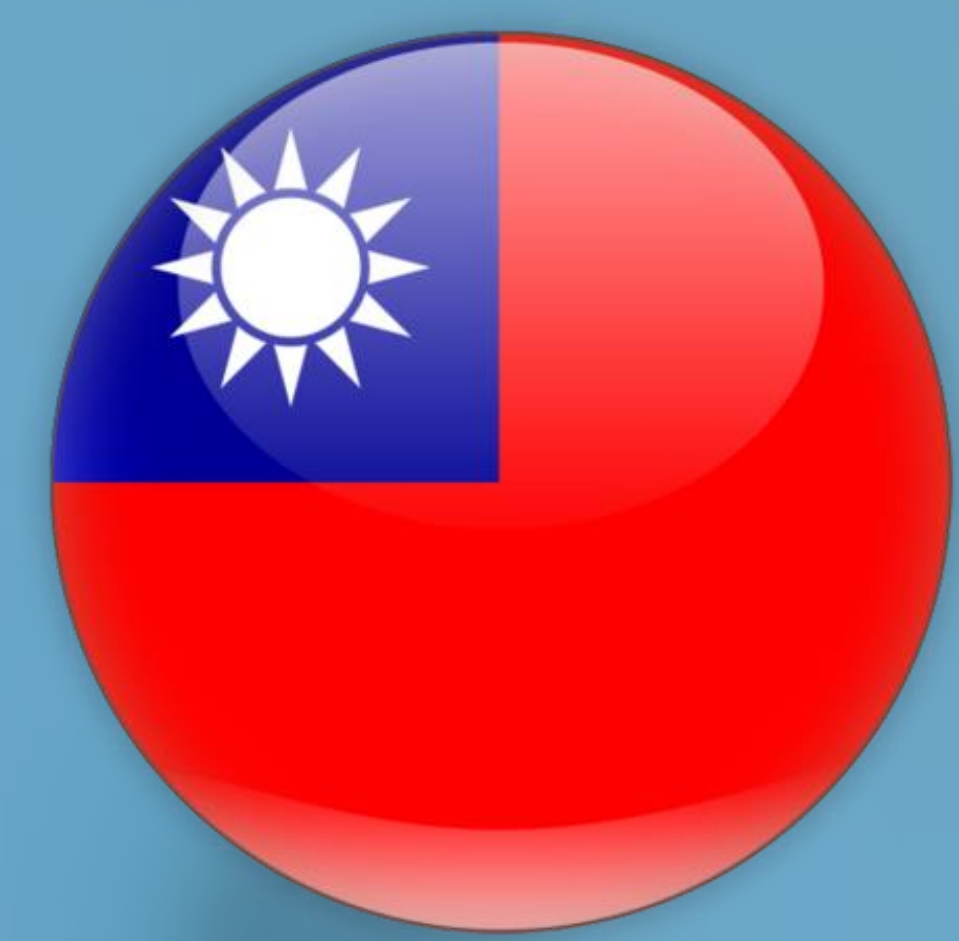




A STUDY ON FACTORS AFFECTING THE OPERATION TIME IN PATIENTS UNDERGOING TOTAL KNEE ARTHROPLASTY

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INTRODUCTION

The demand for total knee arthroplasty (TKA) is expected to increase substantially. According to the report of Taiwan’s National Health Insurance (2021), there were a total amount of 55,000 patients undergoing primary TKA in 2020, and has been increasing year by year.

The hospital continuously improves the operation process management and estimates the operation time as a scheduling reference. Previous studies have pointed out that adverse events after knee replacement for osteoarthritis are positively correlated with operation time.

Therefore, if we can understand the factors affecting the operation time of TKA, it will help to prevent postoperative complications and improve patient safety.

OBJECTIVE

The present study aimed to identify factors that are associated with operation time among patients undergoing TKA.

METHODS

Data of this cross-sectional study were extracted from the medical records of academic medical center of Southern Taiwan.

A total of 2,321 patients who underwent TKA between January 2016 and June 2022 were identified.

The variables were included

- (1) **Patient factors:** age, gender, body mass index (BMI), main diagnosis (divided into osteoarthritis and others), and number of comorbidities.
- (2) **Surgeon factors:** specialist tenure, surgical experience (<50/year, 50–99/year, or >100/year), and previous operation time.
- (3) **Procedure factors:** types of anesthesia, and American Society of Anesthesiologists (ASA).

Operation time was defined as the surgical time from skin incision to complete skin closure.

A generalized linear model (GLM) was used to evaluate which factors have a significant effect on operation time.

RESULTS

Generalized linear model (GLM) of factors affecting the operation time

	n(%)	Mean(SD)	B	(95%CI)	P value
Patient factors					
Age (year)		70.8(8.0)			
20–44	13(0.6)		10.51	(0.65–20.37)	0.037
45–64	428(18.4)		4.48	(2.32–6.65)	<0.001
≥65	1880(81.0)		Ref.		
Gender					
Male	554(23.9)		8.55	(6.69–10.42)	<0.001
Female	1767(76.1)		Ref.		
Body mass index (BMI)		28.6(4.5)	0.58	(0.38–0.78)	<0.001
Main diagnosis					
Osteoarthritis	2270(97.8)		-9.40	(-14.60– -4.19)	<0.001
Others	51(2.2)		Ref.		
Number of comorbidities					
1	683(29.4)		0.27	(-1.66–2.19)	0.787
2	634(27.3)		1.01	(-0.98–3.01)	0.319
≥3	539(23.2)		2.10	(-0.36–4.56)	0.094
none	465(20.0)		Ref.		
Surgeon factors					
Specialist tenure		19.9(6.5)	0.05	(-0.08–0.18)	0.462
Surgical experience		90.1(63.3)			
>100/year	1154(49.7)		-4.28	(-6.38– -2.17)	<0.001
50–99/year	304(13.1)		-3.12	(-5.61– -0.63)	0.014
<50/year	863(37.2)		Ref.		
Previous operation time (minutes) ¹		101.3(26.1)	0.87	(0.83–0.92)	<0.001
Procedure factors					
Types of anesthesia					
Regional	1724(74.3)		-6.29	(-8.38– -4.21)	<0.001
General	597(25.7)		Ref.		
American Society of Anesthesiologists (ASA)					
1	97(4.2)		-0.21	(-4.53–4.11)	0.924
2	1756(75.7)		0.68	(-1.45–2.82)	0.530
3	468(20.2)		Ref.		

Likelihood ratio chi-square 2532.610, P<0.001

CI, Confidence Interval; Ref., reference group; SD, standard deviation.

¹previous operation time was defined as average duration of last 10 procedures of surgeon.

CONCLUSIONS

Positive associated with longer operation time : patients with the **age of 20–44 years, male, BMI, and previous operation time**

Negative associated with longer operation time : **main diagnosis of osteoarthritis, high-volume surgeons, and regional anesthesia**

We concluded that the operation time for TKA was affected by patient age, BMI, previous operation time, surgeon surgical volume, and anesthesia type. Patients with a **higher BMI, less experienced surgeons, and anesthesia type** would significantly prolong the operation time.

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