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Research Article

The Length of Stay After Total Hip and Knee Arthroplasty and Factors Associated with Prolong Stay in a Tertiary Specialised Centre

Adnan A Aladarii[1], Abdulmajeed Alsharari[2], Ayman Alghamdi[3], Ghassan Binyaseen[3], Sulaiman Hushlul[4], Khalid Idris[1], Zeyad Bukhary[1], Eyad Alsulaimani[5], Ahmad Kalantn[6], Doaa Mohorjy[7], Ahmed Mehasseb[1], Wael Hyderabad[1], Mohammed Nassri[1]

[1]Department of Orthopaedics Surgery, King Abdullah Medical city, Mecca, KSA

[2]Faculty of Medicine Al-Jouf University, KSA

[3]College of medicine, Umm Al-Qura University, Mecca, KSA

[4]Department of Orthopaedics Surgery, King Fahad Armed Forced Hospital, Jeddah, KSA

[5]Department of Orthopaedics Surgery, King Abdulaziz Hospital, Mecca, KSA

[6]Department of Orthopaedics Surgery, King Faisal Hospital, Mecca, KSA.

[7]Department of Biostatistics & Technology, Research Center, king Abdullah medical city, Mecca, KSA.

***Corresponding author:** Adnan A Aladraii, Orthopaedic Department, King Abdullah Medical City, Makkah, 24246, Saudi Arabia.

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Abstract

Background: Total hip arthroplasty (THR) and total knee arthroplasty (TKR) have become very common surgeries in the recent century. Inpatient length of stay (LOS) is one of the determinants of the cost of these surgeries, and all health care systems aim to reduce the LOS to preserve the resources. This study investigates the factors associated with prolonged LOS post-THR and TKR in a tertiary, subspecialized center in Saudi Arabia. **Methodology:** This retrospective cohort study investigates the inpatient LOS of 219 patients admitted to THR and TKR in the period from January 2020 until June 2023. We calculated the LOS and readmission rate, defined a prolonged hospital stay as more than 4 days, and divided the patients into two groups: group A experienced a LOS of 1–3 days, while group B experienced a LOS of more than 3 days. We analysed preoperative factors such as age, gender, BMI, comorbidity, serum albumin level, and mobility; intraoperative factors such as the type of surgery, anaesthesia type, ASA classification, and intraoperative bleeding; and postoperative factors like complications, postoperative mobility status, and postoperative transfusion. We also statistically analyzed the significant differences between the two groups using independent t-tests for continuous parametric data and chi-squared tests for categorical variables. We conducted the multifactor analysis using the linear regression method. $P < 0.05$ is considered statistically significant. **Result:** We collected and analyzed data from 222 patients. The mean age was 62.53 years (SD: 9.56), and 149 subjects (67.1%) were female. Mean BMI was 32.7 kg/m², knee

replacement procedures were 193 (86.9%), and 29 (13.1%) hip replacement procedures, and the average LOS in our study was 2.14 ± 1.02 days; 193 (86.9%) had LOS <2 days, and 29 (13.1%) had prolonged LOS >3 days. The most common comorbidity was arterial hypertension (68%), followed by diabetes mellitus (44.6%), and anaemia (8.1%) was linked to prolonged LOS. Other factors, such as chronic diseases (7.7%), cardiovascular disease (6.8%), respiratory disease (4.5%), and renal disease (2.7%), did not significantly correlate with prolonged LOS. Patients who were walking were 132 (59.5%), and their ability to move after surgery was 210 (94.6%). Factors like age, BMI, type of anaesthesia, anaemia, albumin, ASA class, post-operative haemoglobin, and pre- and post-operative mobility were significantly correlated with LOS in TKA and THA patients ($P<0.05$). The other factors showed no significant correlation with LOS in TKA and THA patients ($P>0.05$). **Conclusion:** The average length of stay post arthroplasty hip and knee surgery is 2 days. Prolonged LOS significantly correlated with age, BMI, type of anaesthesia, anaemia, albumin, ASA class, post-operative haemoglobin, and pre- and post-operative mobility.

