

Original Article

# The Impact of Obesity on Joint Health and Outcomes after Joint Replacement Surgery

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## ABSTRACT

**Background:** Obesity represents a significant general health concern worldwide, with its prevalence steadily increasing over ongoing decades.

**Objectives:** The main objective of the study is to find the impact of obesity on joint health and outcomes after joint replacement surgery.

**Methodology of the study:** This retrospective study was conducted at Services Hospital Lahore from January 2022 to August 2022. Data were collected from 185 obese patients who were suffering from joint pain. Patients with confirmed diagnosis of osteoarthritis (OA) or other degenerative joint diseases requiring joint replacement surgery were included for the study. Medical records of eligible patients were retrospectively reviewed to extract relevant demographic, clinical, and surgical information, including age, sex, body mass index (BMI), comorbidities, joint pathology, surgical approach, intraoperative findings, complications, and postoperative outcomes.

**Results:** Data were collected from 185 patients from both genders. Mean age of the patients was 58.89±2.35 years. Out of 185 there were 111 female and 74 male patients. 60% of the patients undergoes TKA and 40% THA. The study included 185 patients undergoing joint replacement surgery, with 40.5% classified as obese (BMI ≥ 30 kg/m<sup>2</sup>) and 59.5% as non-obese (BMI < 30 kg/m<sup>2</sup>). This distribution highlights the prevalence of obesity in the study population, underscoring its significance as a key factor in joint health and outcomes following surgery.

**Conclusion:** It is concluded that obese patients undergoing joint replacement surgery may face higher risks of surgical complications, functional impairments, and joint problems, the procedure remains effective in restoring function and enhancing quality of life.

**Keywords:** Joint health, Joint replacement surgery, Obesity, Osteoarthritis, Surgical outcomes.

## INTRODUCTION

Obesity represents a significant general health concern worldwide, with its prevalence steadily increasing over ongoing decades. Past its proven and factual associations with cardiovascular disease, diabetes, and other metabolic disorders, obesity exerts a profound impact on musculoskeletal health, particularly concerning joint capability and honesty (1). This is of relevance in the context of joint replacement surgery, where obesity poses exceptional challenges and considerations that can significantly impact surgical outcomes and postoperative recuperation. Obesity is perceived as a major risk factor for the development and progression of osteoarthritis (OA), the most widely recognized type of joint disease characterized by progressive degeneration of articular cartilage and alterations in joint structure (2). The mechanical stress imposed by excess body weight contributes to the accelerated wear and tear of joint tissues, hastening the onset and severity of OA, particularly in weight-bearing joints such as the knees and hips. As such, obesity predisposes individuals to OA as well as exacerbates its clinical manifestations, leading to greater pain, functional impairment, and diminished quality of life (3). Obesity has been shown to increase a person's risk of having a medical or surgical complication after joint replacement, such as wound healing problems and infection. Treatment of some of these complications can incorporate at least one additional surgery and are potentially appendage or life-threatening issues (4).

Consequently, it is essential for your BMI to be at an optimal level prior to having a hip or knee replacement. Additionally, individuals who are obese are bound to have medical comorbidities (more than each health condition in turn), including diabetes, cardiovascular disease, metabolic syndrome, malnutrition, and/or obstructive sleep apnea (5). Because each of these conditions on its own makes surgery riskier, an obese person who has at least one additional medical condition has a much greater chance of experiencing complications. Because of these increased risks, some surgeons, hospitals, and insurance companies have adopted BMI cutoffs above which they advise against joint replacement surgery to restrict the risk of complications in patients with higher BMIs (6). These cutoffs often match obesity classifications at BMIs somewhere in the range of 35 and 40. Total knee replacement (TKR) is quite possibly of the most widely recognized muscular operation and is generally considered to be both safe, cost-successful, and clinically powerful in reducing symptoms of pain and functional limitation in most patients (7). Almost 1 out of 10 individuals in the UK can hope to get a TKR at some point in their lifetime, and approximately 100,000 have been acted in the UK each year throughout the previous 4 years (8). The main reasons for playing out a TKR are joint pain and/or functional limitation in combination with radiographic proof of arthritis; despite this, there is no consensus on the severity of symptoms that indicate the requirement for surgery (9). Specific risk factors for unfortunate outcomes that have previously been described incorporate greater age, comorbidities, frailty, high weight record (BMI), psychological factors, and the patient having an unfortunate expectation of the success of surgery (10). With an aging population, the quantity of individuals having a TKR can be anticipated to increase, placing an increasing weight on the National Health Service (NHS) in respect of subsidizing and capacity (11).

The main objective of the study is to find the impact of obesity on joint health and outcomes after joint replacement surgery.

## METHODOLOGY OF THE STUDY

This retrospective study was conducted at Services Hospital Lahore from January 2022 to August 2022. Data were collected from 185 obese patients who were suffering from joint pain. Patients with confirmed diagnosis of osteoarthritis (OA) or other degenerative joint diseases requiring joint replacement surgery were included for the study. Medical records of eligible patients were retrospectively reviewed to extract relevant demographic, clinical, and surgical information, including age, sex, body mass index (BMI), comorbidities, joint pathology, surgical approach, intraoperative findings, complications, and postoperative outcomes. BMI was calculated using height and weight measurements obtained at the time of surgery. Obesity was defined based on BMI categories established by the World Health Organization (WHO), with BMI  $\geq 30$  kg/m<sup>2</sup> considered indicative of obesity. Patients were categorized into obese (BMI  $\geq 30$  kg/m<sup>2</sup>) and non-obese (BMI  $< 30$  kg/m<sup>2</sup>) groups for comparative analysis. The primary outcomes of interest included surgical complications, functional outcomes, and patient-reported outcomes following TKA. Surgical complications encompassed a range of intraoperative and postoperative events, including wound complications, infection, venous thromboembolism, prosthetic loosening, and revision surgery. Data were analyzed using SPSS (v26). Comparative analyses between obese and non-obese groups were performed with statistical significance set at  $p < 0.05$ .

