

Economic Evaluation of Knee Arthroscopic Surgery: A Comparison of Ambulatory and In-patient Knee Arthroscopic Surgery in Thailand

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BACKGROUND

- Ambulatory knee arthroscopic surgery (AKAS) has been an uprising concept of the healthcare system on an outpatient basis.
- Many studies found the clinical advantage of ambulatory surgery over inpatient knee arthroscopic surgery (IKAS).
- No economic evaluation comparing these two systems has been conducted from a societal perspective of health-related quality of life.

OBJECTIVE

- This study measured the health-related quality of life (HRQoL) and costs and conducted a cost-utility analysis and budget impact analysis (BIA) of ambulatory knee arthroscopic surgery (AKAS) compared with inpatient knee arthroscopic surgery (IKAS) in Thailand from a societal perspective.

METHODS

- Health outcomes were measured in units of quality-adjusted life-year (QALY) and costs were obtained from an electronic database at a tertiary-care hospital (Ramathibodi Hospital).
- A cost-utility analysis was performed to evaluate AKAS and IKAS using the societal perspective and a 2-week time horizon.
- The incremental cost-effectiveness ratio (ICER) was applied to examine the costs and QALYs.
- One-way sensitivity analysis was used to investigate the robustness of the model.
- BIA was performed considering a 5-year time horizon.

RESULTS

Baseline characteristics

- A total of 161 knee arthroscopic patients were included in this study.
- Table 1** shows the descriptive characteristics of patients undergoing AKAS and IKAS.

Table 1 Descriptive characteristics

Variable	AKAS (58 patients)	IKAS (103 patients)
Age in years, SD	36 (11.33)	40 (12.19)
Male, N (%)	48 (82.76)	75 (72.82)
Body mass index, kg/m ² , SD	26.66 (12.59)	25.66 (5.37)
Co-morbidity, N (%)		
- Hypertension	3 (5.17)	9 (8.74)
- Diabetes mellitus	1 (1.72)	4 (3.88)
- Hyperlipidemia	-	1 (0.97)
ASA class, N (%)		
- ASA I	37 (63.79)	56 (54.37)
- ASA II	21 (36.21)	41 (39.81)
- ASA III	-	6 (5.83)
Operative time (minute)	84.66	91.90
Estimated blood loss (ml)	5.83	6.69

Measurement of Health Utility

- The utility of the AKAS group was 0.392 whereas the IKAS group was 0.226 at 2 weeks.
- QALY, calculated by multiplying utility and time horizontally, was 0.812 and 0.788 in AKAS and IKAS, respectively.

Measurement of costs

- Total direct costs of AKAS were 1,984 USD (68,725 THB) while IKAS reported 2,217 USD (76,794 THB).
- Direct non-medical costs of both groups amounted to 16.90 USD (585.18 THB).
- Combining all costs, AKAS treatment saved 233 USD (8,069 THB) compared to IKAS.
- Model parameters for both AKAS and IKAS groups are presented in **Table 3**.

Table 3 Cost parameters

Costs; USD (THB)	AKAS	IKAS
Direct medical cost	1,984 (68,725)	2,217 (76,794)
Direct non-medical cost	16.90 (585)	16.90 (585)
Total cost	2,000 (69,310)	2,233 (77,379)

Cost-utility analysis

- AKAS has become the dominant strategy over IKAS.
- Table 3** shows the total costs, QALY values and ICER of IKAS and AKAS under base case conditions.

Table 3 Base case results

Alternative	Cost; USD (THB)	QALY	Difference in cost	Difference in QALY	ICER; USD (THB) per QALY
1 IKAS	2,234 (77,379)	0.788	-	-	-
2 AKAS	2,001 (69,310)	0.812	- 8,069.28	0.024	Dominant

Sensitivity analysis

- One-way sensitivity analysis results showed that medical supply costs of IKAS were the most influential factor affecting the change in results.
- Details are shown in the Tornado diagram (**Figure 1**).

