VILNIUS UNIVERSITY

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TOTAL KNEE ARTHROPLASTY – THE INFLUENCE OF PREOPERATIVE PATIENT FACTORS ON PAIN, FUNCTION AND QUALITY OF LIFE

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Biomedical sciences, Medicine (06 B)

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VILNIAUS UNIVERSITETAS

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KELIO SĄNARIO ENDOPROTEZAVIMAS – PRIEŠOPERACINIŲ PACIENTO VEIKSNIŲ ĮTAKA POOPERACINIAM KELIO SĄNARIO SKAUSMUI, FUNKCIJAI IR GYVENIMO KOKYBEI

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1. ABBREVIATIONS

Ahlback joint	Ahlbäck classification of osteoarthritis of the knee
ASA class	American Society of Anesthesiologists physical status
BMI	Body mass index
CI	Confidence interval
Charnley class	Classification used to assess patients level of activity
MCS	Mental health composite score
OA	Osteoarthritis
OMERACT-OARSI	Outcome Measures in Rheumatology and Osteoarthritis Research Society International
PCS	Physical health composite score
PROM	Patient reported outcome measure
ROM	Range of motion
SD	Standard deviation
SF-12	Short From 12 item Health Survey
TKA	Total knee arthroplasty
WHO	World Health Organisation
WOMAC	Western Ontario and McMasterUniversities' proposed Osteoarthritis Index

2. INTRODUCTION

2.1. Background

Osteoarthritis (OA) is one of the most common diseases affecting the musculoskeletal system in elderly people and has a substantial impact on patients quality of life (QoL)(1). Age is the strongest predictor of the development and progression of osteoarthritis, as such a number of people suffering from OA is expected to continue to increase over the coming years due to the ageing population and increasing obesity(2). A primary total knee arthroplasty (TKA) is an effective treatment for an end stage knee osteoarthritis(3–5). TKA is aimed to provide long lasting joint which relieves pain and improves patient's physical function(6). Since the introduction of modern TKA in 1970's, the surgical techniques, the instrumentation, the implant technologies have changed dramatically and those improvements greatly benefited to postoperative outcomes. Knee arthroplasty has moved from a salvage operation, performed in extreme cases, to an intervention designed to improve the quality of life in patients who might otherwise cope without the intervention. However, a significant patient population (10-20%) is still experiencing unsatisfactory results (7). There is no clinical, radiographic or laboratory explanation for their dissatisfaction. This patients group, referred to as the "looks good but feels bad" group remains a mystery to knee surgeons (8).

Therefore a traditional indicators of surgical success such as stating the range of knee motion (ROM), the implant position on x-ray and implant survival may not mirror the patient's postoperative experience. Patient-reported outcome measures (PROMs) have become a corner-stone of outcome assessment after joint surgery (9). Numerous PROMs are used to measure the TKA outcome from the patient's perspective. Usually one generic and one specific questionnaire are used because they measure different but complementary aspects of patient outcomes(10). The Medical Outcome Short Form 36 (SF-36) Health Survey and the Western Ontario and McMaster

Universities Osteoarthritis Index (WOMAC) is the most used combination in the literature (5).

WOMAC is a joint specific instrument for measuring clinical outcome in patients treated for knee osteoarthritis (11).

The SF-36 score is a generic health measure of patient's overall physical and mental wellbeing(12).

Various patient-related factors can be associated with poor outcome after TKA, including age, sex, obesity, education, social support and mental status(13–16). It is important to identify those preoperative risk factors in order to understand why some people fail to benefit from TKA.

2.2. The aim of the study

The aim of this study was to prospectively evaluate the influence of preoperative patient factors on patient reported outcome one year after total knee arthroplasty.

2.3. Objectives of the study

1.1. To evaluate knee pain, function, general physical and mental health status of patients before total knee arthroplasty and to compare among patient groups differing by age, sex, education level, social support level, BMI, place of residence, co-morbidities according to Charnley and stage of knee osteoarthritis according to Ahlback.

1.2. To evaluate knee pain, function, general physical and mental health status of patients one year after total knee arthroplasty and to compare among patient groups differing by age, sex, education level, social support level, BMI, place of residence, co-morbidities according to Charnley and stage of knee osteoarthritis according to Ahlback.

1.3. To compare WOMAC and SF-12 scores change among patient groups differing by age, sex, education level, social support level, BMI, place of

residence, co-morbidities according to Charnley and stage of knee osteoarthritis according to Ahlback.

2. To find out preoperative patient factors which predict knee pain and function in one year following total knee arthroplasty.
3. To find out the proportion and which patients do not respond to total knee arthroplasty according to OMERACT-OARSI set of responder criteria.

2.4. The scientific novelty of the study and implementation into the practice

TKA has demonstrated improvements in OA patient's pain and function. Unfortunately, not all patients are satisfied with the results(17) . The incidence of dissatisfaction or suboptimal outcome after TKA varies in the literature. Variations of reported outcomes may be due to the different kinds of questionnaires used and lack of consensus amongst physicians regarding how they should be applied(18,19). Until now no research has been done to evaluate the influence of patient factors on the TKA outcome using PROMs in Lithuania. Every surgeon is responsible for the results of the intervention, so we need to have all possible information regarding the factors influencing postoperative outcomes. It is important before surgery to identify patients at risk of reporting an unsatisfactory TKA outcomes. If risks are identified and addressed in time the post-operative results could be improved. It is impossible to rely on the data taken from studies done in countries with different economy, culture and traditions.

3. MATERIALS AND METHODS

3.1. Study Design and Settings

The prospective observational study was performed at the Republican Vilnius University Hospital, Vilnius, Lithuania, from October 2012 to April 2014.

The study protocol was approved by the Regional Ethical Committee of the Vilnius Regional Bioethics Committee, Vilnius, M.K. Ciurlionio 21/27, LT-03101, Lithuania. (Nr. 158200-14-738-254)

The cohort consisted of patients from the orthopaedic department of Republican Vilnius University Hospital.

The patients scheduled for primary TKA were screened for inclusion. All enrolled patients gave a written consent. Flowchart of study cohort is shown in Figure 1.

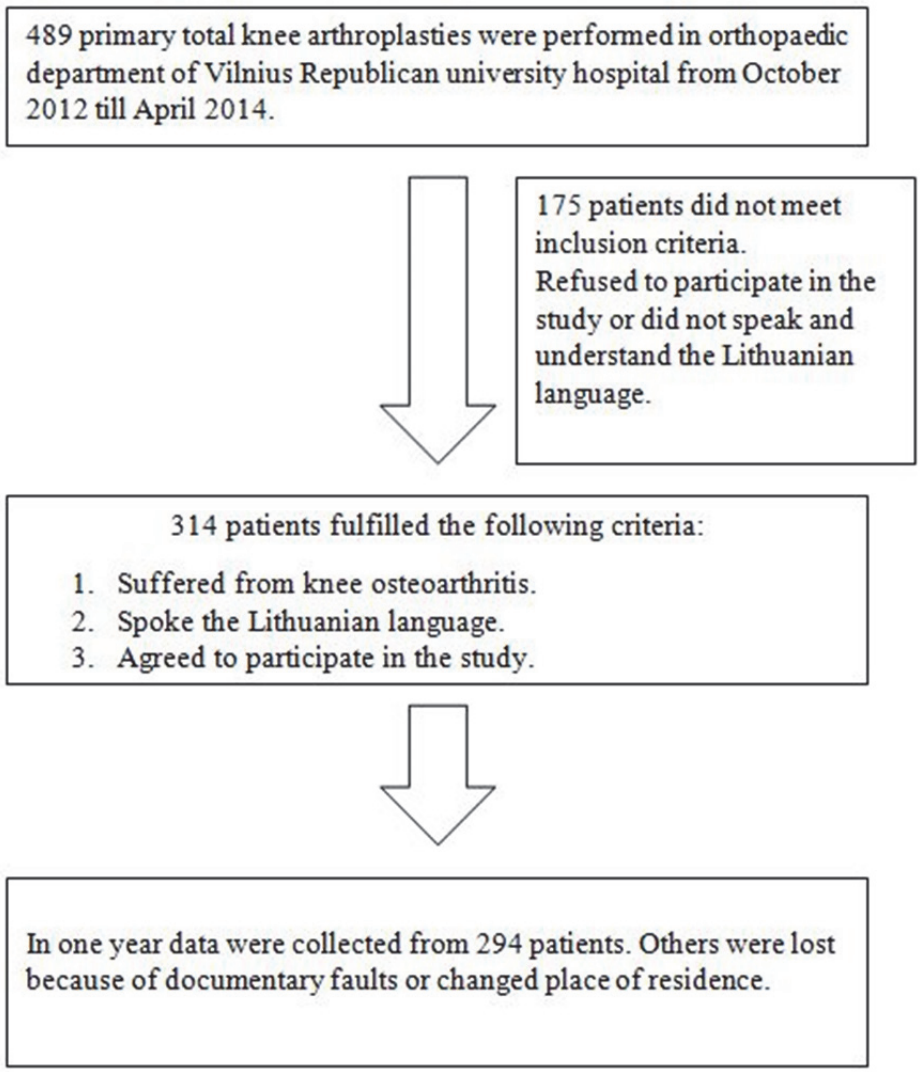

Fig. 1. Flowchart of study cohort

Three hundred fourteen participants were enrolled in the trial. Two hundred ninety four patients completed the study.