Introduction

Osteoarthritis of the hip and knee is the most common cause of joint pain and functional disability in the elderly population [1]. Moreover, it has a high prevalence among the Saudi population; it was reported to be between 13 and 30% in various regions and showed an expansion over the years, which is unfortunately considered a big financial burden [2-4]. Joint arthroplasty is one of the most successful surgeries for hip and knee osteoarthritis [5-8].

Many studies have focused on the length of stay (LOS), or the number of days a patient stays in an inpatient facility before and after arthroplasty procedures, as the number of joint arthroplasty surgeries and their associated costs have increased worldwide. The United States of America has implanted the Riak assessment prediction tool for length of hospital stay post arthroplasty, but other states have found its predictions to be inaccurate. The majority of the health system requires a reduction in the length of stay following hip and knee arthroplasty surgery, as this will enhance bed turnover, decrease the waiting list, and enhance the overall effectiveness of the health care system. Furthermore, reducing the LOS reduces the cost of surgery and reduces the risk of nosocomial infection post-surgery [9,10]. Recent studies have reported that reducing the length of stay (LOS) after total hip and knee arthroplasty is safe. They have found that a LOS of up to 2 days does not increase the risk of major complications following either type of surgery, nor does it increase the risk of readmission [11,12]. Various studies have identified different risk factors for prolonged length of stay (LOS) following hip and knee arthroplasty, which vary based on the socioeconomic background of patients in different countries. However, these studies report common factors. The aim of this study is to investigate the association between these factors and other specific factors that we believe contribute to LOS in our community in Saudi Arabia. We believe that considering specialised tertiary hospitals as high-turnover centres for arthroplasty is the best way to reflect the association between these factors and LOS following total hip and knee arthroplasty surgery.

Research Methodology

A retrospective observational cohort study was conducted at Orthopaedic department in King Abdullah medical city tertiary centre. Data collection has not started until the IRB approval was obtained. The data was collected from all patient that underwent primary TKA and THA in King Abdullah medical city between January 2020 to June 2023. The sample size was calculated based on the Cochrane's formula was 245 and considering there were revision surgeries, we have finalized the sample size to 222 Non-probability consecutive sampling technique was applied to select the required number of files.

Exclusion criteria are revision arthroplasty and patients under 18 years old. 219 patients were fit for inclusion criteria and has sufficient data in the record. The following data were collected from each patients file: age, gender, type of surgery, type of anaesthesia, date for admission and discharge, BMI, ability of mobility before and 48h after surgery, comorbidities like: obesity (BMI≥30 kg/m^2),diabetes, hypertension, anaemia, cardiovascular diseases as ischemic heart disease, respiratory disease as COPD and asthma, renal diseases as chronic renal failure and end stage renal failure, ASA grade, re-admission rate and reasons for that re-admission.

Statistical Analysis

Statistical analyses were performed using computer software [the Statistical Package for Social Studies (SPSS), version 25(IBM Corporation, Armonk, NY, USA)]. Descriptive data are presented as the mean ± the standard deviation or the number and percentage. The significance of differences between the two groups was statistically analyzed using Independent t-tests for continuous parametric data and Chi-squared tests for categorical variables. The multifactor adopted the linear regression analysis. $P < 0.05$ is considered statistically significant.

Results

We collected and analyzed the data from 222 patients who satisfied the inclusion and exclusion criteria. The mean age was 62.53 years

(SD: 9.56), and 149 subjects (67.1%) were female. Only 21 (9.5%) who received blood. Mean BMI was 32.7 kg/m², and 22 (9.9%) patients were smokers at the moment of surgery. The provincial dataset consisted of hip and knee replacement procedures: 193 (86.9%) knee procedures and 29 (13.1%) hip procedures, and the average LOS in our study was 2.14 ± 1.02 days (Table 1).

