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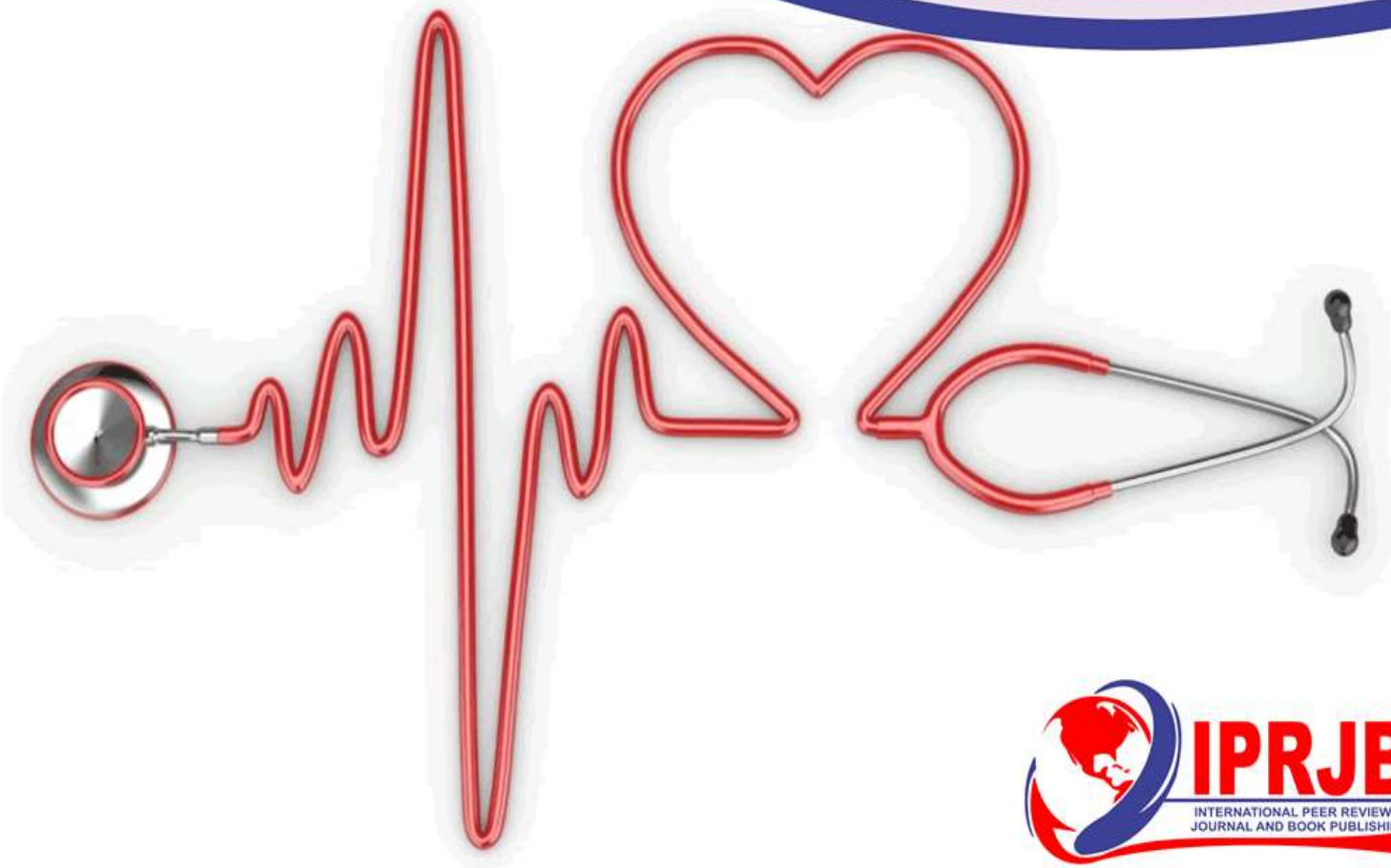

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Favourable Clinical and Functional Outcomes Following Total Knee Replacement Surgery in a Kenyan Hospital: A 6-Week Follow-Up Study

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Abstract

Purpose: The incidence of total knee replacement (TKR) is increasing due to factors such as heightened patient satisfaction, an ageing population, and the obesity epidemic, all of which lead to more significant stress on weight-bearing joints. This study determined the incidence of prosthetic knee joint infection, evaluated functional recovery, and analysed rehabilitation progress among orthopaedic patients who underwent Total Knee Replacement in a hospital in Kenya.

