

ORIGINAL ARTICLE

Frequency of Anterior Knee Pain (AKP) in Different Gender Groups after Total Knee Replacement (TKR)

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Introduction: Anterior Knee Pain (AKP) is one of the most common causes of persistent problems after knee replacement. Total Knee Arthroplasty (TKA) is a surgical procedure in which artificial joint or prosthesis replace the damage knee. A significant proportion of the patients experience AKP after surgery.

Objective: To find out the frequency of Anterior Knee Pain after Total Knee Arthroplasty.

Study Setting: Department of Orthopedics, KTH Khyber Teaching Hospital, Peshawar.

Study Design: A Cross sectional study.

Study Duration: June -2020 to February -2021.

Subjects and Methods: After recording complete history, physical examination and routine baseline investigations were done. Patients were put on OT list and surgeries were performed in all patients by expert orthopedic surgeon designated for performing total knee arthroplasty. Post-operatively, patients were kept under observations for 5 days in ward and were discharged if indicated. Patients were followed at regular intervals and finally at the end of 3rd month to measure the intensity of pain on VAS.

Results: Out of 205 patients, 69.3% were males and 30.7% were females. Means \pm SD calculated for age was 48.62 ± 7.98 years, for BMI was 24.63 ± 3.07 and for Pain on VAS was 1.31 ± 1.39 . Most patients (51.7%) were recorded in 51-60 years age group. Rheumatoid Arthritis (RA) in 18% while Osteoarthritis (OA) was found in 82% patients. 21.5% patients were diabetic while 31.7% patients were hypertensive. AKP at 3rd month was found in 8.8% patients.

Conclusion: It is evident that anterior knee pain (AKP) after the total knee arthroplasty (TKA), or total knee replacement (TKR) is prevalent and clinically relevant. There is an absolute need for further investigations to find out ways to decrease or eliminate the AKP after TKA in order to improve the quality of life after this surgery.

Keywords: Anterior Knee Pain, Total Knee Replacement, Total Knee Arthroplasty.

INTRODUCTION

Anterior knee pain is one of the most common causes of persistent problems after total knee replacement. According to the literature, the rates of satisfaction after total knee arthroplasty (TKA) vary between 75 and 89%.¹⁻³ It can occur with or without patellar resurfacing. The intensity of pain is mostly mild to moderate¹. Total Knee Arthroplasty is a common surgical procedure in which artificial joint or prosthesis replace damage knee. It's mostly used for treating patients with osteoarthritis, still significant proportion of the patients experience Anterior Knee Pain (AKP) after surgery².

The main objective of this study was to determine the frequency of anterior knee pain (AKP) after total knee arthroplasty (TKA) in patients presented to Department of Orthopedic Surgery in Khyber Teaching Hospital Peshawar.

MATERIAL AND METHODS

Sample Size: Sample size was 205 patients, keeping 7% prevalence of AKP after TKA, 95% confidence level and 3.5% absolute precision using WHO formula for sample size calculator.

Sampling Technique: Consecutive (non-probability) sampling technique was used to conduct this study.

Sample Selection: Inclusion Criteria

- 1 All patients scheduled for TKA irrespective of indication.
- 2 Patients of either gender.

Exclusion Criteria

- 1 Patients with BMI of more than 30 kg/m^2 .
- 2 Immunocompromised patients (diabetics with Fasting Blood Glucose of $>126 \text{ mg/dl}$, malignancy diagnosed through past medical records, patients with HIV/AIDS).
- 3 Patients with debilitating diseases like chronic liver, renal or cardiac impairment.

Data Collection Procedure: The study was carried out after getting approval from hospital's ethical and research committee. OPD/ER patients meeting the inclusion criteria were included in

the study. The purpose, risks and benefits of the study were explained to all included patients in detail. They were assured that the study was purely conducted for research and data publication and written informed consents were obtained from all included patients.

Complete history of all patients were recorded very keenly. Complete physical examination and routine pre-operative baseline investigations were done for all patients.

Post operatively, all patients were kept under observations for 5 days in ward and were discharged if indicated. The patients were followed at regular intervals and finally at the end of 3rd postoperative month to measure the intensity of pain on visual analogue scale (VAS) and label as presence or absence of Anterior Knee Pain.

