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EPIDEMIOLOGICAL STUDY OF TOTAL KNEE ARTHROPLASTY: ANALYSIS OF DEMOGRAPHICS, COMORBIDITIES AND CLINICAL OUTCOMES FROM A TERTIARY CARE HOSPITAL

Kammadanam Sushma[*1], Juntipally Pavani[1], K. Ravitreyini[1] and Dr. D. Venkata Ramana, M. Pharm: PhD[2]

[*1]Doctor of Pharmacy Intern, [2]Professor and Principal
Department of Pharmacy Practice, Holy Mary College of Pharmacy, Bogaram (V), Medchal (M), Hyderabad, Telangana, India, 501301.

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***Corresponding Author**
Kammadanam Sushma
Doctor of Pharmacy Intern, Department of Pharmacy Practice, Holy Mary College of Pharmacy, Bogaram (V), Medchal (M), Hyderabad, Telangana, India, 501301.

ABSTRACT

Aim: To assess the necessity of TKR in patients suffering with knee degeneration. **Objectives** -To determine the distribution of study participants according to age, BMI, gender, associated comorbidities, previous medical and to determine the clinical outcome of post TKR in the training participants. **Method** - A sum of 150 members were signed up for our imminent observational review directed in the ongoing division of KIMS sunshine, Secunderabad, over a time of a half year. **Results** -Our review consisted of members with knee osteoarthritis who underwent complete knee arthroplasty. The majority (55%) were 60-69 years old, and females were more affected (63.3%) than males (36%). Most members were overweight, with 31% smokers and 37% alcohol consumers. Smoking was linked to disease progression. Common comorbidities included hypertension and diabetes (21%), hypertension (18%), and hypothyroidism (18%). A quarter of the population had no comorbidities, while 63 members had a medication history and 28 had previous knee injuries. **Conclusion** - Our review highlights the significant risk of total knee replacement (TKR) associated with osteoarthritis, particularly in individuals aged 60-69 (55%) and females (63%). Overweight individuals and those with left knee issues are more susceptible. Comorbidities, medication history, lifestyle, and past knee injuries also contribute to knee degeneration. Notably, all participants required TKA due to failed

conservative treatments, underscoring the severity of their condition and the potential need for advanced interventions.

INTRODUCTION

DEFINITION

Osteoarthritis (OA) is considered as disease of articular cartilage. It is characterized by changes in structural and functional failure of synovial joints. There are effective pharmacological and non-pharmacological treatments available for the management of osteoarthritis.[1]

Knee arthroplasty is a surgical procedure which is defined as reconstruction of the knee joint Total knee arthroplasty (TKA) also known as total knee replacement (TKR) is an excellent treatment option for the individuals with symptomatic. Additionally, unicompartmental knee arthroplasty is another effective surgical treatment for the end stage symptomatic osteoarthritis.[2,3]

CLASSIFICATION

Primary osteoarthritis -primary risk for OA is obesity, when compared to normal weight controls, observed that those with BMI more than 30kg/m2 were 6.8 times more likely to develop OA.

Secondary osteoarthritis -secondary OA develops as people age and is brought on by past illnesses, fractures, inflammation, loose bodies, and congenital hip dislocation, trauma, metabolic or endocrine disorders, hereditary factors are the main causes of secondary OA.[4]

ETIOLOGY

Age, female gender, obesity, anatomical factors, muscle weakness and joint injury. Primary osteoarthritis is the most common subset of the disease and diagnosed in absence of predisposed trauma or disease. Secondary osteoarthritis occurs with a pre-existing joint abnormality.[5]

SYMPTOMS

- Joint pain with activity
- Transient stiffness in the morning or after rest
- Reduced range of motion
- Joint crepitus or periarticular tenderness, or both

- Bony swelling.[1]

CLINICAL INVESTIGATIONS

Physical examination should include an assessment of body weight, range of motion in the joint, the location of tenderness, muscle strength, and ligament stability and radiological imaging.[1]

EPIDEMIOLOGY

OA affects about 3.3-3.6% of population globally. It causes moderate to severe disability in 43 million population. It is established that 80% of population over 60 years old has evidence of OA although only 60% of this subset are symptomatic.[6]

PATHOPHYSIOLOGY

The cause of OA is an interplay of risk factors, mechanical stress, and abnormal joint mechanics. The combination leads to pro-inflammatory markers and proteases that eventually mediate joint destruction. The complete pathway that leads to the destruction of the entire joint is unknown.

