

Background

- Obesity is a complex chronic disease that has reached epidemic proportions around the world [1,2].
- Lifestyle interventions (diet and physical activities) are the first-line treatment recommended in clinical guidelines[3-5].
- The Duodenal–Jejunal Bypass Sleeve (DJBS, TONGEE®, TONGEE Medical, Hangzhou, China) is a novel nonsurgical device system (Fig 1). The DJBS is an impermeable sleeve placed via endoscopy to prevent nutrient absorption in the duodenum and proximal jejunum[6].

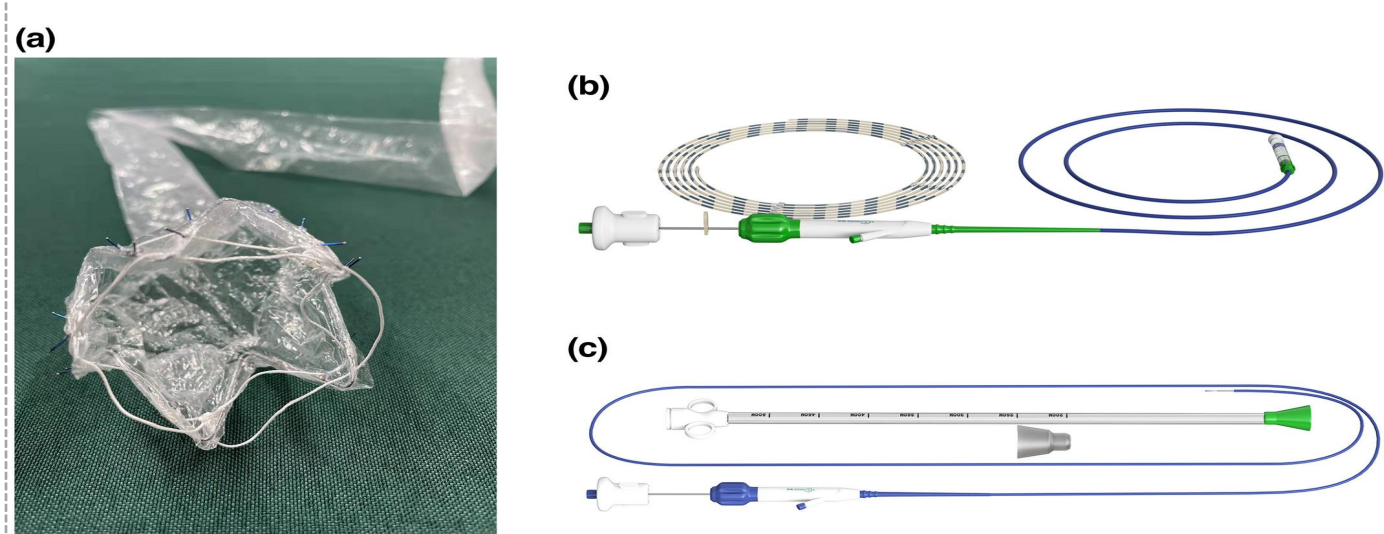


Fig 1. TONGEE (Tangji Medical, Hangzhou, China) duodenal–jejunal bypass sleeve device. (a) Sleeve, (b) delivery system, and (c) retrieval system.

Objective

This study aims to conduct an economic evaluation of Duodenal–Jejunal Bypass Sleeve (DJBS) plus Intensive Lifestyle Intervention (ILI) compared with ILI only in people with obesity in China..

Methods

- A decision tree Markov model was used to compare 9-month and lifetime horizon cost-effectiveness between DJBS plus ILI and ILI only (Fig 2).
- The data of clinical effectiveness were based on a prospective, open-label and randomized trial (NCT05938231).
- The analysis was performed from the perspective of China's healthcare system. Costs were reported in 2022 Chinese Yuan (CNY ¥). Costs and health outcomes were discounted at an annual rate of 5% [7].

Methods

- The health outcomes of the analysis were expressed as the difference in body mass index (BMI) from baseline, life years, Quality-Adjusted of Life Years (QALYs), and incremental cost-effectiveness ratio (ICER).
- The Willingness-To-Pay (WTP) ranged from 1~3 times the Gross Domestic Product (GDP) per capita in China (GDP per capita ¥85,498, 2022). The results of the lifetime horizon were presented after half-cycle correction.
- One-way, probabilistic sensitivity and scenario analysis were performed to test the robustness of the results.

