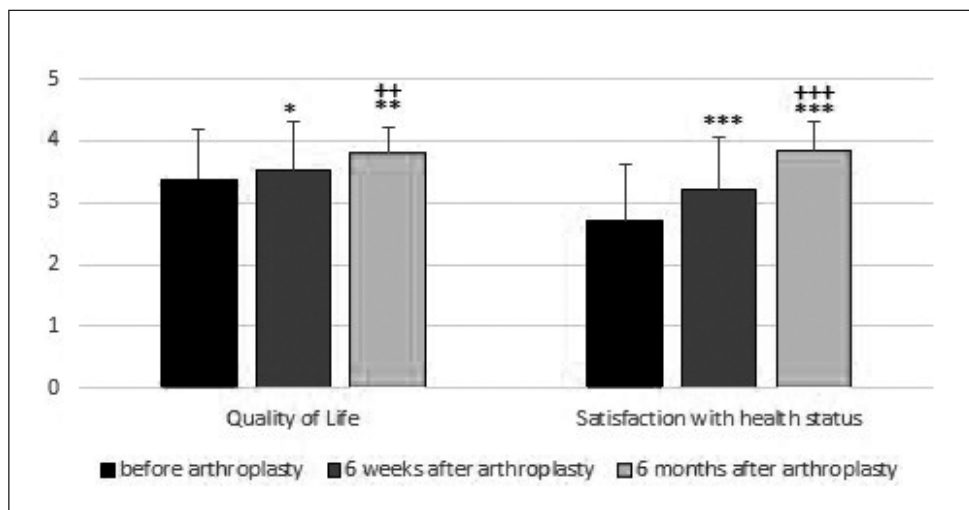


Fig. 1. Assessment of the quality of life and satisfaction with health status before, 6 weeks and 6 months after total hip arthroplasty, according to WHOQoL-BREF questionnaire. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$, compared to pre-surgery values, ++ $p < 0.01$, +++ $p < 0.001$ compared to values after surgery (6 weeks).

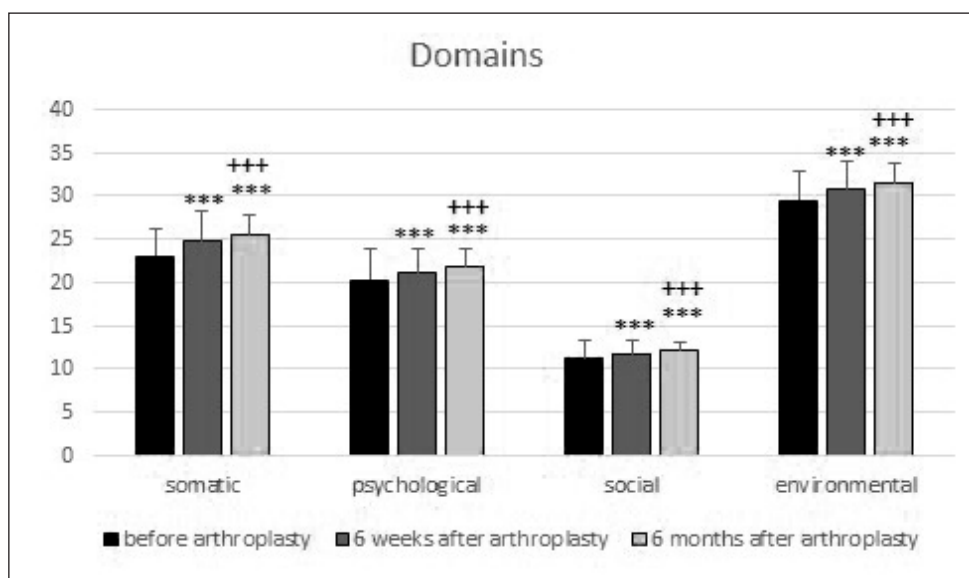


Fig. 2. Assessment of quality of life according to WHOQoL-BREF questionnaire before, 6 weeks and 6 months after total hip arthroplasty. *** $p < 0.001$ compared to the values before the procedure, +++ $p < 0.001$ compared to the values after surgery (6 weeks).

RESULTS

Clinical characteristics of participants are presented in Table 1. In the studied population, the mean age was 58 ± 11 years, BMI values 29.2 ± 5.24 kg/m², average duration of degenerative disease was 6.0 ± 5.21 years.

