



## A Systematic Review of Complication Rates in Elderly Age Patients Undergoing Knee Arthroplasty

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### ABSTRACT

Knee arthroplasty is a commonly performed surgical procedure to treat knee osteoarthritis and has been shown to be effective in relieving pain and improving knee function in patients. However, like any surgical procedure, knee arthroplasty also carries a risk of complications. The risk of complications in elderly patients undergoing knee arthroplasty is generally higher than in younger patients. This study aimed to conduct a systematic review of the literature to assess complication rates in elderly patients undergoing knee arthroplasty. This research used a systematic literature review (SLR) method following the Preferred Reporting Items for Systematic Reviews and Meta-analyses (PRISMA) guidelines. Data were collected by conducting a literature search in electronic databases such as PubMed, Scopus, and ScienceDirect. The collected data were then analyzed descriptively. The results showed that patients over 80 years of age had a higher incidence of morbidity and mortality compared with younger patients after undergoing knee arthroplasty, including revision surgery. Elderly patients had a higher rate of medical complications after knee arthroplasty, as well as longer hospital stays. The higher complication rate in elderly patients compared to younger patients can be explained by several main factors, including decreased physiological function, comorbidities, and limited medication options. The findings underscore the importance of thorough preoperative assessment and careful postoperative management in elderly patients undergoing knee arthroplasty.

**Keywords:** Complications, Elderly Patients, Knee Arthroplasty.

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### INTRODUCTION

A joint is a connection between two or more bones that is covered by connective tissue and can be moved by a muscular system (Muscolino, 2016). The main function of joints is to allow body movement. The knee joint is part of the lower extremity which is located between the thigh and lower leg, consisting of the femur and tibia bones (Poerwanto, 2018). In the knee area there is also a patella bone which functions to absorb pressure from the muscles. A healthy knee joint

has a bone surface covered by smooth and slippery cartilage. This cartilage functions to reduce direct contact between the ends of the jointed bones and reduces friction when the joint moves. If cartilage is damaged, the ends of the bones will meet together, causing the joint surfaces to wear away due to friction. This increases the pain which will get worse as cartilage damage continues to increase (Saputra, 2021).

Currently, there is no drug or intervention that can restore damaged cartilage, except through Total Knee Arthroplasty (TKA). Knee arthroplasty or total knee replacement is a procedure that replaces part of the joint damaged by arthritis with an artificial component, usually on the end surface of the bone (Choi & Ra, 2016). Knee pain due to arthritis can greatly limit daily activities. Knee arthroplasty is increasingly being performed to treat this problem, especially in elderly patients and those with arthritis or knee injuries (McCartney & Nelligan, 2014). Based on data from 31 countries, the incidence of arthroplasty was 118.8 per 100,000 population per year for total hip replacement (THR) and 104.3 per 100,000 population per year for total knee replacement (TKR) in 2007. Although arthroplasty procedures are often performed in Indonesia, the study did not include Indonesia as a data source. This shows that data collection for arthroplasty procedures in Indonesia is very lacking, so there is no data available regarding the number or quality of arthroplasty procedures in this country (Saputra, 2021).

Knee arthroplasty is a common surgical procedure performed to treat knee osteoarthritis. This procedure has been proven to be effective in relieving pain and improving knee function in patients. However, like any surgical procedure, knee arthroplasty also carries a risk of complications. The risk of complications in elderly patients undergoing knee arthroplasty is generally higher than in younger patients. This is caused by several factors, including underlying health conditions, decreased physical function, and a slower healing process in elderly patients. TKA surgery can cause various complications such as: (1) myocardial infarction, (2) pulmonary embolism, (3) pneumonia, (4) infection, (5) death, (6) deep vein thrombosis and (7) dislocation (Utomo et al., 2019).