Variable	Values
	222 (100%)
Demographic	
Age, mean ± SD	62.53 ± 9.56
Gender, n (%)	
Male	73 (32.9)
Female	149 (67.1)
BMI, mean ± SD	32.7 ± 5.46
Type of surgery, n (%)	
Knee	193 (86.9)
Hip	29 (13.1)
LOS, n (%)	
1	29 (13.1)
2	164 (73.9)
3	18 (8.1)
4	2 (.9)
5	6 (2.7)
6	0
7	1 (.5)
8	1 (.5)
9	0
10	1 (.5)
LOS, mean ± SD	2.14 ± 1.02
History of smoking, n (%)	
No	200 (90.1)
Yes	22 (9.9)
Blood receive, n (%)	
No	201 (90.5)
Yes	21 (9.5)
Comorbidities	
Diabetes, n (%)	
No	123 (55.4)
Yes	99 (44.6)
Hypertension, n (%)	
No	71 (32)
Yes	151 (68)
Dyslipidemia, n (%)	
No	216 (97.3)
Yes	6 (2.7)
Anemia, n (%)	
No	204 (91.9)
Yes	18 (8.1)
Cardiovascular disease, n (%)	
No	207 (93.2)
Yes	15 (6.8)
Respiratory disease, n (%)	
No	212 (95.5)
Yes	10 (4.5)
Renal disease, n (%)	
No	216 (97.3)
Yes	6 (2.7)
Other chronic diseases, n (%)	
No	205 (92.3)
Yes	17 (7.7)
Preoperative laboratory values	
Albumin, mean ± SD	7.42 ± 9.65
Vitamin D, mean ± SD	22.85 ± 19.07
Perioperative factors	
Pre-op mobility	
Ambulating	4 (1.8)
Cane	53 (23.9)
Walking	108 (48.6)
Wheel chair	57 (25.7)
ASA grade	
Grade 1	18 (8.1)
Grade 2	132 (59.5)
Grade 3	71 (32)
Grade 4	1 (.5)
Admission	
Re-admission	
No	198 (89.2)
Yes	24 (10.8)
LOS after re-admission	
0	197 (88.7)
1	19 (8.6)
2	0
3	0

4	1 (.5)
5	1 (.5)
6	0
7	3 (1.4)
8	1 (.5)
Reason of re-admission	
No	10 (4.5)
No readmission	197 (88.7)
Yes	15 (6.8)
Operational variables	
Postoperative rehabilitation	
Day one post op	222 (100)
Ability of mobility after surgery, n (%)	
No	12 (5.4)
Yes	210 (94.6)
Post-operative hemoglobin, n (%)	
No	165 (74.3)
Yes	57 (25.7)
Post op hemoglobin ± SD	9.76 ± 3.26
Type anesthesia	
1st epidural/ 2nd spinal	1 (.5)
1st general/ 2nd spinal	6 (2.7)
1st spinal/ 2nd general	7 (3.2)
1st spinal/2ndspinal	1 (.5)
1st under general/2nd under general	1 (.5)
Combined spinal and general	1 (.5)
Epidural	1 (.5)
General	88 (39.6)
General and epidural	1 (.5)
Spinal	114 (51.4)
Values are presented as numbers (percentages) & mean ± SD	

Table 1: Descriptive statistics of study variables.

The most commonly observed comorbidity was arterial hypertension (68%), followed by diabetes mellitus (44.6%), anaemia (8.1%), other chronic diseases (7.7%), cardiovascular disease (6.8%), respiratory disease (4.5%), anaemia (2.7%), and renal disease (2.7%). Table 1 reported details on the prevalence of comorbidities. We summarise preoperative lab values as a mean for vitamin D and albumin (22.85, 7.42), respectively. 59.5% of our sample had ASA grade II patients, compared to 40.6% who had ASA I, III, or IV classifications. Preoperative mobility Patients who were walking were 132 (59.5%), and their ability to move after surgery was 210 (94.6%). 24 (10.8%) had readmission; LOS after readmission was 0 for around 197 patients (88.7%), while the reason for readmission was 68% for 15 patients, and only 57 patients had post-operative haemoglobin. The majority type of anaesthesia was spinal (51.4%).

Table 2 displays descriptive summaries of each variable stratified by type of surgery to empirically assess patient and surgical similarities and differences across locations. The hip group contained 29 patients, whereas the knee group included 193.

