



# A Systematic Review of the Economic Evaluation of Digital Health Interventions in Depression: A Comparison with Pharmacotherapy

Jiae Im, Eui-Kyung Lee

Sungkyunkwan University, Suwon-si, Gyeonggi-do, Republic of Korea

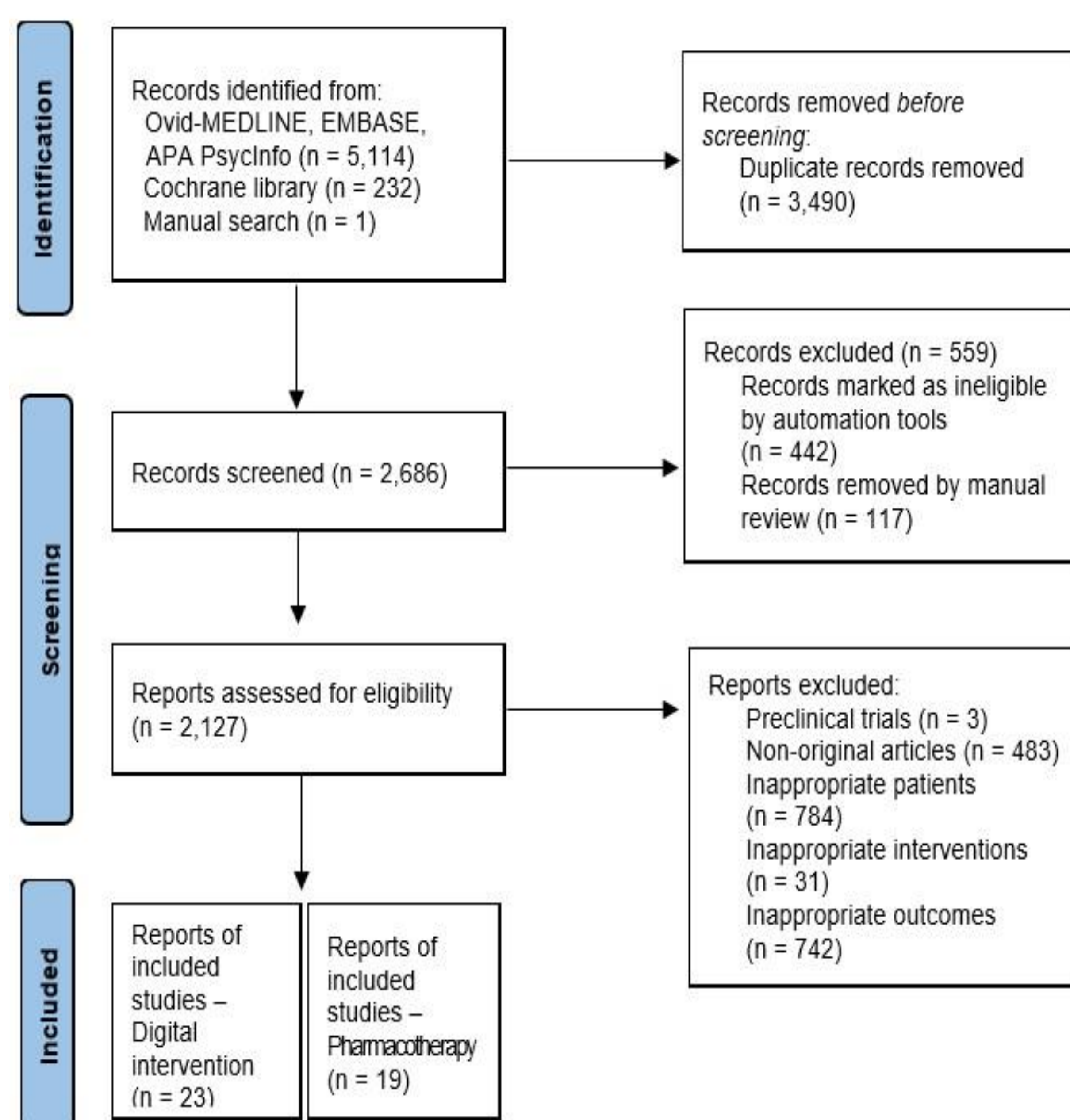
## OBJECTIVES

- This study systematically reviewed and compared economic evaluation literature on digital health interventions for treating depression.