Methodology: This study employed a prospective cohort study design for six months, following 75 patients who had undergone TKR at Metropolitan Hospital in Nairobi County. Data collection methods included medical record reviews, patient interviews, and clinical assessments. Specifically, standardized questionnaires and assessment tools were utilized, including the short form health survey (SF-12) for quality-of-life assessment, the visual analogue scale (VAS) for pain measurement, and relevant scales for activities of daily living (ADL) assessment. The incidence density of prosthetic joint infection was calculated using the conventional formula, accounting for new cases and patient time at risk. We observed that functional outcomes post-TKR are generally favourable, with patients who were followed up resuming their daily activities in a relatively short timeframe of less than six weeks.

Findings: By the sixth week, 60% of the patients had undergone excellent rehabilitation progress. The incidence of prosthetic knee infection was notably low (9 cases per 1000 patient weeks) and was only associated with age, perhaps highlighting the effectiveness of the applied surgical techniques and postoperative care. Additionally, we identified that comorbid conditions, particularly diabetes and hypertension, are the primary factors that contributed to delayed healing and resumption of daily activities following TKR.

Unique Contribution to Theory, Practice and Policy: Favourable outcomes and low infection rates indicate that total knee replacement (TKR) is a safe and effective option for patients with severe knee pain, significantly improving quality of life and mobility. However, the association between age and infection risk necessitates thorough preoperative assessments and age-specific care protocols, especially for older patients. Additionally, comorbidities like diabetes and hypertension can delay healing, highlighting the need for targeted preoperative interventions. Optimizing the management of these conditions may enhance recovery and reduce complications. Further research is essential to explore how these comorbidities affect healing post-TKR and to assess the effectiveness of specific interventions.

Keywords: *Total Knee Replacement*

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INTRODUCTION

Total knee replacement (TKR) is an orthopaedic surgery that replaces the articular surfaces of the knee joint with smooth metal and highly cross-linked polyethene plastic to alleviate knee pain and disability caused by osteoarthritis, rheumatoid arthritis, severe knee deformities, post-traumatic arthritis among other knee joint pathologies(Price et al., 2018). Patients who have undergone TKR benefit from enhanced function and improved quality of life (Evans et al., 2019). Nevertheless, the Global Burden of Disease (GBD) 2017 reported >300 million prevalent cases of hip and knee osteoarthritis worldwide, which is the leading cause of TKR, causing approximately 9.6 million Years of Healthy Life Lost Due to Disability (YLDs) (James et al., 2018). The economic consequences of TKR arising from the disease burden, treatment costs, and loss of productivity of patients and their caregivers are enormous(Evans et al., 2019).

Globally, the reported burden of TKR has been increasing due to factors such as an ageing population, sedentary lifestyles, and improved access to healthcare(Delaie et al., 2023). Developed countries with ageing populations and well-established healthcare systems report a higher prevalence of TKR surgeries. For instance, Kremers et al 2014 reported that >1 million total hip and TKR were performed yearly in the United States(Kremers et al., 2014).However, in LMICs, the local burden of TKR is influenced by factors such as the availability and access of healthcare facilities, population demographics, public awareness of knee joint health, and the impact of certain occupations on knee problems, leading to varying subnational demands for TKR surgeries(Bonasia et al., 2019). Over the past 2 to 3 decades, there has been a notable increase in the daily incidence of Total Knee Replacement (TKR) surgeries conducted in Kenyan hospitals. A study assessing early postoperative outcomes across three representative hospitals indicated that 49.5% of patients received hospital-based physiotherapy, 36.1% received home-based physiotherapy, and 18% received a combination of both. The mean postoperative range of motion was recorded at 83.7 degrees, with a range of 80 to 113 degrees (Nyagah Caleb, 2023). A significant proportion of patients (n=18, 29.5%) reported a pain score of 3. The analysis demonstrated that advancing age was associated with a decline in range of motion, while a higher body mass index (BMI) was linked to elevated pain scores. Furthermore, increased pain scores were correlated with greater dissatisfaction, as assessed by the Oxford Knee Score (Nyagah Caleb, 2023).

