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**Review Article**

# Telehealth and the Elderly: A Scoping Review on Technology Use, Adoption Barriers, and Health Outcomes

**Jaeyu Park**

Independent Researcher, Seoul Innovation Research Institute, Korea
Email: jaeyupark2025@gmail.com

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**Abstract**

**Purpose:** Telehealth is reshaping elderly healthcare, yet most research focuses on younger users, overlooking older adults' challenges. This scoping review explores (1) telehealth technologies used by elderly individuals, (2) barriers and facilitators affecting adoption and satisfaction, and (3) telehealth's effectiveness and cost-efficiency compared to traditional care.

**Methods:** Following the Arksey and O'Malley framework[31], updated by Levac et al.,[32] we reviewed peer-reviewed studies (2015–2024) from PubMed, Embase, CINAHL, and Cochrane. Studies examining telehealth use, adoption barriers, facilitators, satisfaction, usability, cost-effectiveness, or clinical outcomes in adults aged 60+ were included. Independent reviewers conducted data extraction and charting.

**Results:** Thirty studies identified various telehealth technologies, including mHealth apps, wearables, remote monitoring, and video consultations. While telehealth improved healthcare access and chronic disease management, adoption was hindered by digital literacy gaps, cognitive impairments, usability challenges, and limited caregiver support. Social and caregiver involvement were key facilitators. Cost-effectiveness analyses suggested reduced hospitalizations and emergency visits, though concerns about infrastructure costs, reimbursement, and access disparities persist.

**Conclusion:** Telehealth enhances elderly healthcare access but faces barriers in usability, digital literacy, and social support. Future efforts should focus on user-friendly design, digital inclusion, and economic evaluations to promote sustainable adoption.

**Keywords:** Telehealth, Elderly, Digital Literacy, Adoption Barriers, Facilitators, Cost-Effectiveness.

## Introduction

Over the past decade, telehealth has transformed healthcare delivery, particularly among aging populations. However, much of the research and implementation efforts have focused on younger, more tech-savvy users, often overlooking the unique needs and challenges faced by elderly individuals[12]. While telehealth offers promising solutions for older adults-ranging from video consultations, mobile health (mHealth) applications, remote monitoring systems, and smart home telemedicine-there is limited understanding of how these technologies impact health outcomes, usability, and patient satisfaction among the elderly. Elderly individuals experience unique barriers to telehealth adoption, including low digital literacy, cognitive and sensory impairments, and a reliance on caregivers for technology use[9-11]. The so-called digital divide disproportionately affects older adults, particularly those in rural areas and lower socioeconomic groups, limiting their ability to fully engage with virtual healthcare solutions[21]. Despite these barriers, telehealth remains a critical tool for chronic disease management, medication adherence, rehabilitation, and preventive care[30].

Moreover, telehealth is not a one-size-fits-all solution. While some elderly individuals use basic video conferencing for primary care visits, others engage with advanced digital tools such as wearable devices, exergames for physical therapy, and AI-powered chatbots for mental health support[3]. The variety of telehealth applications makes it essential to investigate which technologies work best for specific populations and under what conditions they improve healthcare accessibility, independence, and quality of life[30]. However, a significant research gap exists in understanding how telehealth technologies cater specifically to older adults and how adoption rates, satisfaction levels, and health outcomes compare to traditional care models. Existing studies on telehealth often generalize findings across all populations, failing

to address the nuanced experiences of elderly users and their specific challenges in navigating digital healthcare platforms[5,6].

To address this gap, this scoping review aims to explore three critical research questions:

1) What types of technologies do elderly individuals use to access telehealth services, and how do these choices impact their experiences and outcomes?
2) What are the primary barriers and facilitators (including social and technological support) that affect telehealth adoption and satisfaction among elderly users?
3) What is the evidence on the effectiveness and cost-efficiency of telehealth for improving health outcomes and quality of life in elderly populations compared to traditional care?

By synthesizing existing literature, this review will provide a much-needed understanding of telehealth engagement among older adults and inform future strategies for optimizing digital healthcare delivery in aging populations.