This study enriches the existing literature by providing more in-depth data and analysis regarding complications after knee arthroplasty surgery in elderly patients. This research could provide a stepping stone for future studies that focus on interventions to reduce complications, comparisons between different surgical techniques, or the effects of follow-up care on the long-term outcomes of elderly patients undergoing knee arthroplasty. The aim of this study was to conduct a systematic review of the literature to assess complication rates in elderly patients undergoing knee arthroplasty.

## RESEARCH METHODS

This research uses the systematic literature review (SLR) method by following the Preferred Reporting Items for Systematic Reviews and Meta-analyses (PRISMA) guidelines. The systematic

literature review method (Systematic Literature Review) is a research approach that aims to identify, assess and critically synthesize research relevant issues related to a particular research question in a systematic and transparent way (Cocchia, 2014). Data were collected by literature study from the electronic databases PubMed, Scopus, and ScienceDirect using keywords such as “knee arthroplasty,” “advanced age,” “complication rate,” and “systematic review.” The data used in this research has several inclusion criteria, including being in Indonesian or English with a publication period of 2014-2024. The data that has been collected is then analyzed descriptively. Based on the established criteria, the research flow and results that will be used in this research are depicted in the following PRISMA diagram:

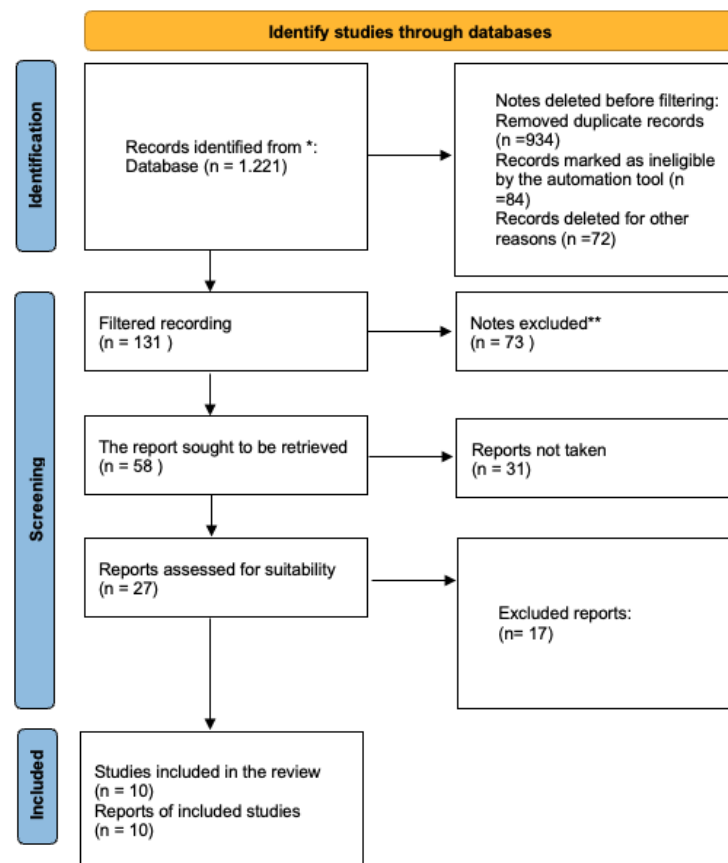


Figure 1. PRISMA diagram

## RESULTS AND DISCUSSION

Aging in the elderly is often associated with declining health and increased risk of various diseases, including Osteoarthritis (OA), which is a common joint disorder associated with aging. OA is recognized as a chronic degenerative disease in which cartilage in the joints degrades and is lost, often due to "wear and tear" from daily activities and other factors (van der Kraan et al.,

2017). Osteoarthritis, which can occur in the knee, is caused by a variety of factors, although its origins are not fully understood. Factors that can trigger this disease include age and being overweight (Saputra, 2021). In elderly people, osteoarthritis of the knee is more common, possibly due to a decrease in the body's metabolic and regeneration processes as we age.