All the data was entered and analyzed in SPSS 20. Mean \pm SD were calculated for numerical variables like age, BMI and pain on VAS. Frequencies and percentages were calculated for categorical variables like gender, indications for TKA (Rheumatoid Arthritis and Osteoarthritis), diabetes mellitus, hypertension and Anterior Knee Pain at 3rd month follow up. Anterior Knee Pain was stratified among age, gender, indications for TKA (Rheumatoid Arthritis and Osteoarthritis), diabetes mellitus and hypertension to see the effect modifiers using chi square test with P value < 0.05 as significant. All the results have been presented as tables.

RESULTS

A total of 205 patients were recruited as per sample size calculated through WHO software to conduct this study at the Department of Orthopedic Surgery, Khyber Teaching Hospital, Peshawar. Means and Standard Deviation calculated for age was 48.62 ± 7.98 years, for BMI was 24.63 ± 3.07 and for Pain on VAS (at 3rd month follow up) was 1.31 ± 1.39 (Table 1).

As per gender distribution, 69.3% patients were male while

30.7% patients were female (Table 2).

Anterior Knee Pain (AKP) at 3rd month follow up was found in 8.8% patients while it was absent in 91.2% patients according to our operational definition (Table 3).

Anterior Knee Pain (AKP) at 3rd month follow up was stratified with respect to gender wherein it was found 4.4 % male patients and 4.4% female patients were still feeling the pain while 64.9% male patients and 26.3% female patients were not feeling the pain at 3rd month follow up (Table 4).

Anterior Knee Pain (AKP) at 3rd month follow up was stratified with respect to indications for TKA (Rheumatoid Arthritis or Osteoarthritis), wherein it was found that 2.4% of the patients who were having Rheumatoid Arthritis and 6.3% of the patients who were having Osteoarthritis were still feeling the pain. On the other hand, 15.6% of the patients who were having Rheumatoid Arthritis and 75.6% of the patients who were having Osteoarthritis were not feeling the pain (Table 5).

Anterior Knee Pain (AKP) at 3rd month follow up was stratified with respect to Body Mass Index (BMI), wherein it was found that 1.5% patients in 19-22.9 BMI group, 4.4% patients in 23-26.9 BMI group and 2.9% patients in 27-29.9 BMI group were feeling Pain (AKP). On the other hand, 34.1% patients in 19-22.9 BMI group, 29.8% patients in 23-29.9 BMI group and 27.3% patients in 27-29.9 BMI group were not feeling the Pain (AKP) as per our operational definition (Table 6).

Table 1: Mean and Standard Deviation of Numeric Variables (n = 205)

Variables	Mean	Standard Deviation
Age	48.62	±7.98
BMI	24.63	±3.07
Pain on VAS	1.31	±1.39

Table 2 Gender Distribution (n = 205)

Gender	Frequency	Percent
Male	142	69.3%
Female	63	30.7%

Table 3: Frequency and Percentages of Anterior Knee Pain (AKP) at 3rd Month Follow Up (n = 205)

AKP	Frequency	Percent
Yes	18	8.8%
No	187	91.2%

Table 4: Stratification of Anterior Knee Pain (AKP) with Respect to Gender (n = 205)

TKP	Gender			
	Male	%age	Female	%age
Yes	9	4.4%	9	4.4%
No	133	64.9%	54	26.3%

P Value = 0.064

Table 5: Stratification of Anterior Knee Pain (AKP) with Respect to Indications for TKA (n = 205)

TKP	INDICATIONS FOR TKA			
	Rheumatoid Arthritis	%age	Osteoarthritis	%age
Yes	5	2.4%	13	6.3%
No	32	15.6%	155	75.6%

P Value = 0.261

Table 6: Stratification of Anterior Knee Pain (AKP) with Respect to Body Mass Index (BMI) (n = 205)

AKP	BMI					
	19-22.9	%age	23-26.9	%age	27-29.9	%age
Yes	3	1.5%	9	4.4%	6	2.9%
No	70	34.1%	61	29.8%	56	27.3%

P Value = 0.173

Anterior Knee Pain (AKP) at 3rd month follow up was stratified with respect to Diabetes Mellitus and Hypertension.

