

Factors Influencing Hospital Stay Duration After Total Hip Replacement Surgery

Abstract

Introduction: Total Hip Replacement (THR) is one of the most successful and cost-effective interventional procedures in healthcare. This study was designed and conducted to determine the factors influencing the prolonged hospital stay of patients after total hip replacement surgery.

Materials and Methods: In this retrospective analytical cross-sectional study, the records of 100 patients who underwent hip replacement surgery from October 2017 to April 2019 were included. Patients who underwent revision hip replacement surgery or bilateral hip replacement were excluded from the study.

Results: The average length of hospital stay was 5.91 ± 1.8 days. The mean age of the patients in the study was 56.37 ± 14.79 years, and the average duration of surgery was 2.76 ± 0.36 hours. There was no significant relationship between the length of hospital stay and age or duration of surgery. Women constituted 42% of the study population, and 46% of the patients had a history of at least one underlying disease. There was no significant difference in the length of hospital stay between men and women (5.88 vs. 5.93 days) and between those with and without underlying diseases (5.88 vs. 5.93 days). Patients who received blood transfusions during surgery had significantly longer hospital stays (6.63 vs. 5.57 days). Additionally, the type of anesthesia (general 5.76 days and spinal 6.22 days) and the type of surgery (emergency 6.48 days and elective 5.79 days) did not affect the length of hospital stay.

Conclusion: The results of this study showed that blood transfusion is associated with an increased length of hospital stay in patients. There was no significant relationship between the length of hospital stay and gender, age, history of underlying disease, type of anesthesia, type of surgery, and duration of surgery.

Keywords: Total hip arthroplasty, Orthopedic Surgery, Hospitalization, Patients.

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Introduction

In recent years, total hip replacement has garnered significant attention from doctors, with the need for this surgery growing daily⁽¹⁾. This method allows for the replacement of a new, mobile, and pain-free joint. Positive results following surgery led to a 40% increase in the frequency of this surgery between 1990 and 1998. For example, in 1998, there were between 8 to 135 hip replacement surgeries per 100,000 people in Europe⁽²⁾. Currently, hip replacement surgery is widely performed worldwide. It is estimated that annually, about 170,000 people in the USA and 300,000 globally undergo this surgery⁽³⁾.

Since the 1960s, the design of acetabular and femoral components of the hip prosthesis, friction interfaces, their sizes, and their fixation to the bone have improved, typically lasting 15 to 20 years. Technological advancements have enhanced the performance and longevity of artificial joints. Undoubtedly, the most critical factor determining the prognosis of arthroplasty is its initial placement post-surgery⁽⁴⁾. Knee replacement is performed for various reasons, the most common being severe osteoarthritis, which accounts for 70% of cases. Osteoarthritis is the most common disease of the movable and axial joints in the body. The hip and knee joints are more commonly affected, especially in older ages. The exact causes of osteoarthritis are not well understood, but factors such as infection, trauma, congenital hip dysplasia, complications from avascular necrosis of the femoral head, metabolic disorders, congenital disorders, and genetic factors can lead to this disease⁽⁵⁾. Other causes include trauma, Paget's

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disease, osteonecrosis of the femoral head, lupus, ankylosing spondylitis, and rheumatoid arthritis. In fact, total hip replacement is the ultimate treatment for advanced hip osteoarthritis. This surgery is also one of the elective treatments for femoral neck fractures in elderly patients who are functionally active and have good bone quality⁽⁶⁾. It should always be noted that surgery is just one of the therapeutic measures to improve joint function. Many factors can influence the prognosis of joint function after surgery, reduce the length of hospital stay, postoperative complications, and patient satisfaction after the operation. Previous studies have shown that age, preoperative function, underlying diseases, obesity, pathogenetic factors, postoperative pain, and psychological factors are among these factors^(7,8). Moreover, one of the crucial factors in the patient's quality of life is their participation in the treatment program and their cooperation in therapeutic measures⁽⁹⁾. Given the increased life expectancy, improved hygiene, and healthcare services, the prevalence of obesity and osteoarthritis has consequently increased, leading to a rise in joint replacement surgeries.