The earliest changes that occur in OA are at the level of the articular cartilage that develops surface fibrillation, irregularity, and focal erosions. These erosions eventually extend down to the bone and continually expand to involve more of the joint surface. On a microscopic level, after cartilage injury, the collagen matrix is damaged, causing chondrocytes to proliferate and form clusters. A phenotypic change to hypertrophic chondrocyte occurs, causing cartilage outgrowths that ossify and form osteophytes. As more of the collagen matrix is damaged, chondrocytes undergo apoptosis. Improperly mineralized collagen causes sub-chondral bone thickening; in advanced disease, bone cysts infrequently occur. Even rarer, bony erosions appear in erosive OA.

There is also some degree of synovial inflammation and hypertrophy, although this is not the inciting factor as is the case with inflammatory arthritis. Soft-tissue structures (ligaments, joint capsule, menisci) are also affected. In end-stage OA, both calcium phosphate and calcium pyrophosphate dihydrate crystals are present. Their role is unclear, but they are thought to contribute to synovial inflammation.[4]

OBJECTIVES

This study aims to analyze the outcomes and demographic information of patients undergoing total knee arthroplasty (TKA), with a focus on the frequency of concomitant conditions such as diabetes, obesity, and heart disease. We will evaluate the clinical results, including functional outcomes, patient satisfaction, complications, and implant survival rates, to determine the factors that contribute to unfavorable TKA outcomes. Additionally, we will examine the impact of comorbidities on readmission rates, length of hospital stay and healthcare costs. Based on the findings, we will provide evidence-based recommendations to improve TKA outcomes and optimize patient care.

METHODOLOGY

Study design and study period: It is a prospective, observational study conducted in KIMS – SUNSHINE, Secunderabad. Study is conducted for 6 months. Source of data- Data is collected from treatment charts, case sheets and laboratory data of the subjects included in the study. Sample size: Estimated sample size is about 100-150 participants. Inclusion criteria: The study includes if the subject satisfies the following criteria: Those who are analyzed with osteoarthritis are included in this learning Age (above 40yrs). Gender (both male and female). Exclusion criteria: The study excludes the following people: × In patients, × Pregnant women, × Lactating women, × Age (Below 40yrs.) × Exclude individuals without a confirmed diagnosis of TKR. × Exclude inappropriate study designs, such as case reports or editorials. Method of collection of data- Informed consent is obtained from the study participants after explaining the study details Data collection and DRP s were identified by using the following ¬ Annexure – I (Patient Data Collection Form) ¬ Annexure –II (informed consent from) ¬ Annexure- III (Averse Drug Reaction form) Statistical analysis: This study makes use of descriptive statistics. The data of the patients who were recruited is then entered into an Excel spreadsheet in Microsoft Office for further investigation.

