

Article

Structured Preoperative Patient Education and Postoperative Recovery After Total Knee Arthroplasty: A Prospective Controlled Longitudinal Study

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Abstract

Background/Objectives: Preoperative patient education (PPE) has been increasingly recognized as an important component of perioperative care in patients undergoing total knee arthroplasty (TKA). This study aimed to evaluate the association between preoperative education and knowledge acquisition, functional outcomes, health-related quality of life, and anxiety levels following TKA. **Methods:** A prospective controlled longitudinal study included 120 patients undergoing primary TKA. Participants were allocated to an intervention group receiving structured preoperative education ($n = 80$) and a control group receiving standard perioperative care ($n = 40$). Outcomes were assessed preoperatively and at one and six months postoperatively using validated instruments, including WOMAC, KOOS, Lysholm score, RAND SF-36, and the Beck Anxiety Inventory. Knowledge levels were evaluated using a structured knowledge test. Between-group comparisons and correlation analyses were performed. **Results:** Patients in the intervention group demonstrated significantly higher knowledge scores following education. The intervention group demonstrated more favorable postoperative functional outcomes across follow-up assessments, reflected by lower WOMAC scores and higher KOOS and Lysholm scores. Significant improvements in health-related quality of life were observed across most RAND SF-36 domains. Anxiety levels decreased over time in both groups, with consistently lower scores observed in the intervention group. Significant correlations were identified between baseline knowledge levels and selected functional and quality-of-life outcomes. **Conclusions:** Structured preoperative patient education was associated with improved knowledge acquisition and more favorable postoperative functional and health-related quality-of-life outcomes following TKA. Anxiety scores decreased over time in both groups; however, anxiety-related findings should be interpreted with caution because baseline BAI scores differed between groups. These findings support the integration of structured patient education into routine perioperative care pathways for individuals undergoing total knee arthroplasty.

Keywords: total knee arthroplasty; preoperative patient education; functional outcomes; health-related quality of life; anxiety; health literacy



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1. Introduction

Osteoarthritis (OA) is one of the leading causes of pain and disability worldwide, particularly among older adults, significantly impairing mobility and quality of life. The knee joint is the most frequently affected, and the global prevalence of OA continues to rise due to population aging, increasingly sedentary lifestyles, and the growing prevalence of obesity [1–3]. According to the Global Burden of Disease Study (GBD 2021), OA affects approximately 7.6% of the global population and represents a major contributor to years lived with disability [4,5].

When conservative treatment fails to provide adequate symptom relief and functional improvement, total knee arthroplasty (TKA) is considered the treatment of choice for patients with advanced knee osteoarthritis, aiming to reduce pain and enhance joint function [6,7]. In recent decades, the number of TKA procedures has increased steadily, while the duration of postoperative hospitalization has progressively decreased. Alongside the widespread implementation of fast-track and outpatient surgical pathways, these changes have shifted greater responsibility for postoperative recovery and self-management onto patients, highlighting the importance of adequate preoperative preparation [8].

Preoperative patient education (PPE) is intended to improve patients' understanding of the surgical procedure, perioperative care, and the expected course of recovery. Educational interventions may be delivered through various formats, including individual or group sessions, multimedia presentations, and written informational materials [9]. By enhancing patients' knowledge, confidence, and engagement in rehabilitation, structured educational programmes may contribute to improved functional outcomes, better quality of life, and higher levels of patient satisfaction following total knee arthroplasty [1,6,10].

Previous studies have indicated that structured preoperative education may reduce perioperative anxiety, improve patient preparedness, and facilitate greater engagement in the recovery process [8,11–13]. Current Enhanced Recovery After Surgery (ERAS) recommendations also emphasize the importance of preoperative education and psychological preparation as key components of perioperative care [14,15]. However, findings remain inconsistent, largely due to heterogeneity in the content, timing, and delivery formats, as well as differences in outcome assessment across studies [12]. Furthermore, patients undergoing TKA are predominantly older adults whose ability to understand and retain preoperative information may be affected by limited consultation time, the use of complex medical terminology, and varying levels of health literacy and formal education [8,11].

Despite the expanding body of literature on preoperative education, evidence regarding patients' baseline knowledge prior to TKA and the extent to which structured educational interventions influence psychological preparedness and postoperative functional outcomes remains limited, particularly within regional healthcare settings.

This study aimed to investigate whether structured preoperative patient education improves knowledge, psychological preparedness, functional outcomes, and quality of life following TKA and to explore the association between preoperative anxiety and postoperative recovery.

2. Materials and Methods

2.1. Study Design and Participants

This study was designed as a prospective controlled longitudinal study and conducted at a single center—the Clinic for Orthopedic Surgery and Traumatology, University Clinical Center of Vojvodina, Novi Sad, Serbia, a tertiary-care university hospital within a publicly funded healthcare system.

The study protocol was reviewed and approved by the Ethics Committee of the University Clinical Center of Vojvodina, Novi Sad, Serbia (Approval No. 00-141, 14 March

2025). Additional approval was obtained from the Ethics Committee of the Faculty of Medicine, University of Novi Sad.

The study was conducted in accordance with the ethical principles outlined in the Declaration of Helsinki. All participants were informed about the aims and procedures of the study, and written informed consent was obtained prior to enrollment. Following ethical approval, patient enrollment and data collection were initiated.

A total of 120 patients scheduled for primary total knee arthroplasty were consecutively recruited during the study period. Eighty patients were included in the intervention group (structured preoperative education), while 40 patients who received standard perioperative care served as controls. Participants with moderate knee osteoarthritis, without severe varus or valgus deformities, were included in the study. Allocation to the intervention or control group was performed using a computer-generated allocation scheme (2:1 ratio). All procedures were performed by the same orthopedic surgical team under the supervision of the head of the department, following standardized surgical and perioperative protocols. All patients were treated within the same institutional perioperative, surgical, postoperative care, and rehabilitation pathway.

Inclusion criteria were age ≥ 40 years; diagnosis of knee osteoarthritis; scheduled for primary total knee arthroplasty; ability to understand the study procedures and complete the questionnaires; and provision of written informed consent.

Exclusion criteria included cognitive impairment interfering with comprehension of educational content or questionnaire completion; refusal to participate; planned bilateral total knee arthroplasty; and revision knee arthroplasty.