Wherein it was found that 1.5% of the diabetic patients and 7.3% of the non-diabetic patients were still feeling the pain while 20% of the diabetic patients and 71.2% of the non-diabetic patients were not feeling the pain (Table 7).

Table 7: Stratification of Anterior Knee Pain (AKP) with Respect to Diabetes Mellitus (n = 205)

TKP	Diabetes Mellitus			
	Yes	%age	No	%age
Yes	3	1.5%	15	7.3%
No	41	20%	146	71.2%

P Value = 0.604

DISCUSSION

It has been estimated that clinically significant osteoarthritis of the knee currently affects 5% to 10% of people³. With a predicted increase in life expectancy and an increasingly active population, the number of patients who are seeking treatment for significant pain and disability secondary to knee arthritis are undoubtedly increasing⁴. In past, before 2005 it was considered that once a definitive diagnosis of osteoarthritis would be made, initial non-operative treatment modalities would include anti-inflammatory medications, heel wedges, off-loading knee braces, weight reduction, activity modification, and the use of ambulatory aids (e.g., cane, crutches)⁵. Failure of these non-operative methods to provide adequate relief might prompt treatment with infrequent use of intra-articular corticosteroid or viscosupplementation. But at last, surgical intervention with Total Knee Arthroplasty (TKA) was the need of the time which was offered to those who had exhausted non-operative attempts to improve quality of life. Occasionally, urgent referrals to orthopedic surgeons were indicated in patients who were presented with complaints of debilitating knee pain and radiographic evidence of severe bone loss and deformity on initial standard radiographs⁶.

The most important finding of the current study is that various variables have been observed with regard to the prevalence of AKP, with some clearly demonstrating a correlation with AKP⁷. Patients' characteristics including age, gender, BMI, diabetes mellitus, hypertension and the presence of preoperative AKP were not found to be predictive of AKP.

Furthermore, it was also observed that the strength of the quadriceps muscle, the ability to stand from sitting on a chair, the thickness of the tibial inlay, and a radiologically measured PB were associated with experiencing postsurgical AKP⁸. Logistic regression revealed that the inlay thickness, the strength of the quadriceps muscle⁹, and the CD1 are associated with AKP, independently from the gender, BMI, age, knee re-surgery, and the number of months after surgery¹⁰. Several investigations pointed out the importance of the function of the quadriceps muscle as a predictor of functional abilities in patients undergoing TKAs¹¹, especially for the elderly. The observed association of AKP with decreased strength of the quadriceps muscle underlines the need of strength training and appropriate physical therapy¹². To accomplish a more profound approach to address the often-observed weakness of the quadriceps muscle, Werner et al¹³, for instance, suggested a multiphasic approach, including an early correction of imbalance between the vastus medialis and vastus lateralis for physically active individuals with AKP¹⁴. A significant association of the thickness of the tibial inlay with AKP was observed when comparing the samples and, in addition, as part of the logistic regression analysis as an independent variable, it was found that an independent association of the thickness of the tibial inlay with AKP¹⁵⁻¹⁶, where by participants having a thinner inlay implanted were more susceptible to experience postsurgical AKP¹⁷⁻¹⁸.

Furthermore, it is not conclusively possible to clarify if the observed limited strength of the quadriceps muscle in participants with AKP is responsible for the postsurgical AKP or if the postsurgical AKP results in less loading of the leg, which impairs quadriceps muscle strength¹⁹⁻²⁰. To investigate further, future studies may consider focusing on quadriceps muscle strength of

the uninjured limb considering the fact that patients tend to shift weight away from the operated limb. So that a causal relationship between postsurgical AKP and the ability to stand up from a chair can be finally drawn, and a careful interpretation of the obtained results may be made.

CONCLUSION

Postoperative pain in both genders are the most common complaint after surgery. It is evident that anterior knee pain (AKP) after the total knee arthroplasty (TKA), or total knee replacement (TKR) is prevalent and clinically relevant. It is well defined that there is an absolute need for further workup to find out ways to decrease or eliminate the AKP after TKA in order to improve the quality of life after TKA surgery are same in all genders groups.

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