PLAN OF STUDY

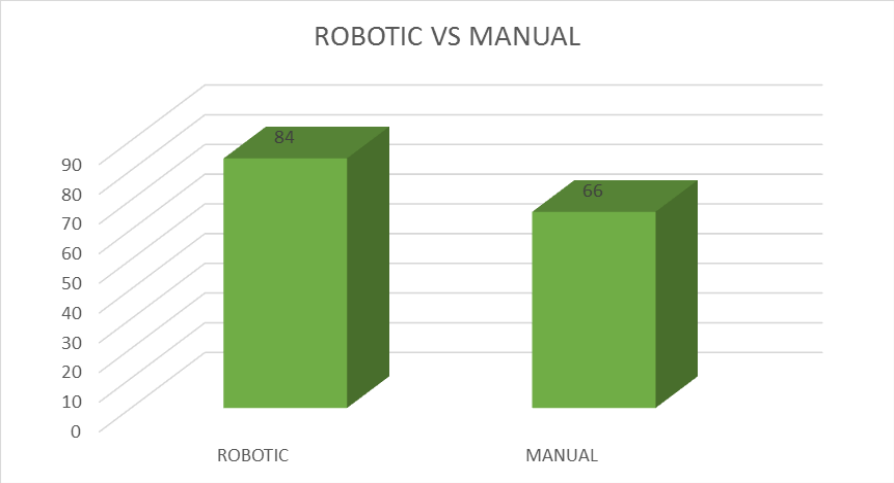
The review should require a half year to meet the objectives. The proposed study was separated into four stages.

Stage 1 • Writing survey, Convention readiness, Getting endorsement from morals advisory group.

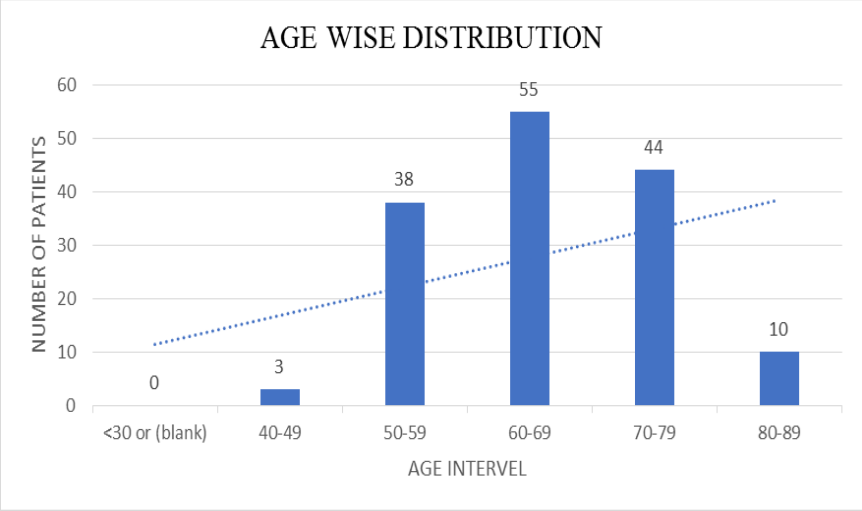
Stage 2 • Making assent structure for the patient, making an information assortment structure, Getting data, Documentation of the gathered information

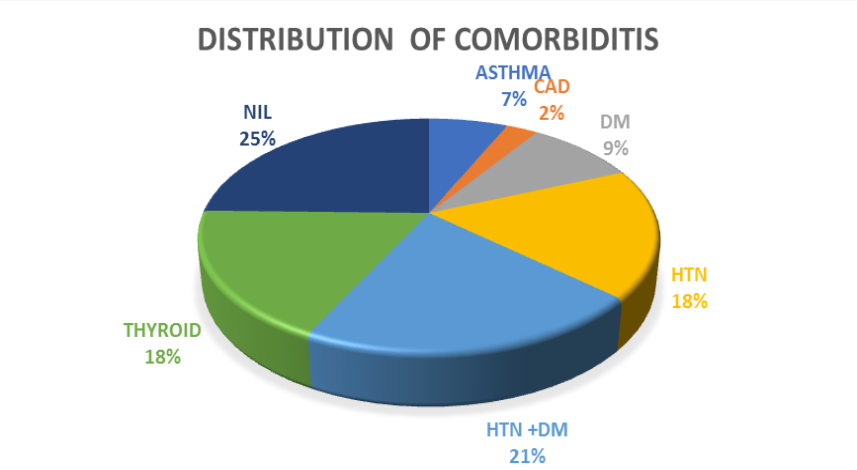
Stage 3 • Measurable investigation of the information. The information is addressed by utilizing illustrations, tables, Translation of information