2.2. Procedure Description

Data were collected at three time points: preoperatively, and one and six months postoperatively. Upon enrollment, participants underwent a baseline assessment. Socio-demographic and clinical data were collected using a structured questionnaire specifically developed for this study.

Preoperatively, validated questionnaires assessing functional status, quality of life, and anxiety (WOMAC, KOOS, Lysholm score, RAND SF-36, and BAI) were administered to characterize the baseline functional and psychosocial profile of the study population.

The Knee Injury and Osteoarthritis Outcome Score (KOOS) was used to evaluate knee-related symptoms and functional status. The questionnaire consists of 42 items divided into five subscales: pain, symptoms, activities of daily living, sport and recreation, and knee-related quality of life. Each subscale is scored from 0 to 100, while higher scores indicate better functional status and fewer symptoms [16].

For the purposes of this study, the Serbian version of the KOOS questionnaire was used. At the time of study planning, no officially available Serbian (Serbia) version of the KOOS questionnaire existed. Therefore, a process of translation, cross-cultural adaptation, and linguistic validation was conducted in accordance with the guidelines of the Mapi Research Trust/ePROVIDE. The process included two independent forward translations into Serbian, backward translation into English, reconciliation of all versions, cognitive debriefing in the target population, and proofreading of the final version. The linguistic validation process was coordinated by the principal investigator of this study. A pre-final validated version obtained during the linguistic validation process was used throughout the study, while the final approved version contained no substantive changes affecting item content or scoring. The final Serbian version of the questionnaire was approved by Mapi Research Trust/ePROVIDE on 4 June 2026 and is available for academic use as the “Serbian for Serbia (Latin)” version.

The Lysholm Knee Scoring Scale was applied to assess knee function following surgery. The total score ranges from 0 to 100, with higher values indicating better knee function [17].

The Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC) was used to evaluate pain, stiffness, and physical function. The questionnaire includes 24 items divided into three domains. For comparability, WOMAC scores were transformed to a 0–100 scale, with higher scores indicating worse symptoms and poorer functional status [18].

Health-related quality of life was assessed using the RAND 36-Item Short Form Health Survey (RAND SF-36), which evaluates eight domains of physical, emotional, and social health. Scores for each domain range from 0 to 100, with higher scores indicating better health status. The RAND version does not generate a single summary score but provides a domain-based profile [19].

Anxiety levels were measured using the Beck Anxiety Inventory (BAI), a 21-item self-report questionnaire assessing the severity of anxiety symptoms. Each item is rated on a scale from 0 to 3, with a total score ranging from 0 to 63; higher scores indicate greater anxiety [20].

Patients' knowledge related to total knee arthroplasty was assessed using a 10-item multiple-choice questionnaire developed specifically for this study. The instrument was based on relevant clinical guidelines and standard patient education content for total knee arthroplasty. Content validity was established through expert review by a multidisciplinary team consisting of an orthopedic surgeon, a nurse, and a physiotherapist, who evaluated the relevance, clarity, and comprehensiveness of the items. Prior to implementation, the questionnaire was reviewed to assess clarity, comprehensibility, and appropriateness for use in an elderly population. The knowledge test was administered to both groups. In the control group, it was administered preoperatively to assess baseline knowledge without structured education. In the intervention group, the test was administered immediately before the educational session (pre-test) and repeated immediately after the session (post-test). Each item had one correct answer, scored as 1 point, while incorrect or "don't know" responses were scored as 0 points. Total scores were expressed as percentages, with higher values indicating better knowledge. A predefined threshold for adequate knowledge was set at $\geq 70\%$ correct answers (≥ 7 out of 10).

A structured preoperative educational program was delivered one day prior to surgery by a multidisciplinary team consisting of an orthopedic surgeon, a nurse, and a physiotherapist. The session lasted approximately 40 min and included a multimedia presentation and written educational materials specifically developed for this study.

The content covered knee anatomy, osteoarthritis, the total knee arthroplasty procedure, anesthesia options, potential complications, early postoperative mobilization, home-based activities after discharge, and indications for seeking medical attention. Following a 15 min break, the post-education knowledge assessment was conducted.

Educational materials were adapted for an elderly population and presented using simple language, visual aids, and illustrative examples to facilitate comprehension and retention.

Perioperative variables, including side of surgery, anesthesia type, duration of surgery, postoperative complications, length of hospitalization, and rehospitalization within 30 days, were recorded from medical documentation.

One and six months after surgery, validated questionnaires assessing functional status, quality of life, and anxiety (WOMAC, KOOS, Lysholm score, RAND SF-36, and BAI) were administered to evaluate the functional and psychosocial outcomes of the educational intervention.

2.3. Statistical Analysis

Descriptive statistics, hypothesis testing methods, and correlation analyses were applied for data analysis. Descriptive statistics included measures of central tendency, variability, and relative frequencies. Continuous variables are presented as mean $\pm$ standard deviation for descriptive purposes, while categorical variables are presented as counts and percentages.

Given the nature of the outcome measures, the unequal group sizes, and the distributional characteristics of the data, non-parametric statistical tests were used for inferential analyses. Between-group comparisons of categorical variables were performed using the chi-square (χ^2) test or Fisher's exact test, as appropriate. Between-group comparisons of continuous and ordinal outcome measures, including WOMAC, KOOS, Lysholm score, RAND SF-36, BAI, and knowledge test scores, were performed using the Mann–Whitney U test.

Within-group changes across the three assessment time points were analyzed using the Friedman test, followed by Wilcoxon signed-rank post hoc analysis when appropriate. Pre- and post-education knowledge scores within the intervention group were compared using the Wilcoxon signed-rank test. Correlations between knowledge scores, anxiety levels, and patient-reported outcome measures were assessed using Spearman's rank correlation coefficient.

Statistical significance was set at a p -value < 0.05 . The results are presented in tables and graphs. Statistical analyses were performed using IBM SPSS Statistics, version 26.

3. Results

3.1. Baseline Characteristics of the Study Population

A total of 120 patients were included in the study and allocated into an intervention group ($n = 80$) and a control group ($n = 40$). Baseline socio-demographic characteristics of the study population are presented in Table 1.

The groups were generally similar with respect to sex, educational level, place of residence, and most comorbidities; however, differences were observed in age distribution, BMI, smoking status, and selected baseline clinical variables.

Table 1. Baseline socio-demographic characteristics of the study population by study group.

