



# Knowledge and attitude toward total knee arthroplasty among senior medical students in comparison to public population in Saudi Arabia: cross-sectional study

Asim M. Makhdom, MD, MSc<sup>a</sup>, Mohammed Anwar Jan, MD<sup>b,\*</sup>

**Background:** Total knee arthroplasty (TKA) is currently considered one of the most common and successful orthopaedic procedures. It plays an essential role in the long-term treatment of osteoarthritis and enhances the patient's quality of life. Very little is known about public and medical students' perceptions of this procedure. The purpose of the current study was to assess the knowledge and attitudes toward TKA among medical students in comparison with the general population in Saudi Arabia.

**Method:** A cross-sectional study was conducted between February and March 2023. Senior-year (interns and the fifth and sixth year) medical school students (Group A) as well as the general population (Group B) were surveyed online. The distributed questionnaire was divided into three main segments: demographics, knowledge, and the prognosis of TKA. The answers were statistically compared among participants.

**Results:** Three hundred thirty-one participants were involved in this study, of whom 202 were from the general population and 128 were medical students. Most of the participants were males (68.3%), and the mean age was  $32.95 \pm 15.22$ . The results were divided into three groups: demographic, knowledge, and prognosis. Medical students demonstrated a higher knowledge score ( $111.25 \pm 42.38$ ) compared to the general population knowledge score ( $64.68 \pm 44.29$ ), ( $P < 0.001$ ).

**Conclusion:** Senior-year medical school students and the general population showed a low level of knowledge regarding TKA. However, the students had a better awareness of the procedure. The authors recommend frequent public education programs for the benefits of TKA. In addition, medical schools are encouraged to emphasize the benefits of TKA as a treatment choice for end-stage knee arthritis in their curriculum and training.

**Keywords:** awareness, orthopaedic, osteoarthritis, TKA, total knee arthroplasty

## Introduction

Total knee arthroplasty (TKA) is the preferred therapeutic intervention for individuals with advanced knee osteoarthritis (OA)<sup>[1]</sup>, particularly in cases where the condition has reached its end-stage. Enhancing the public perception of TKA will facilitate effective doctor-patient communication pertaining to surgical procedures. In Saudi Arabia, the prevalence of knee OA throughout the past two decades ranged between 13 and 41%<sup>[2]</sup>. In 2017, a research study was conducted in Riyadh, Saudi Arabia, with a total of 1540 participants who were Saudi citizens and

## HIGHLIGHTS

- Total knee arthroplasty (TKA) offers effective pain relief and improves function for individuals with severe knee arthritis.
- This cross-sectional study aimed to evaluate medical students' awareness about the procedure as well as the general population in Saudi Arabia.
- Although medical students had better awareness when compared to the general population, both groups had low level of knowledge regarding TKA.
- The importance of educating patients and their relatives should be emphasized in the clinical settings.
- Local medical schools may consider to modify the curriculum to emphasize the benefits of TKA for those with end-stage arthritis.

<sup>a</sup>King Abdulaziz University and <sup>b</sup>King Abdulaziz University, Jeddah, Saudi Arabia

Sponsorships or competing interests that may be relevant to content are disclosed at the end of this article.

\*Corresponding author. Address: King Abdulaziz university 7427 omar ibn nedlah Jeddah, Saudi Arabia. Tel.: +96 656 126 0844. E-mail: Mohammedjan0844@gmail.com (M. A. Jan).

Copyright © 2024 The Author(s). Published by Wolters Kluwer Health, Inc. This is an open access article distributed under the terms of the Creative Commons Attribution-Non Commercial-No Derivatives License 4.0 (CCBY-NC-ND), where it is permissible to download and share the work provided it is properly cited. The work cannot be changed in any way or used commercially without permission from the journal.

Annals of Medicine & Surgery (2024) 86:2555–2561

Received 28 August 2023; Accepted 25 February 2024

Published online 5 March 2024

<http://dx.doi.org/10.1097/MS9.0000000000001912>

found that there persists a misperception and a limited comprehension regarding TKA, perhaps leading to undesirable effects as individuals may decline to have this procedure<sup>[3]</sup>. In 2013, a study was conducted to examine patient attitudes regarding TKA and the impact of different sources of information on these perceptions. The study concluded that certain patients have the expectation that pain reduction is the major objective of the treatment. On the contrary, smaller cohorts hold the expectation that they

will be able to resume their vigorous pursuits subsequent to undergoing a surgical procedure<sup>[4]</sup>. This lack of understanding could potentially affect the prognosis of surgery<sup>[5]</sup>.