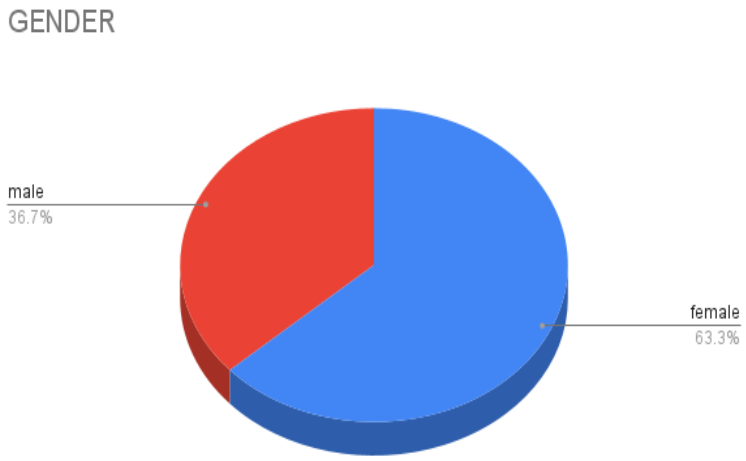
Stage 4 • Project theory show.



RESULTS







DISCUSSION

Our prospective observational study evaluated the necessity of patients undergoing total knee replacement (TKR) for knee osteoarthritis at KIMS SUNSHINE hospital in Secunderabad. The study included 150 participants, with the majority (55%) in the 60-69 age, followed by 44% in the 70-79 age group. Females accounted for 63.3% of the participants, while males made up 36.7%. Notably, 84% of the participants underwent robotic-assisted TKR, while 16% had traditional TKR. The study also found that the majority of patients had no comorbidities, while hypertension and diabetes were the most common comorbidities (21%), followed by thyroid and hypertension (18%), diabetes (9%), asthma (7%), and coronary artery disease (2%). The findings suggest that robotic-assisted TKR is becoming increasingly popular, and comorbidities play a significant role in patient outcomes.

CONCLUSION

Epidemiological analysis of clinical outcomes, comorbidities, and demographics of total knee arthroplasty (TKA) is crucial for healthcare, providing insights that will influence patient treatment in the future. Understanding TKA patient demographics optimizes treatment plans, healthcare services, Providing healthcare access, guaranteeing fair treatment for all people irrespective of their gender, age, or where they live. To make sure people from all walks of life get the treatment they need, this information can fill in any gaps in healthcare access. Enhancing surgical success, maximizing patient selection, perioperative management, and postoperative care, as well as increasing patient satisfaction, all depend on an understanding of the relationship between comorbidities and TKA results. The evaluation of clinical outcomes post-TKA offers a comprehensive understanding of the procedure's effectiveness,

identifying areas for improvement and developing strategies to improve patient experiences and overall outcomes. The projection of future TKA incidence and volume based on demographic changes and comorbidity trends enables healthcare systems to plan for the future, allocate resources effectively, and meet the increasing demand for TKA to ensure optimal patient care. This epidemiological study on TKA provides evidence-based recommendations for patient care. By analysing demographics, comorbidities, and clinical outcomes, it aims to improve outcomes, access to care, and enhance quality of life for individuals undergoing TKA.

FUTURE DIRECTIONS

Future research directions for total knee arthroplasty (TKA) include:

1. Epidemiological studies on TKA outcomes and risk factors
2. Advancements in surgical techniques (minimally invasive, robotic-assisted)
3. Implant innovations (biocompatible materials, 3D printing)
4. Customized treatment strategies (genetic analysis, biomarkers, imaging)
5. Enhanced rehabilitation protocols
6. Long-term implant monitoring
7. Patient education and shared decision-making

These areas aim to improve TKA outcomes, patient satisfaction, and quality of life.

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