Following TKR, patients typically get hospitalized for recovery and pain management, where they receive physical therapy in rehabilitation with targeted exercises that improve motion and strength(L. Snell et al., 2018). Following discharge, outpatient physical therapy focuses on Donestrengthening the knee joint, enhancing function and helping patients regain independence and quality of life (Christensen et al., 2020). While TKR is a generally safe and successful procedure, some potential risks and complications frequently ensue, either during hospitalization or upon discharge. These include but not limited to infection, blood clots, implant problems, nerve or blood vessel injury, and persistent pain or stiffness(Fatoye et al., 2021). These complications disrupt the patients' Activities of Daily Living (ADLs), impacting their ability to carry out essential life tasks independently. Previous research is not definite on the time TKR patients resume ADLs: Bade *et al.* (2010) reported that 70% of patients were independent in performing ADLs six weeks post-TKR. On the other hand(Bade et al., 2010). Konnyu et al. (2019) reported that a wide range of time in resuming more difficult ADLs, including climbing stairs and performing household chores(Konnyu et al., 2023).

The postoperative recovery process, including the time-to-reach unaided mobility, is crucial for patients to regain independence and return to their daily activities. Previous studies have investigated the factors influencing time-to-unaided mobility and reported varying results. For instance, Pua et al. 2019 developed four models to predict individual patients' expected levels of knee extension and flexion range of motion, knee pain, and walking limitations six months after total knee arthroplasty, demonstrating modest to moderately good predictive discrimination when assessing patients with poor postoperative outcomes(Pua et al., 2019). Mehta et al. (2018) also modelled data from 559 patients reporting that knee range of motion changed significantly during the first 12 weeks after TKR and plateaued by 26 weeks(Mehta et al., 2020). For an average patient, knee flexion increased from approximately 2 weeks post TKR to 117º 52 weeks post TKR concluding that the maximum gains in knee range of motion should be expected within the first 12 weeks(Mehta et al., 2020). Shah and colleagues (2019) conducted a systematic review of various studies examining patient-related factors that may affect the length of stay following total knee arthroplasty. They identified several predictors of prolonged hospital stays, including advanced age, female gender, and a body mass index (BMI) of 30 or higher, among others(Shah et al., 2019).

Determining the incidence of adverse clinical outcomes and associated factors among patients who have undergone TKR aids in risk stratification, contributing to precision medicine, precision public health and resource planning and allocation while optimizing healthcare delivery(Edwards et al., 2022) . Overall, while studies characterizing TKR risks and complications that frequently ensue during hospitalization and or upon discharge and determining the time-to-reach unaided mobility have provided impactful findings in developed country settings, there remains a critical gap concerning patients in LMICs, including Kenya(Kigera JWM; Kimpiatu P, 2015). Understanding the potential influence of cultural, socioeconomic, and healthcare system-related factors in developing country settings, post-TKR time, and consequent outcomes is essential. We designed this study to address and fill these gaps in Kenya.

Problem Statement

Total knee arthroplasty is predominantly indicated for osteoarthritis, a condition characterized by joint inflammation, cartilage degradation, and osteophyte formation. These pathological changes result in symptoms such as pain, stiffness, and impaired joint function, significantly affecting patients' quality of life. A global epidemiological study revealed approximately 303.1 million cases of hip and knee osteoarthritis. Prevalence rates are particularly notable in certain regions, with 47.7% among individuals aged 35 to 70 years in Iran and varying from 11.5% in Nigeria to 25.8% in Dubai for those aged 18 and older. The economic impact includes substantial treatment costs and productivity losses for patients and their caregivers. There is a significant lack of data and knowledge regarding the clinical and functional outcomes of TKR surgery in Kenya, particularly concerning short-term recovery, necessitating a focused study to evaluate these outcomes in follow-up studies.

METHODOLOGY

Method Study Design

This study employed a longitudinal study design for six months.

Study Setting and Participants

The research was conducted at Metropolitan Hospital, a distinguished healthcare institution in Kenya recognized for its orthopaedic services. With a bed capacity of 160, the hospital provided access to a diverse patient population and well-equipped facilities for total knee replacement (TKR) procedures and postoperative care. Metropolitan Hospital was selected due to the high volume of patients undergoing TKR. Between January and May 2023, the hospital performed >140 TKR surgeries, averaging 25 to 30 procedures per month. Additionally, the hospital employed more orthopaedic surgeons than other hospitals, further enhancing its capacity to perform these surgeries affordably. The substantial volume of TKR surgeries conducted at Metropolitan Hospital facilitated the execution of this study within the designated timeframe. The hospital is located in Buruburu, Embakasi West Sub-County, Nairobi County, Kenya.