Research has demonstrated that disease awareness and health promotion activities provide notable improvements in patients' health outcomes and their capacity to make lifestyle modifications. The findings of this study unequivocally demonstrate the need for patient education. For instance, research has indicated that people who did not receive any form of diabetes education had a four-fold increase in the likelihood of acquiring significant complications<sup>[6]</sup>. Furthermore, some studies have demonstrated that the implementation of efficacious health education initiatives yields enhanced knowledge, attitudes, and behaviours, resulting in improved glycemic control and the mitigation of diabetes-related consequences<sup>[7,8]</sup>. Such common diseases (e.g. diabetes) have significant coverage in medical school curricula. In contrary, we feel elective procedures such as TKA for end-stage arthritis have little coverage. The primary aim of this study was to evaluate the understanding and awareness of TKA among senior medical students and compare it with that of the general public in Jeddah, Saudi Arabia. These results can be used for the recent and future development of the orthopaedic curriculum and more emphasis on training, which will be reflected in better awareness of this procedure.

## Method

This is an online cross-sectional study that was conducted between February 13 and March 30 2023, in Jeddah, Saudi Arabia. This study was approved by the local institutional ethics review board. This study is registered with a Research Registry UIN (research registry 9715; URL: <https://researchregistry.knack.com/research-registry#home/registrationdetails/655a57244e68fa002a3d1227/>).

Based on the available literature, the authors structured a self-administered questionnaire<sup>[3]</sup>. All the participants were informed that no identification was required. Data was kept secure, and only authorized individuals had access to it. The questionnaire was distributed to fifth and sixth-year medical students and interns in Jeddah and the adult population in Jeddah through social media (WhatsApp, Facebook, Twitter, and Instagram) using convenience sampling technique. The invitation letter of the questionnaire included the study aim and objectives and the inclusion criteria. Participants who meet the inclusion criteria were asked to participate in the study after providing their consent to participate. To avoid duplicate participants, each participant was asked to provide an e-mail address. This work has been reported in line with STROCSS criteria<sup>[9]</sup>.

Being fifth and sixth-year medical students and medical interns in Jeddah and the general population living in Jeddah were the only inclusion criteria. Those who refused to complete the questionnaire and those who were 18 years of age were excluded. Those who did not complete the questionnaire and those under 18 years of age were excluded from the study.

## Questionnaire

The questionnaire was adopted from previous research and revised and modified by orthopaedic experts in knee arthroplasty<sup>[3]</sup> (Table 1). It is divided into three categories: demographics, knowledge, and prognosis. Moreover, the last

**Table 1**

### Content of the questionnaire

#### Questions

##### Baseline characteristics of the study participants

Sex  
Marital status  
Age  
Region of residency  
Education  
Monthly income  
Do you know anyone who did/will do TKA?

##### Knowledge

Have you heard about TKA?  
Have you had any information about TKA?  
Are you aware of the signs and symptoms of the indication for TKA?  
Do you think that TKA is common in Saudi Arabia?  
Do you think that TKA is more common among males than females?

##### Pain management

Any knee pain is only treated by TKA  
TKA is the best choice of treatment in chronic non-responding knee pain  
The best method of treating any chronic knee pain is physical therapy  
The best method of treating any chronic knee pain is painkillers and injections.

##### Risk factors and indications

The pain is an indication for TKA.  
The decreased range of motion is an indication for TKA?  
TKA is subject to age  
TKA is subject to hereditary reasons  
It is better to wait until the pain becomes unbearable before performing the surgery.  
The main cause of doing TKA is knee arthritis  
The main cause of doing TKA is knee ACL or meniscus tears  
The main cause of doing TKA is knee fracture

##### Prognosis

TKA restores normal knee functions  
People who have undergone the surgery quickly show NO pain.  
Knees of people that have undergone the surgery can look normal  
Outcome of the surgery is usually disappointing.  
Patients need a rehabilitation program after the surgery  
People who have undergone the surgery must take drugs such as painkillers and antibiotic for a long time  
Patients can pray normally after doing the surgery

ACL, anterior cruciate ligament; TKA, total knee arthroplasty.

two questions were added to assess patients' knowledge of the material of the implanted artificial joint and its lifespan.

The questionnaire was modified and simplified to meet the study's objectives. The Cronbach's  $\alpha$  was used to measure the internal consistency of the survey. A two-part questionnaire was sent to the 331 participants. The knowledge subscale consisted of 10 items ( $\alpha = 0.753$ ), and the prognosis subscale consisted of 10 items ( $\alpha = 0.761$ ), with a total score of 0.854, which reflects good internal consistency (Table 2).