Based on the analysis of WHOQoL-BREF questionnaire results, it has been established that quality of life and satisfaction with health status (values of both factors in the 1 to 5 scale) improved, with statistical significance, 6 weeks after intervention by 4% and 21%, and 6 months after the procedure by 13% and 42%, respectively (Fig. 1).

In subsequent questions from the WHOQoL-BREF questionnaire, improvement in the quality of life was noted in specific areas. The most substantial, and statistically significant improvement was observed in the somatic domain (the presence of physical pain, need for medical treatment, degree of satisfaction of everyday life) – by 5% 6 weeks after surgery, and by 6% 6 months after it. In regards to other domains: psychological (satisfaction of self appearance, the frequency of negative experiences how depression, anxiety, fear), social (relationships with other people) and environmental ones (security, financial situation, living conditions, communication), a statistically sig-

nificant improvement was also noticed – by 4% 6 weeks after surgery, and by 7-9% 6 months after it (Fig. 2).

Based on the analysis of the quality of life results obtained from the questionnaire concerning health (EQ-5D-5L) the following have been improved, with statistical significance: mobility, self-service, daily activity, pain / discomfort, and anxiety or depression – by 18-24% ($p < 0.001$) 6 weeks after surgical intervention, and by 41-48% ($p < 0.001$) 6 months after hip arthroplasty. The most significant improvement includes pain relief and increased mobility (Fig. 3).

Moreover, in subjective assessment of present health condition (scale 0 to 100) we noted statistically significant improvement – by 20% 6 weeks after surgery, and by 38% in 6 months after hip arthroplasty (Table 2 and Fig. 4).

The analysis of results according to SF-36 questionnaire for assessing the quality of life revealed a statistically significant improvement regarding physical condition, daily activity, and functional limitations – by 14% ($p < 0.001$) 6 weeks after surgery, and by 44% ($p < 0.001$) 6 months after hip arthroplasty. Interpretation of results concerning mental condition, comprising overall health perception, vitality, emotional functioning, and mental health showed

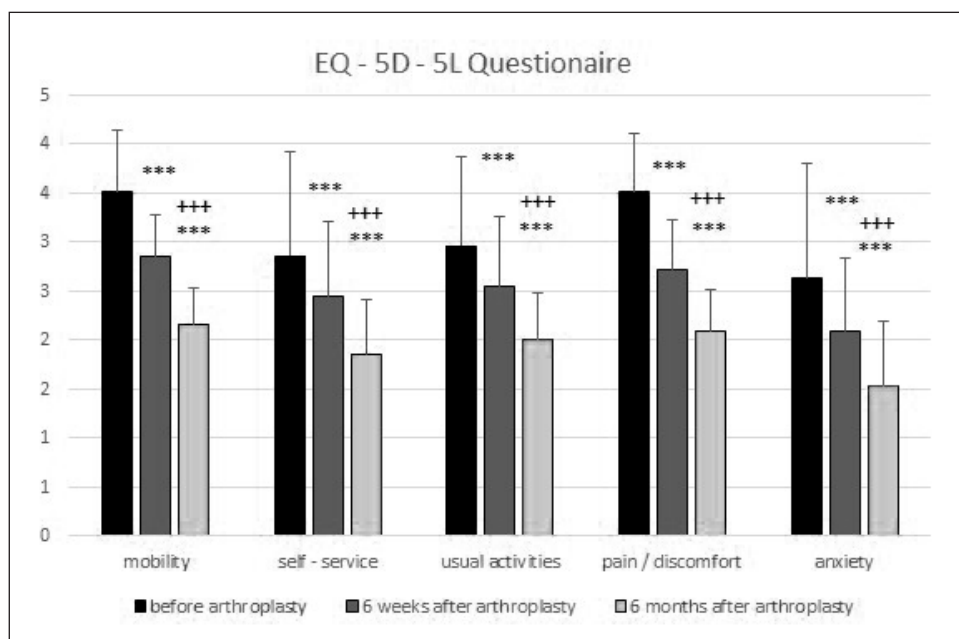


Fig. 3. Assessment of quality of life according to EQ-5D-5L questionnaire before, 6 weeks and 6 months after hip arthroplasty. *** p<0.001 compared to the value before the surgery, +++ p<0.001 compared to the value after the surgery.