Preoperative patient's data was obtained on the day of their preoperative evaluation. Collected information included sex, age, educational level, social support, height and weight was measured (from which body mass index (BMI) was calculated), residence place, co-morbidities. We devided all patients in to two groups according to age (younger than 75 and 75 and older). Usually the elderly are lumped together, grouping everyone over the age of 65. But a 65-year-old's experience of life is much different from a 90-year-old's. The mean age of our cohort was 71. Older adult population is divided into three life-stage subgroups: the young-old (approximately 65–74), the middle-old (ages 75–84), and the old-old (over age 85)(20). We took a cut-off between young-old and middle-old life-stage subgroups. Body Mass Index (BMI) is a simple index of weight-for-height that is commonly used to classify underweight, overweight and obesity in adults (21). It is defined as the weight in kilograms divided by the square of the height in metres (kg/m^2). We used WHO's recommendation for spliting patients in groups according to BMI: I. BMI<30 (patients with normal weight and over-weight), II. BMI 30-34.9 (obese patients class I), III. BMI≥35 (obese patients class II and class III). Patient's educational level was coded as either low (secondary school or vocational training) or high (University). According to living place patients were grouped in to rural and urban. Social support was determined by their marital and living status (lived alone or with somebody). The patients underwent radiographic examination (AP and lateral standing) and were grouped according to Ahlback osteoarthritis stages (22). According to walking ability patients were grouped to A, B, C Charnley classes (23).

Patients filled up two validated and originaly authorized Lithuanian translations of questionnaires: the Western Ontario and McMaster's Universities osteoarthritis Index (WOMAC) and the Short Form - 12 (SF-12) before and one year after TKA.

The WOMAC is a disease-specific instrument with 3 dimensions that measure pain, joint stiffness and physical function. It consists of 24 items (5 for pain, 2 for stiffness and 17 for function). Point values from 0 to 4 are assigned to each response and scores are totaled for each category. The maximum score is 20 points for pain, 8 for stiffness and 68 points for physical function. Higher scores indicate greater difficulty (24). We transformed WOMAC scores to a 0 to 100 point scale for each domain (with 100 being the best score).

The SF-12 score is a generic health measure of a patient's overall physical and mental wellbeing. Physical and Mental Health Composite scores (PCS and MCS) are calculated using the scores of twelve questions and range from 0 to 100, where a zero score indicates the lowest level and 100 indicates the highest level of health(12).

All TKA were made using cemented implants without resurfacing patella and all patients underwent similar rehabilitation program.

Preoperative and in one year clinical outcome scores were analyzed as well as the change in score between preoperative and latest score.

3.2. Study Subjects

3.2.1 Comparing preoperative, postoperative and score change of WOMAC and SF-12 questionnaires among groups differing by preoperative patient factors.

The first aim of this study was to compare knee pain, function, general physical and mental health of patients before and one year after TKA between groups differing by age, sex, BMI, education, social support level, residence place, amount of co-morbidities and grade of knee osteoarthritis.

Patients were grouped according to these preoperative factors and their knee and general health was evaluated using WOMAC and SF-12. The evaluation of statistical and clinically meaningful differences of knee pain, function and general healthscores among groups was done. Differences in the WOMAC

scores of 9 points on a 100-point scale have been shown to be perceptible to patients and are clinically meaningful(6,25,26).

3.2.2 Influence of patient factors on knee pain and function after TKA according to one year WOMAC scores change.

The multiple linear regression model was used to determine the preoperative predictors of pain and functionchange in one year following TKA.

3.2.3 Measuring the patient's response to TKA

To find out what patients can be classified as responders to TKA, we used OMERACT-OARSI set of responder criteria(27). OMERACT-OARSI criteria are based on pain and function as measured by WOMAC. This set is as follows: if the patient has an improvement in pain or function ≥50% and absolute change ≥20 then, he is a responder. If the patient does not reach these criteria but has an improvement in at least two of the three following criteria he will also be a responder: 1. Pain ≥20% and absolute change ≥10; 2. Function ≥20% and absolute change ≥10; 3. Patient's global assessment of the disease ≥20% and absolute change ≥10. Set of responder criteria is demonstrated in Figure 2.

The estimates of OMERACT-OARSI criteria stratified by WOMAC preoperative tertiles of knee pain severity and function according to Escobar et al.(28).

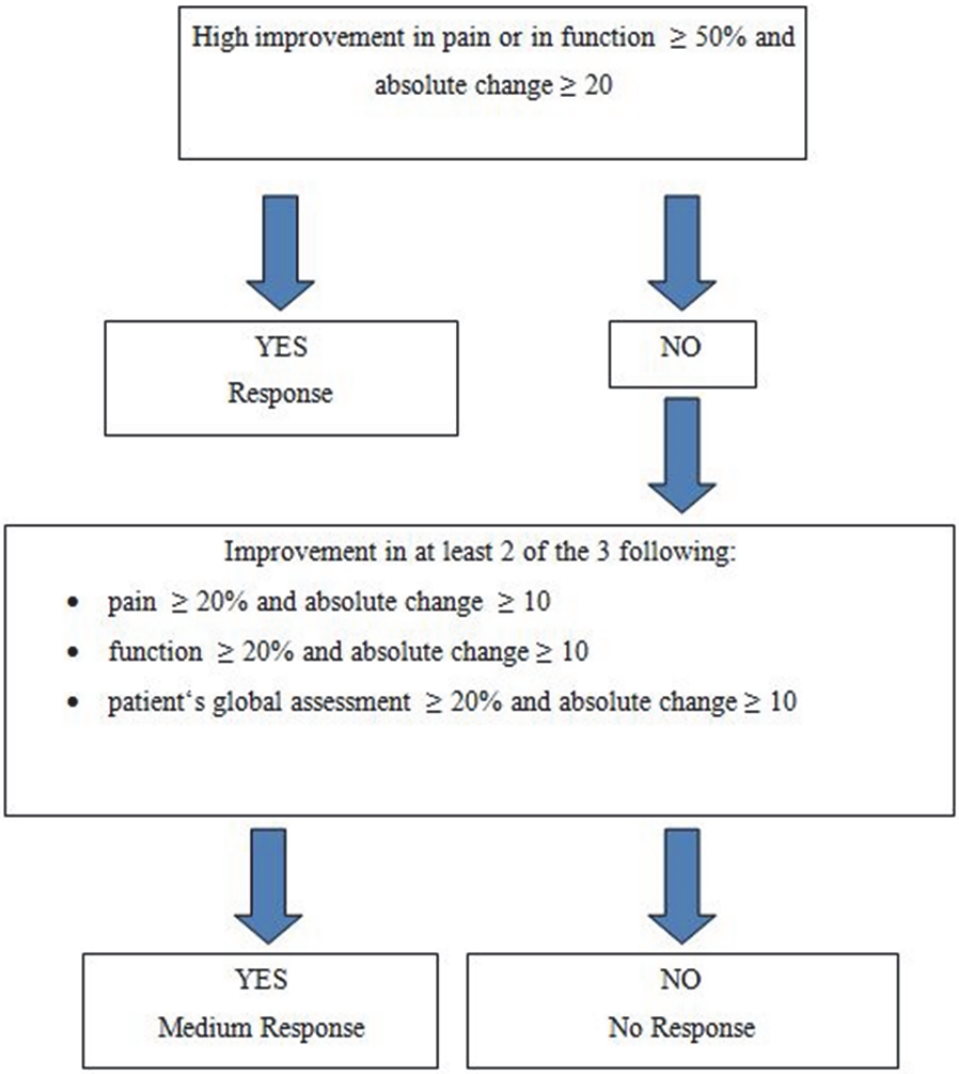

Figure 2. OMERACT-OARSI set of responder criteria.

