

Technology-based Dyadic Interventions For Persons Living With Dementia And Caregivers: Systematic Review Of Literature

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INTRO

- Integrating technology into dementia care is essential to improve safety, independence, medication management, and cognitive function of persons living with dementia.
- Technology can also support caregivers in care coordination and organization, health monitoring for patients, and emotional support.
- This systematic review aimed to identify and synthesize the current evidence of the effectiveness of interventions using technology for persons living with dementia and their caregivers as a dyad.

METHODS

- Six databases were searched for interventions using any technology (CINAHL, PubMed, Web of Science, APA PsycINFO, IEEE Xplore, and Dissertations and Theses Global).
- Search terms included but not limited to mobile phone, telehealth, video game, wearable device, social robots, virtual reality, simulation, and artificial intelligence, from their inception to February 2025.
- Title/abstract screening, full text review were completed using Covidence based on PICO model (Population, Intervention, Comparator, Outcome).
- The total of five reviewers reviewed and compared their results until consensus.
- Risk of Bias was assessed using Cochrane quality assessment template.
- Registered to PROSPERO (CRD42022380937).

RESULTS

- Five studies from 3,608 scholarly records were evaluated.
- Three studies applied mobile apps for cognitive simulation and social interaction.
- Two studies applied telehealth for deprescribing training for caregivers and occupational therapy for managing behavioral symptoms.
- Three feasibility studies reported medium to high feasibility findings, while two studies reported no effect on their outcomes.
- Four studies were evaluated as having a high risk of bias and one a low risk.

CONCLUSION

- Preliminary evidence did not support the effectiveness of technology-based interventions for persons living with dementia and their caregivers.
- Feasibility studies are needed to validate their findings in larger, diverse populations and settings to test the efficacy of interventions.

Table 1. Study Characteristics

Authors	Country	Aim(s)	Sample	Intervention	Control	Measures	Main findings
Green et al., 2023	USA	Assess feasibility of telehealth pharmacist-led intervention in deprescription of medication	Intervention: 27 dyads Control: 28 dyads	Educational brochure on deprescription 1 telehealth visit (video or phone) with a pharmacist Pharmacist-PCP communication on deprescription recommendations 3 recommendations 1 follow-up call	Wait-list control 3 months after intervention group	PLWD: MRCI Total medication count Number of medications stopped by patient Patients who had ≥ 1 medication stopped CG: FCMAHS	Feasibility on medication recommendations from dyad and PCP Reduced visit time - No difference in number of medications, caregiver perception of medication complexity, administration hassle
Beentjes et al., 2023	Netherland	Assess feasibility of app intervention on self-management and engagement in meaningful activities	Intervention: 28 dyads Control: 31 dyads	3 months intervention: one introductory training session Access to FindMyApps Access to a telephone and email helpdesk Written manual	One general tablet training session with 3 months access No FindMyApps included Access to telephone and email helpdesk Written manual	PLWD:ASCOT MSPP SMAS-S Dutch General Self-Efficacy Scale DQoL TOPICS-MDS CG: SSCQ PES TOPICS-MDS-informal carer version	- No difference between groups - Trend in more self management, social participation, positive care experiences in intervention - Trend in more self-management for age >70 - Trend in more social participation in higher education
Rhodus et al., 2023	USA	Assess feasibility of telehealth intervention in occupational performance and behavioral symptoms	Intervention: 10 dyads Standard: 10 dyads Control: 10 dyads	Standard: scripted training on environmental modification and CG techniques Pre-selected 7 sensory toolkit Intervention: Standard training + Guided discovery and training	Daily behavior journal Weekly videoconference calls with interventionist to discuss behavioral symptoms	PLWD: COPM CDR MoCA NPI-Q CG: COPM NPI-Q ZBI SUS	Feasibility on weekly visits - No difference among groups
Rodriguez et al., 2023	USA	Assess feasibility and preliminary effects of a mobile app in caregiver burden and BPSD	Intervention: 26 dyads Control: 27 dyads	Caregiver support and BPSD management training 6 months	None	PLWD: BIQ NPI	Feasibility in intervention group Reduced caregiver burden - No difference in patient BPSD
Neal et al., 2024	Netherland	Assess effectiveness of app intervention in caregiver competence, social participation, quality of life, cost effectiveness	Intervention: 76 dyads Control: 74 dyads	FindMyApp intervention for 3 months Advised to practice together at least twice a week for the first 4 weeks	No FindMyApp 30 min training session on tablet use only Handbook List of websites with dementia friendly apps	PLWD: QALYs EQ-5D ASCOT MSPP Dutch tariff for utility scores CG: QALYS SSCQ	Increased competence in intervention group - No difference for other outcomes between groups Reduced CG total societal costs in intervention group

Notes. ASCOT: Adult Social Care Outcomes Toolkit; BIQ: Behavioral Intention Questionnaire; BPSD: behavioral and psychological symptoms related to dementia; COPM: Canadian Occupational Performance Measure; DQoL: Dementia Quality of Life Instrument; EQ-5D: Euro-Quality of Life-5 Dimension; FCMAHS: Family Caregiver Medication Administration Hassles Scale; MoCA: Montreal Cognitive Assessment; MRCI: Medication Regimen Complexity Index; MSPP: Maastricht Social Participation Profile; NPI: Neuropsychiatric Inventory; PES: Positive Experience Scale; QALYS: Quality-Adjusted Life-Years; SMAS-S: Self-Management Ability Scale – Short Version; SSCQ: Short Sense of Competence Scale (SSCQ); SUS: System Usability Scale; TOPICS-MDS: The Older Persons and Informal Caregivers Survey-Minimum Data Set; ZBI: Zarit Burden Inventory