Variable	Type of surgery		P-value
	Hip	Knee	
	29 (13.1%)	193 (86.9%)	
Demographic			
Age, mean ± SD	48.17 ± 10.07	64.68 ± 7.39	.000*
Gender, n (%)			0.296
Female	17 (58.6)	132 (68.4)	
Male	12 (41.4)	61 (31.6)	
BMI, mean ± SD	32.45 ± 5.67	32.7 ± 5.4	0.771
LOS, n (%)			.000*
1	0	29 (15)	
2	17 (58.6)	147 (76.2)	
3	7 (24.1)	11 (5.7)	
4	1 (3.4)	1 (.5)	
5	3 (10.3)	3 (1.6)	
6	0	0	
7	0	1 (.5)	
8	1 (3.4)	0	
9	0	0	
10	0	1 (.5)	
LOS, mean ± SD	2.83 ± 1.39	2.03 ± .91	.005*
History of smoking, n (%)			0.453
No	25 (86.2)	175 (90.7)	
Yes	4 (13.8)	18 (9.3)	
Blood receive, n (%)			0.125
No	24 (82.8)	177 (91.7)	
Yes	5 (17.2)	16 (8.3)	
Comorbidities			
Diabetes, n (%)			
No	25 (86.2)	98 (50.8)	.000*
Yes	4 (13.8)	95 (49.2)	
Hypertension, n (%)			.001*
No	17 (58.6)	54 (28)	
Yes	12 (41.4)	139 (72)	
Dyslipidemia, n (%)			0.791
No	28 (96.6)	188 (97.4)	
Yes	1 (3.4)	5 (2.6)	
Anemia, n (%)			.000*
No	20 (69)	184 (95.3)	
Yes	9 (31)	9 (4.7)	

Cardiovascular disease, n (%)			0.446
No	28 (96.6)	179 (92.7)	
Yes	1 (3.4)	14 (7.3)	
Respiratory disease, n (%)			0.505
No	27 (93.1)	185 (95.9)	
Yes	2 (6.9)	8 (4.1)	
Renal disease, n (%)			0.135
No	27 (93.1)	189 (97.9)	
Yes	2 (6.9)	4 (2.1)	
Other chronic diseases, n (%)			0.559
No	26 (89.7)	179 (92.7)	
Yes	3 (10.3)	14 (7.3)	
Preoperative laboratory values			
Albumin mean ± SD	4.90 ± 3.50	7.80 ± 10.22	.005*
Vitamin D mean ± SD	19.95 ± 23.12	23.29 ± 18.42	0.381
Perioperative factors			
Pre op mobility			.000*
Ambulating	2 (6.9)	2 (1)	
Cane	15 (51.7)	38 (19.7)	
Walking	2 (6.9)	106 (54.9)	
Wheel chair	10 (34.5)	47 (24.4)	
ASA grade			0.351
Grade 1	3 (10.3)	15 (7.8)	
Grade 2	13 (44.8)	119 (61.7)	
Grade 3	13 (44.8)	58 (30.1)	
Grade 4	0	1 (.5)	
Admission			
Re-admission			0.579
No	25 (86.2)	173 (89.6)	
Yes	4 (13.8)	20 (10.4)	
LOS after re-admission			0.891
0	25 (86.2)	172 (89.1)	
1	3 (10.3)	16 (8.3)	
2	0	0	
3	0	0	
4	0	1 (.5)	
5	0	1 (.5)	
6	0	0	
7	1 (3.4)	2 (1)	
8	0	1 (.5)	