Variable	Category	Intervention Group n (%)	Control Group n (%)	Test Statistic ¹	p -Value
Sex	Male	35 (43.8)	17 (42.5)	0.02	0.98
	Female	45 (56.3)	23 (57.5)		
Age	50–59 years	12 (15.0)	2 (5.0)	6.07	0.05
	60–69 years	34 (42.5)	12 (30.0)		
	70–79 years	34 (42.5)	26 (65.0)		
Education level	Primary education	11 (13.8)	8 (20.0)	1.07	0.62
	Secondary education	59 (73.8)	26 (65.0)		
	Higher education	10 (12.5)	6 (15.0)		
Place of residence	Rural	29 (36.3)	15 (37.5)	0.02	0.98
	Urban	51 (63.8)	25 (62.5)		

¹ Fisher's exact test.

Baseline clinical characteristics of the study population are presented in Table 2. The groups were generally comparable in terms of comorbidities. However, statistically significant differences were observed in body mass index and smoking status between the intervention and control groups.

Additional perioperative characteristics were also examined. No statistically significant differences were observed between the intervention and control groups in side of surgery, duration of surgery, postoperative complications, length of hospitalization, or rehospitalization within 30 days. Mean duration of surgery was 85.24 ± 19.70 min in the intervention group and 84.75 ± 17.83 min in the control group ($p = 0.78$). Length of hospitalization was 5.66 ± 2.59 versus 4.93 ± 1.21 days, respectively ($p = 0.10$). The distribution of anesthesia type showed a borderline difference between groups ($p = 0.05$).

Table 2. Baseline clinical characteristics of the study population.

Variable	Intervention Group (<i>n</i> = 80)	Control Group (<i>n</i> = 40)	Test Statistic	<i>p</i> -Value
BMI (kg/m ²), mean $\pm$ SD	32.88 $\pm$ 5.18	29.12 $\pm$ 4.73	U = 980.00	0.001
Hypertension, <i>n</i> (%)	70 (87.5)	30 (75.0)	Fisher's exact test	0.12
DM, <i>n</i> (%)	19 (23.8)	10 (25.0)	Fisher's exact test	0.98
Cardiovascular disease, <i>n</i> (%)	9 (11.3)	8 (20.0)	Fisher's exact test	0.27
Smoking status, <i>n</i> (%)			Fisher's exact test	0.02
Current smoker, <i>n</i> (%)	22 (27.5)	7 (17.5)		
Former smoker, <i>n</i> (%)	6 (7.5)	9 (22.5)		
Never smoker, <i>n</i> (%)	51 (63.8)	23 (57.5)		

3.2. Knowledge Outcomes

All participants completed the knowledge test preoperatively. The mean baseline knowledge score was significantly higher in the intervention group compared to the control group (45.38 ± 10.86 vs. 41.50 ± 8.02 , respectively). A statistically significant difference between the groups was confirmed using the Mann–Whitney U test ($U = 1137.00$; $p = 0.006$) (Figure 1).

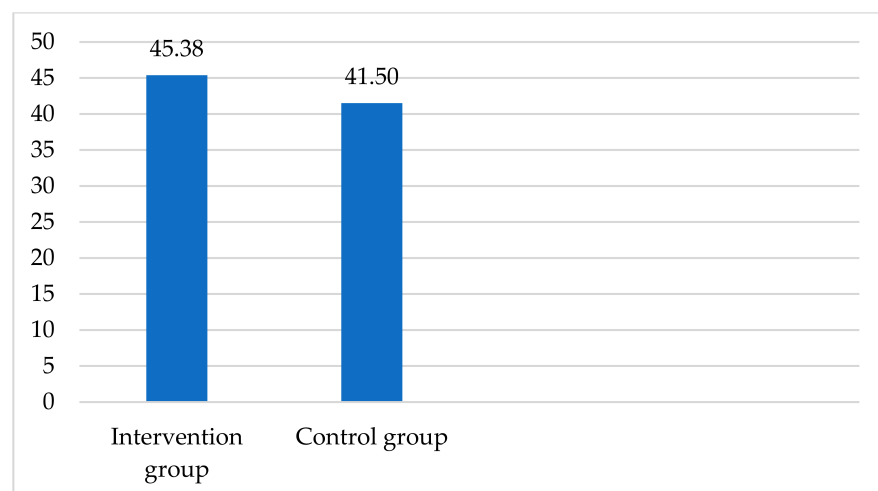


Figure 1. Baseline knowledge test scores in the intervention and control groups. (Mann–Whitney U test, $p = 0.006$).

Within the intervention group, a significant improvement in knowledge scores was observed following the structured preoperative education. Mean knowledge test scores increased from 45.38 ± 10.86 before education to 96.88 ± 5.65 after education. The Wilcoxon signed-rank test demonstrated a statistically significant difference between pre- and post-education scores ($Z = -7.90$; $p < 0.001$) (Figure 2).

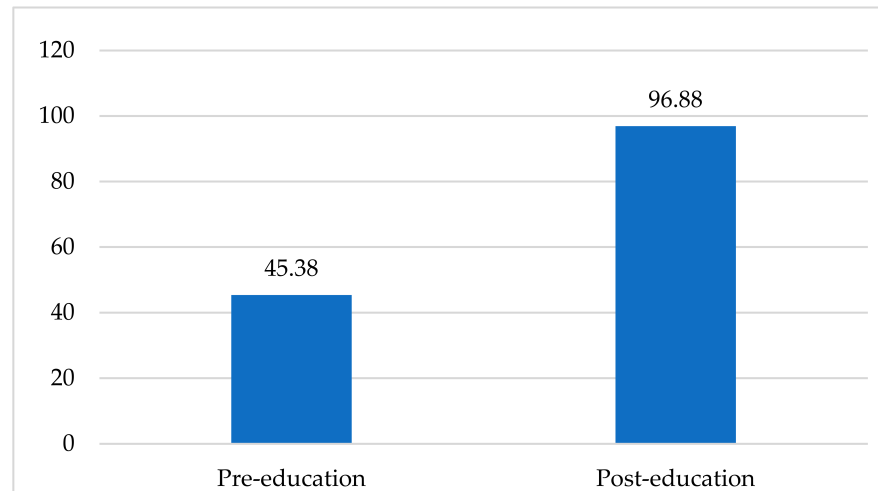


Figure 2. Knowledge test scores in the intervention group before and after structured preoperative education (Wilcoxon signed-rank test, $Z = -7.90$, $p < 0.001$).