Figure 1. PRISMA Flow Diagram

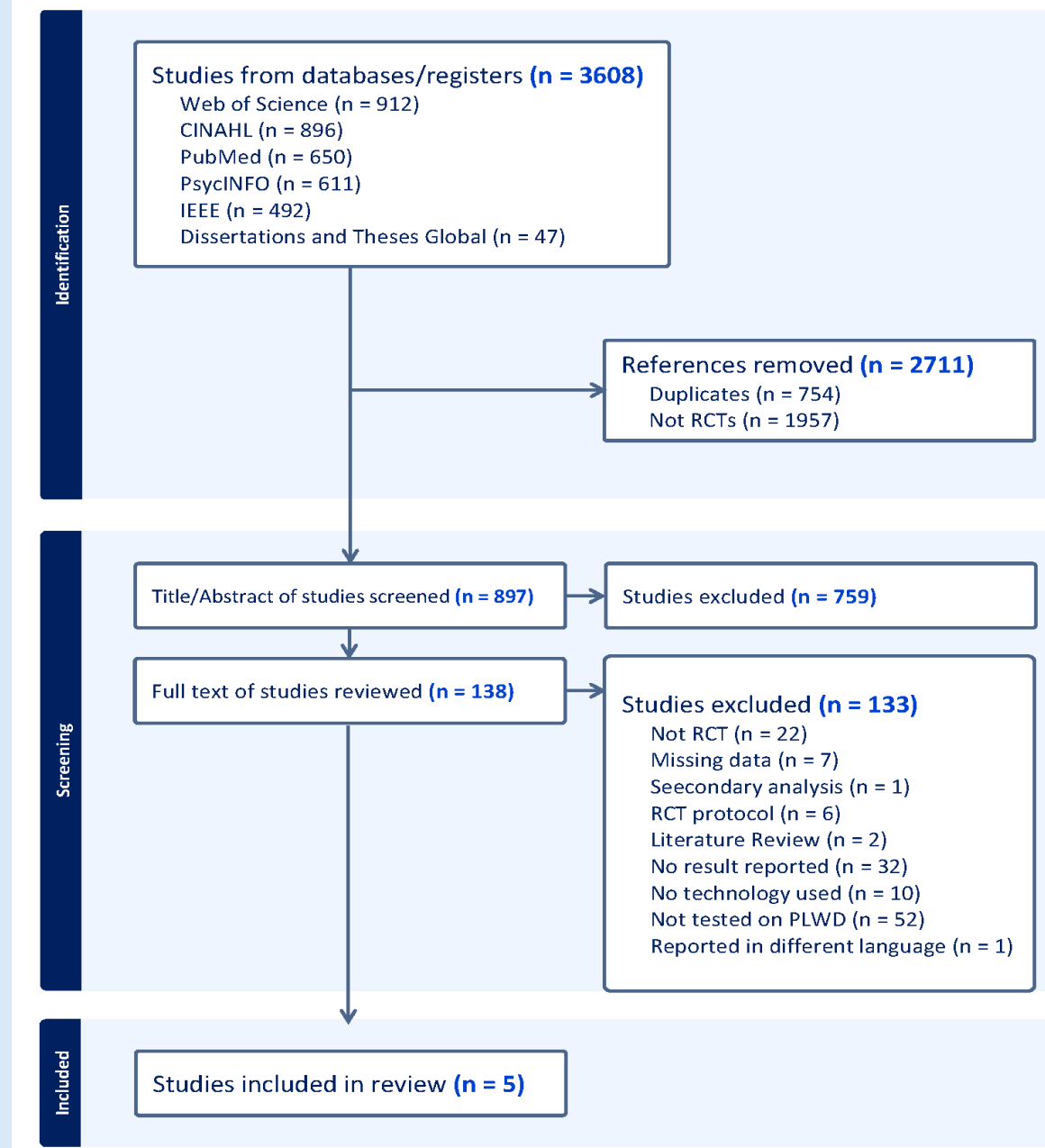


Table 2. Cochrane Methodological Quality Assessment

Authors Years	Selection Bias	Confounders	Blinding	Data collection	Analysis	Withdrawals and dropouts	Global Rating
Green et al., 2023	Unclear	Unclear	Unclear	Low Risk	Low Risk	Unclear	High Risk
Beentjes et al., 2023	Unclear	High Risk	High Risk	Unclear	High Risk	High Risk	High Risk
Rhodus et al., 2023	Unclear	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk
Rodriguez et al., 2023	Low Risk	High Risk	Low Risk	Low Risk	Low Risk	Unclear	High Risk
Neal et al., 2024	High Risk	High Risk	Unclear	Low Risk	Low Risk	Unclear	High Risk

Global Rating Criteria

Low Risk: The study is judged as "low risk" for all five domains.

High Risk: The study is judged as "high risk" in at least one domain, or the study is judged to have "unclear" for multiple domains.

Reference: Nejadghaderi, S. A., Balibegloo, M., & Rezaei, N. (2024). The Cochrane risk of bias assessment tool 2 (RoB 2) versus the original RoB: A perspective on the pros and cons. Health science reports, 7(6), e2165. <https://doi.org/10.1002/hsr2.2165>



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