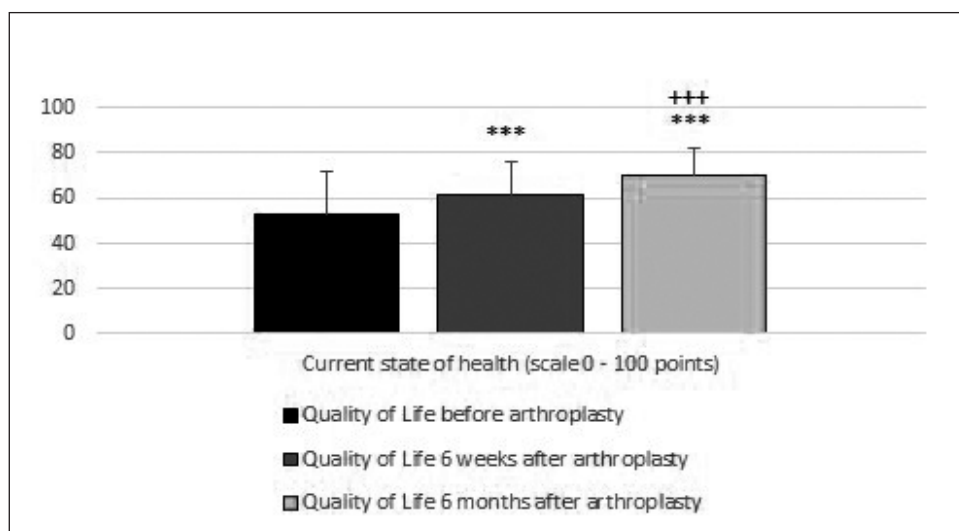


Fig. 4. Subjective health status before, 6 weeks and 6 months after hip arthroplasty. ***p<0.001 compared to the value before surgery, +++p<0.001 compared to the value after surgery.

improvement in comparison with the initial values 6 weeks after surgery by 21% (p<0.001), and 6 months after hip arthroplasty by 54% (p<0.001). Moreover, in the subjective assessment the Quality of Life Index (maximum amount of points in the scale – 171) improved with statistical significance by 19% 6 weeks after surgery (p<0.001), and by 51% 6 months after hip arthroplasty (p<0.001) (Fig. 5).

DISCUSSION

Increased interest in the subject of quality of life results in the necessity of improving the efficacy of health care and standardization of treatment results. The complex nature of problems containing the wide range of physical and mental health, as well as the environment in which patients function, indicates the legitimacy and value of applied, various methods and tools for measuring health condition. Useful in planning and providing complex care by various professionals, preparing patients for self-care [2, 13].

Interest in quality of life in medicine is also a form of response to challenges and demands, which result from increasing occurrence of chronic diseases and their deterioration in societies. It is also related to increasing life expectancy, therefore the period in which patients’s function is substantially disturbed is extended, which influences the patient’s life situation and its subjective perception [5, 14].

Specific questionnaire can be used when assessing quality of life, depends on the aim of the authors study, as it has to be suitable for the clinical situation [11]. As demonstrated in the study of Jin X et al., who compared the validity of using questionnaires EQ-5D-5L and EQ-5D-3L, when assessing the quality of life, the EQ-5D-5L questionnaire proved to be a more sensitive research tool for patients after total hip replacement (THR), as well as total knee replacement (TKR). use of EQ-5D-5L questionnaire in the above study seems fully justified [15].

The measurements of quality of life during clinical examination allowed to confirm beneficial results of treatment.

Table 2. Subjective assessment of health condition for patients before, 6 weeks after surgery, and 6 months after total hip arthroplasty.

n=118	mean	SD	mean	SD	% of change	p value	mean	SD	% of change	p value
	before surgery	6 weeks after hip arthroplasty	6 months after hip arthroplasty							
EQ-1	3.46	0.74	2.68	0.57	-23%	<0.001	1.97	0.49	-43%	<0.001
EQ-2	2.88	1.01	2.36	0.72	-18%	<0.001	1.67	0.57	-42%	<0.001
EQ-3	3.09	0.95	2.49	0.70	-19%	<0.001	1.81	0.52	-41%	<0.001
EQ-4	3.43	0.85	2.61	0.68	-24%	<0.001	1.90	0.50	-45%	<0.001
EQ-5	2.78	1.17	2.14	0.85	-23%	<0.001	1.46	0.61	-48%	<0.001
Present health condition, scale 0 to 100	52.1%	18.5%	62.5%	14.1%	20%	<0.001	72.2%	11.9%	38%	<0.001