**Table 2**

### Cronbach's $\alpha$ test

#### Cronbach's $\alpha$ test results from the questionnaire

Section	No. items	Cronbach $\alpha$
Knowledge score	10	0.753
Prognosis score	10	0.761
Total score	20	0.854

## Statistical analysis

Categorical data, such as age group, sex, marital status, and source of the participants, were expressed by frequency and percentages. Normally distributed values, such as age and questionnaire scores, were expressed using the mean and standard deviation. Bivariate analysis was conducted for categorical variables using the  $\chi^2$  test to examine the difference in the proportion of participants' answers stratified by their sociodemographic characteristics. Moreover, an independent sample *t*-test and an ANOVA test were used to examine the difference in the mean knowledge score based on participants' sex, marital status, and source of the participants (grouped). The statistical significance level was set at a *P* value less than 0.05. Microsoft Excel was used for data entry, and Statistical Package for Social Sciences (SPSS) version 21 (SPSS Inc.) was used for statistical analysis.

## Results

### Sociodemographic characteristics

A total of 331 participants agreed to participate in the study: 203 (61.3%) were from the general population of Saudi Arabia, and 128 (38.7%) were medical students and interns. The majority of the participants were males (68.3%), and the mean age was  $32.95 \pm 15.22$ , with most of them lying between 18 and 25 years old (59.2%). Table 3 demonstrates the rest of the sociodemographic characteristics.

### Frequency distribution of the questionnaire answers

Seventy-eight percent of the study participants reported that they had heard of TKA. In addition, 53.3% of those who had heard about TKA reported that they knew someone who had done or was about to undergo TKA. Patients who knew someone who had done or was about to do TKA had a significantly higher mean knowledge score ( $64.69 \pm 20.282$  vs.  $32.88 \pm 23.882$ ,  $P \leq 0.001$ ). And higher mean total score ( $110.75 \pm 39.761$  vs.

$60.27 \pm 44.087$ ,  $P \leq 0.001$ ). Only half of the participants believed that TKA was common in Saudi Arabia, and only 44.4% thought that TKA was more common in females. Patients who knew someone who had done or was about to do TKA had a significantly higher mean knowledge score ( $64.69 \pm 20.282$  vs.  $32.88 \pm 23.882$ ,  $P \leq 0.001$ ) and a higher mean total score ( $110.75 \pm 39.761$  vs.  $60.27 \pm 44.087$ ,  $P \leq 0.001$ ).

Fifty-eight percent of the participants thought that TKA was the treatment of choice for pain accompanying knee OA that did not respond to conservative methods. Additionally, only 11.2% reported that mild-to-moderate knee OA pain is an indication for TKA. In comparison, 43.8% believed that only severe pain was an indication, with 21.8% reporting that the patient should wait until the pain becomes unrepairable.

When asked about the different causes of knee OA, only 32.9% thought that knee OA depends on genetic factors. Additionally, 9.7% thought that the main reason for TKA was anterior cruciate ligament (ACL) or meniscus tears, and 14.5% thought the reason was knee joint fracture.

Only 21.1% of the study participants reported that the patient did not recover the full function of the joint after surgery. Moreover, 34.7% believed that the pain of the surgery resolved after 6 weeks to 3 months, and approximately half of the participants believed that the knee joint would look normal from the outside after TKA. However, only a small percentage of participants knew the movement capabilities of the patients after the surgery. Only 30.8% thought the patient could prostrate (Sujud) normally, 23.0% thought the patient could kneel on the ground, 35.6% thought that the patient could walk long distances, and only 18.4% believed that the patient could cross their legs together. Finally, when asked about the lifespan of the prosthetic knee joint, 39.3% answered that it was 15 years old. Table 4 demonstrates the participant's answers to the questionnaire.

### Associations between demographics and questionnaire answers

When asked whether they had heard of TKA before, medical students and interns were significantly more knowledgeable than the general population. Around 85.2% of medical students and interns heard about it, compared to 73.9% of the general population ( $P = 0.02$ ). Moreover, similar results were obtained when the study participants were asked whether they knew about the signs and symptoms that indicated the need for TKA, where medical students and interns had more knowledge than the general population (45.3% vs. 31.0%,  $P = 0.01$ ). Additionally, significantly higher rates of knowledge were present in older participants, as the mean age of participants who knew about TKA was  $34.37 \pm 15.98$  years compared to  $27.85 \pm 10.716$  years in those who did not know about TKA ( $P = 0.001$ ). Table 5 demonstrates the relationships between different sociodemographic factors with the first four items of the questionnaire.