Participants

The study population consisted of orthopaedic patients who underwent total knee replacement (TKR) at Metropolitan Hospital during the study period. This population included a diverse group of individuals representing various age groups, genders, and comorbidity profiles. The inclusion criteria specified that the study included orthopaedic patients aged 18 years and older, specifically those who had undergone TKR surgery at Metropolitan Hospital and had a confirmed diagnosis of severe knee joint conditions requiring the procedure. Conversely, the exclusion criteria encompassed patients with a history of knee surgeries other than TKR, those with cognitive impairments that could affect their participation in follow-up assessments, patients who refused to provide informed consent, and individuals whose surgeons declined to consent.

Sample Size Determination and Sampling

The sample size was determined based on the hospital's average annual total knee replacement (TKR) caseload, ensuring adequate representation of patients. The objective was to enroll sufficient participants to ensure statistical validity for incidence estimates, functional outcomes, and comparisons between subgroups. Ditton(Ditton et al., 2020) (2023) conducted a preliminary estimate and suggested that the global incidence rate of adverse clinical outcomes among TKR patients is approximately 5%. With a confidence level of 95% and a margin of error of 5%, the required sample size was calculated using the formula:

$$n = \frac{(Z^2 \cdot p \cdot (1-p))}{(E^2)}$$

Where:

- n = required sample size
- Z = Z-value corresponding to the desired confidence level (Z = 1.96 for a 95% confidence level)
- p= estimated proportion of adverse clinical outcomes (0.05)
- E = desired margin of error (0.05)

Substituting the values, the calculation was as follows:

$$n = \frac{1.96^2 \cdot 0.05 \cdot (1-0.05)}{(0.05)^2}$$

This resulted in the required sample size of approximately 73 participants. A minimum target sample size of 75 participants was established to account for potential attrition or incomplete data.

A consecutive sampling strategy was employed to recruit participants. All eligible patients who met the inclusion criteria during the study period were approached for participation.

Data collection, analyses and management

Data collection involved a combination of methods, including medical record reviews, patient interviews, and clinical assessments. Medical record reviews provided information regarding patients' demographic characteristics, preoperative comorbidities, surgical details, postoperative tests, and complications, all sourced directly from the hospital records. Patient interviews were facilitated using standardized questionnaires that focused on the resumption of activities of daily living (ADL), functional outcomes, and rehabilitation progress. Trained interviewers, comprising healthcare professionals led by the principal investigator, administered these interviews in a designated private space within the hospital. The interviews were anticipated to last approximately 30 minutes to ensure a thorough exploration of the patients' experiences. Clinical assessments were conducted by trained healthcare professionals and included physical evaluations to measure parameters such as range of motion, pain scores, and other relevant clinical indicators. These assessments were performed in a clinical setting at scheduled intervals throughout the postoperative period to ensure a comprehensive evaluation of patients' progress.

Standardized questionnaires and assessment tools were utilized, including the Short Form Health Survey (SF-12) for quality-of-life assessment, the Visual Analog Scale (VAS) for pain measurement, and relevant scales for ADL assessment. These tools were administered by the trained healthcare professionals throughout the study to ensure uniformity in data collection procedures. The tools were selected based on their established validity in previous research and their relevance to orthopaedic outcomes assessment. To enhance content validity, a panel of orthopaedic and rehabilitation experts reviewed and adapted the questionnaires, aligning them closely with the study objectives. Construct validity was rigorously assessed through a pilot study, incorporating feedback from a subset of the target population to refine and tailor the questionnaires. Concurrent and convergent validity were addressed by comparing results with established measures, ensuring that the collected data accurately reflected the experiences and outcomes of orthopaedic patients undergoing total knee replacement at Metropolitan Hospital.