3.3. Statistical analysis

The independent variables were age, sex, BMI (<30; 30-34.9; ≥35.0), level of education (low and high), social support (married/living with someone and otherwise), number of co-morbidities according to Charnley, stage of knee osteoarthritis according to Ahlback, residence place (urban or rural). The effect of each independent variable was analyzed separately for the WOMAC and SF-12. For statistical analysis we used IBM SPSS Statistics 24. To compare two parametric data we used Welch's t-test, for multiple comparisons – ANOVA, with Bonferonnipost-hoc test and comparing non-parametric data we

used Mann-Whitney test for two and Kruskal-Wallis test for multiple groups. Multiple linear regression was used to estimate the influence of preoperative factors on the outcomes according to WOMAC and SF-12. A p-value of < 0.05 was considered to be statistically significant.

4. RESULTS

Of the 314 patients enrolled, 294 completed the study. There were 20 participants who failed to show up for postoperative follow up and were excluded from the study. The main characteristics of the study group population and evaluation of knee pain, function according to WOMAC and general health status according to SF-12 before and after TKA are shown intable 1-2 andfigures 3-4.

Table 1. Characteristics of participants (n=294).

	All n=314	Included n=294	Excluded n=20
Sex			
Females n (%)	259 (82.5)	243 (82.7)	16 (80.0)
Age	Males 71.02 (9.19) Females 70.82 (8.10)		
mean (SD)	70.71 (8.25)	70.86 (8.28)	68.55 (7.57)
Agegroups n (%)			
<75 year	214 (68.2)	198 (67.3)	16 (80.0)
75 andolder	100 (31.8)	96 (32.7)	4 (20.0)
BMI			
mean (SD)	33.04 (6.16)	33.00 (6.20)	33.57 (5.59)
BMI category n (%)			
<30	107 (34.1)	102 (34.7)	5 (25.0)
30-34.9	102 (32.5)	94 (32.0)	8 (40.0)
≥35	105 (33.4)	98 (33.3)	7 (35.0)
Educationallevel n (%)			
Low	206 (65.6)	191 (65.0)	15 (75.0)
High	108 (34.4)	103 (35.0)	5 (25.0)
Socialsupport n (%)			
livingalone	102 (32.5)	94 (32.0)	8 (40.0)
livingwithsomebody	212 (67.5)	200 (68.0)	12 (60.0)
Livingplace n (%)			
Rural	62 (19.7)	52 (17.7)	10 (50.0)
Urban	252 (80.3)	242 (82.3)	10 (50.0)

Table 2. Whole cohort's preoperative and postoperative WOMAC and SF-12 mean values

	Included n=294	Excluded n=20	P value
Preoperative			
Womacmean (SD)			
Pain	53.32 (17.99)	53.25 (13.60)	0.987
Stiffness	51.55 (24.07)	47.30 (20.11)	0.258
Function	47.71 (18.61)	44.40 (12.15)	0.324
Total	49.17 (16.99)	46.40 (11.66)	0.136
SF-12 mean (SD)			
PhysicalCompositescores	33.82 (7.83)	31.82 (6.05)	0.142
MentalHealthCompositescores	46.14 (10.31)	44.11 (6.80)	0.157
1 year postoperative			
Womacmean (SD)			
Pain	90.73 (9.82)	-	-
Stiffness	90.03 (13.23)	-	-
Function	86.30 (10.54)	-	-
Total	87.63 (9.82)	-	-
SF-12 mean (sd)			
PhysicalCompositescores	44.98 (7.42)	-	-
MentalHealthCompositescores	49.37 (7.48)	-	-

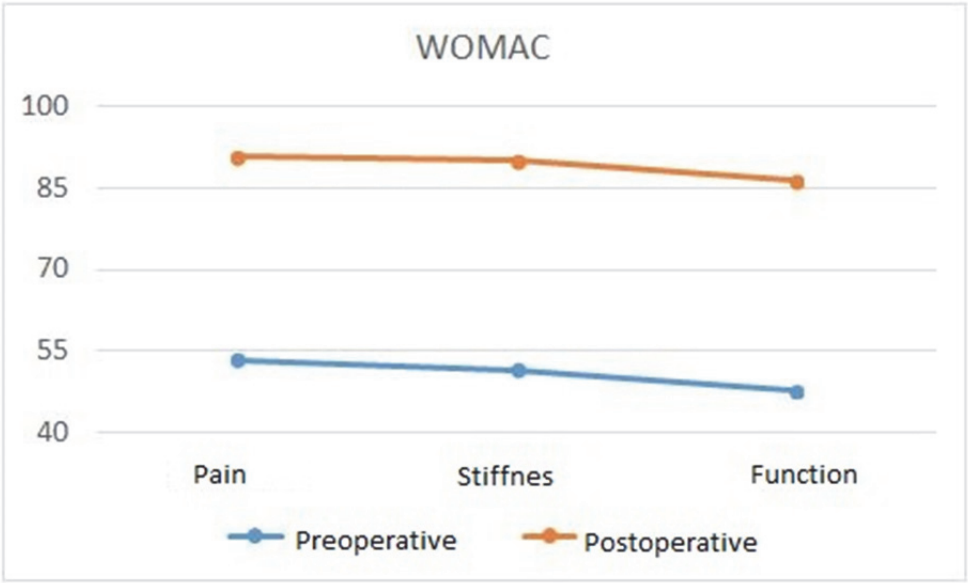

Figure 3. Knee pain, stiffness, function according to WOMAC before and one year after TKA

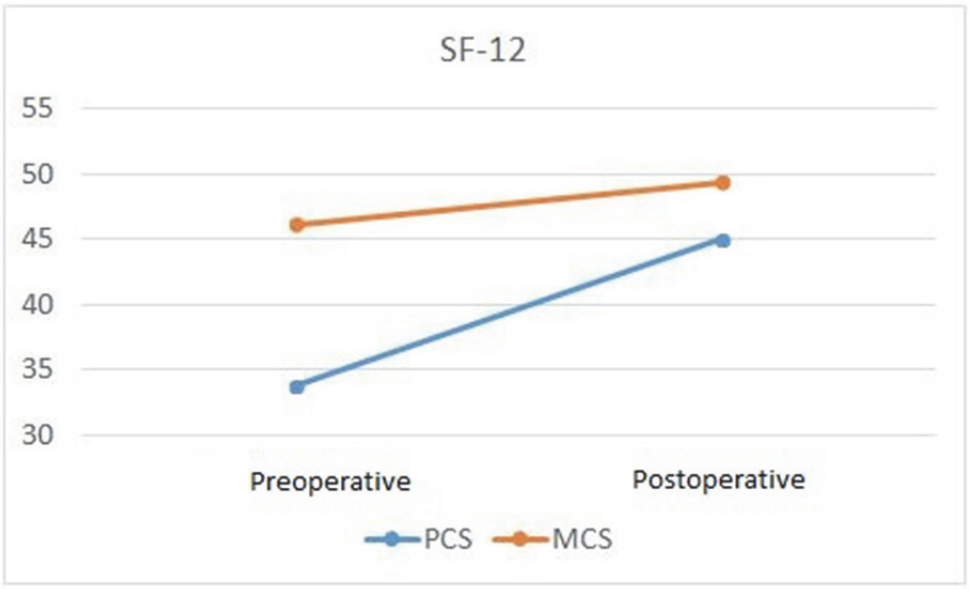

Figure 4. General health status according to SF-12 before and one year after TKA (PCS – Physical Component Summary; MCS – Mental Component Summary)

4.1. Comparing WOMAC and SF-12 results between groups differing by patient factors

At the time of surgery, women reported statistically and clinically significant more pain (p=0.001), and worse knee function (p=0.002) as measured by WOMAC. Also, women scored lower on MCS (p=0.025) according to SF-12. The preoperative characteristics by sex are presented in Table 3.