Reason of re-admission			0.69
No	1 (3.4)	9 (4.7)	
No readmission	25 (86.2)	172 (89.1)	
Yes	3 (10.3)	12 (6.2)	
Operational variables			
Postoperative rehabilitation			-
Day one post op	29 (100)	193 (100)	
Ability of mobility after surgery, n (%)			.032*
No	4 (13.8)	8 (4.1)	
Yes	25 (86.2)	185 (95.9)	
Post-operative hemoglobin, n (%)			.000*
No	10 (34.5)	155 (80.3)	
Yes	19 (65.5)	38 (19.7)	
Post op hemoglobin ± SD	8.79 ± 2.39	9.91 ± 3.35	.032*
Type anesthesia			0.141
1st epidural/ 2nd spinal	0	1 (.5)	
1st general/ 2nd spinal	0	6 (3.1)	
1st spinal/ 2nd general	0	7 (3.6)	
1st spinal/2ndspinal	1 (.5)	0	
1st under general/2nd under general	0	1 (.5)	
Combined spinal and general	0	1 (.5)	
epidural	0	1 (.5)	
General	17 (58.6)	71 (36.8)	
general and epidural	0	1 (.5)	
Spinal	11 (37.9)	103 (53.4)	
*Statistically significant. Values are presented as numbers (percentages) & mean ± SD			

Table 2: Univariate Descriptions of patients by type of surgery.

Table 3 displays the characteristics of patients with normal and prolonged LOS. The normal group contained 193 patients, whereas the prolong group included 29 (Figure 1).

Variable	Type of surgery		P-value
	Normal LOS	**Prolong LOS**	
	193 (86.9%)	**29 (13.1%)**	
Demographic			
Age, mean ± SD	63.37 ± 8.73	56.93 ± 12.70	.013*
Gender, n (%)			0.296
Female	132 (68.4)	17 (58.6)	
Male	61 (31.6)	12 (41.4)	
BMI, mean ± SD	32.40 ± 5.32	34.91 ± 6.00	.020*
History of smoking, n (%)			
No	172 (89.1)	28 (96.6)	0.212

Yes	21 (10.9)	1 (3.4)	
Blood receive, n (%)			.004*
No	179 (92.7)	22 (75.9)	
Yes	14 (7.3)	7 (24.1)	
Comorbidities			
Diabetes, n (%)			0.978
No	107 (55.4)	16 (55.2)	
Yes	86 (44.6)	13 (44.8)	
Hypertension, n (%)			0.907
No	62 (32.1)	9 (31)	
Yes	131 (67.9)	20 (69)	
Dyslipidemia, n (%)			0.336
No	187 (96.9)	29 (100)	
Yes	6 (3.1)	0	
Anemia, n (%)			.000*
No	183 (94.8)	21 (72.4)	
Yes	10 (5.2)	8 (27.6)	
Cardiovascular disease, n (%)			0.974
No	180 (93.3)	27 (93.1)	
Yes	13 (6.7)	2 (6.9)	
Respiratory disease, n (%)			0.104
No	186 (96.4)	26 (89.7)	
Yes	7 (3.6)	3 (10.3)	
Renal disease, n (%)			.000*
No	192 (99.5)	24 (82.8)	
Yes	1 (.5)	5 (17.2)	
Other chronic diseases, n (%)			0.559
No	179 (92.7)	26 (89.7)	
Yes	14 (7.3)	3 (10.3)	
Preoperative laboratory values			
Albumin, mean ± SD	7.31 ± 9.83	8.09 ± 8.56	0.687
Vitamin D, mean ± SD	22.73 ± 18.43	23.69 ± 23.25	0.8
Perioperative factors			
Pre-op mobility			.004*
Ambulating	4 (2.1)	0	
Cane	46 (23.8)	7 (24.1)	
Walking	101 (52.3)	7 (24.1)	
Wheel chair	42 (21.8)	15 (51.7)	

