

# Study of post total knee replacement and outcome in Aden, Yemen

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## Abstract

**Background:** Total knee replacement (TKR) has significantly improved the quality of life of patients suffering from osteoarthritis of the knee.

**Objective:** The objective of the study was to describe the characteristics of the patients and to evaluate the total knee replacement related to sex, age, weight, outcome and complications.

**Materials and method:** This was a retrospective study of all patients who underwent knee replacement surgery at Al-Naqib Private Hospital in Aden, over the period from January 2016 to December 2018.

**Results:** The total study patients were 62 and they were 21 (33.9%) males and 41 (66.1%) females. Most of patients were in the age 56-70 years with 33 (53.2%).

The age of all patients ranged between 25 to 85 years. The mean age of all patients was  $59.0 \pm 13.2$  years.

There was statistically significant difference between mean ages of male and female patients ( $p < 0.05$ ). The female patients with weight of 60 kilogram and more were predominant 28 (45.2%). The difference between values is statistically highly significant ( $p=0.003$ ).

The comorbidity were congestive cardiac failure 2 cases (3.2%), diabetes mellitus and hypertension 5 (8.1%) and hypertension 6 (9.7%). We found varus deformity predominance with 58 (93.5%) and valgus deformity 4 (6.5%).

Two female patients (3.2%) developed postoperative superficial surgical site infection and also 2 (3.2%) female patients complained of postoperative mild pain.

Mild kneeling pain and discomfort were found in 34 (54.8%). The difference between values of gender related to kneeling pain and discomfort is statistically significant ( $p = 0.05$ ).

**Conclusion:** Patients underwent TKR in our study were mostly women. Our results showed only two cases developed postoperative superficial surgical site infection and also 2 (3.2%) female patients complained of postoperative mild pain, also a large number cases of kneeling pain and discomfort.

**Key words:** Total knee, replacement, outcome, Aden, Yemen

## Introduction

Osteoarthritis (OA) affects hundreds of millions of people worldwide and accounts for a huge burden of pain, functional limitations, loss of productivity, disability, and loss of quality-adjusted life expectancy [1].

Total knee replacement (TKR) has been performed since the 1960s and has significantly improved the quality of life of patients suffering from osteoarthritis of the knee [2]. Recent trends show that patients undergo surgery at a younger age [3]. Furthermore, they want to be able to return to their daily activities and work as soon as possible [2].

OA contributes strongly to one individual's global disability and has been shown to be the leading cause of immobility and impaired health related quality of life in the elderly as compared to any other chronic disease [4]. End-stage osteoarthritis of the knee can be understood as a total organ failure of the synovial knee joint resulting from damage and subsequent loss of function of the involved structures: bone, meniscus, synovium, synovial fluid and cartilage [5]. Till now, there is still no curative treatment available, and thus, the ultimate cure remains the total surgical replacement of the affected knee joint.

Radiographic evidence of end-stage knee OA and consistent pain refractory to treatment have been postulated to be the leading key indicators for taking the decision for TKR surgery [6]. Of those two criteria, the x-ray imaging-based assessment of the knee joint is the more objective and reliable method and has been shown to serve as a good parameter when trying to evaluate the patient's need for TKR [7].

## Objective

To describe the characteristics of the patients and to evaluate the total knee replacement related to sex, age, weight, outcome and complications.

## Materials and method

This is a retrospective study of all patients who underwent knee replacement surgery at Al-Naqib Private Hospital, in Aden, over the period from January 2016 to December 2018.

The total study patients during this period were 62 who were admitted at the Hospital for total knee replacement. The patients' charts were retrieved and obtained data about sex, age, side, and the variables of post-operative findings.

The data was analyzed using SPSS version 17. Data was presented as frequencies and percentages for categorized variables and as means and standard deviation for continuous variable. The relationships between study variables were examined based on Fisher test. Significance was considered at P value  $\leq 0.05$ .