Table 3. Preoperative WOMAC and SF-12 scores according to patient's sex

	Preoperative: Sex						
	Male			Female			
WOMAC scores	Md*	Mean ± SD	CI**	Md*	Mean ± SD	CI**	P value
Pain	65	61.37 ± 17.44	[56.47; 66.28]	50	51.63 ± 17.68	[49.39; 53.86]	0.001
Stiffness	63	59.84 ± 23.38	[53.27; 66.42]	50	49.81 ± 23.90	[46.79; 52.83]	0.004
Function	62	56.18 ± 20.74	[50.34; 62.01]	44	45.93 ± 17.67	[43.70; 48.17]	0.002
Total	60	57.63 ± 18.82	[52.33; 62.92]	46	47.40 ± 16.06	[45.37; 49.43]	0.001
SF-12							
PCS	36.47	35.60 ± 8.34	[33.26; 37.95]	32.77	33.44 ± 7.69	[32.47; 34.42]	0.073
MCS	49.80	49.07 ± 9.13	[46.50; 51.64]	45.45	45.52 ± 10.45	[44.20; 46.84]	0.025

*– Median; ** - 95% confidence interval PCS – physical health score MCS – mental health score

One year after TKA men demonstrated better knee pain (p=0.023), function (p=0.005) scores according to WOMAC and better physical health (p=0.049) and mental health (p=0.020) according to SF-12. The results are shown in table 4.

Table 4. Postoperative WOMAC and SF-12 scores according to patient's sex

	Postoperative: Sex						
	Male			Female			
WOMAC scores	Md*	Mean ± SD	CI**	Md*	Mean ± SD	CI**	P value
Pain	95	93.53 ± 6.95	[91.57; 95.48]	95	90.14 ± 10.24	[88.85; 91.44]	0.023
Stiffness	100	93.59 ± 8.95	[91.07; 96.10]	88	89.29 ± 13.86	[87.54; 91.04]	0.061
Function	90	90.08 ± 6.28	[88.31; 91.84]	88	85.51 ± 11.08	[84.11; 86.91]	0.005
Total	92	91.16 ± 5.62	[89.58; 92.74]	90	86.89 ± 10.35	[85.58; 88.20]	0.003
SF-12							
PCS	47.20	46.84 ± 6.55	[44.99; 48.68]	45.20	44.59 ± 7.55	[43.64; 45.54]	0.049
MCS	51.69	51.53 ± 6.88	[49.59; 53.46]	48.95	48.92 ± 7.54	[47.97; 49.87]	0.020

*– Median; ** - 95% confidence interval PCS – physical health score MCS – mental health score

Women got more benefit from surgery than men according to WOMAC pain score change (p=0.001). The results are shown in table 5.

Table 5. WOMAC and SF-12 score change according to patient's sex

	Difference: Sex						
	Male			Female			
WOMAC scores	Md*	Mean ± SD	CI**	Md*	Mean ± SD	CI**	P value
Pain	30	32.16 ± 16.32	[27.57; 36.75]	40	38.52 ± 18.71	[36.15; 40.88]	0.011
Stiffness	37	33.75 ± 20.85	[27.88; 39.61]	38	39.48 ± 24.64	[36.37; 42.59]	0.101
Function	31	33.90 ± 19.34	[28.46; 39.34]	41	39.57 ± 19.21	[37.15; 42.00]	0.057
Total	30	33.53 ± 17.34	[28.65; 38.41]	41	39.49 ± 17.65	[37.26; 41.72]	0.029
SF-12							
PCS	11.96	11.23 ± 8.84	[8.74; 13.72]	11.18	11.14 ± 8.42	[10.08; 12.21]	0.947
MCS	1.88	2.46 ± 7.59	[0.32; 4.59]	2.35	3.40 ± 9.56	[2.19; 4.61]	0.584

*– Median; ** - 95% confidence interval PCS – physical health score MCS – mental health score

Comparing preoperative WOMAC and SF-12 scores between groups differing in age, older patients felt less pain (p=0.035) and demonstrated better mental health (p=0.023). The results are shown in table 6.

Table 6. Preoperative WOMAC and SF-12 scores according to patient's age

	Preoperative: Age						
	Under 75			75 and older			
WOMAC scores	Md*	Mean ± SD	CI**	Md*	Mean ± SD	CI**	P value
Pain	50	51.72 ± 17.55	[49.26; 54.18]	55	56.61 ± 18.53	[52.86; 60.37]	0.035
Stiffness	50	49.71 ± 24.27	[46.31; 53.11]	50	55.34 ± 23.32	[50.62; 60.07]	0.052
Function	48	47.44 ± 18.09	[44.90; 49.97]	46	48.27 ± 19.73	[44.27; 52.27]	0.928
Total	48	48.47 ± 16.54	[46.16; 50.79]	49	50.47 ± 17.88	[46.99; 54.24]	0.312
SF-12							
PCS	33.47	33.71 ± 7.58	[32.65; 34.78]	33.32	34.04 ± 8.36	[32.34; 35.73]	0.742
MCS	45.68	45.19 ± 10.74	[43.68; 46.69]	48.23	48.10 ± 9.11	[46.25; 49.94]	0.023

*– Median; ** - 95% confidence interval PCS – physical health score MCS – mental health score

Younger patients improved more than older ones. They demonstrated more changein WOMAC pain domain (p=0.001) and mental function (p=0.040) scores according to SF-12.

There were no statistical differences between the results of age groups one year after TKA. The results are shown in table 7.

Table 7. WOMAC and SF-12 change score according to patient's age

	Difference: Age						
	Under 75			75 and older			
WOMAC scores	Md*	Mean ± SD	CI**	Md*	Mean ± SD	CI**	P value
Pain	40	39.12 ± 18.52	[36.52; 41.71]	32.50	33.91 ± 17.89	[30.28; 37.53]	0.011
Stiffness	38	40.43 ± 24.12	[37.05; 43.81]	37	34.47 ± 23.65	[29.68; 39.26]	0.061
Function	40.50	39.35 ± 19.33	[36.64; 42.06]	38	37.02 ± 19.29	[33.11; 40.93]	0.333
Total	41	39.54 ± 17.74	[37.05; 42.02]	37	36.23 ± 17.54	[32.67; 39.78]	0.133
SF-12							
PCS	12.03	11.80 ± 8.28	[10.64; 12.96]	10.48	9.84 ± 8.77	[8.06; 11.62]	0.063
MCS	2.73	4.00 ± 9.65	[2.65; 5.36]	1.08	1.64 ± 8.18	[-0.01; 3.30]	0.040

*– Median; ** - 95% confidence interval PCS – physical health score MCS – mental health score

More educated patients felt less pain(p=0.010) and demonstrated statistically and clinically better knee function (p<0.001)than less educated patiens before TKA according to WOMAC. After TKA less educated patients improved more in kneepain (p=0.032) and function (p<0.001) according to WOMAC score change. One year after TKA patients from both groups demonstrated similar WOMAC and SF-12 results. The results are shown in tables 8 and 9.

Table 8. Preoperative WOMAC and SF-12 scores according to patient's education level

	Preoperative: Level of Education						
	Low §			High			
WOMAC scores	Md*	Mean ± SD	CI**	Md*	Mean ± SD	CI**	P value
Pain	50	51.41 ± 18.05	[48.84; 53.99]	55	56.84 ± 17.42	[53.44; 60.25]	0.010
Stiffness	50	51.78 ± 24.49	[48.28; 55.27]	50	51.13 ± 23.39	[46.56; 55.70]	0.896
Function	41	44.75 ± 19.14	[42.02; 47.48]	53	53.77 ± 16.30	[50.02; 56.39]	<0.001
Total	45	46.77 ± 17.53	[44.27; 49.28]	55	53.62 ± 15.03	[50.68; 56.56]	<0.001
SF-12							
PCS	33.24	33.43 ± 7.77	[32.32; 34.54]	33.47	34.54 ± 7.94	[32.99; 36.09]	0.246
MCS	46.61	46.31 ± 10.06	[44.87; 47.74]	45.82	45.83 ± 10.80	[43.72; 47.94]	0.703

*– Median; ** - 95% confidence interval PCS – physical health score MCS – mental health score §Elementary or less.