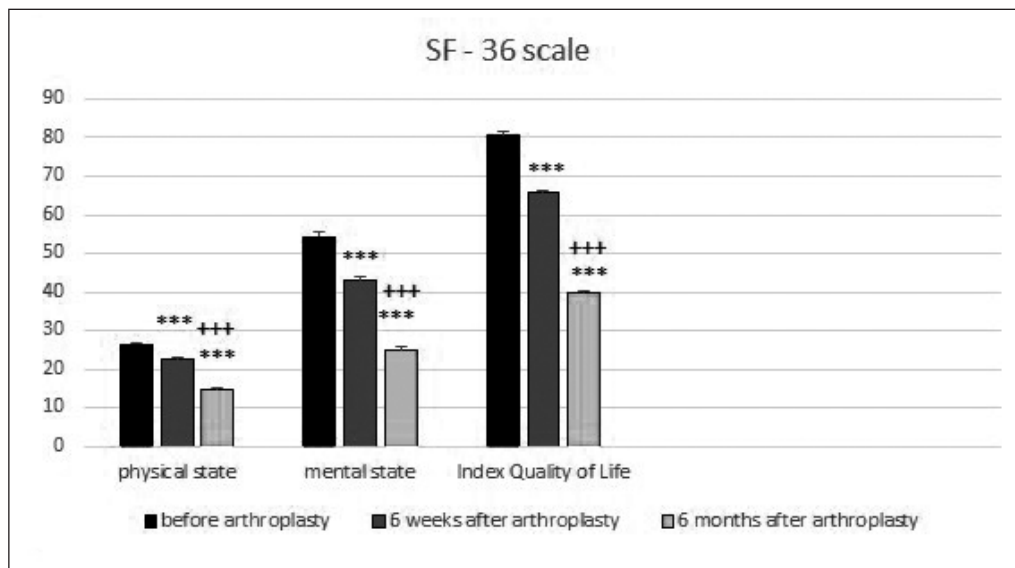


Fig. 5. Assessment of quality of life according to SF-36 questionnaire before, 6 weeks and 6 months after total hip arthroplasty. ***p<0.001 compared to the value before surgery, +++p<0.001 compared to the value after surgery.

As demonstrated in research, the quality of life assessed acc. to WHOQoL-BREF questionnaire, concerning overall quality of life, self-assessment, and health condition, improved in the study group of patients as early as 6 weeks after surgery (p<0.001). That result was also satisfactory as showed during further clinical follow up, carried out 6 months after hip arthroplasty (p<0.001).

Snell DL et al. evaluated the quality of life in patients after total hip arthroplasty (THA) and total knee arthroplasty (TKA), using also the WHOQoL-BREF questionnaire, 6, 12, 24, and 60 months after the intervention. The results of their study demonstrated a positive correlation between the clinical condition and the assessed psychological aspects which influence the quality of life of treated patients [16].

Also Lapaj L. et al. evaluated the quality of life of 62 patients (44 female and 18 male ones) before and after hip arthroplasty procedure (mean follow-up: 12–18 months) using modified WHOQoL-100 questionnaire. The results of their studies confirmed significant beneficial influence of the surgical intervention upon the physical and psychological level of independence, as well as overall quality of life in patients who were subjects of surgical treatment, where no influence of the surgical procedure upon the level of social independence was demonstrated [17].

It is worthwhile to refer to the results of the study per-

formed by Peeters CM et al. who made a metaanalysis of 49 studies from available databases, which refer to the assessment of health status (HR) and health-related quality of life (HRQoL) in patients over 65 years of age, after total hip arthroplasty or hemiarthroplasty due to neck of femur fracture. The analysis comprised the period of 6 months after surgical intervention, that is the mean follow-up. The research demonstrated that quality of life was significantly higher in the patients who underwent total hip arthroplasty, in comparison with patients on whom hemiarthroplasty was performed [18].

In the study reported here, the authors also used most widely generic EQ-5D-5L questionnaire for evaluation of quality of life, which also revealed a significant improvement in quality of life as early as 6 weeks after the surgery (p<0.001), while the degree of improvement achieved (41-48%) was significantly higher 6 months after hip arthroplasty. The most remarkable improvement was noted in the reduction of pain, as well as enhanced mobility (p<0.001).