Ellings et al. in 2014 conducted a systematic review to examine the factors affecting patient recovery after hip replacement surgery. Fourteen research articles were included in this study, encompassing a total of 199,410 patients. Two studies examined the improvement of physical function in patients, and twelve studies examined the length of hospital stay. The review results indicated that increased hospital stay was associated with the following factors: patients with higher scores in anesthesia assessments per the American Society of Anesthesiologists (ASA) (OR 3.34 to 6.22, +0.20 days), a higher number of comorbidities (RR 1.10, +0.59 to 1.61 days), the presence of cardiovascular disease (RR 1.59, +0.26 days), and patients with pulmonary complications (RR 1.30, +0.34 days).

Abbas et al. in 2011 conducted a retrospective analytical cross-sectional study in Pakistan to examine the factors affecting the length of hospital stay after hip replacement surgery. This study included 199 patients who had undergone elective unilateral hip replacement surgery between 2000 and 2010. Demographic and clinical data of the patients, including age, gender, body mass index (BMI), surgical complications, surgical factors (such as surgical method, type of prosthesis used, type of cement, and surgery time), anesthesia-related

factors (type of anesthesia), and length of hospital stay were examined. Sixty-four percent of patients stayed in the hospital for more than 12 days, 28% for three weeks, and 8% for more than three weeks. The average hospital stay for women was longer than for men (11.5 days versus 9 days, $p=0.009$). Additionally, the average hospital stay for patients aged 65 years or younger showed a significant difference (13 days versus 9 days, $p<0.001$). The hospital stay for patients with ASA grades 3 or 4 was longer than those with ASA grades 1 or 2 (68% versus 25%, $p<0.001$). The study revealed that factors affecting the length of hospital stay included age over 65 years, female gender, and ASA grade 3 or 4⁽¹¹⁾.

Foot et al. in 2009 conducted a descriptive-analytical study in England to examine the factors affecting the length of hospital stay after hip replacement surgery. They included 675 patients in the study. The average hospital stay was eight days. Most patients (81.5%) stayed in the hospital for two weeks, 13.6% for two to four weeks, and 4.9% for more than four weeks. Age over 70 years, ASA grades 3 and 4, longer surgery duration, and longer incision length were associated with hospital stays longer than two weeks⁽¹²⁾.

Dall et al. in 2009 conducted an analytical cross-sectional study in England. They included 2,302 patients who had undergone knee replacement surgery over nine years. The average hospital stay was 8.1 days. After adjusting for factors, it was found that younger age, male gender, better preoperative combined Harris hip score, better preoperative activity level, and better health status were associated with shorter hospital stays⁽¹³⁾.

Tien et al. in 2008 conducted a retrospective cross-sectional study in Taiwan to examine the factors affecting the discharge of patients who had undergone hip replacement surgery. They reviewed 37,918 records from 1996 to 2004. The study results indicated that age under 65 years, absence of osteoarthritis, rheumatoid arthritis, avascular necrosis, and the absence of any severe primary disease were associated with shorter hospital stays and earlier discharge⁽¹⁴⁾.

Lin et al. in 2004 conducted an analytical cross-sectional study in the USA to examine the factors affecting recovery and rehabilitation after knee or hip replacement surgery. They included 808 patients who had undergone hip or knee replacement surgery from 2000 to 2001. The study examined the

relationship between patient record information, including age, gender, marital status, race, surgical indication, BMI, comorbidities, and length of hospital stay. A higher number of comorbidities, being unmarried, black race, older age, and male gender were associated with longer hospital stays⁽¹⁵⁾.

The present study investigates the factors affecting the long-term hospital stay of patients after hip replacement surgery at Imam Khomeini Hospital of Urmia University of Medical Sciences.

Methodology

The present study is a retrospective cross-sectional analytical study examining the factors influencing the long-term hospital stay of patients after total hip replacement surgery at Imam Khomeini Hospital, Urmia University of Medical Sciences, Iran. The medical records of patients who underwent hip replacement surgery from October 2017 to April 2019 were reviewed. Patients who had undergone revision hip replacement surgery or bilateral hip replacement were excluded from the study. Demographic and clinical information of the patients, including age, gender, comorbidities, and anesthesia-related factors, were recorded in a checklist.