Table 9. WOMAC and SF-12 score change according to patient's education

	Difference: Level of Education						
	Low §			High			
WOMAC scores	Md*	Mean ± SD	CI**	Md*	Mean ± SD	CI**	P value
Pain	40	39.11 ± 18.00	[36.54;41.68]	35	34.27 ± 18.95	[30.57; 37.98]	0.032
Stiffness	38	37.57 ± 24.04	[34.14; 41.00]	38	40.17 ± 24.20	[35.44; 44.90]	0.415
Function	43	41.30 ± 19.23	[38.55; 44.04]	34	33.56 ± 18.55	[29.94; 37.19]	0.001
Total	42	40.57 ± 17.71	[38.05; 43.10]	36	34.53 ± 17.11	[31.19; 37.88]	0.006
SF-12							
PCS	11.66	11.31 ± 7.52	[10.24; 12.39]	11.25	10.87 ± 10.07	[8.90; 12.84]	0.696
MCS	1.91	3.24 ± 8.44	[2.03; 4.44]	2.96	3.23 ± 10.62	[1.15; 5.31]	0.825

*– Median; ** - 95% confidence interval PCS – physical health score MCS – mental health score §Elementary or less.

Socialy supported patients demonstrated better general physical function (p=0.008) one year after TKA according to SF-12. The results are shown in table 10.

Table 10. Postoperative WOMAC and SF-12 scores according to patient's social support

	Postoperative: Social support						
	Yes			No			
WOMAC scores	Md*	Mean ± SD	CI**	Md*	Mean ± SD	CI**	P value
Pain	95	91.10 ± 8.98	[89.85; 92.35]	95	89.95 ± 11.42	[87.61; 92.29]	0.874
Stiffness	94	90.19 ± 13.46	[88.31; 92.06]	88	89.71 ± 12.77	[87.10; 92.33]	0.601
Function	88	87.16 ± 9.53	[85.83; 88.49]	88	84.47 ± 12.28	[81.95; 86.98]	0.164
Total	90	88.34 ± 9.12	[87.06; 89.61]	89.50	86.13 ± 11.07	[83.86; 88.40]	0.184
SF-12							
PCS	46.47	45.76 ± 6.87	[44.81; 46.72]	44.01	43.31 ± 8.27	[41.62; 45.00]	0.008
MCS	49.72	49.31 ± 7.44	[48.27; 50.35]	49.36	49.51 ± 7.60	[47.95; 51.06]	0.833

*– Median; ** - 95% confidence interval PCS – physical health score MCS – mental health score

The cohort's preoperative WOMAC scores according to BMI are presented in Table 11. Patients with BMI≥35kg/m^2 (group III) had significantly worse preoperative WOMAC pain and function scores compared to patients with BMI<30kg/m2 (group I) (p=0.002) and BMI = 30-34.9kg/m2 (group II) (p=0.010) (p=0.033). Patients with BMI<30 (group I) demonstrated better physical function than patients with BMI=30-34.9 (group II) (p=0.035) and with BMI≥35 (group III) (p=0.034) according to SF-12.

Table 11. Preoperative WOMAC and SF-12 scores according to patient's BMI

	Preoperative: BMI										
	<30 (I)			30-34.9 (II)			≥35 (III)				
WOMAC scores	Md*	Mean ± SD	CI**	Md*	Mean ± SD	CI**	Md*	Mean ± SD	CI**	P value	
Pain	55	56.23 ± 18.26	[52.64; 59.81]	55	54.79 ± 7.79	[51.14; 58.43]	45	48.88 ±17.21	[45.43; 52.33]	Ivs.II	0.540
										Ivs.III	0.002
										IIvs.III	0.010
Stiffness	50	52.58 ± 23.58	[47.95; 57.21]	50	55.44 ± 3.83	[50.56; 60.32]	38	46.75 ±24.25	[41.89; 51.61]	Ivs.II	0.459
										Ivs.III	0.088
										IIvs.III	0.019
Function	53	51.17 ± 20.13	[47.21; 55.12]	49	48.77 ± 7.92	[45.10; 52.44]	41	43.10 ±16.77	[39.74; 46.46]	Ivs.II	0.361
										Ivs.III	0.002
										IIvs.III	0.033
Total	53	52.26 ± 18.25	[48.78; 55.95]	49	50.46 ± 6.24	[47.13; 53.78]	44	44.62 ±15.45	[41.52; 47.72]	Ivs.II	0.426
										Ivs.III	0.001
										IIvs.III	0.016
SF-12											
PCS	34.68	35.35 ± 7.83	[33.82; 36.89]	33.09	32.99 ± 8.01	[31.35; 34.64]	32.74	33.01 ±7.49	[31.51; 34.52]	Ivs.II	0.035
										Ivs.III	0.034
										IIvs.III	0.986
MCS	47.48	47.29 ± 9.35	[45.46; 49.13]	46.35	46.30 ± 0.54	[44.14; 48.46]	45.19	44.78 ± 10.61	[42.58; 46.98]	0.223	

*– Median; ** - 95% confidence interval PCS – physical health score MCS – mental health score BMI – body mass index

Patients with BMI≥35 (group III) improved more than patients with BMI<30 (group I)according to WOMAC pain domain change score (p=0.025) and more than patients with BMI<30 (group I)(p=0.010) and with BMI=30-34.9(group II)(p=0.025) according to WOMAC function domainchange score. Results are shown in table 12. Patients from all three BMI groups demonstrated similar WOMAC and SF-12 results one year after TKA.

There were no differences in WOMAC and SF-12 preoperative, postoperative and change scores between groups stratified according to place of residence and co-morbidities according to Charnley.Patients with Ahlback knee osteoarthritis grades III(p=0.010) and IV (p=0.022) improved more than patients with grade I according to SF-12 physical score change.

Table 12. WOMAC and SF-12 change score according to patient's BMI

	Difference: BMI										
	<30 (I)			30-34.9 (II)			≥35 (III)				
WOMAC scores	Md*	Mean ± SD	CI**	Md*	Mean ± SD	CI**	Md*	Mean ± SD	CI**	P value	
Pain	35	35.20 ±18.10	[31.64; 38.75]	35	35.85 ±18.37	[32.09; 39.61]	45	41.22 ±18.47	[37.52; 44.93]	Ivs.II	0.715
										Ivs.III	0.025
										IIvs.III	0.077
Stiffness	38	38.79 ±23.25	[34.23; 43.36]	37	34.53 ±24.38	[29.54; 39.53]	38	41.95 ±24.35	[37.07; 46.84]	Ivs.II	0.272
										Ivs.III	0.304
										IIvs.III	0.044
Function	32.50	35.97 ±18.60	[32.32; 39.62]	37.5	36.81 ±20.17	[32.68; 40.94]	44	43.02 ±18.62	[39.29; 46.75]	Ivs.II	0.759
										Ivs.III	0.010
										IIvs.III	0.025
Total	36	36.10 ±16.91	[32.78; 39.42]	38	36.59 ±18.36	[32.83; 40.35]	44.50	42.70 ±17.29	[39.24; 46.17]	Ivs.II	0.844
										Ivs.III	0.008
										IIvs.III	0.016
SF-12											
PCS	9.42	9.90 ±7.80	[8.37; 11.43]	11.77	11.83 ±9.41	[9.90; 13.76]	12.88	11.83 ±8.16	[10.19; 13.46]	0.180	
MCS	2.39	2.84 ±7.73	[1.32; 4.36]	2.11	2.44 ±10.32	[0.33; 4.55]	2.06	4.41 ±9.58	[2.48; 6.33]	0.626	

*– Median; ** - 95% confidence interval PCS – physical health score MCS – mental health score

4.2. Preoperative predictors of WOMAC pain and function score change

The multiple linear regression models are presented in tables 13-14.