ASA grade			
Grade 1	15 (7.8)	3 (10.3)	.001*
Grade 2	124 (64.2)	8 (27.6)	
Grade 3	53 (27.5)	18 (62.1)	
Grade 4	1 (.5)	0	
Admission			
Re-admission			.013*
No	176 (91.2)	22 (75.9)	
Yes	17 (8.8)	7 (24.1)	
LOS after re-admission			.006*
0	175 (90.7)	22 (75.9)	
1	15 (7.8)	4 (13.8)	
2	0	0	
3	0	0	
4	0	1 (3.4)	
5	1 (.5)	0	
6	0	0	
7	1 (.5)	2 (6.9)	
8	1 (.5)	0	
Reason of re-admission			.002*
No	5 (2.6)	5 (17.2)	
No readmission	175 (90.7)	22 (75.9)	
Yes	13 (6.7)	2 (6.9)	
Operational variables			
Postoperative rehabilitation			-
Day one post op	193 (100)	29 (100)	
Ability of mobility after surgery, n (%)			.003*
No	7 (3.6)	5 (17.2)	
Yes	186 (96.4)	24 (82.8)	
Post-operative hemoglobin, n (%)			0.51
No	142 (73.6)	23 (79.3)	
Yes	51 (26.4)	6 (20.7)	
Post op hemoglobin ± SD	9.947 ± 3.25	8.57 ± 3.08	.035*

Type anesthesia			
1st epidural/ 2nd spinal	1 (.5)	0	.003*
1st general/ 2nd spinal	6 (3.1)	0	
1st spinal/ 2nd general	7 (3.6)	0	
1st spinal/2ndspinal	0	1 (.5)	
1st under general/2nd under general	1 (.5)	0	
Combined spinal and general	1 (.5)	0	
epidural	1 (.5)	0	
General	69 (35.8)	19 (65.5)	
general and epidural	0	1 (3.4)	
Spinal	106 (54.9)	8 (27.6)	
*Statistically significant. Values are presented as numbers (percentages) & mean ± SD			

Table 3: Univariate Descriptions of patients by LOS.

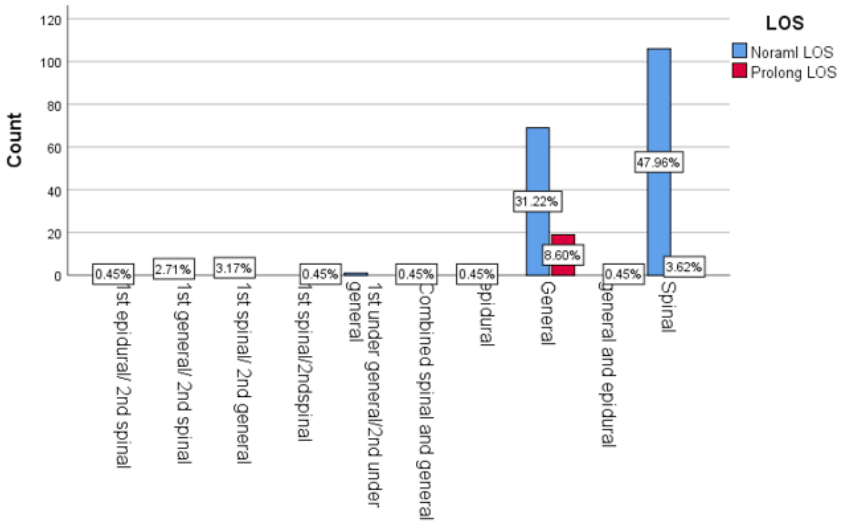

Figure 1: Type Anaesthesia.

Age at admission (P <0.01), a LOS (P <0.01), diabetes mellitus (P <0.01), Hypertension (P <0.01), anaemia (P <0.01), albumin lab test result (P <0.01), Pre-operative mobility (P <0.01), Ability of mobility after surgery (P <0.01), and Post-operative haemoglobin (P <0.01), were significantly related to type of surgery. There were no statistically significant differences regarding other clinical factors between those undergoing THA and those undergoing TKA.

Table 4 presents the results of a multi-factor linear regression analysis. The results suggested that age, BMI, LOS, anaemia, albumin, ASA class, and post-operative haemoglobin were significantly correlated with LOS in TKA and THA patients (P < 0.05). The other factors showed no significant correlation with LOS in TKA and THA patients (P > 0.05) (Figure 2).