In the descriptive statistics section, quantitative variables were presented as "mean ± standard deviation," and qualitative variables were presented as frequency percentages in suitable tables and charts. In the inferential statistics section, appropriate tests, including the Chi-square test, Fisher's exact test, and independent t-test, were used for statistical analysis in line with the study objectives. The significance level (p) was considered 0.05 in all tests.

Results

In the present study, a total of 100 patients were examined, with an average age of 56.37 ± 14.79 years. Among the entire study population, 42 patients (42%) were female and 58 patients (58%) were male. The average length of hospital stay was 5.91 ± 1.8 days.

To investigate the relationship between age and length of hospital stay, Pearson's correlation coefficient was used, and the results showed no

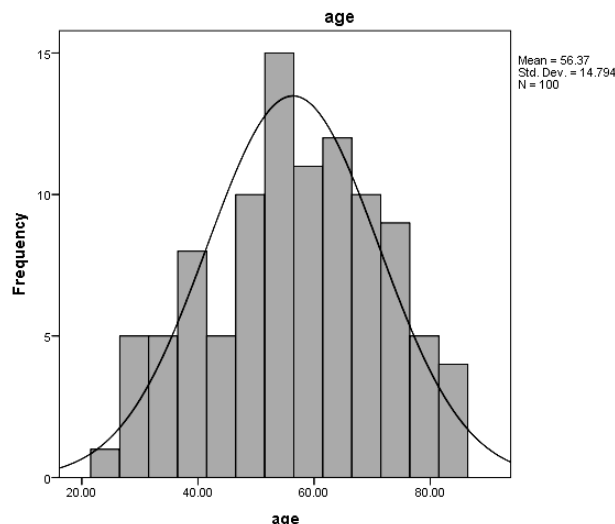


Figure 1. Age Distribution of the Study Population

Table 1: Comparison of Average Length of Stay Between Genders		
Gender	Average Length of Stay ± Standard Deviation (days)	p-value
Men	5.93 ± 1.74	0.89
Women	5.88 ± 1.91	

Table 2: Comparison of Average Length of Hospital Stay in Patients With and Without Underlying Conditions		
Underlying Condition	Average Length of Stay ± Standard Deviation (days)	p-value
Yes	5.93 ± 1.66	0.90
No	5.88 ± 1.93	

significant relationship between age and the length of hospital stay (p=0.62). Figure 1 illustrates the age distribution within the study population. Table 1 shows the average length of hospital stay for patients by gender. The average length of stay for men was 5.93 ± 1.74 days, and for women, it was 5.88 ± 1.91 days. According to the statistical test results, there was no significant difference between the two genders in this regard (p=0.89).

In the entire study population, 12 individuals (12%) had a history of diabetes, 34 individuals (34%) had a history of high blood pressure, 6 individuals (6%) had a history of heart disease, and 1 individual (1%) had a history of respiratory disease (Table 3). Although the average length of stay was longer for individuals with high blood pressure, diabetes, and a

Table 3: Comparison of Average Length of Hospital Stay in Patients with Various Underlying Conditions			
Underlying Condition	Condition Status	Average Length of Stay ± Standard Deviation (days)	p-value
High Blood Pressure	Yes	6.17 ± 1.76	0.28
	No	5.77 ± 1.82	
Diabetes	Yes	6.51 ± 2.31	0.23
	No	5.82 ± 1.73	
Heart Disease History	Yes	6.16 ± 1.32	0.72
	No	5.89 ± 1.84	

Table 4: Comparison of the Average Hospital Stay Duration Based on Anesthesia Type (Spinal or General) and Blood Transfusion			
Anesthesia Type and Need for Blood Transfusion		Average Duration ± Standard Deviation	p-value
Anesthesia Type	Spinal	6.22±2.07	0.24
	General	5.76±1.67	
Blood Transfusion	Yes	6.63±2.36	0.03
	No	5.57±1.57	

Table 5: Comparison of the Average Length of Hospital Stay by Type of Surgery		
Type of Surgery	Average Length of Stay ± Standard Deviation	p-value
Elective	5.79±1.66	0.16
Emergency	6.48±2.38	

history of heart disease, these differences were not statistically significant ($p > 0.05$).

According to the information in Table 2, although the average duration of stay was longer for individuals with underlying conditions, this difference was not statistically significant ($p = 0.90$).

