

ESM 3. Study Characteristics and Candidate/Ongoing Studies

Article title: Multimodal Digital Health Interventions versus Standard Perioperative Management in Lung Cancer Surgery: A Systematic Review, Meta-Analysis, and Evidence Gap Map

Journal: Supportive Care in Cancer

Authors: [replace with author names]

Table S3A. Included study characteristics

First Au- thor (Year)	N En- rolled	N Com- pleted/Analyzed (I/C)	Design	Setting	Country	Digital Modal- ities (Count)	Platform/Device	Primary/Key Out- come(s)	Follow- up	Synthesis Role	Journal
Sui Y (2020)	200	100/100	RCT	Single- center	China	WeChat edu- ca- tion videos + rehab videos + WeChat Move- ment + video- call sup- port (4)	WeChat Usual care	HADS anxi- ety/depression; EORTC QLQ- C30; survival/follow- up	12 months	RCT quan- tita- tive/descrip- tive	European Jour- nal of Oncol- ogy Nurs- ing
Jiang Y (2024)	60	30/30	RCT	Single- center	China	WeChat mini- program pa- tient por- tal + nurse por- tal (2)	WeChat mini- program Usual care	PaO2; VAS; EORTC QLQ- 30	12 months	RCT quan- tita- tive/descrip- tive	Alternative Ther- apies descrip- tive Health and Medicine

First Au- thor (Year)	N En- rolled	N Com- pleted/ Analyzed (I/C)	Design	Setting	Country	Digital Modal- ities (Count)	Platform/Device	Comparator	Primary/Key Out- come(s)	Follow- up	Synthesis Role	Journal
Chen (2024)	100	51/49	Retrospec- com- para- tive study	Single- center	China	Wearable pe- dome- ter/detection equipment + moni- tored indi- ca- tors + per- sonal- ized rehab (3)	Wearable pe- dome- ter/detection	Routine nurs- ing	FEV1; After FVC; FEV1/FVC; post- oper- ative hospi- tal- iza- tion		NRSI SWiM nar- rative	Alternative Ther- apies Health and Medicine
Lee J (2024)	194	74/120	Nonrand- historical control clinical trial	Single- center	South Ko- rea	Wearable moni- tor- ing + web- based data + re- mote coun- seling (3)	Wearable de- vice and web dash- board	Historical usual- care co- hort	Daily steps; MVPA; 6MWD; EORTC QLQ- C30; dysp- nea	2 weeks and 6 months	NRSI SWiM nar- rative	JAMA Net- work Open
Xu J (2025)	186	72/75	RCT	Single- center	China	DTx plat- form: symp- toms + ePRO + ed- uca- tion + ex- ercise (4)	DTx multi- portal plat- form	Multidis- cipli- nary man- age- ment	FEV1; recov- ery; LOS; man- age- ment time	90 days	RCT quan- tita- tive/descriptive	BMC Medicine

First Author (Year)	N Enrolled	N Completed (I/C)	Design	Setting	Country	Digital Modalities (Count)	Platform/Device	Comparison	Primary/Key Outcome(s)	Follow-up	Synthesis Role	Journal
Lv C (2025) [POP-PER]	140	68/68	RCT single-blind	Single-center	China	Smartphone app: symptom reporting + exercise training + education (3)	POP-PER	Usual care	Pulmonary function recovery ratio; LOS; pain	30 days	RCT sensitivity/descriptive	International Journal of Surgery
Li G (2025)	50	22/18 for HRQoL analysis	RCT	Single-center	China	App + wearable HR monitor + AI-driven exercise prescription (3)	Recovery Plus Health app + chest-strap HR	Usual care	VO2peak; EORTC QLQ-C30; anxiety; fatigue	5 months	RCT quantitative/descriptive	JMIR mHealth and Health
Dai W/Jing P (2025)	418	182/173	RCT	Multicenter (4 sites)	China	WeChat ePRO + CBT + automated clinical alerts (3)	WeChat ePRO	Usual care	Symptom threshold events; HRQoL; readmission	12 weeks to 12 months	RCT SWIM/descriptive	British Journal of Cancer

First Au- thor (Year)	N En- rolled	N Com- pleted/ (I/C)	Design	Setting	Country	Digital Modal- ities (Count)	Platform/Device	Comparison	Primary/Key Out- come(s)	Follow- up	Synthesis Role	Journal
Patel YS (2023)	102	45/50 for Table 2 out- comes	RCT	Single- center	Canada	Fitbit wear- able + breath- ing/aerobic goals + lifestyle edu- ca- tion + re- mote moni- tor- ing (4)	Fitbit and re- mote moni- ing	Usual pre- oper- ative care	Prolonged LOS; LOS; com- plica- tions; ad- verse events	Hospital to 12 weeks	RCT quan- tita- tive/descriptive	BJS
Chen L (2026)	138	68/70	RCT	Single- center	China	Intelligent breath- ing trainer + feed- back + data up- load + thresh- old ad- just- ment + nurse plat- form (5)	Boyi KI- 8001 intel- ligent breath- ing trainer	Routine reha- bilita- tion care	FEV1; FVC; 6MWT; WHOQOL- 100; PAIS- SR	Discharge to 3 months	RCT quan- tita- tive/descriptive	Biological Re- search Nurs- ing

First Au- thor (Year)	N En- rolled	N Com- pleted/Analyzed (I/C)	Design Setting	Country	Digital Modal- ities (Count)	Platform/Device	Comparator	Primary/Key Out- come(s)	Follow- up	Synthesis Role	Journal
Tang/Wang (2026)	500	table n varies	Retrospective matched con- trolled study	China	Remote plat- form + spirom- eter + oxime- ter + BP moni- tor + ther- mome- ter + ECG (6)	Dignio plat- form and con- nected de- vices	Matched stan- dard in- struc- tions	FEV1; FVC; FEV1/FVC; emer- gent com- plica- tion detection	1 to 9 months	NRSI SWiM nar- rative	Medicine

Supplementary Table S3: Candidate and Ongoing Studies Not Included

Study	Source	Final status	Reason	Follow-up action
Wang et al. WeChat respiratory training, N=96	VIP/CNKI candidate	Excluded after user manual full-text review	Did not meet final inclusion after full-text assessment	None
Shuang 2024	Chinese database candidate	Excluded after user manual full-text review	Did not meet final inclusion after full-text assessment	None
Wang 2026 D-PNP	Frontiers in Medicine	Excluded after user manual full-text review	Did not meet final inclusion after full-text assessment	Do not use abstract values in analysis
NCT05990946	ClinicalTrials.gov / JMIR Res Protoc 2025	Awaiting results	No intervention results publication located as of June 2026	Monitor for future result publication
NCT07310056	ClinicalTrials.gov	Ongoing/not yet recruiting	No results available	Monitor for future result publication
NCT06600503	ClinicalTrials.gov / protocol publication	Protocol only	No results available	Monitor for future result publication