Table 13. Preoperativepredictorsofpostoperative WOMAC pain status

Change WOMAC pain			
	Coef	95% CI	p-value
Age	-0.06	-0.21; 0.09	0.466
Sex			
Male	Ref.		
Female	-1.35	-4.50; 1.80	0.400
BMI	-0.04	-0.24; 0.16	0.697
Social support			
No	Ref.		
Yes	0.46	-2.07; 2.99	0.720
Level of Education			
Higher	Ref.		
Lower	-0.37	-2.80; 2.05	0.762
Residence			
Urban	Ref.		
Rural	0.96	-2.07; 3.99	0.532
Preop. WOMAC pain	-0.90	-0.97; -0.83	<0.001
Charnley class			
A	Ref.		
B	-0.94	-3.73; 1.86	0.511
C	-1.46	-5.34; 2.42	0.459
AHLBACK			
1+2	Ref.		
3+4	1.19	-1.09; 3.47	0.305
SF-12			
Preop. PCS	0.10	-0.06; 0.26	0.205
Preop. MCS	0.10	-0.01; 0.22	0.080

Table 14. Preoperative predictors of postoperative WOMAC functional status

Change WOMAC function			
	Coef	95% CI	p-value
Age	-0.13	-0.29; 0.03	0.113
Sex			
Male	Ref.		
Female	-2.35	-5.70; 0.99	0.167
BMI	-0.05	-0.26; 0.16	0.652
Social support			
No	Ref.		
Yes	1.74	-0.95; 4.42	0.204
Level of Education			
Higher	Ref.		
Lower	-0.62	-3.24; 2.00	0.642
Residence			
Urban	Ref.		
Rural	1.28	-1.93; 4.49	0.433
Preop. WOMAC function	-0.93	-1.01; -0.85	<0.001
Charnley class			
A	Ref.		
B	-1.95	-4.92; 1.03	0.198
C	-1.83	-5.94; 2.28	0.382
AHLBACK			
1+2	Ref.		
3+4	0.62	-1.81; 3.05	0.614
SF-12			
Preop. PCS	0.09	-0.08; 0.26	0.302
Preop. MCS	0.14	-0.01; 0.26	0.034

The preoperative WOMAC pain score was the strongest determinant of the postoperative WOMAC pain score in one year ($p<0.001$).

The preoperative WOMAC function ($p<0.001$) and SF-12 mental health scores ($p=0.034$) were the strongestdeterminants of the WOMAC function score in one year after TKA.

4.3. Responders to TKA

Patients stratified into 3 groups according to OMERACT-OARSI set of responder criteria (table 15).

Table 15. Patients according to response to TKA and their preoperative WOMAC score

	Total (n=294)	
Responder	Number (%)	Preop. WOMAC global mean (SD)
No	31 (10.5)	72 (15)
Medium	38 (12.9)	68 (7)
Response	225 (76.5)	43 (13)

We put together in one group responders and medium responders according to OMERACT-OARSI.

Responders and nonresponders to TKA stratified into three groups according to WOMAC pain and function baseline severity tertiles. The results are demonstrated in table 16.

Table 16. Responders and nonresponders according to WOMAC baseline severity tertiles

	Preop. WOMAC pain			Preop. WOMAC function		
Responder	<35 (low)	35-55 (medium)	>55 (high)	<32 (low)	32-45.5 (medium)	>45.5 (high)
Yes	12.9%	54.0%	33.1%	20.9%	31.6%	47.5%
No	0%	16.1%	83.9%	0%	9.7%	90.3%

5. CONCLUSIONS

1.1. Preoperatively men demonstrated better WOMAC knee pain, function and SF-12 mental function scores than women.

Older patients demonstrated better WOMAC knee pain and SF-12 mental scores.

Patients with high education demonstrated better WOMAC knee pain and function scores.

Less obese patients demonstrated better WOMAC knee pain, function and SF-12 physical function scores.

1.2. One year after TKA men demonstrated better than woman WOMAC knee pain, function and better SF-12 physical and mental function scores.

Socially supported patients demonstrated better SF-12 physical function score.

1.3. Women demonstrated higher WOMAC pain score changethan men.

Younger patients demonstrated higher WOMAC pain and SF-12 mental higher WOMAC pain and function score change. Patients with end stages of osteoarthritis according to Ahlback demonstrated higher SF-12 physical function score change.

2. The preoperative WOMAC pain score was the strongest determinant of the postoperative WOMAC pain score one year after TKA.

The preoperative WOMAC function and SF-12 mental health scores were the strongest determinants of the WOMAC function score one year after TKA.

Lower preoperative knee pain, function scores and better mental health function results in greater change.

3. Eleven percent (11 %) of patients experienced no improvement in pain and function one year after surgery. Most of them did demonstrated high WOMAC pain and function scores before surgery.

6. PRACTICAL RECOMMENDATIONS

1. PROM data should be collected before surgery.
2. In order to create realistic patient expectations before the surgery take measures to identify those patients who are at high risk of experiencing no improvement in knee pain and function. Outcomes could be improved for a majority of patients by addressing identified risk factors before TKA.
3. Consider before TKA taking pro-active therapeutic measures for patients identified with depression.
4. One year after TKA identify non-responders using PROM's and invite them for thorough clinical and radiographic examination.

7. LIST OF PUBLICATIONS ON THE TOPIC OF THE DISSERTATION

1. The main characteristics of the patients hospitalized for the knee joint endoprosthesis due to knee primary osteoarthritis (Medicinos teorija ir praktika, 2015)
2. Influence of preoperative knee function on TKA results (Laboratorinė medicina, 2016)
3. Age, sex, body mass index, education and social support influence functional results after total knee arthroplasty (Geriatric Orthopaedic Surgery and Rehabilitation, 2016)

8. LIST OF PRESENTATIONS ON THE TOPIC OF THE DISSERTATION

1. Total knee arthroplasty in the elderly (The 8th Morphology Scientific Conference 2015)
2. Influence of preoperative factors on TKA outcome (The 13-th congress of Lithuanian society of orthopaedic and trauma surgeons, 2016)
3. What do surgeons know about evolution? (3-rd international congress of evolutionary medicine, 2016)
4. Influence of patient factors on the TKA outcomes at 12 month follow-up (Nordic Orthopaedic Federation congress 2016)
5. How does gender and socioeconomic status affect patients self evaluation before and after TKA? (EFORT 17th Annual congress, 2016)

9. REFERENCES

1. WHO | World report on disability [Internet]. WHO. [cited 2016 Jul 15]. Available from: http://www.who.int/disabilities/world_report/2011/en/

2. OECD. Health at a Glance 2011 [Internet]. OECD Publishing; 2011 [cited 2016 Jul 15]. (Health at a Glance). Available from: http://www.oecd-ilibrary.org/social-issues-migration-health/health-at-a-glance-2011_health_glance-2011-en

3. Rick L Lau AVP. The role of surgeon volume on patient outcome in total knee arthroplasty: A systematic review of the literature. BMC Musculoskelet Disord. 2012;13(1):250.

4. Ayyar V, Burnett R, Coutts FJ, van der Linden ML, Mercer TH, Ayyar V, et al. The Influence of Obesity on Patient Reported Outcomes following Total Knee Replacement, The Influence of Obesity on Patient Reported Outcomes following Total Knee Replacement. Arthritis Arthritis. 2012 Oct 17;2012, 2012:e185208.

5. Ethgen O, Bruyère O, Richy F, Dardennes C, Reginster J-Y. Health-Related Quality of Life in Total Hip and Total Knee Arthroplasty. J Bone Jt Surg Am. 2004 May 1;86(5):963–74.

6. Lingard EA, Katz JN, Wright EA, Sledge CB, Kinemax Outcomes Group. Predicting the outcome of total knee arthroplasty. J Bone Joint Surg Am. 2004 Oct;86–A(10):2179–86.

7. Robertsson O, Dunbar M, Pehrsson T, Knutson K, Lidgren L. Patient satisfaction after knee arthroplasty: A report on 27,372 knees operated on between 1981 and 1995 in Sweden. Acta Orthop Scand. 2000 Jan 1;71(3):262–7.

8. Fisher DA, Dierckman B, Watts MR, Davis K. Looks good but feels bad: factors that contribute to poor results after total knee arthroplasty. J Arthroplasty. 2007 Sep;22(6 Suppl 2):39–42.