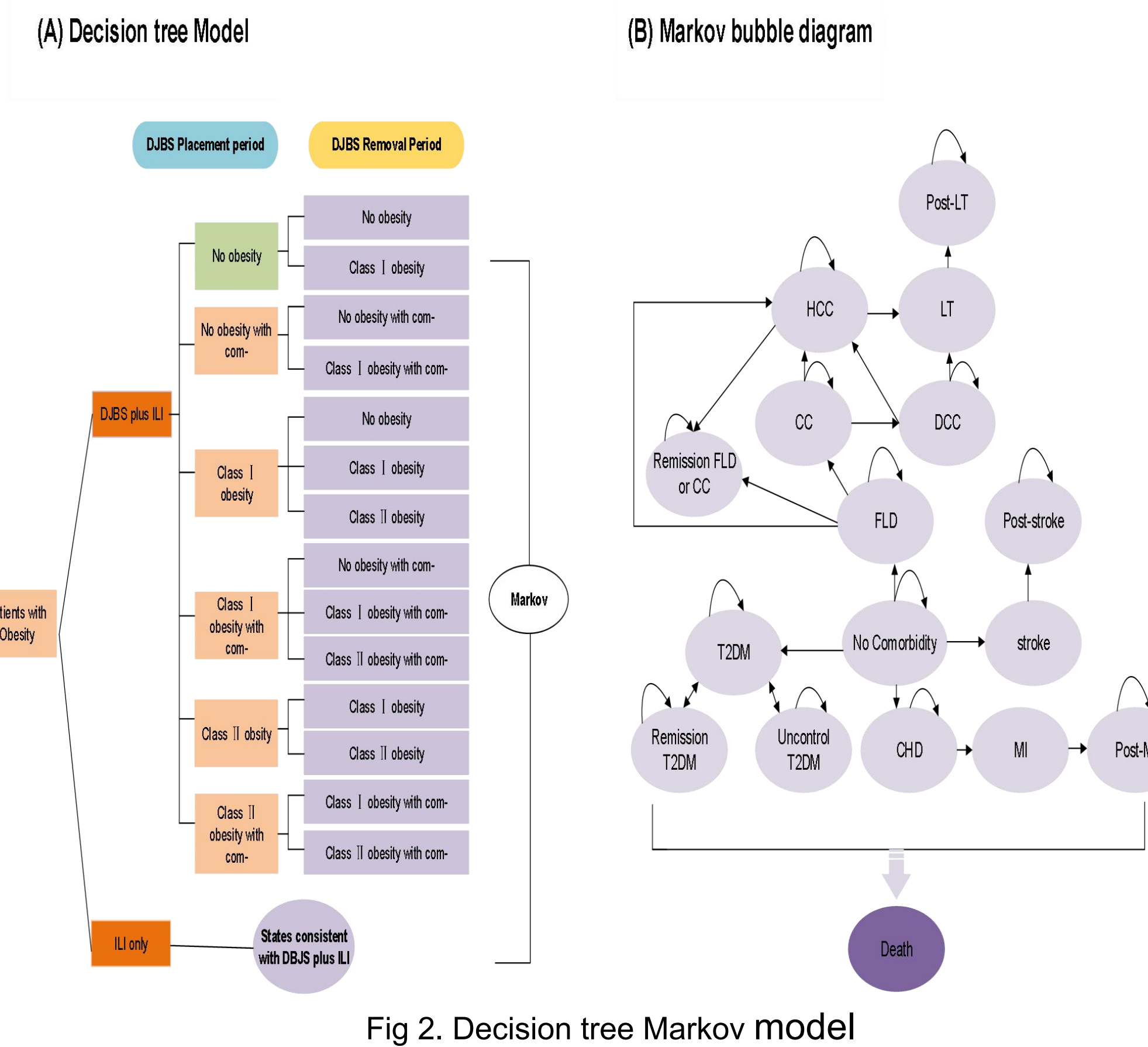


Fig 2. Decision tree Markov model

Results

- The results of 9-month decision tree model showed that compare to ILI, DJBS plus ILI decreased BMI by 1.69 kg/m² (1.41 vs. 3.10), with increasing cost of CNY ¥28,963.98 yuan (CNY ¥29,111.06 vs. CNY ¥147.08). The ICER was CNY ¥17,138.45 yuan per unit decrease of BMI.
- The lifetime horizon model showed that compared to ILI, DJBS plus ILI had a higher cost of CNY ¥13261.94 yuan (CNY ¥ 31,688.98 vs. CNY ¥18,427.04), while with life-years increase of 0.02 (9.43 vs. 9.41) and QALYs increase of 0.15 (7.82 vs. 7.67) per people with obesity. The ICER was CNY ¥88,412.93 per QALY gained.

Table 1 Base case cost-effectiveness results (9 months)

	Total cost(CNY ¥)	Incremental cost (CNY ¥)	BMI	ABMI	ICER (CNY ¥/ABMI)
ILI	147.08	-	1.41	-	-
DJBS plus ILI	29,111.06	28,963.98	3.10	1.69	17,138.45

Table 2 Base case cost-effectiveness results (lifetime)

	Total cost (CNY ¥)	Incremental cost (CNY ¥)	Total LYs	Incremental LYs	Total QALYs	Incremental QALYs	ICER (CNY ¥/QALY)
ILI	18,427.04	-	9.41	-	7.67	-	-
DJBS plus ILI	31,688.98	13,261.94	9.43	0.02	7.82	0.15	88,412.93