A scoring system was used for items 5–24, where 10 points were given for each correct answer. The scoring system was categorized depending on the aspect of the questionnaire into knowledge (10 items), prognosis (10 items), and total score (20 items).

Medical students and interns showed significantly higher scores in all questionnaire categories than the general population. The *P* value was less than 0.001 for all the three aspects. In addition, when comparing the mean scores between medical

**Table 3**  
Sociodemographic characteristics

	N (%)
Sex	
Male	226 (68.3)
Female	105 (31.7)
Marital status	
Single	210 (63.4)
Married	121 (36.6)
Age group	
18–25	196 (59.2)
26–35	40 (12.1)
36–50	37 (11.2)
51–80	58 (17.5)
Source of the participant	
General population	203 (61.3)
5th-year medical student	17 (5.1)
6th-year medical student	91 (27.5)
Medical intern	20 (6.0)
	Mean (SD)
Age (year)	32.95 (15.22)

Age data are expressed as mean  $\pm$  standard deviation, and others are expressed as numbers (N) and percentages (%).

**Table 4**  
**Questionnaire answers**

Questions	No (%)	Yes (%)	I don't know (%)	
<b>Knowledge</b>				
1- Have you ever heard about TKA?	21.8	78.2	0.0	
2- Do you know anyone who did or is about to do TKA?	55.6	44.4	0.0	
3- Do you have any information about TKA?	55.0	45.0	0.0	
4- Are you aware of the signs and symptoms that indicate the need for TKA?	63.4	36.6	0.0	
5- Do you think that TKA is common in Saudi Arabia?	19.0	52.0	29.0	
6- Do you think that TKA is more common among females than males?	12.7	44.4	42.9	
7- Do you believe that all patients get informed about the type of material used as a replacement for the knee joint in TKA?	6.6	63.1	30.2	
8- Do you think that TKA is the best management for the chronic pain of knee osteoarthritis that doesn't respond to other treatment methods?	7.3	58.0	34.7	
9- Do you think that the mild-to-moderate pain of knee osteoarthritis is an indication of TKA?	52.6	11.2	36.3	
10- Do you think that only severe knee osteoarthritis is an indication of TKA?	17.8	43.8	38.4	
11- Do you think that knee osteoarthritis depends on genetic factors?	25.7	32.9	41.4	
12- Do you think that it is better to wait until the pain is unrepairable and the patient is unable to walk to do TKA?	48.0	21.8	30.2	
13- Do you believe that ACL or meniscus tears are the main reasons to do TKA?	39.3	9.7	51.1	
14- Do you believe that knee joint fracture is the main reason to do TKA?	36.0	14.5	49.5	
<b>Prognosis</b>				
15- Do you think that the patient recovers the full function of the joint after TKA?	21.1	36.3	42.6	
16- Do you think that pain after TKA resolves after 6 weeks to 3 months?	6.3	34.7	58.9	
17- Do you think that the knee joint looks normal from the outside after TKA?	7.9	50.1	42.0	
18- Do you think that the results of TKA don't usually satisfy the patient?	40.2	10.6	49.2	
19- Do you think that some patients can prostrate (Sujod) normally after TKA?	24.2	30.8	45.0	
20- Do you think that some patients can kneel on the ground normally after TKA?	28.4	23.0	48.6	
21- Do you think that some patients can cross their legs normally after TKA?	28.7	18.4	52.9	
22- Do you think that all patients can set on a chair after TKA?	4.5	63.4	32.0	
23- Do you think that all patients can walk long distances after TKA?	20.5	35.6	43.8	
<b>Questions</b>				
24- What is the lifespan of the prosthetic knee joint?	5 years (%)	10 years (%)	15 years (%)	40 years (%)
	8.8	27.5	39.3	24.5

ACL, anterior cruciate ligament; TKA, total knee arthroplasty.

students and interns, fifth-year students scored the lowest, followed by sixth-year students and interns, as they had the highest mean score among all the categories ( $P \leq 0.001$ ). The mean scores were highest among the youngest age group, demonstrating  $P$  values of 0.001, 0.004, and 0.001 for the knowledge, prognosis, and total scores, respectively. Table 6 presents the relationships between different sociodemographic factors with the mean scores of the questionnaire categories.