9. Giesinger JM, Hamilton DF, Jost B, Behrend H, Giesinger K. WOMAC, EQ-5D and Knee Society Score Thresholds for Treatment Success After Total Knee Arthroplasty. J Arthroplasty. 2015 Dec;30(12):2154–8.

10. Bombardier C, Melfi CA, Paul J, Green R, Hawker G, Wright J, et al. Comparison of a generic and a disease-specific measure of pain and physical function after knee replacement surgery. Med Care. 1995 Apr;33(4 Suppl):AS131-144.

11. Western Ontario & McMaster Universities Osteoarthritis Index (WOMUOI) [Internet]. [cited 2016 Jan 24]. Available from: http://www.rheumatology.org/I-Am-A/Rheumatologist/Research/Clinician-Researchers/Western-Ontario-McMaster-Universities-Osteoarthritis-Index-WOMAC

12. Ware J, Kosinski M, Keller SD. A 12-Item Short-Form Health Survey: construction of scales and preliminary tests of reliability and validity. Med Care. 1996 Mar;34(3):220–33.

13. Ali A, Sundberg M, Robertsson O, Dahlberg LE, Thorstensson CA, Redlund-Johnell I, et al. Dissatisfied patients after total knee arthroplasty: a registry study involving 114 patients with 8-13 years of followup. Acta Orthop. 2014 Jun;85(3):229–33.

14. Nuñez M, Lozano L, Nuñez E, Segur J-M, Sastre S. Factors influencing health-related quality of life after TKA in patients who are obese. Clin Orthop. 2011 Apr;469(4):1148–53.

15. Barrack RL, Ruh EL, Chen J, Lombardi AV, Berend KR, Parvizi J, et al. Impact of Socioeconomic Factors on Outcome of Total Knee Arthroplasty. Clin Orthop. 2014 Jan;472(1):86–97.

16. Papakostidou I, Dailiana ZH, Papapolychroniou T, Liaropoulos L, Zintzaras E, Karachalios TS, et al. Factors affecting the quality of life after total knee arthroplasties: a prospective study. BMC Musculoskelet Disord. 2012;13:116.

17. Bourne RB, Chesworth BM, Davis AM, Mahomed NN, Charron KDJ. Patient Satisfaction after Total Knee Arthroplasty: Who is Satisfied and Who is Not? Clin Orthop. 2010 Jan;468(1):57–63.

18. Dunbar MJ, Robertsson O, Ryd L, Lidgren L. Appropriate questionnaires for knee arthroplasty. Results of a survey of 3600 patients from The Swedish Knee Arthroplasty Registry. J Bone Joint Surg Br. 2001 Apr;83(3):339–44.

19. Pollard B, Johnston M, Dieppe P. What do osteoarthritis health outcome instruments measure? Impairment, activity limitation, or participation restriction? J Rheumatol. 2006;33(4):757–763.

20. Phases of Aging: The Young-Old, Middle-Old, and Old-Old: Introduction to Sociology [Internet]. [cited 2016 Nov 20]. Available from: https://lumen.instructure.com/courses/199939/pages/Section13-4?module_item_id=4575415

21. WHO□:: Global Database on Body Mass Index [Internet]. [cited 2016 Nov 20]. Available from:http://apps.who.int/bmi/index.jsp?introPage=intro_3.html

22. Ahlbäck S. Osteoarthrosis of the knee. A radiographic investigation. Acta Radiol Diagn (Stockh). 1968;Suppl 277:7-72.

23. Charnley J, Halley DK. Rate of wear in total hip replacement. Clin Orthop. 1975 Oct;(112):170–9.

24. Bellamy N, Buchanan WW, Goldsmith CH, Campbell J, Stitt LW. Validation study of WOMAC: a health status instrument for measuring clinically important patient relevant outcomes to antirheumatic drug therapy in patients with osteoarthritis of the hip or knee. J Rheumatol. 1988 Dec;15(12):1833–40.

25. Ehrich EW, Davies GM, Watson DJ, Bolognese JA, Seidenberg BC, Bellamy N. Minimal perceptible clinical improvement with the Western Ontario and McMaster Universities osteoarthritis index questionnaire and global assessments in patients with osteoarthritis. J Rheumatol. 2000 Nov;27(11):2635–41.

26. Angst F, Aeschlimann A, Stucki G. Smallest detectable and minimal clinically important differences of rehabilitation intervention with their implications for required sample sizes using WOMAC and SF-36 quality of life measurement instruments in patients with osteoarthritis of the lower extremities. Arthritis Rheum. 2001 Aug;45(4):384–91.

27. Pham T, van der Heijde D, Altman RD, Anderson JJ, Bellamy N, Hochberg M, et al. OMERACT-OARSI initiative: Osteoarthritis Research Society International set of responder criteria for osteoarthritis clinical trials revisited. Osteoarthritis Cartilage. 2004 May;12(5):389–99.

28. Escobar A, Gonzalez M, Quintana JM, Vrotsou K, Bilbao A, Herrera-Espiñeira C, et al. Patient acceptable symptom state and OMERACT-OARSI set of responder criteria in joint replacement. Identification of cut-off values. Osteoarthr Cartil OARS Osteoarthr Res Soc. 2012 Feb;20(2):87–92.

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12. RESUME IN LITHUANIAN

Įvadas.

Kelio sąnario osteoartritas (OA) yra viena iš dažniausių žmonių neįgalumo priežasčių išsivysčiusiose šalyse. Dauguma osteoartritu sergančių pacientų yra vyresnio amžiaus ir moterys serga dažniau nei vyrai. Vėlyvose osteoartito stadijose, kada konservatyvus gydymas, tai yra reabilitacija bei medikamentinis gydymas tampa nebe efektyvus, atliekama kelio sąnario endoprotezavimo operacija. Ilgėjant gyvenimo trukmei didėja kelio sąnario osteoartrito paplitimas, taigi auga kelio sąnario endoprotezavimo operacijų skaičius. Nepaisant evoliucijos medicinoje, tai yra pažangos chirurginėje technikoje, anesteziologijoje, pooperacinėje priežiūroje, reabilitacijoje, implantų dizaine, literatūros duomenimis iki 20 procentų pacientų išlieka nepatenkinti pooperaciniais kelio sąnario endoprotezavimo rezultatais. Įvairūs veiksniai daro įtaką pooperaciniam rezultatui. Dažnai neužtenka klinikinio ištyrimo ar rentgenografinio bei kompiuterinės tomografijos tyrimų, kad nustatyti nepatenkinamo pooperacinio rezultato priežastį. Pacientų savęs vertinimo klausimynai (PROMs) tapo labai svarbiu įrankiu pooperaciniam rezultatui vertinti.

Tyrimo tikslas.

Įvertinti priešoperacinių paciento veiksnių įtaką rezultatams po kelio sąnario endoprotezavimo, naudojant savęs vertinimo klausimynus.

Tyrimo uždaviniai.

1.1. Įvertinti priešoperacinį kelio sąnario skausmą, funkciją, bendrą paciento fizinę ir psichinę sveikatą bei rezultatus palyginti tarp pacientų grupių, sudarytų pagal sociodemografinius veiksnius.

1.2. Įvertinti pooperacinį kelio sąnario skausmą, funkciją, bendrą paciento fizinę ir psichinę sveikatą bei rezultatus palyginti tarp pacientų grupių, sudarytų pagal sociodemografinius veiksnius.
1.3. Įvertinti kelio sąnario skausmo, funkcijos, bendros paciento fizinės ir psichinės sveikatos pokyčius per pirmus metus po kelio sąnario endoprotezavimo bei rezultatus palyginti tarp pacientų grupių, sudarytų pagal sociodemografinius veiksnius.
2. Nustatyti priešoperacinius paciento veiksnius, kurie daro didžiausią įtaką kelio sąnario skausmo ir funkcijos kitimui per 12 mėnesių po kelio sąnario endoprotezavimo.
3. Nustatyti nepatenkintus kelio sąnario endoprotezavimo rezultatais pacientus, naudojant savęs vertinimo klausimynus.

Ligoniai ir tyrimo metodika.

