**Original Article :**

# Analysis of knee arthroplasty surgeries in Asir province, Kingdom of Saudi Arabia—Techniques, pre-operative criteria, and comorbidities

Ali Mubarak A Al Qahtani[1], Zaki Sulaiman Al Hefzi[2], Awad Saeed Shafllot[3], Majed Abdullah Al Hoban[4], Ashaq Mubarak AlQahtani[4], Venkata Nagaraj Kakaraparthi[5], Irshad Ahmad[5]

1. Orthopedic Senior Resident, ACH, MOH, Abha, KSA.

2. Consultant of Orthopedic arthroplasty and MSK Oncology, ACH, MOH, Abha, KSA.

3. Consultant of Orthopedic arthroplasty, ACH, MOH, Abha, KSA.

4. Orthopedic Resident, ACH, MOH, Abha, KSA.

5. Department of Medical Rehabilitation Sciences, College of Applied Medical Sciences, King Khalid University, Abha, KSA

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**Corresponding Author:**

Venkata Nagaraj Kakaraparthi*

Department of Medical Rehabilitation Sciences,College of Applied Medical Sciences

King Khalid University, P.O Box Number 3665 , Guraigar, Abha, KSA

Mob: 00966-504885712 , Email: kvnagaraj13@yahoo.com

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**Abstract**

**Background & Aims:**

The aim of this study was to analyze the increasing numbers of total knee arthroplasty procedures and examine utilization in Asir province, Abha, Kingdom of Saudi Arabia.

**Methods:**

In this retrospective study, patients who underwent total knee arthroplasty at Asir Central Hospital from 2018 to 2020 were analyzed according to demographic characteristics, including age, gender, and procedure type.

**Results:**

We found an increase in the incidence of knee arthroplasties from 2018 to 2019 and a drastic decrease from 2019 to 2020. Most patients were women older than 65 years. The most common pre-operative diagnosis was osteoarthritis. Diabetes mellitus and hypertension were the most chronic comorbid chronic illnesses reported for the patients in this study.

**Conclusion:**

We found substantial variance in the numbers of knee arthroplasties performed during the study period. We expect an increase in the number of knee arthroplasties performed in the future, which may pose a financial burden on the healthcare system in Abha, Saudi Arabia.

**Keywords:**

Knee arthroplasty, gender, incidence, Saudi Arabia

## Introduction

The introduction of bicondylar knee arthroplasty occurred in 1970, as the first reported general arthroplasty [1], and soon became adopted for clinical application in Sweden, Finland, Norway, Germany, USA, Australia, Canada, New Zealand, Saudi Arabia, and many other countries worldwide. Knee arthroplasty is among the most common and well-known surgical procedures used for the management of knee osteoarthritis (OA) to relieve pain and improve functional health [2,3]. However, these procedures are costly, and the number of knee arthroplasty procedures performed is expected to increase significantly due to an increasing incidence in arthritis among the global aging population [4,5]. Estimates suggest that the demand for knee arthroplasty will continue to increase over the next ten years [6], with an increasing number of younger patients undergoing knee arthroplasties, particularly in western populations [7,8]. Differences in the frequency of total knee arthroplasty (TKA) procedures have been observed between geographical locations and among age groups [9,10].

On a global scale, attempts have been made to improve and standardize existing TKA procedures and establish worldwide registries of patients who undergo knee arthroplasties. Prospective advantages exist to combining data obtained from various countries, which might reveal variations in the disease presentation, treatment procedures, and outcomes [11]. However, not all hospitals and doctors report their TKA procedures or outcomes to medical registries, resulting in a lack of available data [12]. Therefore, we addressed two primary objectives in this study: 1) examine the incidence of TKA procedures in Asir province; and 2) identify differences in postoperative complications according to age and gender

## Materials and Methods

Data collected between 2018 and 2020 were provided by Academic Affairs, Abha, Kingdom of Saudi Arabia, which included pre-operative diagnosis, surgical procedures, and postoperative complications associated with knee arthroplasty procedures performed at Asir Central Hospital, Abha, Kingdom of Saudi Arabia.

The Asir Central Hospital Research Ethics Committee (REC # 2019-01-13) approved the present study, which was performed in accordance with the ethical standards of the local ethical committee.

Information was obtained for all patients who underwent TKA, and subgroup analyses were performed according to age and gender

SPSS software (version 21.0 for Windows; SPSS, Inc, Chicago, USA) was used to

conduct statistical analyses, and data were evaluated and graphically demonstrated. Descriptive statistics were used to characterize the sample.

## Results

A slight increase in the number of TKA procedures performed was observed between 2018 and 2019, and a drastic decrease was observed between 2019 and 2020. During the investigated 3-year period, 102 TKAs were performed in 2018, 116 were performed in 2019, and only 39 were performed in 2020 (Table. 1).

Table 1: Knee arthroplasty procedures performed .from 2018 to 2020

| Year | No. of procedures |
|---|---|
| 2018 | 102 |
| 2019 | 116 |
| 2020 | 39 |

Approximately 69.6% of all procedures were performed in women (Table. 2), and nearly 68.8% of patients were older than 65 years (Fig. 1).

Table 2: Percentage of knee arthroplasty procedures per- .formed according to gender

| Gender | Percentage of procedures (%) |
|---|---|
| Male | 30.4 |
| Female | 69.6 |

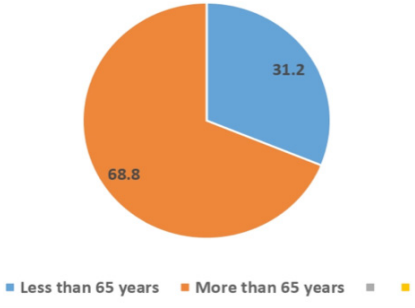



Figure 1: Percentage of knee arthroplasty procedures performed according to age.