3.3. Functional Outcomes

3.3.1. WOMAC Functional Outcomes

The intervention group demonstrated significantly better WOMAC outcomes than the control group at all assessment time points and across all domains. The magnitude of improvement increased over time, with the largest between-group differences observed six months after surgery (Table 3).

Table 3. WOMAC scores in the intervention and control groups at different time points.

Domain	Time Point	Intervention Group Mean $\pm$ SD	Control Group Mean $\pm$ SD	<i>p</i> -Value
WOMAC total	Preop	54.98 $\pm$ 13.70	80.55 $\pm$ 4.94	<0.001
	1 month	25.09 $\pm$ 8.91	58.67 $\pm$ 8.54	<0.001
	6 months	0.31 $\pm$ 0.69	21.20 $\pm$ 18.84	<0.001
Pain	Preop	57.69 $\pm$ 14.54	79.38 $\pm$ 6.81	<0.001
	1 month	27.19 $\pm$ 9.27	56.50 $\pm$ 10.01	<0.001
	6 months	0.00 $\pm$ 0.00	14.63 $\pm$ 18.89	N/A
Stiffness	Preop	63.13 $\pm$ 26.30	78.44 $\pm$ 9.80	<0.001
	1 month	30.00 $\pm$ 17.06	60.94 $\pm$ 13.03	<0.001
	6 months	0.00 $\pm$ 0.00	24.69 $\pm$ 25.86	N/A
Physical function	Preop	53.22 $\pm$ 15.34	81.13 $\pm$ 5.29	<0.001
	1 month	23.90 $\pm$ 9.50	59.04 $\pm$ 8.98	<0.001
	6 months	0.44 $\pm$ 0.98	22.72 $\pm$ 19.20	<0.001

At the six-month follow-up, the WOMAC pain and stiffness domains showed no variability in the intervention group, with all 80 patients scoring 0.00. In comparison, 14

of 40 patients in the control group scored 0.00 in these domains. Therefore, inferential between-group testing was not applicable for the WOMAC pain and stiffness domains at six months and was reported as N/A. These values were checked against the raw dataset and reflect a floor effect in the intervention group at the six-month follow-up.

3.3.2. KOOS Functional Outcomes

Significantly better KOOS outcomes were observed in the intervention group compared with the control group across most domains and assessment time points. The intervention group demonstrated superior postoperative outcomes in pain, symptoms, activities of daily living, sport and recreation function, and quality of life. Detailed KOOS scores are presented in Table 4.

Table 4. KOOS scores in the intervention and control groups at different assessment time points.

Domain	Time Point	Intervention Group Mean $\pm$ SD	Control Group Mean $\pm$ SD	<i>p</i> -Value
Pain	Preop	46.25 $\pm$ 14.97	18.05 $\pm$ 5.37	<0.001
	1 month	70.28 $\pm$ 8.02	41.04 $\pm$ 8.45	<0.001
	6 months	99.93 $\pm$ 0.62	85.90 $\pm$ 17.22	<0.001
Symptoms	Preop	48.84 $\pm$ 16.54	45.00 $\pm$ 9.73	0.416
	1 month	57.54 $\pm$ 9.04	48.57 $\pm$ 7.09	<0.001
	6 months	69.69 $\pm$ 4.55	59.64 $\pm$ 12.11	<0.001
Activities of daily life	Preop	9.60 $\pm$ 15.45	19.96 $\pm$ 9.73	<0.001
	1 month	75.96 $\pm$ 8.36	41.51 $\pm$ 9.47	<0.001
	6 months	99.94 $\pm$ 0.37	79.82 $\pm$ 1.01	<0.001
Sport and recreation function	Preop	14.94 $\pm$ 13.74	4.59 $\pm$ 4.78	<0.001
	1 month	37.81 $\pm$ 7.95	17.38 $\pm$ 8.32	<0.001
	6 months	60.69 $\pm$ 5.67	36.38 $\pm$ 18.05	<0.001
QoL	Preop	32.81 $\pm$ 19.44	22.34 $\pm$ 7.34	<0.001
	1 month	60.78 $\pm$ 11.85	41.72 $\pm$ 12.77	<0.001
	6 months	98.98 $\pm$ 6.40	72.34 $\pm$ 25.43	<0.001

The high KOOS pain score observed in the intervention group at six months was also checked against the raw dataset. A total of 79 of 80 patients in the intervention group scored 100.00 in the KOOS pain domain, compared with 10 of 40 patients in the control group, resulting in a mean score of 99.93 $\pm$ 0.62. This finding reflects a ceiling effect in the intervention group at the six-month follow-up.

3.3.3. Lysholm Functional Outcomes

Lysholm scores improved over time in both groups; however, significantly better outcomes were consistently observed in the intervention group at all assessment time points. Detailed results are presented in Table 5.

Table 5. Lysholm scores in the intervention and control groups at different assessment time points.

Lysholm Score	Time Point	Intervention Group Mean $\pm$ SD	Control Group Mean $\pm$ SD	<i>p</i> -Value
	Preop	54.78 $\pm$ 10.68	45.60 $\pm$ 8.53	<0.001
	1 month	77.78 $\pm$ 6.54	69.60 $\pm$ 12.85	<0.001
	6 months	97.49 $\pm$ 6.54	82.98 $\pm$ 12.85	<0.001

3.4. Quality of Life and Anxiety Outcomes

3.4.1. SF-36 Quality of Life Outcomes

Health-related quality of life assessed using the RAND SF-36 questionnaire showed significantly better outcomes in the intervention group compared with the control group at all assessed time points. Detailed SF-36 domain scores are presented in Table 6.

Table 6. RAND SF-36 health-related quality-of-life scores in the intervention and control groups at different assessment time points.