Collected data were entered into a secure electronic database with restricted access. Data cleaning and validation were conducted to ensure accuracy and consistency. Confidentiality and protection of data were maintained throughout the study. The R Statistical software was utilized for the statistical analysis. Descriptive statistics, including frequencies and percentages, were employed to summarize the characteristics of the study participants. Functional outcomes were classified as either prompt (recovery within < 6 weeks) or delayed (recovery beyond 6 weeks). We conducted descriptive statistics on these outcomes and assessed differences using Chi-Square Statistics by cross-tabulating them with patient characteristics.

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Rehabilitation progress and the resumption of activities of daily living were evaluated at the sixth week of follow-up, categorized as either excellent or poor. "Excellent" rehabilitation progress was defined as the restoration of total function and improved range of motion within <6 weeks, whereas "poor" rehabilitation progress indicated recovery beyond 6 weeks, characterized by limited function and range of motion.

Statistical significance for all analyses was set at an alpha level of 0.05, and effect sizes, along with P-values, were reported to provide a practical understanding of the clinical significance of the observed differences.

Data on new infections were collected through regular clinical assessments and patient self-reports. Each patient was monitored weekly for signs and symptoms of infection. The follow-up period lasted five months, during which the total number of patient weeks at risk was calculated based on the number of patients actively participating and the duration of their follow-up.

The incidence density of new infections was calculated using the formula:

$$\text{Incidence Density} = \frac{\text{Number of New Infections}}{\text{Total Patient Weeks at Risk}}$$

Incidence rate ratios (IRR) were calculated using Poisson regression analysis to assess the association between patient characteristics and the incidence of infection.

Ethical Aspects

This study addressed all ethical considerations. First, informed consent was sought after the study patients were fully informed about the study's purpose, procedures, potential risks, and benefits before agreeing to participate. The research ensured the confidentiality and anonymity of patient data to protect their privacy. Additionally, the study was designed to avoid any undue influence or coercion, ensuring that participation was voluntary and free from external pressures. Finally, the University of Eastern Africa, Baraton Ethics and Research Committee oversaw the study's adherence to ethical standards, safeguarding the rights and welfare of all participants through institutional ethics approval reference UEAB/ISERC/26/11/2023.

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RESULTS

Table 1: Characteristics of Study Participants

Variable	Category	Frequency, n	Proportion %
Age in years	30-39	1	1.3
	40-49	4	5.3
	50-59	12	16
	60-69	28	37.4
	≥70	30	40
Sex	Male	33	44
	Female	42	56
Marital status	Single	3	4
	Married	50	66.7
	Divorced	9	12
	Widowed	13	17.3
Education attained	None	4	5.3
	Primary	37	49.3
	Secondary	19	25.4
	Post-secondary	15	20
Income level	<10,000	1	1.3
	10,001-50,000	7	9.3
	50,001-100,000	28	37.4
	>100,000	39	52
	<10,000	1	1.3
Religion	Christianity	66	88
	Islam	9	12
Occupation	Formal	29	38.7
	Informal	46	61.3
Comorbidity	DM	8	10.7
	HTN	3	4
	DM and HTN	5	5.3
	None	60	80

Functional Outcomes and Activities of Daily Living Resumption following TKR

We categorized functional outcomes as either prompt (recovery in < 6 weeks) or delayed (recovery > 6 weeks). The majority, 65% (n=49), had prompt outcomes, while 35% (n=26) had delayed outcomes. Table 2 cross-tabulates these frequencies by study characteristics.

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Table 2: Functional Outcome Status Cross-Tabulated With Characteristics of Study Participants

		Outcome		
Variable	**Category**	**Prompt Frequency n (%)**	**Delayed Frequency (n, %)**	**P- Value**
Age in years	30-39	1 (100)	0 (0)	0.002568
	40-49	4 (100)	0 (0)	
	50-59	9 (75)	3 (25)	
	60-69	24 (86)	4 (14)	
	≥70	11 (37)	19 (63)	
Sex	Male	24 (73)	9 (27)	0.343
	Female	25 (60)	17 (40)	
Marital status	Single	2 (66.7)	1 (33.3)	0.1383
	Married	37 (74)	13 (26)	
	Divorced	4 (44.4)	5 (55.6)	
	Widowed	6 (46.2)	7 (53.8)	
Education attained	None	1 (33.3)	3 (66.7)	0.08846
	Primary	22 (59.5)	15 (40.5)	
	Secondary	13 (68.4)	6 (31.6)	
	Post-secondary	13 (86.7)	2 (13.3)	
Income level	<10,000	1 (100)	0 (0)	0.7679
	10,001-50,000	4 (50)	4 (50)	
	50,001-100,000	19 (67.9)	9 (32.1)	
	>100,000	25 (65.8)	13 (34.2)	
Religion	Christianity	42 (63.6)	24 (36.4)	0.6434
	Islam	7 (77.8)	2 (22.2)	
Occupation	Formal	24 (82.8)	5 (17.2)	0.02329
	Informal	25 (54.3)	21 (45.7)	
Comorbidity	DM	1 (12.5)	7 (87.5)	0.00009
	HTN	1 (50)	1 (50)	
	DM and HTN	0 (0)	4 (100)	
	None	47 (77)	14 (23)	