A greater number of TKA procedures were performed on the left side (52.1%), compared with the right side (37.7%), with the remaining procedures performed bilaterally (10.1%). A decrease in the number of bilateral TKA procedures was observed comparing between 2018 and 2020 (Fig. 2).

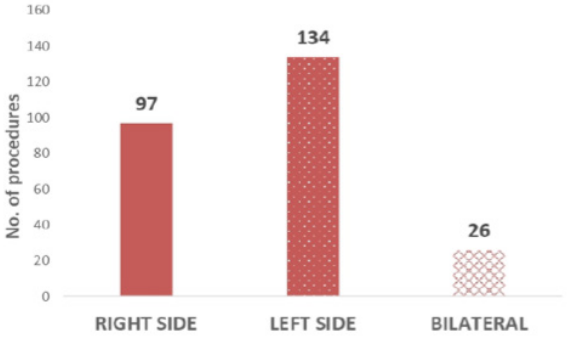



Figure 2: Percentage of knee arthroplasty procedures performed according to side.

The majority of patients (97.6%) who underwent TKA were diagnosed with osteoarthritis, with the remainder diagnosed with other conditions such as rheumatoid arthritis, post-traumatic conditions. (Fig. 3).

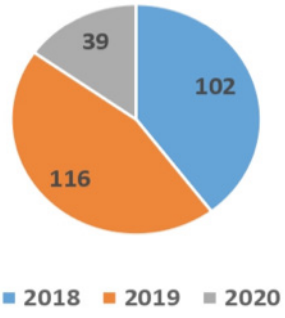



Figure 3: Pre-operative diagnosis of the patients who undergo knee arthroplasty.

Prior to surgery, patients were diagnosed with hypertension (43.5%), diabetes (41.6%), and other conditions such as ischemic heart diseases, renal diseases etc.

(Fig. 4), and the number of hypertensive patients who underwent TKA increased each year. The majority of procedures used components manufactured by Depuy (43.5%), followed by Stryker (29.1%), Smith & Nephew (21%), and other companies. Among patients who underwent knee arthroplasty, more than two-thirds of patients were classified as overweight or obese.

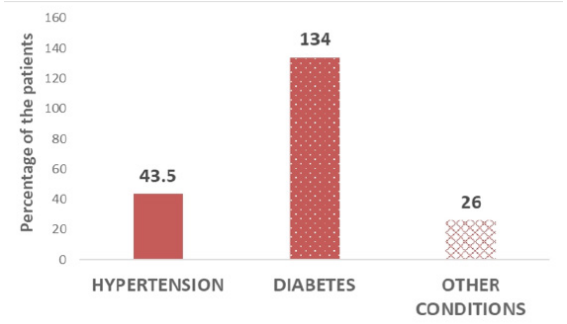



Figure 4: Chronic illnesses among patients who undergo knee arthroplasty.

## Discussion

The aim of the present study was to evaluate the occurrence of TKA procedures performed between 2018 and 2020 in the Asir region, Abha, Saudi Arabia, according to age, gender side, pre-operation diagnosis, manufacturer of materials used, and patient comorbidities.

The incidence of knee arthroplasties has been increasing yearly in Saudi Arabia based on the statistics available in the present study. To our knowledge, this is the first study to provide an overview of the incidence of knee arthroplasty procedures performed at Asir Central Hospital, Abha, Saudi Arabia, over a period of three years, with consideration for various contributing factors.

A slight increase in the number of knee arthroplasty procedures performed in Saudi Arabia was observed between 2008 and 2018, which is consistent with the reports of studies performed in Italy and the United States [6,13]. This increase might be associated with the patient selection criteria for knee arthroplasty, which is commonly recommended for the treatment of osteoarthritis in patients older than 60 years.

The majority of patients in our study underwent unilateral knee arthroplasty procedures. Many unilateral knee arthroplasty patients informed us of the need for contralateral TKA, even though arthroplasty was not necessary according to guidelines. Unnecessary surgical procedures performed on the contralateral side can result in a decrease in the range of motion of the sagittal plane knee joint, increased adduction range of motion, and a decreased push-off vertical ground reaction force, compared with those in patients who underwent unilateral knee arthroplasty procedures. Patients who underwent bilateral knee arthroplasty were found to have stiff knee joint range of motion in the sagittal plane, enhanced frontal plane joint slackness, and a quadriceps prevention gait, similar to the findings of previous studies [14-16].

The majority of patients who underwent knee arthroplasty in the present study were women, and with twice as many women receiving the procedure as men during the study period. This result was similar to those reported by previous studies, indicating a higher rate of osteoarthritis occurrence in the knee joint of women than of men [17,18], which coincides with the increased diagnosis of osteoarthritis among women than among men [19]. Various other factors that may contribute to this difference also showed gender-predominant trends, which should be investigated in future studies.

This study has some limitations. First, not all arthroplasty procedures were analyzed in this study. Second, we only analyzed primary knee arthroplasty procedures, whereas patients who underwent revision arthroplasty were not included in this study. Third, the patient dissatisfaction rates after the procedure were not evaluated in this study. Last, the data we analyzed belong only to one hospital in this region and may not be representative of the entire region.

## Conclusion

We found that TKA procedures increased from 2018 to 2019 and decreased from 2019 to 2020. Patients older than 65 years were the most common cohort to undergo TKA surgery, and women underwent this procedure more often than men. In addition, international differences in patient demographics were observed when comparing our results with those of other countries, and differences in the national healthcare system of the Kingdom of Saudi Arabia compared with other countries could also contribute to differences in TKA incidence.

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