## Results

Table 1 and Figure 1 show the total study patients were 62 and they were 21 (33.9%) males and 41 (66.1%) females. The ratio of female to male was 2:1. The age groups 25-40 years were 8 (12.9%) patients, 41-55 years were 15 (24.2%), 56-70 were 33 (53.2%) patients and the age groups over 70 years were 6 (9.7%). The age of all patients ranged between 25 to 85 years. The mean age of all patients was  $59.0 \pm 13.2$  years; the mean age of male patients was  $61.5 \pm 15.1$  years and the mean age of female patients was  $57.7 \pm 12.1$  years. There was a statistically significant difference between mean ages of male and female patients ( $p < 0.05$ ).

Table 2 reveals that the effected left knee in females and in male patients was predominant. In female patients it was 25 (40.3%) and in male patients 13 (21.0%) of the total patients. The difference between values is not statistically significant ( $p = 0.005$ ).

Also, Table 2 shows that female patients with weight of 60 kilogram and more were predominant 28 (45.2%). While male patients of less than 60 kilogram weight were 15 (24.2%). The difference between values is statistically highly significant ( $p=0.003$ ).

The comorbidities were congestive cardiac failure 2 cases (3.2%), diabetes mellitus and hypertension 5 (8.1%) and hypertension 6 (9.7%). We found varus deformity predominance with 58 (93.5%) and valgus deformity 4 (6.5%).

## Discussion

Knee OA is the leading cause of pain and disability in older people [8]. If pharmacological and conservative treatments do not relieve symptoms, primary TKR is commonly performed. In 2013, over 70,000 TKR operations were performed in the National Health Service [9]. Although the operation is effective for many patients, a considerable proportion of patients experience long-term pain and functional limitations after surgery [10]. An estimated 20 % of patients report long-term pain after TKR [11] and 52 % of patients report functional limitations, compared to 22 % of age- and gender-matched people without TKR and no previous history of knee disorders [10]. Evidence also suggests that many patients do not return to more demanding activities after TKR, such as gardening [10,12], kneeling [13], sports [14] and valued leisure activities [15].

In our study, females were 41 (66.1%) while males were 21 (33.9%) and the ratio of females to males was 2:1.

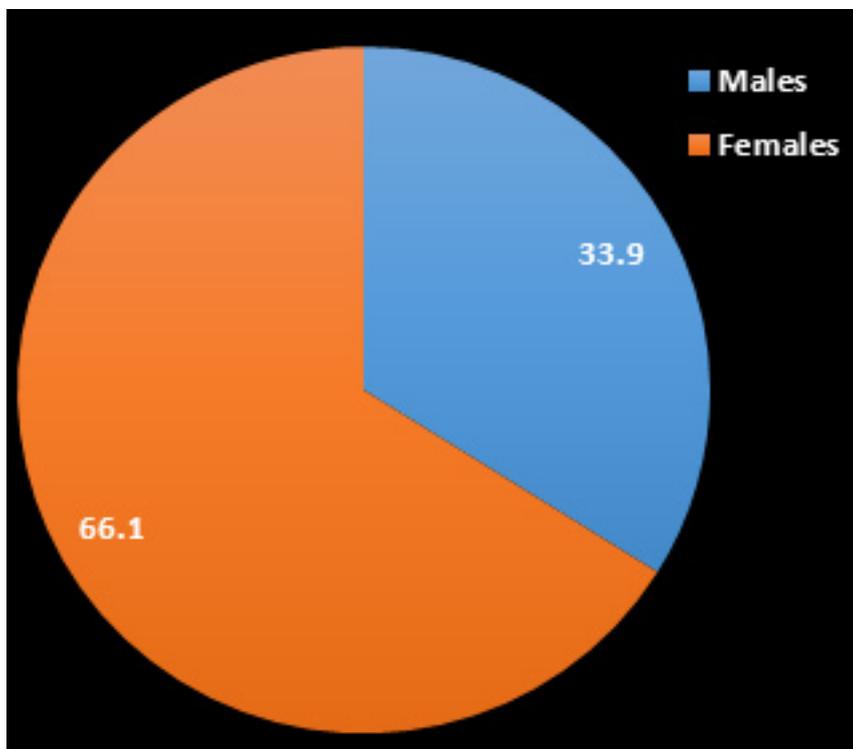
Compared with men, women are at increased risk of knee OA and of greater severity at presentation [16]. Women are 3 times more likely than men to undergo TKR at a more advanced stage of OA [16]. Women experience greater pain before and after TKR but gain as much benefit as men from TKR [17]. Women achieve greater

