

A Retrospective Cohort Analysis of the Burden of Total Knee Arthroplasty in Japan



INTAGE Healthcare Inc.

LoPresti M¹, Isemura T¹, Yamaguchi S¹, Baker A²

¹INTAGE Healthcare Inc., Chiyoda-ku, Tokyo, Japan, ²Stryker Corporation, Allendale, NJ, USA

INTRODUCTION

Japan is faced with a rapidly aging population. By 2025 **elderly persons aged 65 or older are expected to represent about 30% of the population** – or nearly one in three persons.¹

The number of total knee arthroplasty (TKA) procedures in Japan is also expected to increase given that approximately **90% of patients that undergo a TKA procedure in Japan are aged 65 or older**.²

However, **relatively little national-level information** is available on treatment outcomes and cost of care for TKA procedures in Japan.

OBJECTIVES

The objective of this study is to provide national-level information on the length of stay (LOS), cost of inpatient care, and initial diagnoses for TKA procedures in Japan based on a nationwide claims database.

METHOD

A retrospective cohort analysis was conducted using the Medi-Scope nationwide insurance claims database between **January 2014 and February 2019**. Medi-Scope is an insurance claims database for Japan available through Kyowa Kikaku, Ltd. It covers approximately 6.7 million unique patients in Japan.

Medi-Scope included **998 patients aged 18 or older** that had undergone one or more TKA procedures for the period examined. LOS, cost of inpatient care, and initial diagnoses were examined for those patients.

For patients that underwent two TKA procedures during the period examined (11.6% of patients), the LOS and cost of inpatient care per procedure were calculated based on the average of both procedures.

RESULTS

Demographics

A **mean age of 65.7** was observed for patients undergoing a TKA procedure during the period examined. However, Medi-Scope does not include claims from insurance programs managed by municipalities which cover most retired person. So the mean age of patients undergoing TKA procedures in Japan is likely to be higher.

Among those undergoing a TKA procedure for the period examined **approximately 76% were female** which is very close to the national average of 80%.²

Length of Stay (LOS)

Table 1 shows details on LOS for patients undergoing TKA procedures during the period examined. After accounting for patients that underwent two TKA procedures during the period examined, the **mean LOS was 28.8 days**. These findings are similar to previous studies for Japan.^{3,4}

Very little variation based on age, gender, or region was observed.

Cost of Inpatient Care

The average cost of inpatient care per patient associated with a TKA procedure was **3,236,196 JPY** for the period examined.

Table 1 shows more details on the cost of inpatient care per patient for TKA procedures during the period examined. After accounting for patients that underwent two TKA procedures, the average cost of inpatient care was **2,240,450 JPY for medical fees** and **542,932 JPY for medical devices / equipment fees** associated with the procedure. These findings are similar to previous studies based on smaller patient populations.⁵

RESULTS (continued)

Table 1: Summary Data (n=998)

	Length of Stay Data	Inpatient Medical Fees	Medical Device / Equipment Fees
Mean	28.8 days	2,045,519 JPY	515,866 JPY
Median	25.0 days	1,877,970 JPY	492,189 JPY
Std. deviation	16.1 days	765,094 JPY	196,935 JPY
First 25% mean	19.0 days	1,643,105 JPY	457,526 JPY
First 75% mean	33.0 days	2,240,450 JPY	542,932 JPY
95% CI	27.79 - 29.79 days	1,997,994 - 2,093,045 JPY	503,633 - 528,100 JPY

Typical cost outliers involved patients that suffer from hemophilia and/or hepatitis – both of which are conditions that involve additional medication and other fees to manage.

Very little variation based on age, gender, and region was observed for the cost of inpatient care.

Initial Diagnosis

The most common initial diagnoses for those that underwent a TKA procedure during the period examined were **osteoarthritis of the knee, rheumatoid arthritis, and osteoporosis**.

- **Osteoarthritis of the knee** was indicated as an initial diagnosis for **about 90% of cases** observed.
- **Rheumatoid arthritis**, which has been associated with lower functional improvement overall for TKA patients in Japan, was indicated as an initial diagnosis for about **15% of cases** observed.⁶
- **Osteoporosis**, which is said to be associated with more cases of post-TKA malalignment and well as a higher risk of osteonecrosis in Japan, was indicated as an initial diagnosis for about **13% of cases** observed.⁴

CONCLUSIONS

- A majority of patients undergoing a TKA procedure in Japan are **hospitalized for around a month**, on average.
- Moreover the cost of inpatient care tends to be **up to 2,800,000 JPY per procedure**.
- Estimates obtained for the mean LOS and the average cost of inpatient care may be under-estimated given that the Medi-Scope database includes only a small proportion of patients aged 65 or older. However, very little variation was observed by age group, so the difference may be minimal.
- At least 15% of TKA patients suffered from an underlying condition such as rheumatoid arthritis or osteoporosis which has been associated with worse treatments outcomes. This may suggest the need for **greater focus on certain high-risk patient subpopulations** in treatment planning.

REFERENCES

- 1) National Institute of Population and Social Security Research website (<http://www.ipss.go.jp/index-e.asp>)
- 2) NDB Open Data (4th Release). 2019. Ministry of Health, Labor, and Welfare. NDB Open Data Japan
- 3) Chikuda et al. 2013. Impact of age and comorbidity burden on mortality and major complications in older adults undergoing orthopaedic surgery: an analysis using the Japanese diagnosis procedure combination database. BMC Musculoskeletal Disorders (2013). 14:173.
- 4) Kawata et al. 2017. Annual trends in knee arthroplasty and tibial osteotomy: Analysis of a national database in Japan. The Knee 24 (2017) 1198–1205.
- 5) Kuroda et al. 2013. A Comparison of Total Inpatient Care Costs for Initial and Second Bilateral Total Knee Arthroplasty [in Japanese] The Central Japan Journal of Orthopaedic Surgery & Traumatology (2013). 56: 691-692.
- 6) Kobayashi et al. 2018. Rheumatoid Arthritis Patients Achieve Better Satisfaction but Lower Functional Activities as Compared to Osteoarthritis Patients After Total Knee Arthroplasty. The Journal of Arthroplasty 34 (2019). 478-482.