Among the study population, 31 patients (31%) had spinal anesthesia, while 69 patients (69%) received general anesthesia. Additionally, 22 patients (22%) required blood transfusions during surgery. As shown in Table 4, there was no statistically significant difference in the average duration of stay between the spinal anesthesia and general anesthesia groups ($p = 0.24$). However, for patients who received blood transfusions during surgery, the duration of stay was significantly longer ($p = 0.03$).

The average duration of surgery for all patients was 2.76 ± 0.36 hours. To examine the relationship between the duration of surgery and the length of hospital stay, Pearson correlation test was used, and no significant correlation was found between these two parameters ($p = 0.43$). Among the studied population, 82 patients (82%) underwent elective surgery and 18 patients (18%) had emergency surgery. According to Table 5, the average length of stay for those who had emergency surgery was longer, but this difference was not statistically significant ($p = 0.16$).

Discussion

Total hip replacement is one of the most successful and cost-effective interventions in healthcare. Many researchers have reported the long-term, highly favorable outcomes of this procedure in terms of improving quality of life, reducing pain, and increasing the functional capacity of patients with debilitating hip joint diseases⁽¹⁶⁻¹⁸⁾. Over the past two decades, the average length of hospital stay after total hip replacement surgery has significantly decreased from an average of three weeks to an average of four days^(19,20). This study was designed and conducted to identify factors affecting long-term patient recovery after total hip replacement at a specific center, with the average hospital stay for the patients in the study being 5.91 days. Moreover, there was no significant relationship between patient age or gender and the length of hospital stay following hip replacement surgery. In the study by Abbas et al. in Pakistan conducted in 2011, the average hospital stay was 11.8 days, which was considerably higher compared to the current study⁽¹¹⁾. Additionally, contrary to the findings of this study, there was a significant difference in hospital stay duration between patients older than 65 years and women compared to other patients. In Foote et

al.'s study in the UK in 2009, the average hospital stay was 11.4 days, and women and older individuals experienced longer hospital stays⁽¹²⁾. These results also differ from those of the current study. The differences in study results may be due to the timing of the studies. The studies mentioned were conducted in earlier years, and advancements in surgical techniques, anesthesia, tools, and facilities could all contribute to differences in study outcomes. For example, a 2019 study by Grosso et al. in the USA showed that the length of hospital stay had decreased in the years 2014 to 2016 compared to 2006 to 2009⁽²¹⁾.

This study also found that the type of surgery (emergency or elective), duration of surgery, and type of anesthesia (general or spinal) did not significantly affect the length of hospital stay. In Foote et al.'s study, contrary to the current findings, surgeries lasting over 140 minutes significantly increased the hospital stay duration⁽¹²⁾. Similarly, in Abbas et al.'s study, there was no significant difference in hospital stay between patients with different surgery durations⁽¹¹⁾. The variations in study results might be due to differences in how surgery duration was categorized. In the present study, the average surgery duration for all patients was over 2.5 hours, whereas in Foote et al.'s study, patients were divided into groups with surgery durations of less than 140 minutes and more than 140 minutes⁽¹²⁾. On the other hand, Abbas et al.'s study categorized patients into three groups based on surgery duration: less than three hours, three to five hours, and more than five hours⁽¹¹⁾.

In this study, there was no significant difference in hospital stay duration between patients with underlying conditions and those without. Additionally, patients with various conditions such as diabetes and hypertension did not show significant differences compared to others. However, in Grosso et al.'s study, patients with a history of underlying conditions had significantly shorter hospital stays⁽²¹⁾.

This study also revealed that patients who received blood transfusions had a significantly longer hospital stay compared to those who did not receive transfusions. Consistent with the current study's results, a cohort study in the United States involving 2,087,423 patients found that blood transfusions were associated with longer hospital stays after total hip replacement surgery⁽²²⁾.

Conclusion

The results of this study indicated that blood transfusions are associated with an increased length of hospital stay. There was no significant correlation between the length of hospital stay and factors such as gender, age, history of underlying conditions, type of anesthesia, type of surgery, or duration of surgery. It is recommended to conduct studies with larger sample sizes and a variety of study types, such as cohort studies, to better assess the factors influencing hospital stay duration.

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