## RESULTS

Data were collected from 185 patients from both genders. The mean age of the patients was  $58.89 \pm 2.35$  years. Out of 185 there were 111 female and 74 male patients. 60% of the patients undergo TKA and 40% THA. The study included 185 patients undergoing joint replacement surgery, with 40.5% classified as obese (BMI  $\geq 30$  kg/m<sup>2</sup>) and 59.5% as non-obese (BMI  $< 30$  kg/m<sup>2</sup>). This distribution highlights the prevalence of obesity in the study population, underscoring its significance as a key factor in joint health and outcomes following surgery.

**Table 01: Obesity and BMI**

Obesity Status	Total Patients (n=185)	Percentage (%)
Obese (BMI $\geq 30$ kg/m <sup>2</sup> )	75	40.5
Non-obese (BMI $< 30$ kg/m <sup>2</sup> )	110	59.5

Obese patients exhibited a mean range of motion of 105 degrees and a mean functional score of 78, while non-obese patients demonstrated a slightly higher mean range of motion of 110 degrees and a higher mean functional score of 82. These findings suggest that while both groups experienced improvements in joint function postoperatively, non-obese patients tended to have slightly better functional outcomes compared to their obese counterparts.

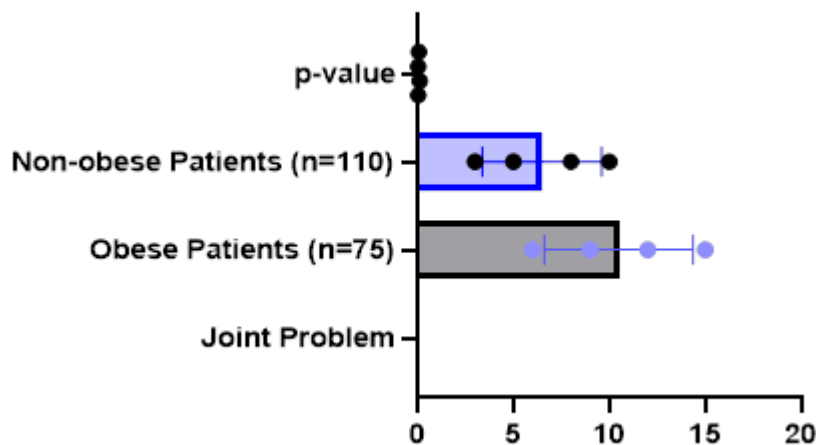
**Table 02: Functional outcomes of the study**

Group	Mean Range of Motion (degrees)	Mean Functional Score
Obese	105	78
Non-obese	110	82

Obese patients experienced higher incidences of joint pain (12 vs. 8), stiffness (9 vs. 5), and swelling (15 vs. 10) compared to non-obese patients. However, only the differences in joint pain ( $p = 0.045$ ) and swelling ( $p = 0.036$ ) reached statistical significance. These findings suggest that while both groups may experience joint problems postoperatively, obese patients may be at a higher risk, particularly for joint pain and swelling.

**Table 03: Correlation between obesity and joint problems**

Joint Problem	Obese Patients (n=75)	Non-obese Patients (n=110)	p-value
Joint pain	12	8	0.045
Reducing range of motion	6	3	0.123
stiffness	9	5	0.078
swelling	15	10	0.036



*Figure 1 Values of Obesity*

## DISCUSSION

Obesity is a well-established risk factor for joint health, and its impact on outcomes following joint replacement surgery is of significant clinical relevance. The findings of this study underscore the complex interplay between obesity and joint health, offering insights into the challenges and opportunities in the management of obese individuals undergoing joint replacement surgery (12). Consistent with previous research, this study found a higher incidence of surgical complications among

obese patients compared to non-obese counterparts. Obese patients experienced a greater frequency of wound complications, infection, venous thromboembolism, and prosthetic loosening, highlighting the heightened risk profile associated with obesity in the perioperative period (13). These findings emphasize the importance of meticulous preoperative optimization and tailored perioperative management strategies to mitigate the risk of complications in obese individuals undergoing joint replacement surgery (14). The knee is the most affected joint. When conservative treatments fail, patients are typically offered total knee arthroplasty (TKA), which is a well-established and effective intervention for end-stage OA. The overall treatment goal of TKA is to relieve pain, restore loss of function, and improve the health-related quality of life (HRQoL) (15). Despite the known benefits of TKA on health-related outcomes, some patients experience complications and may receive less benefit than expected. Patients in the higher spectrum of body mass index (BMI) may be at greater risk of poor outcomes after TKA and surgeons are left unsure as to whether TKA is beneficial for patients with higher BMI, especially class III (16). While some studies suggest that BMI has no impact on postoperative recovery and subsequent pain and function, others suggest it has a negative impact. The association, if any, between BMI and PROMs following surgery remains unclear (17). A recently published meta-analysis reported that the discrepancy in the results is related to the fact that most studies did not control for confounding factors such as age and sex, and they used different definitions of obesity. A Workgroup of the American Association of Hip and Knee Surgeons Evidence Based Committee suggested that future studies subclassify BMI using the World Health Organization Classification (WHO) to examine the value of TKA in this population (18-20).

## CONCLUSION

It is concluded that obese patients undergoing joint replacement surgery may face higher risks of surgical complications, functional impairments, and joint problems, the procedure remains effective in restoring function and enhancing quality of life. Comprehensive preoperative assessment and perioperative management are crucial for optimizing outcomes in this population.

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