

Cost-effectiveness of Pharmacopuncture Versus Conventional Acupuncture for Insomnia: An RCT-based Economic Evaluation with a Markov Model

Eun Cho^a, Ji-Eun Lee^a, Jung-Hwa Lim^{b, c}, Jae-Hyok Lee^d, Chan-Young Kwon^e, Bo-Kyung Kim^{b, c, *}

^a College of Pharmacy, Sookmyung Women's University, Seoul, Republic of Korea

^b Department of Neuropsychiatry, School of Korean Medicine, Pusan National University, Yangsan, Republic of Korea

^c Pusan National University Korean Medicine Hospital, Yangsan, Republic of Korea

^d Department of Neuropsychiatry, College of Korean Medicine, Semyung University, Chungju, Republic of Korea

^e Department of Oriental Neuropsychiatry, Dong-Eui University College of Korean Medicine, Pusan, Republic of Korea

E-mails: eun-cho@sookmyung.ac.kr; jieun1608@sookmyung.ac.kr; suede22@hanmail.net; yuean69@hanmail.net; beanalogue@naver.com; npjolie@pusan.ac.kr

*** Corresponding author:** Bo-Kyung Kim

Pusan National University, Pusan National Korean Medicine Hospital, Gumo-ro 20, Mulgeum-eup, Yangsan-si, Geongnam, 50612, Republic of Korea

E-mail address: npjolie@pusan.ac.kr

Phone: 82-55-360-5965/ 82-10-4071-3425

Fax: 82- 55-360-5509

*** First authors:**

Eun Cho and Ji-Eun Lee contributed equally to this work as co-first authors.

Supplement Table S1. Details of cost estimation

Component	Details	KRW (ref 2024)
Outpatient clinic for Korean Medicine	First visit	17,760
	Revisit	12,280
Pharmacopuncture ^a	Medical practice for pharmacopuncture	20,000
	Materials: Hominis Placenta pharmacopuncture	16,000
	Materials: Hwangryunhaedok-tang pharmacopuncture	5,000
	Materials: Se-sim pharmacopuncture	10,500
	Materials: Bufonis Venenum pharmacopuncture	4,000
	Materials: Dendropanax morbifera pharmacopuncture	9,000
Other acupuncture	General acupuncture	23,960
	Electroacupuncture ^b	33,050
Outpatient clinic for Western Medicine	Treatment for insomnia (KCD: F51, G47) per visit ^c	32,709
Prescribed Hypnotics	Pharmacy use cost per visit ^d	13,580
	Unit price per table/capsule	20 ~ 624 ^e

^a Pharmacopuncture cost per session = medical practice fee + material cost

^b Electroacupuncture cost per session = general acupuncture fee + electrical stimulation for acupuncture needle

^c HIRA dataset on disease statistics by subcategory for insomnia

^d Included services: pharmacy management, basic prescription, medication counseling, and pharmaceutical management, prescription (30 days)

^e HIRA dataset on weighted average prices by active ingredients (2024)

Supplement Table S2. Parameters for analyses

Model	Medical Practice for PC (KRW)	Duration		F/u Probability		Remission maintenance (F/u)		Utility		
		Tx	F/u	PC	CA	PC	CA	no	mild	moderate
Base-case: Model 1	20,000	4	4	PC	CA	100%	100%	-	-	-
Base-case: Model 2	20,000	4	20	PC	CA	100%	100%	0.844	0.791	0.784
SA 1. Cost of Medical Practice for PC										
SA 1-1	15,000	a	a	a	a	a	a	a	a	a
SA 1-2	25,000	a	a	a	a	a	a	a	a	a
SA 1-3	30,000	a	a	a	a	a	a	a	a	a
SA 2. Treatment duration										
SA 2-1	a	8	16	a	a	a	a	a	a	a
SA 2-2	a	12	12	a	a	a	a	a	a	a
SA 2-3	a	24	0	a	a	a	a	a	a	a
SA 3. F/u transition probability										
SA 3-1	a	a	a	CA	CA	a	a	a	a	a
SA 3-2	a	a	a	PC	PC	a	a	a	a	a
SA 4. Remission maintenance (F/u)										
SA 4	a	a	a	b	b	81% ^c	64% ^c	a	a	a
SA 5. Utility^d										
SA 5	a	a	a	a	a	a	a	0.830	0.790	0.740

Tx, treatment; F/u, follow-up; PC, pharmacopuncture; CA, conventional acupuncture (general acupuncture and electroacupuncture); pRCT, pragmatic randomized controlled trial; SA, sensitivity analysis

^a All parameter values are identical to those used in the base-case model.

^b All parameter values are identical to those used in the base-case model, except for the probability of remission maintenance during the follow-up period.

^c The observed remission maintenance rate during the follow-up period (4 weeks) was applied instead of the base-case assumption, which did not allow for deterioration from the symptom-free state.

^d EQ-5D-based utility weights were derived from Chalet et al. (2023), which reported adjusted associations between EQ-5D and ISI severity. [Chalet FX, Saskin P, Ahuja A, et al. *The Associations between Insomnia Severity and Health Outcomes in the United States*. J Clin Med. 2023;12(6):2438. doi:10.3390/jcm12062438.]

Supplement Table S3. Sensitivity analysis results

Model	Difference in QALY	Difference in cost (KRW)	ICER (KRW/QALY)
Base case			
Model 2	0.0046	77,000	16,940,000
SA 1. Cost of Medical Practice for PC			
SA 1-1. 15,000	^a	27,000	6,000,000
SA 1-2. 25,000	^a	127,000	27,881,000
SA 1-3. 30,000	^a	177,000	38,822,000
SA 2. Treatment duration			
SA 2-1. 8 weeks	0.0021	33,000	15,688,000
SA 2-2. 12 weeks	0.0013	17,000	12,594,000
SA 2-3. 24 weeks	0.0011	12,000	10,339,000
SA 3. F/u transition probability			
SA 3-1. CA in f/u phase	0.0035	^b	22,168,000
SA 3-2. PC in f/u phase	0.0031	^b	25,098,000
SA 4. Remission maintenance (F/u)			
SA 4. Observed remission maintenance	0.0062	^b	12,537,000
SA 5. Utility			
SA 5-1. Previous study (Chalet 2023 ^c)	0.0033	^b	23,195,000

QALY, quality-adjusted life year; ICER, incremental cost-effectiveness ratio; SA, sensitivity analysis; PC, pharmacopuncture; F/u, follow-up; CA, conventional acupuncture

^a The difference in QALY result is the same as in the base-case model 2.

^b The difference in cost result is the same as in the base-case model 2.

^c EQ-5D-based utility weights were derived from Chalet et al. (2023), which reported adjusted associations between EQ-5D and ISI severity. [Chalet FX, Saskin P, Ahuja A, et al. *The Associations between Insomnia Severity and Health Outcomes in the United States*. J Clin Med. 2023;12(6):2438. doi:10.3390/jcm12062438.]