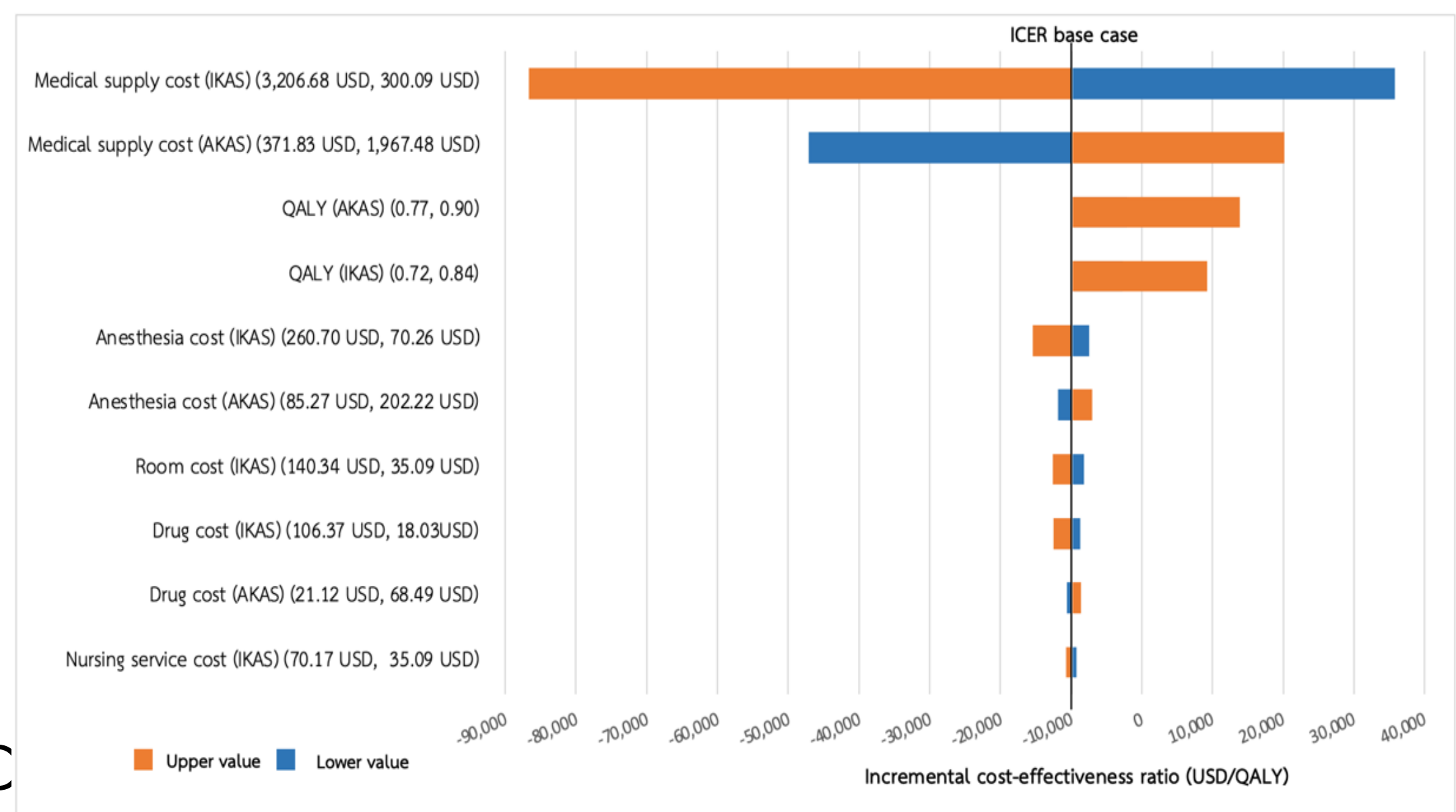


Figure 1 Tornado diagram of AKAS compared with IKAS.

Budget impact analysis

- For patients undergoing knee arthroscopic surgery in Thailand, AKAS led to net savings of 4.5 million USD (157 million THB) compared to IKAS over 5 years.
- This reduction in costs was mainly due to decreased use of medical supplies, inpatient facilities and hospital rooms.

DISCUSSION

- Average overall utility scores of the AKAS group for mobility, self-care, usual activities, pain/discomfort, and anxiety/depression were higher than the IKAS group at 2 weeks after surgery.
- The AKAS alternative had significantly lower costs of medical supplies, nursing services, and use of hospital inpatient facilities and rooms, with a shorter period of hospital resource consumption.
- The next challenge for public healthcare management in Thailand is to promote ODS procedures in other hospitals and also support facility and health staff readiness.

CONCLUSION

AKAS proved to be a better cost-saving strategy compared to IKAS due to lower treatment costs and better health outcomes. The one day procedure was a feasible alternative to traditional inpatient surgery and should be applied in various types of hospitals nationwide.

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