Variable	B	Std. Error	T value	P value	95%CI for B	
					Lower	Upper
Age	0.013	0.002	5.834	.000*	0.009	0.018
Gender	-0.02	0.041	-0.482	0.63	-0.101	0.061
BMI	0.008	0.003	2.37	.019*	0.001	0.015
LOS	-0.049	0.021	-2.295	.023*	-0.091	-0.007
History of smoking	-0.048	0.061	-0.794	0.428	-0.168	0.072
Blood receive	-0.107	0.066	-1.613	0.108	-0.238	0.024
Diabetes	0.074	0.043	1.707	0.09	-0.012	0.16
Hypertension	0.052	0.045	1.16	0.248	-0.036	0.14
Dyslipidemia	-0.088	0.109	-0.813	0.418	-0.303	0.126
Anemia	-0.211	0.071	-2.979	.003*	-0.351	-0.071
Cardiovascular disease	0.005	0.072	0.069	0.945	-0.136	0.146
respiratory disease	-0.024	0.083	-0.292	0.771	-0.188	0.14
Renal disease	0.239	0.138	1.727	0.086	-0.034	0.511
Other chronic diseases	0.004	0.068	0.06	0.952	-0.131	0.139
Albumin	0.008	0.003	2.864	.005*	0.002	0.013
Vitamin D	0.001	0.001	0.788	0.431	-0.001	0.003
Pre-op mobility	0.043	0.025	1.76	0.08	-0.005	0.092
ASA grade	-0.076	0.033	-2.328	.021*	-0.14	-0.012
Re-admission	0.036	0.098	0.367	0.714	-0.157	0.229
LOS after re-admission	0.006	0.044	0.139	0.89	-0.081	0.094
Reason of re-admission	-0.027	0.061	-0.441	0.66	-0.147	0.093
Ability of mobility after surgery	0.137	0.089	1.539	0.126	-0.039	0.312
Post op hemoglobin	0.031	0.008	3.746	.000*	0.015	0.048
Post-operative hemoglobin	-0.182	0.043	-4.244	.000*	-0.267	-0.097

Table 4: Multi-Factor linear regression analysis.

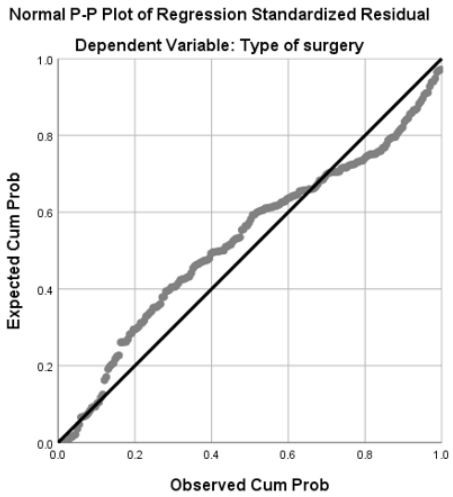

Figure 2: Normal P-P Plot of Regression Standardized Residual.

Discussion

This study identified multiple factors that affect the duration of stay after arthroplasty surgery. A prolonged length of stay (LOS) following arthroplasty surgery was associated with characteristics including advanced age, female sex, anaesthesia type, patient comorbidities (predominantly diabetes mellitus, hypertension, anaemia, and obesity), pre- and postoperative mobility status, hypoalbuminemia, and postoperative anaemia. Multivariate analysis identified a substantial positive association between these parameters and extended length of stay. Several studies have indicated that age and gender influence the hospital postoperative length of stay, with advanced age correlating with prolonged LOS [13-15] and female gender linked to extended LOS [16-17]. Our research reinforces this observation, indicating that the higher comorbidity linked to age and the differential responsiveness of females to pain management may be the underlying explanation. This may affect their performance in inpatient postoperative rehabilitation sessions.

Numerous studies indicate that the type of anaesthesia influences the length of stay, with local or regional anaesthesia, including spinal anaesthesia, correlating with reduced LOS following arthroplasty surgery [18-20]. Our investigation revealed that the regional block administered post-arthroplasty constituted a confounding variable, given it was performed subsequent to general anaesthesia. Our findings corroborate earlier studies, demonstrating that spinal anaesthesia is linked to a decreased duration of stay following arthroplasty surgery. Certain studies have indicated a correlation between general anaesthesia and an extended duration of hospitalisation after total knee arthroplasty [21,22]. Nevertheless, certain studies refute this conclusion, indicating no substantial impact of anaesthesia type on the duration of hospitalisation [23].