## Discussion

The pathogenesis of OA remains poorly understood, and there is currently no universally effective treatment for managing symptoms and mitigating associated damage. Exercise has been identified as a viable and efficacious intervention for individuals in the first phases of knee OA<sup>[10]</sup>. Various non-surgical techniques exhibit varying levels of efficacy, with outcomes influenced by multiple aspects such as equipment quality, provider expertise, and patient characteristics. Consequently, the selection of these procedures should be approached with caution, taking into account the specific clinical context. The initial management of treatment should use a cautious strategy, encompassing both pharmaceutical and non-pharmacological interventions<sup>[10]</sup>. In the event that this conservative and noninvasive therapeutic intervention proves to be ineffective, the option of surgical intervention is next deliberated about<sup>[10]</sup>. The pharmacological approach includes the utilization of nonsteroidal anti-

inflammatory medicines (NSAIDs), Cox-II inhibitors, as well as opioids for delivery<sup>[10]</sup>. Various surgical techniques can be employed to address knee-related issues, such as arthroscopic lavage and debridement, osteotomies in the vicinity of the knee, joint arthroplasty, unicompartmental knee arthroplasty, and TKA<sup>[10]</sup>.

Our main goal was to compare medical school students to the general population. Both groups had a low level of knowledge, but senior medical school students were more knowledgeable than the general population. The difference between medical students and interns and the general population was found to be statistically significant ( $P < 0.001$ ). One possible justification for this finding is the low prevalence rate of severe OA. Prior literature has indicated that a notable proportion of symptomatic individuals, specifically twenty-eight percent, exhibited radiographic knee OA<sup>[11]</sup>. Additionally, 16% of these patients experienced symptomatic knee OA, while 8% presented with severe radiographic knee OA<sup>[11]</sup>.

The lack of knowledge of medical students and interns could be attributed to the fact that OA and TKA are not well covered in the curriculum and training. A previous study conducted to assess medical school education regarding musculoskeletal disorders concluded that there is a pressing need to enhance musculoskeletal curriculum coverage<sup>[12]</sup>. The competence of medical students is more focused on musculoskeletal emergencies, although they are also taught about OA therapy and the initial treatment. A previous study by Åkesson recommended the implementation of

**Table 5**  
**Association between sociodemographic characteristics and items 1–4**

Categories		Have you ever heard about TKA?	Do you know anyone who did or is about to do TKA?	Do you have any information about TKA?	Are you aware of the signs and symptoms that indicate the need for TKA?
Sex	Male	79.6%	41.2%	44.7%	34.5%
	Female	75.2%	51.4%	45.7%	41.0%
<i>P</i> value		0.446	0.103	0.956	0.313
Marital status	Single	74.8%	35.2%	44.3%	35.7%
	Married	84.3%	60.3%	46.3%	38.0%
<i>P</i> value		0.059	< 0.001*	0.813	0.764
Age group	18–25	74.5%	32.1%	41.8%	33.2%
	26–35	67.5%	72.5%	37.5%	32.5%
	36–50	89.2%	56.8%	37.8%	35.1%
	51–80	91.4%	79.3%	65.5%	51.7%
<i>P</i> value		0.003*	< 0.001*	0.006*	0.077
Source of the participant	General population	73.9%	51.7%	40.4%	31.0%
	5th-year medical student	70.6%	11.8%	29.4%	5.9%
	6th-year medical student	85.7%	36.3%	50.5%	48.4%
	Medical intern	95.0%	35.0%	80.0%	65.0%
<i>P</i> value		0.021*	0.002*	0.002*	0.077
Source of the participant (grouped)	General population	73.9%	51.7%	40.4%	31.0%
	Medical students and interns	85.2%	32.8%	52.3%	45.3%
<i>P</i> value		0.022*	0.001*	0.044*	< 0.001*

The percentages (%) provided are for participants who answered Yes to the demonstrated questions.  
 TKA, total knee arthroplasty.  
 \*Statistical significance was set at  $P < 0.05$ .  
 Abbreviations: %: percentage.

an enhanced undergraduate curriculum aimed at enhancing the education of musculoskeletal disorders within medical schools<sup>[13]</sup>. Each medical institution should prioritize the

inclusion of a comprehensive musculoskeletal medicine course in their curriculum, with a focus on clinical evaluation, prevalent outpatient musculoskeletal conditions, and the identification of

**Table 6**  
**Association between sociodemographic characteristics and scores on the different aspects of the questionnaire**

