

Comorbidities and indications for total hip arthroplasty at a tertiary care center in Saudi Arabia

Abstract

Objectives: Total hip arthroplasty (THA) is one of the most effective orthopedic interventions for the treatment of patients with advanced-stage hip disease. However, reports regarding indications for primary THA in Saudi Arabia are limited. We aimed to evaluate primary indications for THA and identify associated chronic diseases and postoperative complications in THA patients at a tertiary hospital in Saudi Arabia. These are important to provide knowledge on types of hip diseases and variables that may affect the outcome of this intervention in the Saudi population.

Methods: This is a retrospective cohort study of THA cases performed between 2010 and 2019 at a tertiary center in Saudi Arabia. Retrieved data include patients' ages at the time of surgery, chronic diseases, presurgical diagnosis, site and duration of surgery, and postoperative complications.

Results: We identified 83 patients who had undergone primary THA; in regard to comorbidities, 32.5% and 30.1% had hypertension and diabetes mellitus, respectively. The most common indication for THA was degenerative hip osteoarthritis (50.6%), followed by post-traumatic arthritis (22.9%) and hip avascular necrosis (20.5%).

Conclusion: Despite the high rate of trauma and accidents in Saudi Arabia, degenerative osteoarthritis remains the most common indication for primary THA. Post-traumatic osteoarthritis is identified as the second major indication for THA.

Keywords: arthroplasty, diabetes, hip, hypertension, osteoarthritis, replacement, Saudi Arabia

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Abbreviations: THA, total hip arthroplasty; OA, osteoarthritis; SCD, sickle cell disorder; AVN, avascular necrosis; US, United States; KFHS&RC-Jed, King Faisal Specialist Hospital and Research Center in Jeddah, SD, standard deviation; SAS, statistical analysis system

Introduction

Many patients with musculoskeletal disorders complain of pain and dysfunction that affect their quality of life, which can be improved through orthopedic surgeries. One of the most-successful orthopedic interventions is total hip arthroplasty (THA), which is now widely used to treat patients with hip pain. This procedure has evident positive outcomes in the management of both simple and complex very late hip arthritis.¹ THA has been shown to have encouraging effects on improving the functional outcomes of patients with end-stage hip disease; this is further reflected by the increasing numbers of these procedures performed in most Western countries.²

Since the 1960s, several studies have reported substantial success with THAs. This is associated with marked enhancements in THA techniques and their rate of performance, secondary to the change in the selection criteria of patients eligible for this procedure.^{3,4} The rate of degenerative hip diseases or post-traumatic conditions requiring operative intervention is higher in the elderly, and it is presumed that the number of THA will grow up since more senior patients will select this intervention to improve their future quality of life.⁵

Several conditions, including osteoarthritis (OA), septic and inflammatory arthritis, pediatric hip diseases and developmental dysplasia, trauma, tumor, and avascular necrosis (AVN), are recognized to affect the integrity of the hip joint. These disorders may

also damage the hip joint and cause hip pain, lower-limb deformity, and gradual loss of function.^{6,7}

OA was reported as the main indication for THA in a study that showed that about 67.3% of patients who had THA were diagnosed as having OA. In the same manner, other authors reported that OA was the most common indication for THA, regardless of the underlying etiology and the patient's age and gender.⁸

Patients on steroids were found to have an 8–10% risk of femoral head osteonecrosis. This report showed that 5–12% of THAs cases were secondary to osteonecrosis of the hip. Hemiarthroplasty of the hip might be enough intervention if the acetabulum is intact. However, THA is frequently indicated for advanced degenerative hip diseases.^{9,10}

THA as a treatment for OA in patients with sickle cell disorder (SCD) has also been documented since osteonecrosis of the femoral head is one of the devastating consequences seen in these patients. Patients with SCD are young and motivated to remain active; many are at the apex of their professional and personal lives and, thus, willing to explore every option in search of pain relief and restoration of function. In terms of pain, level of activity, and function, the hip is one of the most limiting factors in their lives. Despite this, THA have resulted in considerable improvement in patient's quality of life for hip osteonecrosis secondary to SCD.^{11,12}

Comorbidities are defined as disorders that are coexisting with the primary disease but not directly linked to it. In 2012, the rate of having one comorbid condition in the United States (US) was found to be around 49.8%. However, the result of a study conducted in the US identified about 83.7% of patients requiring hip or knee

replacements had a minimum of one comorbid disorder. It is well recognized that the number of comorbidities is directly correlated to the patient's age, which will directly impact the number of patients with multiple comorbid conditions who are going for future joints arthroplasty intervention.¹³ A limited number of studies explored the rate of patients with comorbid conditions and THA, the commonly identified comorbidities were hypertension, stroke, cardiac disease, and diabetes.¹⁴