The American Society of Anaesthesiologists (ASA) score was used as an objective metric in this study, and we discovered a strong correlation between preoperative comorbidity and prolonged length of stay. Furthermore, we performed a disease-specific correlation study that demonstrated a favourable link between prolonged length of stay and illnesses such as hypertension and diabetes. The literature supports the link between an elevated ASA score and extended length of stay (LOS). Furthermore, they elucidate that this score excludes another significant comorbidity and exhibits moderate intraoperative reliability, rendering its utility for correlation questionable. [24,25].

High BMI is generally associated with comorbidities and a longer recovery period after surgery, which has led researchers to characterise it as a risk factor for a longer duration of stay after arthroplasty surgery [26-28]. Our investigation also identified a comparable positive correlation and associated with extended length of stay (LOS). Contrary to our findings, Tornese et al. [29] states that an elevation in BMI does not correspond with an extended duration of stay in his study on knee arthroplasty cases, and he characterises the variation in BMI among his patients as clinically insignificant. Our study revealed a considerable disparity in BMI among patients, indicating a positive association between elevated BMI and prolonged length of stay (LOS), a conclusion that contradicts several earlier studies [30-32].

The mobility status before and after surgery has been examined in numerous studies, with various rehabilitation programs proposed to reduce the duration of hospitalisation [29]. They further propose that a patient may only be safely discharged if they can independently conduct daily activities, including self-care, bed transfers, and toilet visits. Our investigation revealed that preoperative mobility limitations can lead to diminished performance in postoperative physiotherapy. This may consequently extend the patient's hospitalisation to attain the requisite functionality for secure discharge. Additionally, a diminished preoperative functional status was associated with an extended length of stay following arthroplasty surgery.

Reports indicate that the duration of hospitalisation is contingent upon the specific type of arthroplasty performed. Total hip arthroplasty has a longer length of stay than total knee arthroplasty, and revision arthroplasty has a longer duration than primary arthroplasty [33-35]. Our study revealed comparable outcomes, notably an increased length of stay in total hip replacement cases relative to total knee replacement cases.

Martin et al. [36] correlate laboratory findings following arthroplasty with extended hospitalisations, indicating that diminished haemoglobin levels post-surgery are associated with elevated blood transfusion rates and prolonged hospital stays. This study presents analogous findings; furthermore, we discovered

that diminished albumin levels correlate with extended length of stay (LOS), as low albumin may be associated with comorbidities or poor nutritional status, resulting in protracted recovery and prolonged hospitalisation following surgery.

We report a readmission rate of 10.8% in the first month following surgery for arthroplasty cases, with 88.7% of the readmission cases having prolonged length of stay. The majority of these readmissions were caused by post-surgical bleeding and illnesses related to comorbidities. Certain investigations corroborated this finding, indicating no definitive association between length of stay and the 30-day readmission rate [37].

We adhere to a standardised approach for pain treatment following arthroplasty surgery in every case, consistent with numerous studies that highlight its importance in decreasing the length of hospital stay [38]. Standardising the pain management protocol in our investigations mitigates the influence of pain on other variables. This study does not encompass a comparison of postoperative pain regimens and their impact on length of stay; such an analysis would necessitate a distinct investigation employing a validated, reproducible pain assessment in a prospective design.

This study's limitation lies in its retrospective design at a single centre, as a larger sample utilising arthroplasty registry data could provide a more comprehensive understanding of length of stay (LOS) and facilitate further analysis of additional factors, thereby informing the design of a prospective study that standardises all confounding variables.

Ethics approval and consent to participate

All participant has been consented for participation in the study after approval of the KAMC IRB with approval number 23-1140 KReSP which is registered at the national biomedical ethics committee, King Abdulaziz city for science and technology.

Availability of data and material

The data and material for this study is available for review at any time by the journal.

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Authors' contributions

All authors of this paper have read and approved the final version of submitted.

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Conflicts of Interest

All authors have no conflicts of interest, and the work was not supported or funded by any drug company.

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