Table 1: Demographic characteristics of the study patients (n=62)

Variables	Ratio	Means $\pm$ SD	No	%
<b>Sex:</b>				
Males			21	33.9
Females			41	66.1
<i>Ratio female : male</i>	2 : 1			
<b>Age group (years):</b>				
25-40			8	12.9
41-55			15	24.2
56-70			33	53.2
> 70			6	9.7
<b>Age (years):</b>				
Age range (years):		25 - 85		
Total mean age $\pm$ SD		59.0 $\pm$ 13.2		
Male mean age $\pm$ SD		61.5 $\pm$ 15.1		
Age range (years)		25 - 85		
Female mean age $\pm$ SD		57.7 $\pm$ 12.1		
Age range (years)		26 - 80		
P-value		0.019		

SD = Standard Deviation

Figure 1: Distribution of study patients related to sex (n=62)



**Table 2: Characteristics and clinical findings of the study patients (n=62)**

Variable	Sex		Total No (%)	p-value
	Females	Males		
<i>Side:</i>				
Left knee	25 (40.3)	13 (21.0)	38 (61.3)	P > 0.05
Right knee	16 (25.8)	8 (12.9)	24 (38.7)	
<i>Weight:</i>				
Less than 60 kg	13 (21.0)	15 (24.2)	28 (45.2)	P = 0.003
≥ than 60 kg	28 (45.2)	6 (9.7)	34 (54.8)	
<i>Comorbidity:</i>				
Congestive cardiac failure	1 (1.6)	1 (1.6)	2 (3.2)	P > 0.05
Diabetes mellitus and hypertension	4 (6.5)	1 (1.6)	5 (8.1)	
Hypertension	6 (9.7)	0 (0.0)	6 (9.7)	
NO	30 (48.4)	19 (30.6)	49 (79.0)	
<i>Angulation:</i>				
Valgus deformity	4 (6.5)	0 (0.0)	4 (6.5)	P > 0.05
Varus deformity	37 (59.7)	21 (33.9)	58 (93.5)	
<i>Fixed flexion deformity:</i>				
Mild	5 (8.1)	7 (11.3)	12 (19.4)	P > 0.05
Severe	1 (1.6)	0 (0.0)	1 (1.6)	
No	35 (56.5)	14 (22.5)	49 (79.0)	

**Table 3: Distribution of post-operative findings of the study patients (n=62)**

Variable	Sex				Total	p-value	
	Female		Male				
	No	(%)	No	(%)			
<i>Post-operative infection:</i>							
Surgical site infection	2	(3.2)	0	(0.0)	2	(3.2)	P > 0.05
Non-infected	39	(62.9)	21	(33.9)	60	(96.8)	
<i>Post operation pain:</i>							
Mild	2	(3.2)	0	(0.0)	2	(3.2)	P > 0.05
No pain	39	(62.9)	21	(33.9)	60	(96.8)	
<i>Kneeling pain and discomfort:</i>							
Mild	26	(41.9)	8	(12.9)	34	(54.8)	P = 0.05
Non	15	(24.2)	13	(21.0)	28	(45.2)	

improvement in function than men after TKR, but do not attain the same final level of function [18].

In the current study, we found most of the patients were of the age group 56-70 years with 33 (53.2%) patients. The age of all patients ranged between 25 to 85 years. The mean age of all patients was  $59.0 \pm 13.2$  years, the mean age of male patients was  $61.5 \pm 15.1$  years and the mean age of female patients was  $57.7 \pm 12.1$  years. There was a statistically significant difference between mean ages of male and female patients ( $p < 0.05$ ).

Carr et al [19] reported that TKR remains a successful and effective procedure in the treatment of knee osteoarthritis.

As the osteoarthritis burden grows, an increasing number of TKRs are being performed; high-volume countries like the United States are projecting nearly 3.5 million procedures for the year 2030 [19,20].

Growing patient demand, expectations for improved quality of life, and increasing implant survivorship have contributed to the expansion of TKR towards a greater number of younger patients [21] In particular, patients <65 years of age represent the fastest growing population of TKR recipients and are expected to account for more than 50% of knee replacement procedures by the year 2030 [22].