Domain	Time Point	Intervention Group Mean $\pm$ SD	Control Group Mean $\pm$ SD	<i>p</i> -Value
Physical functioning	Preop	49.13 $\pm$ 24.15	6.63 $\pm$ 4.14	<0.001
	1 month	59.94 $\pm$ 17.43	30.50 $\pm$ 13.81	<0.001
	6 months	86.70 $\pm$ 6.44	64.22 $\pm$ 20.79	<0.001
Role physical	Preop	49.06 $\pm$ 49.75	0.63 $\pm$ 3.95	<0.001
	1 month	58.75 $\pm$ 47.58	11.88 $\pm$ 20.40	<0.001
	6 months	99.38 $\pm$ 5.59	78.75 $\pm$ 40.65	<0.001
Bodily pain	Preop	48.91 $\pm$ 19.34	23.31 $\pm$ 7.15	<0.001
	1 month	57.56 $\pm$ 12.94	49.56 $\pm$ 11.28	0.004
	6 months	86.28 $\pm$ 10.33	76.31 $\pm$ 20.18	0.015
General health	Preop	70.56 $\pm$ 14.39	54.88 $\pm$ 21.11	<0.001
	1 month	71.44 $\pm$ 14.12	60.63 $\pm$ 21.96	0.013
	6 months	74.00 $\pm$ 13.65	61.75 $\pm$ 22.91	0.007
Vitality	Preop	56.75 $\pm$ 17.49	35.38 $\pm$ 8.73	<0.001
	1 month	65.00 $\pm$ 11.33	52.13 $\pm$ 12.80	<0.001
	6 months	84.28 $\pm$ 22.37	65.25 $\pm$ 17.32	<0.001
Social functioning	Preop	78.44 $\pm$ 26.08	35.94 $\pm$ 13.63	<0.001
	1 month	84.22 $\pm$ 18.20	57.81 $\pm$ 14.35	<0.001
	6 months	95.94 $\pm$ 7.38	86.56 $\pm$ 22.00	0.034
Role emotional	Preop	71.25 $\pm$ 44.61	46.66 $\pm$ 47.62	0.007
	1 month	87.50 $\pm$ 29.24	63.34 $\pm$ 47.62	0.001
	6 months	100.00 $\pm$ 0.00	70.00 $\pm$ 46.41	<0.001
Mental health	Preop	69.45 $\pm$ 15.75	61.90 $\pm$ 13.77	0.002
	1 month	75.05 $\pm$ 10.73	68.90 $\pm$ 14.81	0.013
	6 months	85.20 $\pm$ 7.49	72.60 $\pm$ 16.39	<0.001

3.4.2. BAI Outcomes

Mean BAI scores were significantly lower in the intervention group than in the control group at all assessed time points (Table 7; $p < 0.001$). Anxiety levels decreased over time in both groups. Category-based analysis showed that most patients in both groups had mild anxiety preoperatively and minimal anxiety during follow-up (Table 8).

Table 7. BAI scores in the intervention and control groups at different assessment time points.

BAI Score	Time Point	Intervention Group Mean $\pm$ SD	Control Group Mean $\pm$ SD	<i>p</i> -Value
	Preop	10.49 $\pm$ 4.99	13.58 $\pm$ 4.79	<0.001
	1 month	2.39 $\pm$ 1.24	3.55 $\pm$ 1.78	<0.001
	6 months	0.63 $\pm$ 0.66	1.83 $\pm$ 1.80	<0.001

Table 8. Distribution of anxiety severity categories according to BAI score in the intervention and control groups across assessment time points.

Anxiety Category	Time Point	Intervention Group <i>n</i> (%)	Control Group <i>n</i> (%)
Minimal	Preop	22 (27.5)	4 (10.0)
	1 month	79 (98.8)	39 (97.5)
	6 months	80 (100.0)	39 (97.5)
Mild	Preop	46 (57.5)	24 (60.0)
	1 month	0 (0.0)	1 (2.5)
	6 months	0 (0.0)	1 (2.5)
Moderate	Preop	10 (12.5)	10 (25.0)
	1 month	1 (1.3)	0 (0.0)
	6 months	0 (0.0)	0 (0.0)
Severe	Preop	2 (2.5)	2 (5.0)
	1 month	0 (0.0)	0 (0.0)
	6 months	0 (0.0)	0 (0.0)

3.5. Correlation Between Knowledge Test Scores and Questionnaire Outcomes

Spearman correlation analysis was performed to explore the association between knowledge test scores and patient-reported outcomes across assessment time points. Significant correlations were observed primarily for pre-education knowledge scores, suggesting that baseline knowledge was associated with selected postoperative functional and quality-of-life outcomes. Detailed significant correlations are presented in Table 9.

Table 9. Correlation between baseline knowledge test scores and patient-reported outcome measures at different assessment time points.

Time Point	Knowledge Test Score	Outcome Domain	Spearman's Rho	<i>p</i> -Value
Preop	Pre-education knowledge	SF-36 Vitality	0.258	0.02
Preop	Pre-education knowledge	SF-36 Social functioning	0.292	0.009
Preop	Pre-education knowledge	SF-36 Role emotional	0.350	0.001
Preop	Pre-education knowledge	SF-36 Mental health	0.270	0.01
1 month	Pre-education knowledge	SF-36 Vitality	0.238	0.03
1 month	Pre-education knowledge	SF-36 Social functioning	0.297	0.01
1 month	Pre-education knowledge	SF-36 Mental health	0.333	0.01
6 months	Pre-education knowledge	SF-36 Bodily pain	−0.246	0.03
6 months	Pre-education knowledge	SF-36 Vitality	0.227	0.04
6 months	Pre-education knowledge	WOMAC Physical function	0.242	0.03
6 months	Pre-education knowledge	WOMAC total score	0.242	0.03

3.6. Change in Clinical Outcomes over Time in the Intervention Group

The intervention group demonstrated significant improvements in health-related quality of life across the follow-up period. For the RAND SF-36 questionnaire, significant improvements were observed in physical functioning, bodily pain, vitality, and role emotional domains as early as one month after surgery, with further improvement at six months. Improvements in social functioning, role physical, and mental health became significant at six months postoperatively. No significant changes were observed in the general health

domain. Similarly, KOOS and WOMAC scores demonstrated significant improvements across all domains over time ($p < 0.001$). Significant temporal changes were also observed for Lysholm and BAI scores, with improved knee function and reduced anxiety during follow-up ($p < 0.001$).

3.7. Correlation Between Anxiety Scores and Clinical Outcomes

A significant association between anxiety levels and clinical outcomes was observed, particularly in the preoperative period. Higher preoperative BAI scores were associated with poorer health-related quality of life, worse knee-related functional status, and lower Lysholm scores. Positive correlations between BAI and WOMAC scores further indicated poorer functional outcomes among patients with higher anxiety levels. One month after surgery, these associations weakened and remained significant only for selected SF-36 domains and Lysholm scores. Six months after surgery, no significant correlations were observed between anxiety levels and most functional or quality-of-life outcomes, suggesting that the influence of anxiety on clinical outcomes diminished over time following total knee arthroplasty.