On a global scale, OA is one of the major health problems in the elderly, affecting many people with significant pain and disability. According to the World Health Organization (WHO), OA causes a significant reduction in quality of life by inhibiting mobility, reducing work ability, and interfering with daily activities. This condition often makes sufferers experience limitations in movement, even around 80% of patients experience significant obstacles in carrying out their routine activities (Ariyanti et al., 2021). One solution for OA, especially in the knee, is to perform knee arthroplasty or knee joint replacement. This surgical procedure is commonly used and has been shown to be effective in reducing pain, restoring knee function, and improving patients' quality of life. Studies show that knee arthroplasty provides consistent results with reduced symptoms and improved mobility (Varacallo et al., 2018). More than just repairing physical damage, this procedure helps OA sufferers to return to being physically active and improve their overall well-being.

Knee arthroplasty is a surgical procedure that involves replacing damaged joint surfaces with implants. The main goal is to restore impaired joint function, which can be caused by significant wear, damage or pain. This procedure often provides great benefits to elderly patients by improving quality of life and reducing pain. Knee arthroplasty has excellent functional outcomes, with recent research aiming to improve rapid recovery time, long-term stability, and ensure optimal joint function even under extreme conditions. Nonetheless, there is a serious risk of complications associated with this procedure, and solutions to address these complications are still limited (de l'Escalopier et al., 2016).

The complication rate in elderly patients may be higher compared to younger patients. Several studies have shown that elderly patients often have a weaker physical condition in general, compared to younger patients. The study by Lakra et al. (2023) highlighted that patients who are more frail in general are at a higher risk for various postoperative complications and require more intensive healthcare. Findings from Rubin et al. (2016) showed that patients aged over 80 years had a higher incidence of morbidity and mortality compared to younger patients after undergoing knee arthroplasty, including revision surgery. Older patients tend to experience longer lengths of hospitalization and often require follow-up care in rehabilitation facilities.

Other research by Murphy et al. (2018) and Yohe et al. (2018) also confirmed that elderly patients have higher rates of medical complications after knee arthroplasty, as well as longer hospitalization. The study of Nanjayan et al. (2014) observed that the incidence of perioperative medical and surgical complications was higher in patients aged above 80 years, compared to patients of different age groups undergoing knee joint replacement procedures. The higher

complication rate in elderly patients compared to younger patients can be explained by several key factors:

1. Decreased physiological function

Elderly patients tend to have decreased immune system function. This means they are more susceptible to infections and have slower wound healing after surgery. A weakened immune system may also make it more difficult for them to recover after surgery (Alazawi et al., 2016).

2. Comorbidities

Elderly patients often have other medical conditions that may increase the risk of complications (Mistry et al., 2017). Examples include heart disease, diabetes, hypertension, or obesity. The presence of these conditions not only worsens the general health of the patient, but also increases the risk of postoperative complications.

3. Medication limitations

Elderly patients often take various medications to manage their medical conditions. Some of these medications can have adverse side effects, such as increasing the risk of bleeding or increasing susceptibility to infection (Davies & O'Mahony, 2015). Drug interactions can also be more complex in elderly patients, which can affect postoperative management.

The combination of these factors means that elderly patients often have poorer outcomes and higher complication rates after undergoing surgical procedures such as knee arthroplasty. Therefore, careful and coordinated care is essential to reduce the risk of complications and maximize overall outcomes for elderly patients undergoing knee arthroplasty.

## CONCLUSION

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Patients over 80 years of age tend to experience a higher incidence of morbidity and mortality compared with younger patients following knee arthroplasty, including the possibility of revision surgery. Elderly patients often face a higher rate of medical complications after knee arthroplasty, which also results in longer hospital stays. The higher complication rate in elderly patients compared with younger patients may be explained by several major factors, including the natural decline in physiological function with age, the presence of comorbidities such as heart disease or diabetes, as well as limitations in the use of certain medications that may required in post-operative management. Therefore, postoperative care for elderly patients undergoing knee arthroplasty should carefully consider these factors to reduce the risk of complications and maximize overall patient outcomes.

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