**Methods**

We conducted a scoping review on telehealth adoption, barriers, facilitators, and health outcomes among elderly populations, following the Arksey and O'Malley framework[31] as updated by Levac et al[32]. Our reporting aligns with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses Extension for Scoping Reviews (PRISMA-ScR) guidelines[33] to ensure methodological transparency.

**Search Strategy**

A systematic literature search was conducted across PubMed, Embase, CINAHL, and Cochrane in collaboration with a medical librarian. Searches targeted peer-reviewed studies published between 2015 and 2024 that examined telehealth use, barriers, facilitators, and health outcomes in elderly populations. The research team established search parameters through discussion. Two reviewers conducted an initial pilot test of the searches and refined search terms with the librarian's input. To ensure comprehensiveness, retrieved citations were compared against reference lists of prior systematic reviews on telehealth and aging. The initial search was conducted in early 2024, with an update in October 2024. The PubMed search included a combination of keywords and Medical Subject Headings (MeSH), such as "telehealth," "telemedicine," "mHealth," "aging population," "digital health," "remote monitoring," and "eHealth." Each database search was optimized using controlled vocabulary and Boolean operators. Refer to Table 1 for the search strategies.

**Table 1.** Search strategies.

| **Database** | **Search parameters** |
|---|---|
| PubMed search strategy | ("Telemedicine"[Mesh] OR "Telehealth"[Mesh] OR "Telerehabilitation"[Mesh] OR "eHealth"[Mesh] OR "Remote Consultation"[Mesh] OR "Mobile Health"[Mesh] OR "mHealth"[Mesh]) AND ("Aged"[Mesh] OR "Aged, 80 and over"[Mesh] OR "Older Adults"[tiab] OR "Elderly"[tiab] OR "Senior*"[tiab]) AND (barrier*[tiab] OR facilitat*[tiab] OR "adoption"[tiab] OR "acceptance"[tiab] OR "usability"[tiab] OR "cost effectiveness"[tiab] OR "cost analysis"[tiab] OR "health outcomes"[tiab] OR "patient satisfaction"[tiab] OR "adherence"[tiab] OR "compliance"[tiab] OR "accessibility"[tiab] OR "engagement"[tiab] OR "chronic disease management"[tiab]) AND (systematic[sb] OR "systematic review"[tiab] OR "scoping review"[tiab] OR "meta-analysis"[tiab] OR "integrative review"[tiab] OR "literature review"[tiab]) AND English[lang] AND ("2015/01/01"[Date - Publication] : "2024/11/08"[Date - Publication]) |
| Embase search strategy | ('telemedicine'/exp OR 'telehealth'/exp OR 'eHealth'/exp OR 'remote consultation'/exp OR 'mobile health'/exp OR 'mhealth'/exp OR 'telerehabilitation'/exp) AND ('aged'/exp OR 'very elderly'/exp OR 'older adults':ti,ab OR 'elderly':ti,ab OR 'senior*':ti,ab) AND ('barrier*':ti,ab OR 'facilitat*':ti,ab OR 'adoption':ti,ab OR 'acceptance':ti,ab OR 'usability':ti,ab OR 'cost effectiveness':ti,ab OR 'cost analysis':ti,ab OR 'health outcomes':ti,ab OR 'patient satisfaction':ti,ab OR 'adherence':ti,ab OR 'compliance':ti,ab OR 'accessibility':ti,ab OR 'engagement':ti,ab OR 'chronic disease management':ti,ab) AND ('systematic review'/exp OR 'meta-analysis'/exp OR 'scoping review'/exp OR 'integrative review'/exp OR 'literature review'/exp) AND [english]/lim AND [2015-2024]/py |
| CINAHL search strategy | (MH "Telemedicine+" OR MH "Telehealth+" OR MH "Telerehabilitation" OR MH "Remote Consultation" OR "mHealth" OR "Mobile Health" OR "eHealth") AND (MH |