4. Discussion

This study demonstrated that structured preoperative education was associated with improved patient knowledge related to total knee arthroplasty. A statistically significant increase in correct answers was observed following the educational intervention, with a strong effect size, indicating not only statistical significance but also clear clinical relevance. The substantial increase in knowledge observed in this study suggests that even a short, well-structured educational intervention delivered immediately prior to surgery can be highly effective.

To the best of our knowledge, no previous study conducted in Serbia has prospectively examined the impact of structured preoperative education on functional outcomes, quality of life, and anxiety in patients undergoing total knee arthroplasty. The findings confirm that such interventions significantly enhance patients' understanding of the surgical procedure, perioperative course, and expected recovery process. The combination of verbal explanation, visual presentation, and written materials appears to be particularly effective in facilitating knowledge acquisition.

Our results are consistent with previous studies reporting positive effects of educational interventions on patients' understanding of total knee arthroplasty and facilitating active participation in perioperative care [10,11,21,22].

Previous studies have also demonstrated beneficial effects on postoperative recovery following total knee arthroplasty. Jahić et al. [23] demonstrated short-term functional improvements following exercise programs, while a recent systematic review also reported beneficial, primarily short-term effects of prehabilitation on knee function before and after total knee arthroplasty [24]. In contrast, this study emphasizes education as a complementary component of preoperative preparation. These findings suggest that physical prehabilitation and educational interventions should not be viewed as competing strategies, but rather as mutually supportive approaches that may together contribute to improved perioperative outcomes.

Baseline knowledge was associated with several psychosocial and functional outcomes, suggesting that patients with greater pre-existing understanding may be better prepared for postoperative recovery. This finding supports earlier studies indicating that education, together with better baseline functional capacity, is associated with improved postoperative recovery and quality of life [6]. In addition, previous research has shown that structured educational programs may contribute to lower anxiety, improved patient satisfaction,

and more positive postoperative experiences [1,25]. The increasing use of multimedia and digital educational tools has been further associated with higher patient satisfaction, supporting their inclusion in contemporary preoperative education programmes [26].

In this study, patients who received structured preoperative education demonstrated better postoperative outcomes compared with the control group across all postoperative assessment points. These findings were consistently observed across multiple instruments, including WOMAC, KOOS, and Lysholm scores, indicating reduced pain and improved knee function in the intervention group. However, these findings should be interpreted in light of the baseline differences observed between groups.

These results are in agreement with those reported by Dash et al. [6], who demonstrated that patients with better preoperative understanding and greater engagement in rehabilitation achieved significantly improved functional outcomes following total knee arthroplasty. Likewise, Ho et al. [8] reported that integrated education programs combining preoperative education, in-hospital instruction, and postoperative support improved both patient- and physician-reported functional outcomes.

Exercise-based prehabilitation has been shown to improve knee function, particularly in the preoperative period and early postoperative phase; however, previous reviews have reported heterogeneity in intervention design, intensity, and outcome measures, as well as variable effects on postoperative functional outcomes and quality of life [24,27]. In this context, structured education should be viewed as a complementary component of preoperative preparation rather than as an alternative to physical prehabilitation. By improving patients' understanding of the surgical procedure, recovery expectations, rehabilitation requirements, and coping strategies, educational interventions may support adherence, active participation in rehabilitation, and psychological preparedness during recovery [28].

This is further supported by studies demonstrating that interventions targeting psychological factors, such as anxiety and coping strategies, may positively influence postoperative functional outcomes. Patients who are better informed and psychologically prepared are more likely to actively participate in rehabilitation and achieve improved recovery trajectories [29,30].

Patients who received structured preoperative education demonstrated significantly better health-related quality of life across multiple domains of the RAND SF-36 questionnaire. Similar findings have been reported previously. Dash et al. [6] found that patients who understood total knee arthroplasty better before the surgery had a better quality of life and better functional performance after surgery. Yen-Mou Lu et al. [31] demonstrated improvements in both physical and mental components of the SF-36 over time, with particularly pronounced changes observed at six months postoperatively, although some domains did not fully reach normative values. These findings suggest that structured preoperative education may represent a simple, low-cost, and easily implementable intervention capable of improving patients' quality of life and supporting recovery following total knee arthroplasty.

One possible explanation is that preoperative education improves patients' understanding of the surgical procedure and recovery expectations, thereby enhancing psychological preparedness and engagement in rehabilitation. In line with previous observations, psychological factors, including preoperative mental health status and coping ability, have an important role in determining postoperative outcomes after total knee arthroplasty. Higher levels of preoperative anxiety have been associated with poorer quality of life and functional recovery, suggesting that interventions targeting psychological readiness may contribute to improved postoperative outcomes [32].

In this study, patients in the intervention group demonstrated lower BAI scores than the control group at all assessed time points, including the preoperative assessment. There-

fore, anxiety-related findings should be interpreted with caution, as baseline differences may have contributed to the observed between-group differences during follow-up. Nevertheless, anxiety decreased over time in both groups, suggesting that postoperative recovery itself may also have influenced psychological outcomes.

These findings are consistent with previous studies reporting that structured educational interventions are associated with lower preoperative anxiety and improved psychological preparedness. Previous studies have shown that structured education reduces preoperative anxiety levels and improves psychological preparedness, while the influence of anxiety on postoperative outcomes tends to diminish over time [7,31,33]. The reduction in anxiety may be explained by the role of education in improving patients' understanding of the surgical procedure and managing expectations. By providing clear and accessible information, educational interventions help patients better cope with perioperative stress and uncertainty. This is further supported by systematic reviews indicating that preoperative education contributes to lower anxiety, improved patient satisfaction, and better overall perioperative experience [1].

These findings indicate a significant short-term psychological benefit, with long-term changes likely influenced by recovery over time.

All patients were treated at the same orthopedic clinic according to standard institutional perioperative and rehabilitation protocols. Postoperative rehabilitation followed the routine clinical pathway used at the institution. However, surgical technique, anesthesia type, and the exact timing of first postoperative mobilization could vary depending on the operating surgeon, anesthesiologist, and individual clinical circumstances. These factors were not controlled by the study intervention and were therefore considered potential sources of variability.