Rehabilitation Progress and Activities of Daily Living Resumption

In this study, **e**xcellent rehabilitation progress meant restoration of total function and improved range of motion in <6 weeks, while poor rehabilitation progress meant recovery >6 weeks with limited function and range of motion. Table 3 shows rehabilitation progress and activities of daily living resumption cross-tabulated by frequencies of study characteristics.

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Table 3: Rehabilitation Progress and Activities of Daily Living Resumption at the 6th Week of Follow-Up

Variable	Category	Poor	Excellent	P- Value
Age in years	30-39	0 (0)	1 (100)	0.001
	40-49	0 (4)	4 (100)	
	50-59	3 (25)	9 (75)	
	60-69	7 (25)	21 (75)	
	≥70	20 (66.7)	10 (33.7)	
Sex	Male	10 (30.3)	23 (69.7)	0.19
	Female	20 (47.6)	22 (52.4)	
Marital status	Single	1(33.3)	2 (66.7)	0.43
	Married	17 (51.5)	33 (48.5)	
	Divorced	5 (55.6)	4 (44.4)	
	Widowed	7 (53.8)	6 (46.2)	
Education attained	None	3 (75)	1 (25)	0.16
	Primary	17 (45.9)	20 (54.1)	
	Secondary	7 (36.8)	12 (63.2)	
	Post-secondary	3 (20)	12 (80)	
Income level	<10,000	0 (0)	1 (100)	0.85
	10,001-50,000	4 (50)	4 (50)	
	50,001-100,000	10 (35.7)	18 (64.3)	
	>100,000	16 (42.1)	22 (57.9)	
Religion	Christianity	28 (42.4)	38 (57.6)	0.42
	Islam	2 (22.2)	7 (77.8)	
Occupation	Formal	5 (16.7)	25 (83.3)	0.003
	Informal	25 (54.3)	21 (45.7)	
Post-discharge physiotherapy care	Yes	18 (32.1)	38 (67.9)	0.03
	No	12 (63.2)	7 (36.8)	
Comorbidity	DM	7 (87.5)	1 (12.5)	0.0001
	HTN	1 (50)	1 (50)	
	DM and HTN	4 (100)	0 (0)	
	None	18 (29.5)	43 70.5)	

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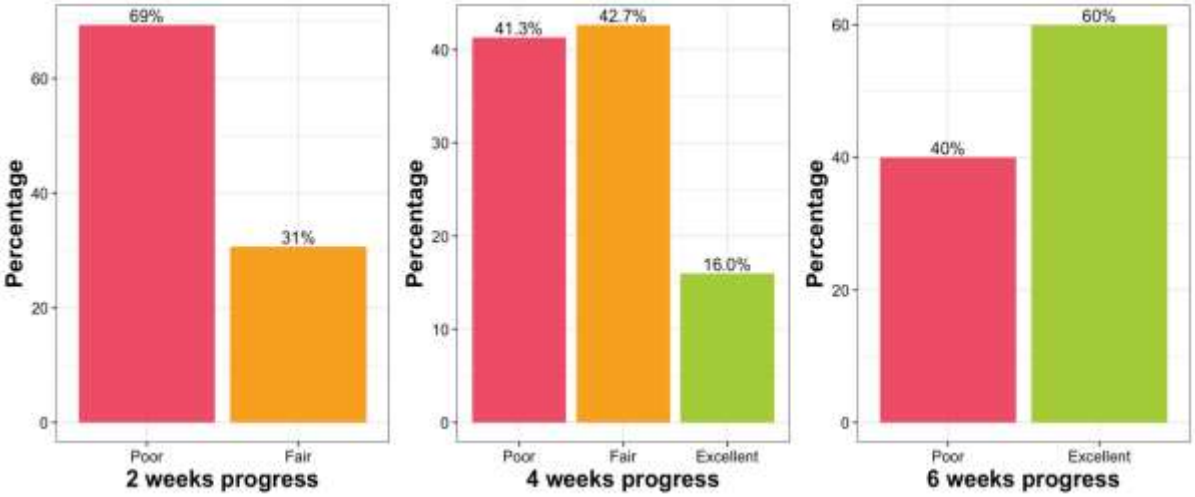