Categories		Knowledge score mean ± SD	Prognosis score mean ± SD	Total score mean ± SD
Sex	Male	46.11 ± 28.71	36.59 ± 26.85	82.67 ± 43.48
	Female	48.95 ± 24.21	33.71 ± 24.06	82.67 ± 43.48
<i>P</i> value		0.350	0.330	0.995
Marital status	Single	51.29 ± 26.17	38.48 ± 26.54	89.76 ± 48.00
	Married	39.59 ± 27.91	30.83 ± 24.37	70.41 ± 48.67
<i>P</i> value		< 0.001*	0.010*	0.001*
Age group	18–25	52.04 ± 25.89	39.34 ± 26.96	91.38 ± 48.15
	26–35	38.25 ± 30.62	29.25 ± 25.15	67.50 ± 52.46
	36–50	37.57 ± 28.71	24.32 ± 21.15	61.89 ± 46.83
	51–80	42.07 ± 25.59	35.00 ± 23.48	77.07 ± 44.80
<i>P</i> value		0.001*	0.004*	0.001*
Source of the participant	General population	37.19 ± 25.70	27.49 ± 23.06	64.68 ± 44.29
	5th-year medical student	49.41 ± 24.61	38.24 ± 27.89	87.65 ± 48.67
	6th-year medical student	64.29 ± 20.11	49.89 ± 23.96	114.18 ± 38.50
	Medical intern	66.00 ± 26.63	52.00 ± 27.26	118.00 ± 49.05
<i>P</i> value		< 0.001*	< 0.001*	< 0.001*
Source of the participant (grouped)	General population	37.19 ± 25.70	27.49 ± 23.06	64.68 ± 44.29
	Medical students and interns	62.58 ± 22.28	48.67 ± 25.17	111.25 ± 42.38
<i>P</i> value		< 0.001*	< 0.001*	< 0.001*

All the score data are expressed as mean ± standard deviation.  
 \*Statistical significance was set at  $P < 0.05$ .



urgent situations<sup>[13]</sup>. The next objective is to enhance proficiency in the management of musculoskeletal issues in primary care settings by enhanced education. However, there is a requirement for improvement among all healthcare practitioners and at all levels within the healthcare system<sup>[13]</sup>.

Another study conducted among medical school students in California suggested the need for interdisciplinary collaboration to create standardized objectives to achieve basic competency in the primary care setting. Increasing curriculum time alone is not sufficient<sup>[14]</sup>. However, the general population's lack of awareness and knowledge about TKA can be attributed to several factors. First, there is a lack of educational programs that provide information about the procedure, its benefits, and the recovery process. This can lead to misunderstandings and misconceptions regarding TKA. Additionally, some individuals may not realize that they are candidates for TKA and may not seek information about it until they experience significant knee pain or mobility issues<sup>[15]</sup>. Therefore, it is crucial to increase awareness and education regarding TKA to ensure that individuals have accurate information and can make informed decisions about their health. Physicians may face allegations of negligence in the context of counselling, such as when they fail to adequately educate patients about the potential risks, refuse to perform invasive procedures upon patient request, or withhold pertinent information regarding the necessity or accessibility of such procedures<sup>[16]</sup>. In the context of discharging a comprehensive informed consent process, it is incumbent upon physicians to fulfil their professional obligation by providing detailed explanations and initiating a discourse regarding the potential risks, advantages, and available alternatives associated with a particular medical procedure<sup>[16]</sup>.

One of the interesting findings in our study is that 17.8% of the study participants did not agree that severe knee OA is an indication for TKA, and about 38.4% answered "I don't know". A previous study by Mohrej *et al.*<sup>[3]</sup> found that 63.2% of the study participants were unaware that severe arthritis was the main indication for TKA. Our study participants demonstrated a limited level of awareness regarding OA and TKA. This indicates the need for further efforts to enhance the knowledge of the population. The utilization of personalized medicine has emerged as a potential method in the management of knee arthroplasty. This strategy considers various elements, including genetics, lifestyle, and environmental impacts, in order to enhance outcomes and mitigate possible risks<sup>[17]</sup>. Personalized medicine inherently relies on a substantial amount of information, and its predictive, diagnostic, and therapeutic capacities are derived from complex datasets with several dimensions<sup>[18]</sup>. The identification of specific biomarkers associated with inflammation holds the potential to forecast the probability of postoperative problems, including infection or excessive inflammation<sup>[17]</sup>.

In our study, we found that 78.2% of our study sample had heard of TKA. This is in line with the findings of a previous study that was conducted in Riyadh, which also reported approximately the same percentage (71.6%). This suggests a high prevalence of TKA procedures in the community<sup>[3]</sup>. Furthermore, patients who knew someone who had done or was about to perform TKA scored higher regarding knowledge than those who answered do not know ( $64.69 \pm 20.282$  vs.  $32.88 \pm 23.882$ ,  $P \leq 0.001$ ). This finding is in line with the findings of a previous study by Al-Mohrej *et al.*<sup>[3]</sup>. This emphasizes the importance of educating patients' relatives, leading to the spread of knowledge regarding TKA in the community.