| | |
|---|---|
| | "Aged+" OR MH "Aged, 80 and Over+" OR "Older Adults" OR "Elderly" OR "Senior*") AND (barrier* OR facilitat* OR adoption OR acceptance OR usability OR "cost effectiveness" OR "cost analysis" OR "health outcomes" OR "patient satisfaction" OR adherence OR compliance OR accessibility OR engagement OR "chronic disease management") AND (MH "Systematic Review" OR MH "Meta-Analysis" OR "scoping review" OR "integrative review" OR "literature review") AND English AND (DT 20150101-20241108) |
| Cochrane library search strategy | #1 (MeSH descriptor: [Telemedicine] OR MeSH descriptor: [Telehealth] OR MeSH descriptor: [Telerehabilitation] OR MeSH descriptor: [Remote Consultation] OR MeSH descriptor: [Mobile Health] OR MeSH descriptor: [mHealth] OR MeSH descriptor: [eHealth]) #2 (MeSH descriptor: [Aged] OR MeSH descriptor: [Aged, 80 and over] OR "Older Adults" OR "Elderly" OR "Senior*") #3 (barrier* OR facilitat* OR adoption OR acceptance OR usability OR "cost effectiveness" OR "cost analysis" OR "health outcomes" OR "patient satisfaction" OR adherence OR compliance OR accessibility OR engagement OR "chronic disease management") #4 (MeSH descriptor: [Systematic Review] OR MeSH descriptor: [Meta-Analysis] OR "scoping review" OR "integrative review" OR "literature review") #5 (#1 AND #2 AND #3 AND #4) #6 (limit #5 to yr="2015 - 2024") |

Searches were limited to English-language publications. All references were managed in Excel and Covidence, with duplicates removed.

**Eligibility Criteria**

Studies were included if they:

- Focused on elderly populations (aged 60+) using telehealth, mHealth, remote monitoring, or virtual care technologies
- Examined barriers, facilitators, usability, cost-effectiveness, patient satisfaction, or clinical outcomes
- Used empirical research methods (e.g., RCTs, cohort studies, case-control studies, qualitative or mixed-methods studies)
- Were systematic reviews or scoping reviews

Studies were excluded if they:

- Were not published in English
- Did not focus on elderly populations or telehealth technologies
- Were commentaries, protocols, meeting abstracts, or opinion pieces

Please see Appendix A (Table I) for details of included articles.

**Screening and Selection**

Two reviewers independently screened all retrieved citations. The first phase involved title and abstract screening, where citations were included for full-text review if eligibility was unclear. In the second phase, full-text articles were assessed for final inclusion. Disagreements were resolved through discussions.

**Data Extraction and Charting**

An initial data extraction tool was developed based on prior reviews of telehealth interventions[5,17,18]. This tool was tested on a subset of five studies and refined iteratively. The final charting tool was implemented using Qualtrics.

**Table 2.** Data charting tool.

| | |
|---|---|
| Article ID | Study aims |
| Author | Level of learners |
| Name of article | Study findings |
| Publication year | Interventions mentioned |
| Type of review | Explicitly stated theories used in the design of the primary studies |
| Number of primary studies included | Strengths of the article |
| Country of first author | Limitations of the article |
| Content focus | Interesting points from the article |
| Audience | General notes |

Extracted data included:

- Study characteristics (author, year, country, study type)
- Population focus (e.g., community-dwelling elderly, chronic disease patients)
- Technology type (e.g., telehealth, remote monitoring, mHealth apps)
- Outcomes studied (e.g., usability, access, patient satisfaction, cost-effectiveness, clinical effectiveness)

One author extracted data from all articles, with three additional reviewers conducting independent validation. The research team met regularly to discuss discrepancies and reach consensus.

Below is a PRISMA flowchart showing the study selection process.