Growing patient demand, expectations for improved quality of life, and increasing implant survivorship have contributed to the expansion of TKR towards a greater number of younger patients [21]. In particular, patients <65 years of age represent the fastest growing population of TKR recipients and are expected to account for more than 50% of knee replacement procedures by the year 2030 [22].

The rapidly expanding use of TKR by younger patients presents a number of different challenges. Due to more active lifestyles, greater physical demands, and longer lifespans compared to traditionally older recipients of TKR, concerns have been raised about the higher rates of revision surgery faced by this group [23]. Bayliss et al [24] have reported an increased lifetime risk of revision of up to 35% in male patients who undergo TKR in their early 50s. Furthermore, the excellent pain, function, and quality of life outcomes reported in the literature have mostly related to older and less active patient populations, and therefore may not translate to younger patients [23].

In the present study, we found that female patients with weight of 60 kilogram and more were predominant 28 (45.2%), while male patients of less than 60 kilogram weight were 15 (24.2%). The difference between values is statistically highly significant ( $p=0.003$ ).

Manek et al [25] found a strong association between high body mass index (BMI) and the presence of knee OA in a study of female twins with a mean age of 54.5 years. Coggon et al [26] found an increased relative risk of knee OA with increased weight.

Harms et al [27] reported that few studies have examined the relationship between obesity and total joint replacement among individuals less than 60 years old.

We found in our present study that varus deformity predominance with 58 (93.5%) and mild fixed flexion deformity.

Verdonk et al [28] found in their study that varus deformity of the knee is the most common angular deformity in total knee arthroplasty.

In our current study, we found 2 (3.2%) female patients with postoperative superficial surgical site infection.

Our finding of postoperative surgical site infection was low value as that reported by Khan et al [29] from Pakistan in which they found out of the total 78 cases, 5 (6.41%) cases got infected.

We found in the present study 2 (3.2%) female patients developed postoperative mild pain complication. Also, we found mild kneeling pain and discomfort in 34 (54.8%). The difference between values of gender related to kneeling pain and discomfort is statistically significant ( $p = 0.05$ ). Anterior knee pain is one of the most common causes of persistent problems after implantation of a total knee replacement. It can occur with or without patellar resurfacing [30]. Sensi et al [31] reported an incidence of 8 % for anterior knee pain after TKR and the intensity of pain is mostly mild to moderate.

There have been a number of studies of knee replacement systems which have shown adequate functional results at middle- to long-term follow-up [32]. Most of the functional scoring systems quoted in these studies use pain, the ability to walk or to ascend and descend stairs, the use of a walking aid, etc as measurements of outcome [33].

The ability to kneel is usually not considered. Some recently introduced scoring systems, derived from patient questionnaires, include kneeling as a criterion of function of the knee [34]. The kneeling position is important in many activities of daily living and in certain occupations [35]. The kneeling has been shown to be a predisposing factor for osteoarthritis of the knee and so preselects patients who will need to kneel after surgery. Kneeling has also been shown to be an intermediate position used by older adults to enable them to rise from the floor [36].

Many patients advised to have surgery for arthritis of the knee enquire about the ability to kneel after operation, but there is little published information on the subject [37].

## Conclusion

Patients underwent TKR in our study were mostly women of mean age  $57.7 \pm 12.1$  years, with weight 60 kilogram and more and complained of knee osteoarthritis.

Our results showed only two cases developed postoperative superficial surgical site infection and also 2 (3.2%) female patients complained of postoperative mild pain, and a large number of kneeling pain and discomfort.

More studies are needed aiming to create specific protocols in order to improve the quality of clinical practice with consequent reduction of postoperative complications.

## Recommendation

- In management of osteoarthritis cases operatively it is major role that the early the operation to be done the better the result post operatively, so the younger the patient age the better the results
- In Aden, one of the main factors that improves the post operative long standing result of TKR is to change lifestyle.
- Weight plays a major role in post operative long standing outcome, so reduction of weight preoperatively and postoperatively is an important factor.
- Comorbidity control is an important factor to improve TKR outcome.

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