There were two studies performed locally to identify the primary indications of THA in Saudi Arabia. However, there was a discrepancy in their reported most common indication for THA. Makhdom & Al-Sayyad¹⁵ found that post-traumatic arthritis is by far the most common indication for THA. Nevertheless, Hamdi et al.¹⁶ in 2017 reported that primary OA was the most common one, this discrepancy in the result was attributed to the increment of elderly people in the city and the limitation of data acquisition to the electronic database system without including the old handwritten patient's records in Makhdom and Al-Sayyad study.

Our study is conducted to assess the primary indications of THA and to identify the epidemiological characteristics of THA patients and their association with different comorbid conditions at a tertiary center in Saudi Arabia. The study is important to enhance our knowledge of types of hip diseases and variables that may affect the outcome of this intervention in the Saudi population. This will hopefully reflect on better healthcare pre-planning to deal with different indications and comorbidities in patients going for THA and to correlate these factors with complications of THA.

Materials and methods

We performed a retrospective review of maintained database from January 2010 to December 2019 for THA cases that were managed at King Faisal Specialist Hospital and Research Center in Jeddah (KFHS&RC-Jed), which is one of the main tertiary hospitals in Saudi Arabia.

The retrieved data from the hospital database for this study include information regarding the following:

- Patients' ages at the time of surgery, their gender, and lifestyle habits such as smoking;
- Chronic diseases (diabetes mellitus, hypertension, hypothyroidism, renal disease, cardiac or coronary artery disease, anemia and blood disease, benign prostate hyperplasia, malignancies, rheumatological disorders, and osteoporosis);
- Presurgical diagnoses (degenerative hip OA, rheumatic hip arthritis, post-traumatic OA, ankylosing hip fusion, fracture, AVN, post-traumatic avascular necrosis, psoriatic arthritis, and post-septic arthritis), site and duration of surgery;

Our inclusion criteria were adult patients over 18 years of age who underwent a primary THA at this hospital. We excluded any patient who had undergone revision surgery, hemiarthroplasty, or hip resurfacing procedure, as well as patients with incomplete or missing data in the hospital database (Figure 1).

All data were typed, coded, and analyzed electronically using statistical analysis system (SAS) software program (version 9.4). Quantitative variables were presented as the mean \pm standard deviation (SD), while qualitative variables were presented in number and percentage. Chi-squared test was used to examine the differences in the degree of adherence between qualitative variables and clinical characteristics. Fisher's exact test was used also to see bivariate association. A p-value <0.05 was considered statistically significant.

The primary outcome is to assess the primary indications for THA at a tertiary hospital in Saudi Arabia and to detect their relationship with demographic characteristics. The secondary outcomes: 1. To describe the epidemiologic characteristics of THA performed at KFHS&RC-Jed; 2. To determine the medical comorbidities that are associated with the selected THA patients.

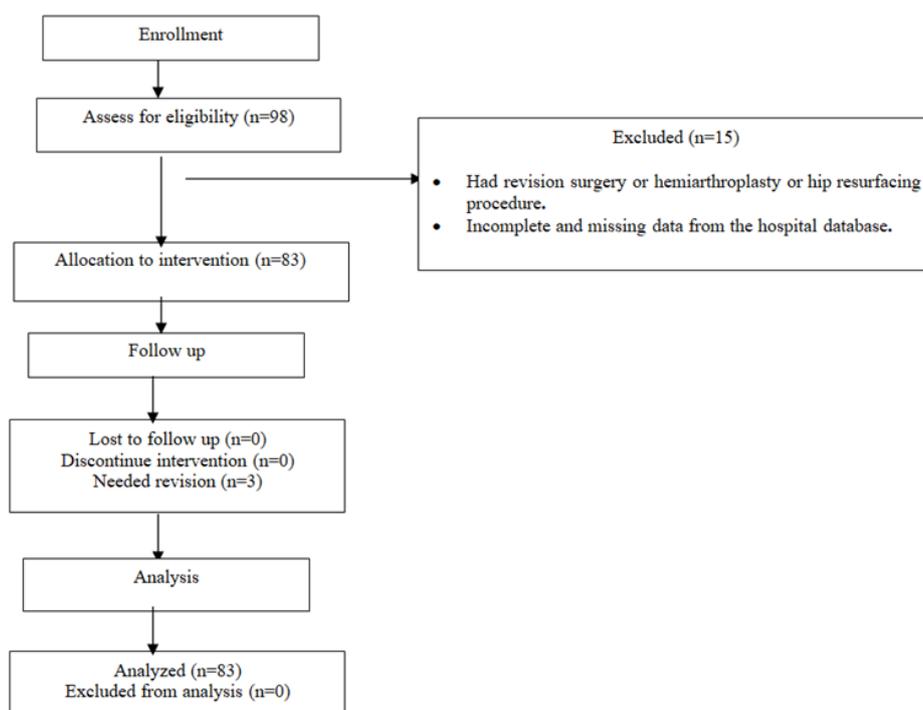


Figure 1 Consort flow chart.