## METHODS

- We searched for articles published between October 2013 and October 2023 using the Ovid-MEDLINE, Embase, Cochrane library, and PsycINFO databases.
- We conducted a qualitative comparison of the costs, effects, and modeling components of each intervention.
- Cross-tabulation analysis was used to examine the frequency of different components in each type of intervention.
- The CHEERS checklist evaluated the reporting quality of the selected literature and generalized linear model analysis investigated factors affecting this quality.

Figure 1. PRISMA Flow Diagram



## RESULTS

- We selected 42 articles: 23 on digital health interventions and 19 on drug interventions.
- Qualitative analysis revealed that direct medical expenses for digital health interventions included license fees or program maintenance costs, while drug interventions included costs related to suicide or suicide attempts.
- Quantitative cross-tabulation analysis showed significant differences in economic evaluation components based on intervention type, including the type of economic evaluation (CUA, CEA or other types)( $p=0.005$ ), the type of comparative alternatives (active control, placebo control or other)( $p=0.000$ ) and funding sources (government, company or other)( $p=0.002$ ).

Table 1. Economic Evaluation Items: Digital Health Interventions vs. Pharmacotherapy

Items	Digital Health Interventions (n=23)	Pharmacotherapy (n=19)	P-value
Perspective	Payer	3 (13.04%)	0.083
	Healthcare	2 (8.70%)	
	Societal	5 (21.74%)	
	Else	13 (56.52%)	
Country	Reference	10 (43.48%)	0.554
	Else	13 (56.52%)	
	CEA	1 (4.35%)	
Type	CUA	11 (47.83%)	0.005
	CEA&CUA	9 (39.13%)	
	Else	2 (8.70%)	
	Time Horizon	≤12month	
Comparator	≥12month	3 (13.04%)	0.276
	Standard	4 (17.39%)	
	Placebo	12 (52.17%)	
	Waitlist	5 (21.74%)	
Funding	Else	2 (8.70%)	0.000
	Company	3 (13.04%)	
	Government	12 (52.17%)	
	University, Research	6 (26.09%)	
Funding	Else	2 (8.70%)	0.002
	Else	3 (15.79%)	

CEA, cost-effectiveness analysis; CUA, cost-utility analysis;

- Generalized linear model analysis indicated that the modeling approach (model-based or trial-based)(OR=1.11,  $p=0.012$ ) and the type of economic evaluation (OR=1.21,  $p=0.002$ ) significantly influenced the CHEERS scores.

Table 2. Results of Generalized Linear Model Analysis

CHEERS	Exp(b)	SE	z
Intervention	0.936	0.034	- 1.83
Modeling	1.109*	0.046	2.50
Country	0.944	0.031	- 1.78
Economic Evaluation Type	1.208**	0.073	3.10
Time horizon	1.039	0.043	0.92
Cons	32.300***	1.924	58.34

\* $p < .05$ ; \*\* $p < .01$ ; \*\*\* $p < .001$

## CONCLUSIONS

- This study confirms that calculation of program costs of digital health interventions varies widely between studies, unlike the relatively fixed costs for drug interventions.
- Additionally, there is a notable lack of model-based studies for digital health interventions, and the existing ones often use simplistic models.
- Our findings highlight the need for more research on cost and effectiveness measurements that reflect the unique characteristics of digital health interventions.
- Moreover, developing and refining modeling methods to accurately capture these characteristics is essential, necessitating more diverse and sophisticated model-based studies.