Our study participants thought that 40.2% of patients may be satisfied with the results of TKA, and only 36.3% can regain knee range of motion (ROM)<sup>[19,20]</sup>. While the results of the surgery are individualized and depend on the patient's risk factors and the surgeon's experience, many studies have shown high satisfaction rates among patients postoperatively regarding pain and knee function<sup>[12-22]</sup>. These findings were similar to those reported by Al-Mohrej *et al.*<sup>[3]</sup>.

Moreover, many patients require clarification regarding whether they can normally pray after the procedure. We covered this in our questionnaire by asking about actions involving the knee joint while praying, prostrate (Sujod), and kneeling normally on the ground. Nearly half of the answers were "I do not know," whereas 30.8% of the participants answered "yes". Al-Mohrej *et al.*<sup>[3]</sup> in their study, included this question in their survey, asking whether they could pray normally. Only 22% answered "yes", which shows similar results<sup>[2]</sup>. There are no studies in the literature that show potential harms regarding kneeling or praying activities after TKA, and this remains at the surgeon's discretion.

Providing educational programs for the general public on TKA is crucial for multiple reasons<sup>[23,24]</sup>. These initiatives have the potential to augment knowledge, cultivate favourable attitudes, and eventually enhance patient outcomes<sup>[23]</sup>. Educational programs provide individuals with the knowledge and tools necessary to make well-informed decisions regarding TKA<sup>[24]</sup>. Comprehending the process, its advantages, potential risks, and other options empowers people to actively engage in collaborative decision-making with their healthcare professionals<sup>[24]</sup>. Having knowledge about what to anticipate and comprehending the significance of rehabilitation and subsequent appointments enhances overall adherence to medical advice. In addition, having trust in the decision-making process and comprehending the reasoning behind interventions are factors that contribute to the overall satisfaction of patients<sup>[24]</sup>. These programs can be performed through formal lectures, social media, and public campaigns.

The current study had some limitations. First, the inherent flaw in the cross-sectional study design, which does not reflect the changes in respondents' TKA knowledge and attitude over time, or the response and recall bias associated with this study design. Second, the number of participants was relatively low, and extrapolation of these results to the general population would be difficult. Therefore, our study findings should be interpreted carefully.

In conclusion, TKA is considered one of the most frequently performed surgeries in orthopaedics. The results of this study demonstrate the basic medical knowledge of TKA among medical students and interns. These results can be used for the recent and future development of the orthopaedic curriculum and more emphasis on training, which will be reflected in the quality of patient care. On the other hand, our results for the general population show a need for orthopaedic specialists to concentrate on educational programs and campaigning that increase people's awareness toward TKA and help them understand their worries and concerns.

## Ethical approval

This work has been approved by the appropriate research ethical committees related to the institution in which it was performed (unit of biomedical ethics, approval number "91-23" on Monday, 13 February 2023). Informed consent was obtained from all participants.

## Consent

Written informed consent was obtained from the participants for publication and any accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal on request. Written informed consent was obtained from the participants' parents/legal guardian for publication and any accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal on request.

## Source of funding

This research did not receive any specific grants from funding agencies in the public, commercial, or not-for-profit sectors.

## Author contribution

A.M. proposed the concept of this study. A.M. and M.J. Designed this study. A.M. and M.J. collected the data. A.M. and M.J. analyzed the data. A.M. and M.J. performed literature review. A.M. and M.J. wrote the manuscript. Review of the manuscript by A.M. The content and similarity index of the paper are the responsibility of all authors who also critically assessed and approved the final text. All authors critically reviewed and approved the final draft and were responsible for the content and similarity index of the manuscript.

## Conflicts of interest disclosure

The author declares no conflict of interest.

## Research registration unique identifying number (UIN)

1. Name of the registry: Asim Makhdom.
2. Unique Identifying number or registration ID: researchregistry9715.
3. Hyperlink to your specific registration (must be publicly accessible and will be checked): <https://www.researchregistry.com/browse-the-registry#home/registrationdetails/655a57244e68fa002a3d1227/> No patient involved.

## Guarantor

The author and co-author are the only ones who have access to the data.

## Data availability statement

Data and information generated during the study of the cases are available upon reasonable request to the corresponding author.

## Provenance and peer review

Not commissioned, externally peer-reviewed.

## Acknowledgement

The authors thank the participants who were all contributed to the study from King Abdulaziz University Hospital.

