Value of Telemonitoring for Positive Airway Pressure Therapy Management in Obstructive Sleep Apnea: A Systematic Literature Review

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INTRODUCTION

Obstructive sleep apnea (OSA) is associated with substantial healthcare utilization and costs.

Positive airway pressure (PAP) therapy is the standard treatment for OSA, and telemonitoring has emerged as a strategy to support patient management.

OBJECTIVE

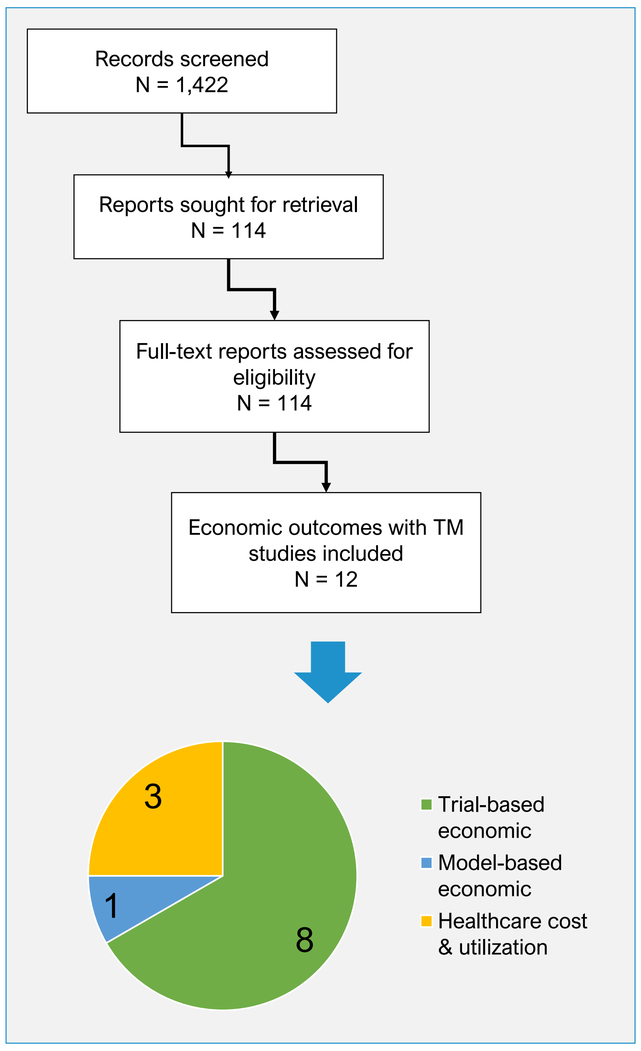
This systematic literature review summarized evidence on economic outcomes associated with telemonitoring and telemedicine-based PAP management in adults with OSA.

METHODS

- A systematic literature review was conducted in accordance with Cochrane collaboration standards and the Preferred Reporting Items for Systematic Reviews and Meta-Analysis (PRISMA) guidelines, using pre-defined PICOS.
- Searches were conducted in Embase, MEDLINE, and PubMed covering literature published from January 2005 through October 2025 and conference abstracts from January 2023 to October 2025 evaluating telemonitoring or telemedicine-based PAP management in adults with OSA.
- Data on economic outcomes were extracted and synthesized. **Figure 1** summarizes the study selection process and distribution of included studies by study design.

RESULTS

Figure 1. Study selection and study designs



Economic findings generally favored telemonitoring: ten studies reported telemonitoring to be cost-effective or cost saving, while two did not demonstrate cost-effectiveness.

Study	Country; Sample Size	Interventions vs Comparator(s)	Outcome	Inference
An 2023[1]	USA; N=342	CPAP + Tele messaging vs. Standard CPAP	Costs (USD): No messaging $5889, 3 months messaging $7382, 3 years messaging $5880	Cost-effective* at 3 years
Deger 2023[2]	UK;	PAP + Telemonitoring vs. No-telemonitoring	Incremental costs: GBP 23,554	Partially cost saving*
Isetta 2015[3]	Spain; N=139	CPAP + Telemedicine-based follow-up vs. CPAP + Standard face-to-face	Incremental effectiveness: 0.0012 QALYs Incremental costs: €11.99	Cost-effective*
Martinez 2023[4]	Spain; N=100	CPAP + Telemonitoring vs. Standard of care	Sleep unit Costs (€): Mean, p-value PAP+TM: 3.09, <0.001; SoC: 0.47, <0.001	Cost saving*
Kosky 2022[5]	Australia;	CPAP + Telemedicine vs. CPAP + standard face to face	Total Costs (AUD) (mean): 1250.7 vs 1385.6	Cost saving*
Locke 2022[6]	USA; N=976	PAP + Remote tracking (Adherent vs. Non-adherent vs. Overall)	Change in costs pre to post (USD/year), mean difference: $4480 vs. $5798 vs. $4989	Cost saving*
Lugo 2019[7]	Spain; N=186	CPAP + Virtual sleep unit vs. CPAP + hospital routine	Total incremental costs: € -153.34	Cost-effective*
Ou 2023[8]	China; N=57	CPAP + Telemedicine vs. Control	Cost of patients' medical treatment was reduced	Cost saving*
Ssegonja 2023[9]	Sweden; N=167	CPAP + Telemonitoring vs. CPAP + standard follow-up	Incremental cost: $192	Cost-effective*
Turino 2017[10]	Spain; N=100	CPAP + Telemedicine vs. Standard of care	ICER: €17,358.65/QALY	Cost-effective*
Turino 2021[11]	Spain; N=60	CPAP plus standard management vs. CPAP plus intelligent monitoring system	Incremental cost: €6	Not cost-effective*
Xu 2024[12]	China; N=356	APAP vs in-person management	ICER: Chinese Yuan 358,250/QALY	Not cost-effective*

- Across the evidence, 9 out of 12 studies included a full or partial economic assessment, with telemonitoring reported as **cost-saving, cost-effective, or dominant in 8 of those 9 analyses**.
- Reported economic benefits were primarily driven by **reduced patient travel and more efficient use of healthcare resources.**
- Seven studies reported **comparable or improved clinical outcomes** with remote PAP management compared with standard in-person care, including PAP adherence, symptom control, and quality of life.

CONCLUSIONS

Most economic evaluations reported telemonitoring-based PAP management to be cost-saving, cost-effective, or dominant compared with standard care, with benefits primarily driven by reduced patient travel and more efficient healthcare resource utilization.

Differences in economic findings may reflect variation in healthcare settings and time horizons of the analysis, with longer-term analyses generally demonstrating greater economic value.

Telemonitoring represents a promising strategy to improve the economic efficiency of OSA management while maintaining treatment effectiveness.

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***Dominant:** Lowers net costs (ΔC < 0) and improves clinical efficacy (ΔE > 0); **Cost-Saving:** Lowers net costs (ΔC < 0) with non-inferior/equivalent efficacy (ΔE ≈ 0); **Cost-Effective:** Improves clinical outcomes (ΔE > 0) at an incremental cost within willingness-to-pay thresholds, or maintains outcomes at equal/lower cost; **HCRU Saving:** Reduces physical healthcare resource utilization (e.g., clinic visits, staff labor, hospital bed-days) regardless of platform or hardware fees; **Cost-Neutral:** Net zero expenditure change (ΔC ≈ 0) with equivalent clinical efficacy.