Results

A total of 83 patients who had primary THA were drawn from the patient-reported database at KFSH&RC-Jed from the period between January 2010 to December 2019, with the patients' mean age being 52.3 ± 17.2 years old. The mean duration for patient length of stay was 8.2 days. All cases were unilateral except for three cases involved bilateral THA. Female patients accounted for 56.6% of the total (Table 1). Male patients who underwent THA were predominant in the age group 25–54 years, while females were predominant in the age group 25–64 years, with no Statistical significance (Table 2).

Table 1 Basic characteristics of the studied participants (n=83)

Basic characteristics	Study group (n=83)	
	Number	%
Age (52.3 ± 17.18)		
15-24	7	8.43
25-54	34	40.96
55-64	21	25.3
≥ 65	21	25.3
Total	83	100
Gender		
Male	36	43.37
Female	47	56.63
Total	83	100
Site of surgery		
Right	41	49.4
Left	39	46.99
Bilateral	3	3.61
Total	83	100

Table 2 Total hip Arthroplasty among studied participants categorized by age groups and gender

Age	Sex		P-value
	Male	Female	
17-24	4	3	
25-54	19	15	0.15
55-64	6	15	
≥ 65	7	14	
Total	36	47	

In regard to chronic diseases for the studied group, hypertension and diabetes mellitus were identified in 32.5% and 30.1% of our patients, respectively. Moreover, we found that 7.2% were steroid-dependent (Table 3).

In terms of indications for THA, OA, either degenerative or post-traumatic, was considered the most common (50.6% and 22.9%, respectively). Hip AVN, represented the second most frequent indication for THA, with 20.5% of the studied participants, regardless of age (Table 4 & 5).

Table 3 Clinical comorbidities of the studied participants (n=83)

Clinical comorbidities	Study group (n=83)	
	Number	%
Diabetes mellitus	25	30.1
Hypertension	27	32.5
Hypothyroidism	3	3.6
Kidney disease	4	4.8
Cardiac disease	3	3.6
Sickle cell disease	5	6
Osteoporosis	1	1.2
Steroid dependent	6	7.2
Aplastic anemia	1	1.2
Rheumatoid arthritis	1	1.2
Leukemia	1	1.2
Ankylosing spondylitis	1	1.2
Benign prostate hyperplasia	1	1.2
Epilepsy	1	1.2
Degenerative lumbar spine	1	1.2
Systemic lupus erythematosus	2	2.4

Table 4 Preoperative indication of total hip arthroplasty among studied participants (n=83)

Clinical characteristics	Study group (n=83)	
	Number	%
Degenerative hip OA*	42	50.6
Rheumatic hip arthritis	2	2.4
Post-traumatic OA*	19	22.9
Hip avascular necrosis	17	20.5
Ankylosing hip fusion	1	1.2
Psoriatic arthritis	1	1.2
Post-septic arthritis	1	1.2

*Osteoarthritis

Table 5 Indication of total hip arthroplasty among studied participants categorized by age groups

Category	Preoperative indication				
	post septic arthritis	Inflammatory	degenerative	Traumatic	Avascular
	(n=1)	(n=4)	(n=42)	(n=19)	(n=17)
Age					
18-24 (n=7)	0	1	1	3	2
25-54 (n=34)	0	3	9	8	14
55-64 (n=21)	1	0	15	4	1
≥65 (n=21)	0	0	17	4	0

Discussion

These results agreed with those of the study by Hamdi et al.¹⁶ in 2017 that included 107 patients who had undergone THA; the mean age of that sample was 58.3±20.2 years, and most patients belonged to the age groups 36–55 years and 56–75 years. In addition, females comprised approximately half of the sample (50.5%); however, the majority had a unilateral hip replacement (left side).