## References

- [1] Kim HA, Kim S, Seo YI, *et al.* The epidemiology of total knee replacement in South Korea: national registry data. *Rheumatology* 2008;47:88–91.
- [2] Makhdom AM BO. Prevalence of knee osteoarthritis in Saudi Arabia: a systematic literature review. *J Musculoskelet Surg Res* 2023;7:235–40.
- [3] Al-Mohrej OA, Alshammari FO, Aljuraishi AM, *et al.* Knowledge and attitude towards total knee arthroplasty among the public in Saudi Arabia: a nationwide population-based study. *Int Orthop* 2018;42:819–27.
- [4] Meneghini RM, Russo GS, Lieberman JR. Modern perceptions and expectations regarding total knee arthroplasty. *J Knee Surg* 2014;27:93–7.
- [5] Abu Al-Rub Z, Hussaini M, Gerrand CH. What do patients know about their joint replacement implants? *Scottish Med J* 2014;59:158–61.
- [6] Asha A, Pradeepa RG, Mohan V. Evidence for Benefits from Diabetes Education program. *Int J Diabetes Dev Ctries* 2004;24:4–11.
- [7] Chawla SPS, Kaur S, Bharti A, *et al.* Impact of health education on knowledge, attitude, practices and glycemic control in type 2 diabetes mellitus. *J Fam Med Primary Care* 2019;8:261–8.
- [8] Task Force on Community Preventive Services. A recommendation to improve employee weight status through worksite health promotion programs targeting nutrition, physical activity, or both. *Am J Prev Med* 2009;37:358–9.
- [9] Mathew G, Agha R. STROCSS 2021: Strengthening the reporting of cohort, cross-sectional and case-control studies in surgery. *Ann Med Surg* 2021;72:103026.
- [10] Uivaraseanu B, Vesa CM, Tit DM, *et al.* Therapeutic approaches in the management of knee osteoarthritis (Review). *Exp Ther Med* 2022;23:328.
- [11] Heidari B. Knee osteoarthritis prevalence, risk factors, pathogenesis and features: Part I. *Caspian J Intern Med* 2011;2:205–12.
- [12] Weiss K, Curry E, Matzkin E. Assessment of medical school musculoskeletal education. *Am J Orthop (Belle Mead, NJ)* 2015;44:E64–7.
- [13] Akesson K, Dreinhöfer KE, Woolf AD. Improved education in musculoskeletal conditions is necessary for all doctors. *Bull World Health Organ* 2003;81:677–83.
- [14] Wang T, Xiong G, Lu L, *et al.* Musculoskeletal education in medical schools: a survey in California and review of literature. *Med Sci Educ* 2021;31:131–6.
- [15] Bedson J, Mottram S, Thomas E, *et al.* Knee pain and osteoarthritis in the general population: what influences patients to consult? *Fam Pract* 2007; 24:443–53.
- [16] Gullo G, Scaglione M, Buzzaccarini G, *et al.* Cell-free fetal DNA and non-invasive prenatal diagnosis of chromosomopathies and pediatric monogenic diseases: a critical appraisal and medicolegal remarks. *J Pers Med* 2022;13:1.
- [17] Hirschmann MT, Friederich NF, Becker R, *et al.* Personalised medicine in knee arthroplasty: we need more science!. *Knee Surg Sports Traumatol Arthrosc* 2019;27:1357–8.
- [18] Piergentili R, Basile G, Nocella C, *et al.* Using ncRNAs as tools in cancer diagnosis and treatment-the way towards personalized medicine to improve patients' health. *Int J Mol Sci* 2022;23:9353.
- [19] Pua YH, Poon CL, Seah FJ, *et al.* Predicting individual knee range of motion, knee pain, and walking limitation outcomes following total knee arthroplasty. *Acta Orthop* 2019;90:179–86.
- [20] Miner AL, Lingard EA, Wright EA, *et al.* Knee range of motion after total knee arthroplasty: how important is this as an outcome measure? *J Arthroplasty* 2003;18:286–94.
- [21] Kahlenberg CA, Nwachukwu BU, McLawhorn AS, *et al.* Patient satisfaction after total knee replacement: a systematic review. *HSS J* 2018;14: 192–201.
- [22] Thambiah MD, Nathan S, Seow BZ, *et al.* Patient satisfaction after total knee arthroplasty: an Asian perspective. *Singapore Med J* 2015;56: 259–63.
- [23] Kim TW, Kim SH. Effectiveness of patient education on total knee arthroplasty: a systematic review and meta-analysis. *J Clin Nurs* 2023;32: 2383–98.
- [24] Zhou Y-y, Zhang B-k, Ran T-f, *et al.* Education level has an effect on the recovery of total knee arthroplasty: a retrospective study. *BMC Musculoskelet Disord* 2022;23:1–9.