Figure 1: Rehabilitation Progress and Activities of Daily Living Resumption at 2 Weeks, 4 Weeks and 6 Weeks among the Patients Who Went TKR

Factors Associated with the Incidence Density of Prosthetic Knee Joint Infection following TKR

The number of new infections in the five months of follow-up was 4 in 449 patient weeks at risk of the infection, yielding an incidence density of 0.009 per patient week or 9 cases per 1000 patient weeks. Only age was associated with this incidence (Table 4).

Table 4: Incidence Rate Ratio of Age Association with Infection Incidence

Term	Coefficient	Standard error	P value	Incidence rate ratio (IRR)	Incidence rate ratio (IRR) lower 95% confidence limit	Incidence rate ratio (IRR) higher 95% confidence limit
Intercept	-23.8	10.5	0.0237	$4.69e^{-11}$	$5.26e^{-20}$	0.0419
Age	0.287	0.138	0.0374	1.33	1.02	1.74

An IRR of 1.33 means that the incidence rate of infection among the study patients increased by 33% for each year of the patients.

Discussion

This study observed that functional outcomes post-TKR are generally favourable, with patients who were followed up resuming their daily activities in a relatively short timeframe of less than six weeks. By the sixth week, 60% of the patients had undergone excellent rehabilitation progress. The incidence of prosthetic knee infection was notably low, perhaps highlighting the effectiveness of the applied surgical techniques and postoperative care. This incidence showed a significant association with age; specifically, for each additional year of age among the study participants, the infection rate increased by 33%. Additionally, we identified that comorbid conditions, particularly diabetes and hypertension, are the primary factors that contributed to delayed healing and resumption of daily activities following TKR.

The positive outcome of patients resuming daily activities within six weeks post-total knee replacement (TKR) is consistent with global trends(Nizam et al., 2019; Sveinsdóttir et al., 2021; Taylor et al., 2022). This quick recovery may be attributed to several factors, including the patients preoperative physical condition, the surgical techniques employed, and strict adherence to postoperative rehabilitation protocols(Nizam et al., 2019; Sveinsdóttir et al., 2021; Taylor et al., 2022). It is well established that active patient involvement in rehabilitation contributes to better outcomes. Motivated patients in structured programs often recover faster, especially with early mobilization and physiotherapy support(Witjes et al., 2017). Advanced surgical techniques, such as minimally invasive methods, have been reported to reduce tissue trauma and quicker recovery(Picard et al., 2018). The presence of an effective health system comprised of skilled orthopaedic surgeons and a coordinated healthcare team, especially nursing support, could have enhanced the success of TKR surgeries in this study, as reported elsewhere(Caprari et al., 2018).

Consistent with this study, the incidence of prosthetic knee infection following total knee replacement (TKR) is remarkably low in recent studies. For instance, Hasenauer al. (2022) reported 35 (0.41% incidence) infections occurring in the first 90 days and 26 (0.32% incidence, infections occurring in the 90-day to 1-year interval(Hasenauer et al., 2022). Pulido et al. reported an incidence of knee infections at 1.1% within their cohort, with most infections identified during the first-year post-surgery. Similarly, Belmont et al. reported a 0.30% infection rate at 30 days post-surgery(Belmont et al., 2014). These findings suggest that with appropriate preoperative screening, meticulous surgical practices, and vigilant postoperative monitoring such as in this study, the risk of prosthetic knee infections can be minimized effectively. Overall, the low incidence of prosthetic knee infections following TKR motivates continuous improvement in surgical practices and patient management strategies.