In regard to chronic diseases and comorbid conditions, diabetes mellitus and hypertension were reported in 30.1% and 32.5% of patients, respectively. The prevalence of diabetes and hypertension are high in general population in our kingdom, which recorded around 30% and 26.1%, respectively.^{17,18} These results were coherent with those of the study by Podmore et al.¹³ They illustrated that there was a substantial correlation between the existence of chronic diseases and patients going for joint arthroplasty intervention in England. His result showed that hypertension and diabetes mellitus are the leading chronic diseases in joints arthroplasty patients consecutively.¹³

It was recognized that about 7.2% of the patients were steroid-dependent, and these results agreed with those of Kao et al.⁹ who found that long-term risk of hip arthroplasty increase with corticosteroid use, majority of them were not related to fractures. They determined that the average rate of having hip arthroplasty after 12years follow up were 2.3% in steroid-dependent patients and 1.3% in non-dependent patients.

In their study, Rahman et al.¹⁰ showed successful outcomes in patients with steroid-induced osteonecrosis of the hip who were treated with THA. The procedure showed positive impact on patient's functional outcome and pain control.

Our study reported that OA, either degenerative or post-traumatic, was considered the most-common indication for THA (50.6% and 22.9%, respectively), and vascular causes (acute avascular necrosis) represented the second most frequent indication for the surgery, with 20.5% of the studied patients, regardless of age. Similar to the present study, Siopack et al.⁶ & Erens et al.⁵ identified that OA was the most common indication for THA, regardless of underlying etiology, age, and gender. By contrast, Hamdi¹⁶ and his colleagues revealed that primary OA and post-traumatic OA were documented in 43.9% and 22.4% of the patients, respectively, but the study showed a significantly higher proportion of patients who had THA due to arthritis compared with those who had ankylosis, AVN, or developmental dislocation. Also, in contrast to the present study, Makhdom & Al-Sayyad¹⁵ reported that primary OA was documented in only 9.2%, and post-traumatic OA was documented in 50% of patients. Rheumatoid arthritis was the main indication for THA in about 7.4% of the cases.

The difference in the results might be related to the reduction in the number of motor vehicle accidents with the new traffic guidelines in Saudi Arabia. Despite that our acute trauma cases are limited because of the hospital policies. However, we routinely receive referrals of post traumatic arthritis from different trauma centers in the country that requires future THA. In addition, the increase in patients' ages due to the expansion of medical diagnoses and treatments for comorbidities might be reflected in aging patients living longer with the number of primary OA cases exceeding post-traumatic cases.

Lai et al.¹⁹ delineated that AVN was the most common indication for primary THA (46.9%) in his series. In contrast, another research performed by Lau et al.²⁰ in Asia revealed that inflammatory arthritis (32.2%) was the main indication for THA. This difference could be related to the widespread immunological and inflammatory diseases found in the East Asia region compared to the Middle East region. The number of inflammatory arthritis cases in Saudi Arabia is significantly lower than in East Asia.

The present study revealed a statistically significant difference between indications for hip replacement and different age groups. This finding aligns with that of Hamdi et al.¹⁶ whose study illustrated that patients >75 years old were more likely to have THA for OA, while those aged 36–55 years old were most likely to have THA for ankylosis or AVN. Additionally, men usually had hip surgery for OA or AVN.

A study by Yoon et al.³ revealed that 63% of patients treated with bipolar hemiarthroplasty were ≥75 years old and that treatment was primarily due to the neck and intertrochanteric fractures of the femur. While 66% needed primary THA, most of these cases were diagnosed as osteonecrosis, followed by OA, and 51% underwent primary revision due to aseptic loosening and infection. The rate of bipolar hemiarthroplasties remarkably increased in the elderly patient group, with an observed predominance of female patients' group. Moreover, their results showed a high proportion of primary THA in all age groups except for the very old age group (more than 85 years).

Our study has several limitations. These include its retrospective nature, short duration, and small sample size. In addition, the fact that our center does not deal with acute trauma patients unless they met the center eligibility policy, which might not definitely represent the entire population going for THA patients in our country.

Conclusion

Osteoarthritis, either degenerative or post-traumatic, is the most common indication for THA, and hip avascular necrosis represented the second most common indication among the studied patients.

Recommendations

We recommend establishing a national joint arthroplasty registry for systematic data collection of hip arthroplasty procedures across Saudi Arabia. This will aid in the optimal utilization of health care resources and better healthcare pre-planning to deal with different indications and comorbidities in patients going for THA.

Ethical considerations

Ethical approval for the study was obtained from the Research Institutional Review Board at KFSH&RC-Jed. The confidentiality of all data was ensured, and data were accessed by the researchers only.

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Conflicts of interest

There are no conflicts of interest.

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