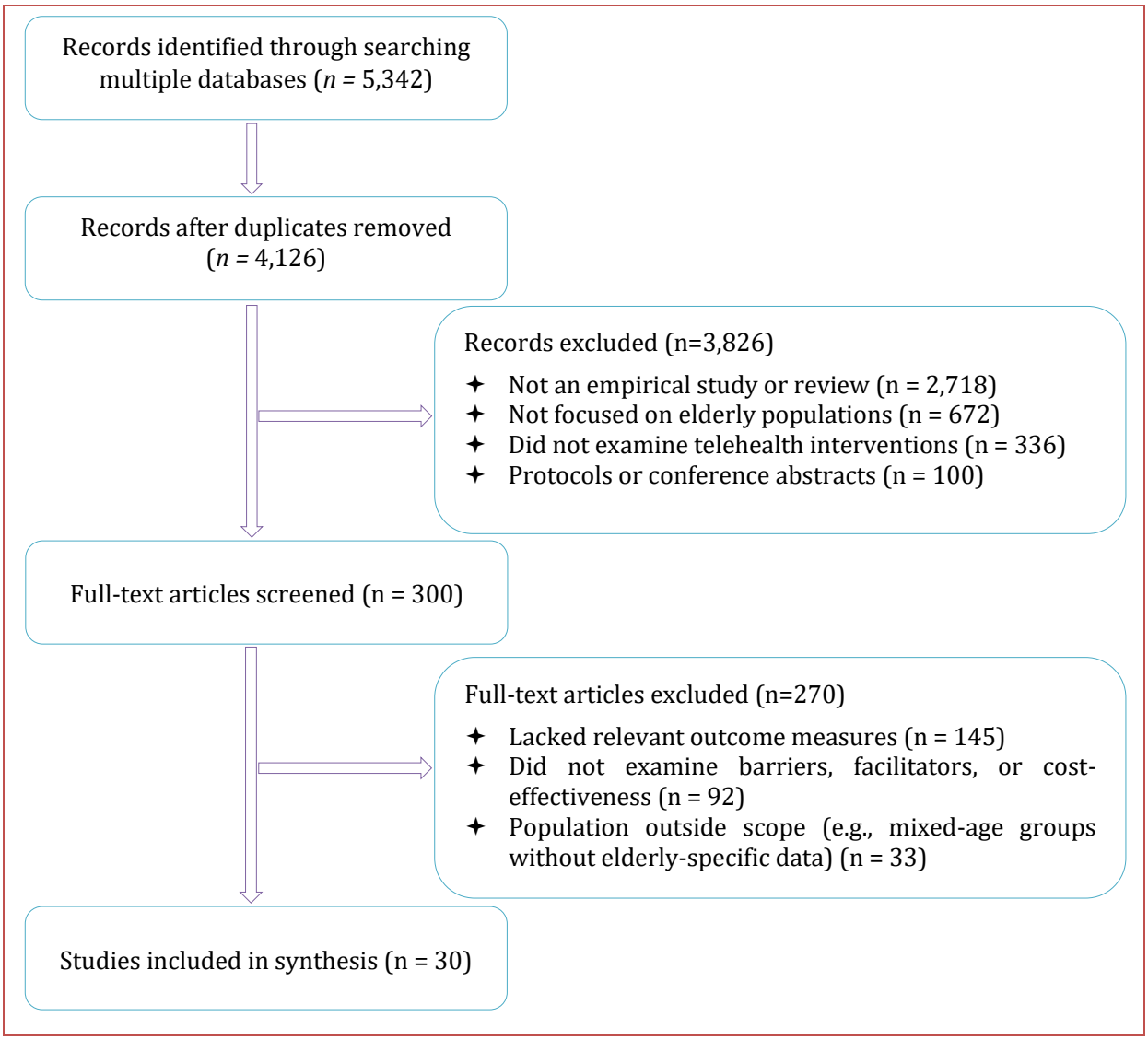


**Figure 1.** PRISMA flowchart.

**Results**

From the total number of studies retrieved, 30 met the inclusion criteria for this scoping review (See Table 1). These studies analyzed telehealth interventions for elderly populations, focusing on technology use, adoption barriers and facilitators, and effectiveness in health outcomes. The studies include systematic reviews (n=6), scoping reviews (n=5), randomized controlled trials (n=7), observational studies (n=4), qualitative studies (n=3), cost-effectiveness analyses (n=3), and usability studies (n=2). The majority of studies (n=22, 73%) were published after 2020, indicating an increasing focus on elderly telehealth adoption in recent years. England (n=11), the USA (n=8), Canada (n=5), Australia (n=2), Italy (n=1), Switzerland (n=2), and Singapore (n=1). Regarding study populations, most research targeted community-dwelling elderly individuals (n=13), patients with chronic conditions (n=7), individuals with neurodegenerative disorders such as Parkinson's or Alzheimer's (n=4), and elderly cardiac patients (n=6). The most frequently studied technologies included telehealth platforms (n=12), mobile health (mHealth) apps (n=8), remote