2012–2014 metais Respublikinės Vilniaus universitetinės ligoninės ortopedijos ir traumatologijos centre buvo atliktas perspektyvusis tyrimas, į kurį įtraukta 314 pacientų, atvykusių pirminei kelio sąnario endoprotezavimo operacijai. Tyrimui atlikti gautas Lietuvos bioetikos komiteto leidimas**.**

Surinkti pacientų duomenys; tai yra amžius, lytis, išsilavinimas, socialinė aplinka, gyvenamoji vieta, ūgis, svoris. Pagal ūgį ir svorį apskaičiuotas kūno masės indeksas (KMI). Pagal KMI pacientai suskirstyti į grupes : I (KMI<30), II (KMI=30-34,9), III (KMI≥35). Pacientų mobilumas vertintas pagal Charnley A, B, C klases. Visiems pacientams atliktos 2-ų krypčių kelio sąnario rentgenogramos ir nustatyta viena iš keturių osteoartrito stadija pagal Ahlback. Pagal amžių pacientai skirstyti į 2 grupes (<75 ir ≥75), pagal išsilavinimą į turinčius aukštąjį išsilavinimą ir žemesnį nei aukštasis. Pacientai skirstyti į miesto ir kaimo gyventojus pagal gyvenamąją vietą. Pagal socialinę aplinką pacientai skirstyti į dvi grupes: I. Gyvena su šeimos nariais ir II. Gyvena vieni.

Pacientai užpildė validuotus ir originaliai išverstus į lietuvių kalbą WOMAC ir SF-12 klausimynus. WOMAC yra ligai specifinis klausimynas. Jis skirtas vertinti paciento sergančio osteoartritu kelio sąnario būklę.

SF-12 klausimynas skirtas vertinti bendrą paciento sveikatą. Visiems pacientams endoprotezuoti kelio sąnariai, naudojant cementinio tvirtinimo pirminius endoprotezus nekeičiant girnelės. 1-ą pooperacinę dieną pradėtas reabilitacinis gydymas. Ligoninėje pacientai gydyti nuo 5 iki 7 dienų. Gydymas tęstas reabilitacijos ligoninėje.

Po 1 metų po operacijos pacientai pakartotinai užpildė WOMAC ir SF-12 klausimynus. Palygintas kelio sąnario skausmas, funkcija bei bendra pacientų fizinė ir psichinė sveikata tarp pacientų grupių, sudarytų pagal priešoperacinius sociodemografinius veiksnius, nustatyti pacientų priešoperaciniai veiksniai, kurie darė didžiausią įtaką kelio sąnario skausmo ir funkcijos kitimui per pirmus metus po kelio sąnario endoprotezavimo bei nustatyti pacientai, kurie po metų išliko nepatenkinti kelio sąnario endoprotezavimo rezultatais, naudojant OMERACT-OARSI kriterijus.

Rezultatai ir išvados.

1.1. Prieš operaciją vyrai geriau nei moterys vertino kelio sąnario skausmą ($p=0,001$) ir funkciją ($p=0,002$) pagal WOMAC.

Vyresni pacientai geriau vertino kelio sąnario skausmą ($p=0,035$) pagal WOMAC ir bendrą psichinę sveikatą pagal SF-12 ($p=0,023$).

Pacientai, turintys aukštąjį išsilavinimą geriau vertino kelio sąnario skausmą ($p=0,010$) ir funkciją ($p<0,001$) pagal WOMAC. Pacientai, kurių mažesnis kūno masės indeksas I grupė (<30) ir II grupė (30-34,9), geriau vertino kelio sąnario skausmą ($p=0,002$) ($p=0,010$) ir funkciją ($p=0,002$) ($p=0,033$) nei pacientai iš III (≥35) grupės pagal WOMAC. Pacientai, kurių mažesnis kūno masės indeksas I grupė (<30) geriau vertino bendrą fizinę sveikatą nei pacientai iš II (30-34,9) ($p=0,035$) ir III (≥35) ($p=0,034$) grupių pagal SF-12.

1.2. Vieneri metai po kelio sąnario endoprotezavimo vyrai geriau nei moterys vertino kelio sąnario skausmą (p=0,023), funkciją (p=0,005) pagal WOMAC ir bendrą fizinę (p=0,049) ir psichinę sveikatą (p=0,020) pagal SF-12.

Pacientai gaunantys socialinę pagalbą vieneri metai po kelio sąnario endoprotezavimo geriau vertino bendrą fizinę sveikatą pagal SF-12 (p=0,008).

1.3. Per pirmus metus po kelio sąnario endoprotezavimo moterys patyrė didesnį kelio sąnario skausmo sumažėjimą negu vyrai vertinant WOMAC pooperacinių ir priešoperacinių reikšmių skirtumą (p=0,011).

Jaunesni pacientai demonstravo didesnį skausmopagal WOMAC (p=0,011) ir psichinės sveikatos pokytį pagal SF-12 (p=0,040).

Pacientai, kurių kūno masės indeksas ≥35 (III grupė) demonstravo didesnį skausmo pokytį nei pacientai kurių KMI <30 (I grupė) (p=0,025) ir didesnį kelio sąnario funkcijos pokytį nei pacientai kurių KMI<30 (I grupė) (p=0,010) ir kurių KMI=30-34,9 (II grupė) (p=0,025). Mažiau išsilavinę pacientai demonstravo didesnį skausmo (p=0,032) ir funkcijos (p=0,001) pokytį pagal WOMAC nei turintys aukštąjį išsilavinimą. Pacientai kuriems diagnozuotos III ir IV stadijos kelio osteoartritas pagal Ahlback demonstravo didesnį bendros fizinės sveikatos pagerėjimą pagal SF-12 lyginant su pacientais, kuriems diagnozuotas I-os stadijos osteoartritas pagal Ahlback (p=0,010) (p=0,022).

2. Priešoperacinis kelio sąnario skausmas pagal WOMAC daro didžiausią įtaką skausmo pokyčiui per pirmus metus po kelio sąnario endoprotezavimo (p<0,001). Priešoperacinė kelio sąnario funkcija pagal WOMAC (p<0,001) ir bendra psichinė sveikata pagal SF-12 (p=0,034) daro didžiausią įtaką kelio sąnario funkcijos pokyčiui.

Prastesnis prieš operacinis kelio sąnario skausmo ir funkcijos vertinimas pagal WOMAC ir geresnė psichinė sveikata pagal SF-12 daro įtaką didesniam skausmo ir funkcijos pagerėjimui per pirmuosius pooperacinius metus.

3. Vertinant kelio sąnario skausmo ir funkcijos pokytį per pirmus pooperacinius metus ir taikant OMERACT-OARSI vertinimo kriterijus, vienuolika procentų pacientų buvo nepatenkinti kelio sąnario endoprotezavimo rezultatu. Dauguma

pacientų, kurie išliko nepatenkinti pooperaciniu rezultatu, labai gerai vertino kelio sąnario skausmą ir funkciją pagal WOMAC prieš operaciją. 84 proc. iš jų priešoperacinį kelio sąnario skausmą vertino daugiau nei 55 balais ir 90 proc. kelio sąnario funkciją vertino daugiau nei 45,5 balais pagal WOMAC.

13. TRUMPA INFORMACIJA APIE AUTORIŲ

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Išsilavinimas

- 1977-1988	Kauno J. Jablonskio vidurinė mokykla
- 1989-1995	Lietuvos sveikatos mokslų universitetas
- 1995-1996	Pirminė rezidentūra Vilkaviškio rajono ligoninėje
- 1996-2000	Ortopedijos traumatologijos rezidentūra Vilniaus Universitete

Darbopatirtis

-2000-2003	Vilniaus Šv. Jokūbo ligoninė, gydytojas ortopedas traumatologas
-Nuo 2003	Respublikinė Vilniaus Universitetinė Ligoninė, gydytojas ortopedas traumatologas
-Nuo 2005	Baltijos ir Amerikos klinika, gydytojas ortopedas traumatologas
-Nuo 2013	Vilniaus miesto klinikinė ligoninė, gydytojas ortopedas traumatologas

Narystė

- Lietuvos traumatologų ortopedų draugija
- Lietuvos sąnarių endoprotezuotojų asociacija
- Lietuvos pėdos chirurgijos draugija
- Europos pėdos ir čiurnos chirurgų draugija