This study has several limitations. First, the study was conducted at a single center, which may limit the generalizability of the findings. Significant baseline differences were observed between the intervention and control groups, including differences in age distribution, BMI, smoking status, baseline knowledge, functional scores, quality-of-life domains, and anxiety levels. These imbalances represent important potential confounding factors and limit the ability to attribute the observed postoperative differences solely to educational intervention. Second, baseline-adjusted multivariable analyses were not performed; therefore, the findings should be interpreted as associations rather than causal effects. Third, postoperative outcome assessment was not blinded to group allocation, which may represent an additional source of bias, although standardized patient-reported outcome measures were used. Fourth, although all patients were treated within the same institution and followed routine clinical care pathways, the study was not designed to fully standardize or control perioperative variables, including surgical technique, anesthesia type, analgesic protocols, and timing of first postoperative mobilization, all of which may have influenced recovery outcomes. Finally, the knowledge questionnaire was developed specifically for this study and has not undergone extensive external validation, and the six-month follow-up period does not allow assessment of the long-term sustainability of the observed effects.

5. Conclusions

Structured preoperative education was associated with improved patient knowledge and more favorable postoperative outcomes following total knee arthroplasty. However, these findings should be interpreted in light of baseline between-group differences and the absence of baseline-adjusted multivariable analyses. These findings suggest that structured multidisciplinary education may be a useful component of routine preoperative care, while

future adequately powered studies with baseline-adjusted analyses are needed to confirm its independent effect on postoperative recovery.

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Abbreviations

The following abbreviations are used in this manuscript:

OA	Osteoarthritis
BMI	Body Mass Index
GBD	Global Burden of Disease Study
TKA	Total Knee Arthroplasty
PPE	Preoperative Patient Education
ERAS	Enhanced Recovery After Surgery
WOMAC	Western Ontario and McMaster Universities Osteoarthritis Index
KOOS	Knee Injury and Osteoarthritis Outcome Score
BAI	Beck Anxiety Inventory
QoL	Quality of Life
DM	Diabetes Mellitus
RAND SF-36	RAND 36- Item Short Form Health Survey

References

1. Longo, U.G.; De Salvatore, S.; Rosati, C.; Pisani, I.; Ceccaroli, A.; Rizzello, G.; De Marinis, M.G.; Denaro, V. The impact of preoperative education on knee and hip replacement: A systematic review. *Osteology* **2023**, *3*, 94–112. [\[CrossRef\]](#)
2. World Health Organization. *Osteoarthritis [Internet]*; World Health Organization: Geneva, Switzerland, 2023. Available online: <https://www.who.int/news-room/fact-sheets/detail/osteoarthritis> (accessed on 23 January 2025).
3. Ren, J.L.; Yang, J.; Hu, W. The global burden of osteoarthritis knee: A secondary data analysis of a population-based study. *Clin. Rheumatol.* **2025**, *44*, 1769–1781. [\[CrossRef\]](#) [\[PubMed\]](#)
4. GBD 2021 Osteoarthritis Collaborators. Global, regional, and national burden of osteoarthritis, 1990–2020 and projections to 2050: A systematic analysis for the Global Burden of Disease Study 2021. *Lancet Rheumatol.* **2023**, *5*, e508–e522. [\[CrossRef\]](#) [\[PubMed\]](#)
5. Courties, A.; Kouki, I.; Soliman, N.; Mathieu, S.; Sellam, J. Osteoarthritis year in review 2024: Epidemiology and therapy. *Osteoarthr. Cartil.* **2024**, *32*, 1397–1404. [\[CrossRef\]](#) [\[PubMed\]](#)
6. Dash, S.K.; Palo, N.; Arora, G.; Chandel, S.S.; Kumar, M. Effects of preoperative walking ability and patient’s surgical education on quality of life and functional outcomes after total knee arthroplasty. *Rev. Bras. Ortop.* **2016**, *52*, 435–441. [\[CrossRef\]](#) [\[PubMed\]](#)