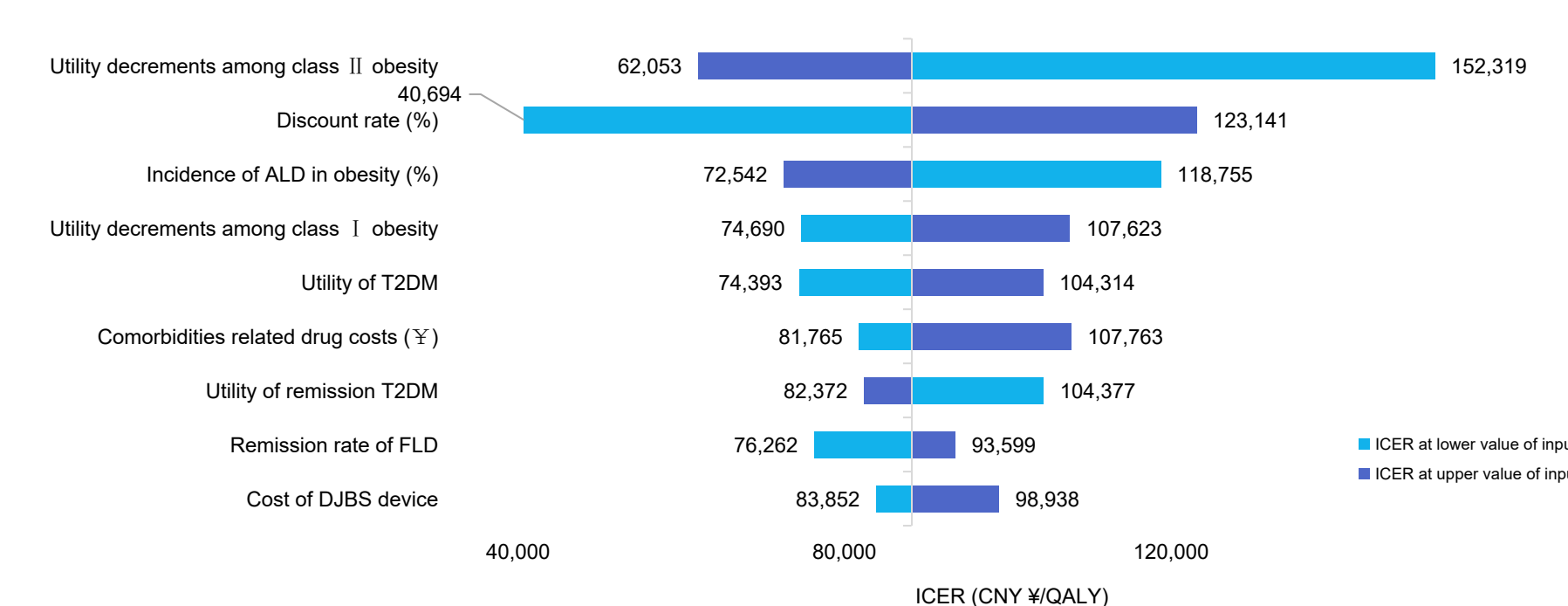


Fig 3. Tornado Diagram for One-way Sensitivity Analysis

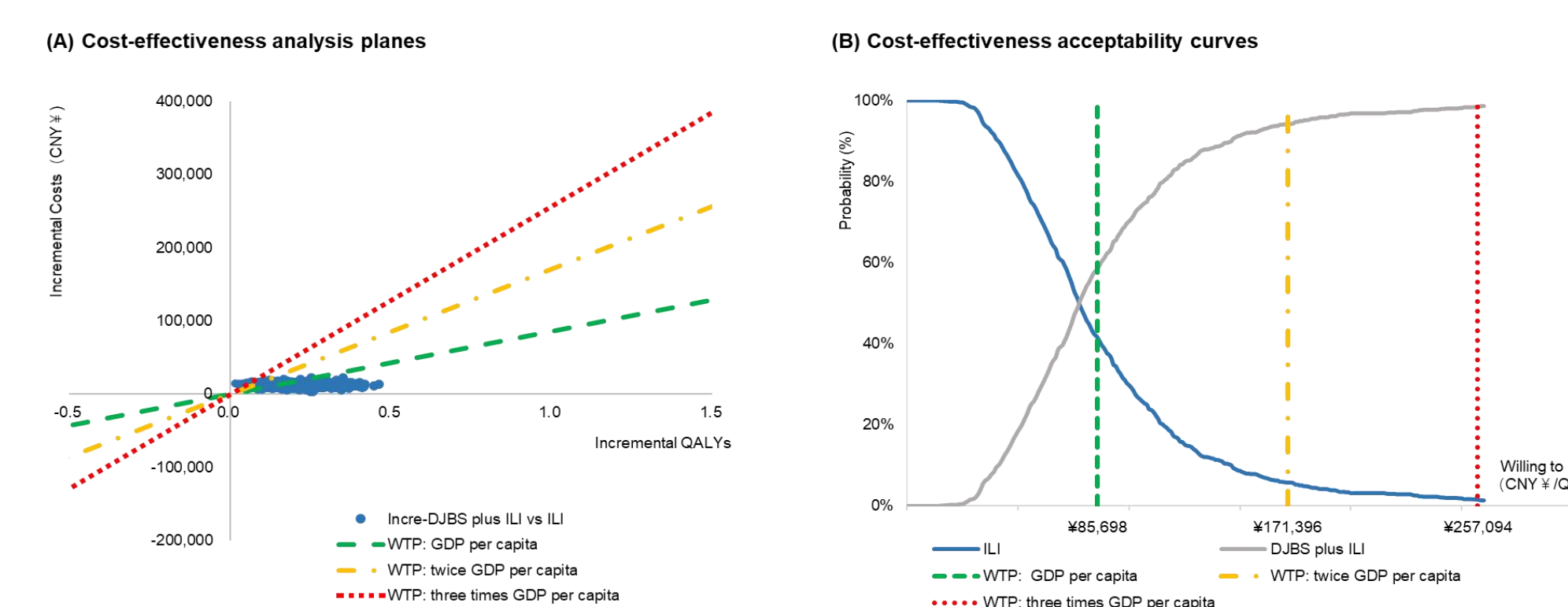


Fig 4. The cost-effectiveness planes and cost-effectiveness acceptability curves

Results

- Sensitivity analysis results
 - The tornado diagram suggested that the utility decrement in class II obesity has the most significance on the ICER (Fig 3).
 - When the WTP threshold is 1 to 3 times GDP per capita, the probability of DJBS plus ILI being cost-effective was 58.4%, 94.2%, and 98.4%, respectively (Fig 4) in Probability sensitivity analysis.
 - Scenario analysis result showed the ICER was CNY ¥148,218.00 for DJBS plus ILI compared to bariatric surgery.

Conclusion

Our study showed compared to ILI only, DJBS plus ILI is a cost-effective strategy over the lifetime horizon when the WTP threshold was 1.03 times GDP per capita.

References

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