While the incidence of infection was low, it was significantly associated with age. Specifically, as age increases, the risk of developing an infection rises, which is consistent with previous research in the field(Inoue et al., 2019; Lum et al., 2018; Spichler-Moffarah et al., 2023), perhaps due to diminished immune response, which emphasizes the importance of age-related factors in preoperative planning and postoperative care. An important implication of this finding is that healthcare providers should implement age-specific strategies to alleviate infection risks. Targeting the unique needs of older patients could enhance TKR outcomes in this vulnerable demographic.

Our findings underscore the significant impact of comorbid conditions, particularly diabetes and hypertension, on the recovery process following TKR. Patients with diabetes often experience impaired wound healing and increased susceptibility to infections, which can delay postoperative recovery and prolong the resumption of daily activities(Li et al., 2023). Similarly, hypertension has been associated with poorer surgical outcomes, as it can affect blood flow and tissue perfusion, further complicating the healing process(Ahmed et al., 2011). Considering the foregoing, we highlight the necessity forcomprehensive preoperative evaluations that consider the management of these comorbidities to optimize surgical outcomes. By controlling diabetes and hypertension prior to surgery, healthcare providers can potentially improve recovery timelines and enhance the overall quality of life for patients undergoing TKR. This approach not only benefits individual patients but also has broader implications for healthcare systems by reducing the burden of prolonged rehabilitation and associated healthcare costs(Ferket et al., 2017).

Recommendations, Contribution to Theory, Policy and Practice

Our findings carry important implications for clinical practice, patient management, and future research in TKR. Favourable outcomes and low infection rates indicate that TKR is a safe, effective option for patients with severe knee pain or stiffness, encouraging them to consider the surgery actively. Embracing this procedure can significantly improve the quality of life, mobility, and overall function for those suffering from debilitating knee conditions(Evans et al., 2019). However, the association of age with infection risk highlights the need for thorough preoperative assessments and age-specific surgical and postoperative care protocols, particularly for older patients. The presence of diabetes and hypertension contributing to delayed healing underscores the necessity for targeted preoperative interventions. By optimizing the management of these comorbid conditions before surgery, healthcare providers can potentially enhance recovery times and reduce the risk of complications, leading to improved overall outcomes. Our findings highlight the need for further research into how diabetes and hypertension affect healing post-TKR, investigating the effectiveness of specific interventions aimed at these comorbidities to provide valuable insights that enhance surgical outcomes. For instance, comprehensive preoperative assessments should be conducted to evaluate the patient's control of these conditions, with medication optimization to ensure optimal management of diabetes and hypertension prior to surgery. Continuous glucose monitoring and insulin protocols can help maintain blood sugar levels within target ranges, while dietary interventions developed in collaboration with dietitians can stabilize glucose levels pre- and postoperatively. Regular blood pressure monitoring and adjustment of antihypertensive medications are essential to keep blood pressure within safe limits throughout the perioperative period. Additionally, encouraging lifestyle modifications such as a balanced diet, regular physical activity, and weight management can further improve the management of diabetes and hypertension in TKR patients, ultimately leading to enhanced surgical outcomes and reduced complications.

Limitations

In this study, we acknowledge a couple of limitations. First, the duration of follow-up was limited to six weeks, which hindered the ability to fully assess the long-term outcomes and potential complications associated with TKR. A more extended follow-up period could provide deeper insights into the incidence of infections and overall joint function over time. Second, they could not disentangle the effects of age and comorbidities on the occurrence of infections. While this limited the generalizability of our findings, addressing these limitations in future research will be essential for enhancing our understanding of the factors influencing infections in TKR patients. While confounding variables such as demographics, BMI, comorbidities, rehabilitation protocols, and psychosocial factors can significantly influence results, this study did not have an opportunity to collect these data. Future studies should aim for longer follow-up periods and consider controlling for these confounding variables to provide a more comprehensive evaluation of TKR outcomes in the Kenyan context. Healthcare providers in Kenya can enhance Total Knee Replacement outcomes by implementing standardized preoperative protocols, fostering multidisciplinary collaboration, adopting tailored clinical guidelines, optimizing postoperative care, and engaging community health initiatives. Increased investment in healthcare infrastructure and ensuring access to essential medications will further support comprehensive management of diabetes and hypertension in patients. Healthcare providers in Kenya can enhance Total Knee Replacement outcomes by prioritizing

preoperative care ensuring that individuals achieve not only successful surgeries but also improved overall health and quality of life.

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