Similar results were achieved by Costa ML. et al., who compared the clinical condition assessment using Oxford Hip Score (OHS), and quality of life using the EuroQol – EQ-5D-5L in patients after total hip arthroplasty, in comparison with resurfacing arthroplasty, in the group of 122 patients over 18 years of age, follow-up 5 years [19].

Miao N.F. et al. made the assessment of clinical condition (Oxford Hip Score and Oxford Knee Score) as well as quality of life (EQ-5D-5L) in patients who had undergone total hip arthroplasty and knee arthroplasty. The assessment was made before surgical intervention, 6 weeks after it, as well as 3 and 6 months after. The authors demonstrated that functional condition and quality of life improved, while the results obtained were significantly higher in the female group after knee arthroplasty ($p < 0.05$) [20].

Another questionnaire used in the study reported here is SF-36 questionnaire. It assessed the physical and mental condition of the study subjects. Also in this case, quality of life improved, with statistical significance, both 6 weeks after surgery (by 21%) ($p < 0.001$), and 6 months after hip arthroplasty (by 54%) ($p < 0.001$).

SF-36 questionnaire was also used by Bahardoust M. et al., who assessed the quality of life (HRQoL), clinical condition, and socio-demographic aspects in 217 Iranian patients after total hip arthroplasty. The mean follow-up was 18-27 weeks after the surgical intervention. The results demonstrated that hip arthroplasty procedure provides improvement in the quality of life, which directly influenced the clinical condition of patients, while the improvement achieved was not a constant value, and changed over the time range assessed [21].

Neuprez A. et al., in turn, assessed the influence of total hip arthroplasty (THA) and total knee arthroplasty (TKA) upon the pain experienced and quality of life in late follow-up (5 years after the intervention) in the group of 626 surgical patients. Validated specific Western Ontario and McMaster Universities Arthritis Index (WOMAC) and generic (SF-36 and EQ-5d-5L) instruments assessing quality of life were used prior to surgery and yearly, thereafter. The beneficial effect on quality of life observed during the first year after hip and knee arthroplasty (THA and TKA) was maintained for up to 5 years. More than 3/4 of the patients in this study experienced a good outcome (86.04% in THA group and 79.91% in TKA group) [22].

Hofstede S.N. et al. conducted a study concerning the assessment of pre-surgery determinants upon the perception of quality of life, functioning, and pain experienced, in patients from 20 cohorts with OA ($n = 1783$) TKA and $n = 2400$ (THA) in the Netherlands. The authors examined the influence of age, gender, BMI, and preoperative values of HRQoL, functioning, and pain on postoperative status and total improvement. For each increase in preoperative point in HRQoL, the postoperative HRQoL increased by 0.51 points in TKA and by 0.37 points in THA in SF-36 scale. Patients with a better preoperative health status have better outcomes, but less improvement. Even though the independent effects may seem small, combined results of preoperative variables may result in larger effects on postoperative outcomes [23].

Balik M.S. et al., have also assessed, like the authors of the *a/m* study, the quality of life in the group of 150 patients after primary hip arthroplasty. The authors additionally assessed the psychiatric symptoms before and after the operation, in order to demonstrate disease-related socio-demographical characteristics of the patient. The

Quality of Life Scale Short Form (SF-36), Beck Depression Inventory (BDI), Beck Anxiety Inventory (BAI), Harris Hip Score (HHS) and Visual Analog Scale (VAS) were implemented in the preoperative period and at 6th and 12th week after the operation. After total hip arthroplasty, significant improvement was observed in quality of life (SF-36), depression, and pain scores (VAS) [24].

It is generally believed that diseases disturb the function of patients to various degrees, affecting quality of life in its many dimensions. That is why in the process of treatment, besides achieving medical targets, an important role belongs to improving the comfort of living for the treated patient. Total hip arthroplasty is the method of choice in the treatment of advanced stages of degenerative changes in hip joint. The aim of the surgical procedure is to increase hip mobility, to enable the patient to return to professional and social activity. The above-mentioned factors have significant influence upon the improvement of patient's quality of life.

CONCLUSIONS

1. Total hip arthroplasty procedure affects statistically significantly improvement of quality of life in the investigated group of patients with hip osteoarthritis, as early as 6 weeks after the surgery. The degree of improvement increases further after 6 months from hip arthroplasty.
2. The achieved improvement concerns both physical and mental health, in particular the reduction of the intensity of pain ailments and improvement of patient's functional state.

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Conflict of interest

Authors declare no conflict of interest

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