7. Akbari, A.R.; Rajabzadeh, R.; Hosseini, S.H.; Jafari, Y.; Mohaddes Hakkak, H.; Ganji, R. Effect of educational intervention on reducing anxiety in patients with knee arthroplasty: A quasi-experimental study. *Health Educ. Health Promot.* **2025**, *11*, 45–51.
8. Ho, C.J.; Chen, Y.T.; Wu, H.L.; Huang, H.T.; Lin, S.Y. The effects of a patient-specific integrated education program on pain, perioperative anxiety, and functional recovery following total knee replacement. *J. Pers. Med.* **2022**, *12*, 719. [\[CrossRef\]](#) [\[PubMed\]](#)
9. McDonald, S.; Page, M.J.; Beringer, K.; Wasiak, J.; Sprowson, A. Preoperative education for hip or knee replacement. *Cochrane Database Syst. Rev.* **2014**, *2014*, CD003526. [\[CrossRef\]](#) [\[PubMed\]](#)
10. Edwards, P.K.; Mears, S.C.; Barnes, C.L. Preoperative education for hip and knee replacement: Never stop learning. *Curr. Rev. Musculoskelet. Med.* **2017**, *10*, 356–364. [\[CrossRef\]](#) [\[PubMed\]](#)
11. Wasim, A.S.; Choudri, M.J.; Saidani, Z.; Khan, A.M.; Siddiqui, R.S.; Ridha, A.; Ahmed, K.S.; Ali, U. The effect of video-assisted learning on pre-operative knowledge and satisfaction for total knee arthroplasty surgery: A randomised controlled study. *J. Orthop. Surg. Res.* **2024**, *19*, 592. [\[CrossRef\]](#) [\[PubMed\]](#)
12. Feng, J.E.; Novikov, D.; Anoushiravani, A.A.; Schwarzkopf, R. Total knee arthroplasty: Improving outcomes with a multidisciplinary approach. *J. Multidiscip. Healthc.* **2018**, *11*, 63–73. [\[CrossRef\]](#) [\[PubMed\]](#)
13. Alotaibi, N.S.M.; Al-Thawbani, M.A.Y.; Albalawi, I.M.R.; Altalyan, A.A.N.; Alotaibi, T.O.; Al-Asiri, M.A.M. Patient education: Preparing for and recovering from orthopedic surgery. *Tec. Empres.* **2024**, *18*, 1016–1033.
14. Sisak, K.; Darch, R.; Burgess, L.; Middleton, R.; Wainwright, T. A preoperative education class reduces length of stay for total knee replacement patients identified at risk of an extended length of stay. *J. Rehabil. Med.* **2019**, *51*, 788–796. [\[CrossRef\]](#) [\[PubMed\]](#)
15. Wainwright, T.W.; Gill, M.; McDonald, D.A.; Middleton, R.G.; Reed, M.; Sahota, O.; Yates, P.; Ljungqvist, O. Consensus statement for perioperative care in total hip replacement and total knee replacement surgery: Enhanced Recovery After Surgery (ERAS®) Society recommendations. *Acta Orthop.* **2020**, *91*, 3–19. [\[CrossRef\]](#) [\[PubMed\]](#)
16. Roos, E.M.; Roos, H.P.; Lohmander, L.S.; Ekdahl, C.; Beynnon, B.D. Knee Injury and Osteoarthritis Outcome Score (KOOS)-development of a self-administered outcome measure. *J. Orthop. Sports Phys. Ther.* **1998**, *28*, 88–96. [\[CrossRef\]](#) [\[PubMed\]](#)
17. Tegner, Y.; Lysholm, J. Rating systems in the evaluation of knee ligament injuries. *Clin. Orthop. Relat. Res.* **1985**, *198*, 43–49. [\[CrossRef\]](#)
18. Bellamy, N.; Buchanan, W.W.; Goldsmith, C.H.; Campbell, J.; Stitt, L.W. 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**, *15*, 1833–1840. [\[PubMed\]](#)
19. Hays, R.D.; Sherbourne, C.D.; Mazel, R.M. The RAND 36-Item Health Survey 1.0. *Health Econ.* **1993**, *2*, 217–227. [\[PubMed\]](#)
20. Beck, A.T.; Epstein, N.; Brown, G.; Steer, R.A. An inventory for measuring clinical anxiety: Psychometric properties. *J. Consult. Clin. Psychol.* **1988**, *56*, 893–897. [\[CrossRef\]](#) [\[PubMed\]](#)
21. Kennedy, D.; Wainwright, A.; Pereira, L.; Robarts, S.; Dickson, P.; Christian, J.; Webster, F. A qualitative study of patient education needs for hip and knee replacement. *BMC Musculoskelet. Disord.* **2017**, *18*, 413. [\[CrossRef\]](#) [\[PubMed\]](#)
22. Causey-Upton, R.; Howell, D.M.; Kitzman, P.H.; Custer, M.; Dressler, E. Pre-operative education for total knee replacement: A pilot survey. *Internet J. Allied Health Sci. Pract.* **2018**, *16*, 6. [\[CrossRef\]](#)
23. Jahic, D.; Omerovic, D.; Tanovic, A.T.; Dzankovic, F.; Campara, M.T. The effect of prehabilitation on postoperative outcome in patients following primary total knee arthroplasty. *Med. Arch.* **2018**, *72*, 439–443. [\[CrossRef\]](#) [\[PubMed\]](#)
24. Gränicher, P.; Mulder, L.; Lenssen, T.; Scherr, J.; Swanenburg, J.; de Bie, R. Prehabilitation Improves Knee Functioning Before and Within the First Year After Total Knee Arthroplasty: A Systematic Review With Meta-analysis. *J. Orthop. Sports Phys. Ther.* **2022**, *52*, 709–725. [\[CrossRef\]](#) [\[PubMed\]](#)
25. Longo, U.G.; Corradini, A.; Marchetti, A.; Di Sarno, C.; D’Angelo, C.; Arias, C.; De Marinis, M.G.; de Sire, A.; Denaro, V. I Am Afraid I Will Not Be Able to Walk, That Is What Worries Me-The Experience of Patients with Knee Osteoarthritis before Total Knee Arthroplasty: A Qualitative Study. *J. Clin. Med.* **2024**, *13*, 2878. [\[CrossRef\]](#) [\[PubMed\]](#)
26. Dayucos, A.; French, L.A.; Kelemen, A.; Liang, Y.; Sik Lanyi, C. Creation and evaluation of a preoperative education Website for hip and knee replacement patients-a pilot study. *Medicina* **2019**, *55*, 32. [\[CrossRef\]](#) [\[PubMed\]](#)
27. Kan, A.; Page, K.; Devine, N.; Rabajoli, A.; Sattler, L. Preoperative lifestyle modifications combined with a structured exercise protocol on patient outcomes following total knee replacement surgery: A systematic review. *Musculoskelet. Care* **2024**, *22*, e1899. [\[CrossRef\]](#) [\[PubMed\]](#)
28. Gränicher, P.; Mulder, L.; Lenssen, T.; Fucentese, S.F.; Swanenburg, J.; De Bie, R.; Scherr, J. Exercise-and education-based prehabilitation before total knee arthroplasty: A pilot study. *J. Rehabil. Med.* **2024**, *56*, 18326. [\[CrossRef\]](#) [\[PubMed\]](#)
29. Sorel, J.C.; Overvliet, G.M.; Gademan, M.G.J.; Haan, C.D.; Honig, A.; Poolman, R.W. The influence of perioperative interventions targeting psychological distress on clinical outcome after total knee arthroplasty. *Rheumatol. Int.* **2020**, *40*, 1961–1986. [\[CrossRef\]](#)
30. Meyer, V.M.; Beydoun, H.A.; Gyenai, L.; Goble, N.M.; Hunter, M.M.; McGill, R.J. The effect of preoperative behavioral intervention on pain, anxiety, opioid use, and function in patients undergoing total knee arthroplasty: A randomized controlled study. *Mil. Med.* **2023**, *188*, e1010–e1017. [\[CrossRef\]](#) [\[PubMed\]](#)

31. Lu, Y.M.; Chang, J.K.; Lin, P.Y.; Lue, Y.J. Pre- and post-operative education and health-related quality of life for patients with hip/knee replacement and hip fracture. *Healthcare* **2023**, *11*, 329. [[CrossRef](#)]
32. De Klerk, T.C.; Dounavi, D.M.; Hamilton, D.F.; Clement, N.D.; Kaliarntas, K.T. Effects of home-based prehabilitation on pre- and postoperative outcomes following total hip and knee arthroplasty. *Bone Jt. Open* **2023**, *4*, 315–328. [[CrossRef](#)] [[PubMed](#)]
33. Varış, O.; Peker, G. Effects of preoperative anxiety level on pain level and joint functions after total knee arthroplasty. *Sci. Rep.* **2023**, *13*, 20787. [[CrossRef](#)] [[PubMed](#)]

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