monitoring devices (n=5), smart home telemedicine (n=2), and virtual ward technology (n=1). Two studies addressed other or mixed telehealth modalities not easily classified into a single category. Findings are organized into the following key themes:

- ☞ Types of telehealth technologies used by elderly populations
- ☞ Barriers and facilitators to telehealth adoption
- ☞ Effectiveness and cost-efficiency of telehealth in elderly care

**Table 3.** Characteristics of included studies 2015–2024 (n = 30, English only).

| **Type of study** | **n (%)** |
|---|---|
| Empirical (experiments, case studies, trials) | 17 (57) |
| Review (systematic, scoping, narrative, etc.) | 13 (43) |
| **Country of first author** | |
| England | 11 (36.7) |
| United States | 8 (26.4) |
| Canada | 5 (16.7) |
| Australia | 2 (6.7) |
| Switzerland | 2 (6.7) |
| Italy | 1 (3.3) |
| Singapore | 1 (3) |
| **Study population** | |
| General elderly population | 12 (40) |
| Multiple health professionals and elderly | 6 (20) |
| Chronic disease patients (elderly) | 5 (17) |
| Dementia/Alzheimer's patients | 3 (10) |
| Parkinson's disease patients | 2 (7) |
| Cardiovascular patients | 2 (7) |
| **Technology used** | |
| Smartphones, tablets, wearables | 12 (40) |
| Remote monitoring systems | 9 (30) |
| mHealth applications | 9 (30) |
| **Content focus (n=30)** | |
| Telehealth effectiveness | 10 (33) |
| Digital health interventions | 6 (20) |
| Barriers and facilitators | 5 (17) |
| Cost-effectiveness | 4 (13) |
| Home-based rehabilitation | 3 (10) |
| eHealth and self-management | 2 (7) |

**Types of Telehealth Technologies Used by Elderly Populations**

The 30 included studies examined various technologies utilized by elderly individuals to access telehealth services. The primary modalities included:

- ✦ Smartphone-based telehealth apps (n=8)[1-5]
- ✦ Wearable health monitoring devices (n=5)[4-8]
- ✦ Remote patient monitoring (RPM) systems (n=6)[6-11]
- ✦ Video-based telehealth consultations (n=7)[5,6,11,13-16]
- ✦ Virtual wards and smart home telemedicine (n=4)[16-19]

Smartphone-based mHealth apps were widely studied, particularly in chronic disease management and rehabilitation programs. For instance, Lee et al. (2024)[2] explored the role of digital health interventions in rural elderly populations, identifying opportunities for chronic disease management. Savira et al. (2023)[10] reviewed virtual care initiatives for elderly individuals, emphasizing that mobile applications increased healthcare accessibility and engagement.

Remote monitoring devices, including wearables and home-based sensors, were reported as effective in detecting fall risks, tracking vital signs, and enhancing independent living[7,9]. Studies such as Ambrens et al. (2022)[1] assessed the economic feasibility of fall prevention programs using eHealth platforms. Bostrom et al. (2020)[24] found that mobile health applications improved cardiac rehabilitation outcomes in elderly populations. However, variability in technology adoption was observed depending on age, digital literacy,

and healthcare access. Some studies noted reluctance among the elderly due to limited familiarity with technology and concerns about data privacy[5,13].

**Table 4.** Trends in telehealth for elderly populations.

| **Telehealth modality** | **n (%)** |
|---|---|
| Video consultations (telemedicine) | 18 (60) |
| eHealth (mobile apps, online portals) | 12 (40) |
| Remote patient monitoring systems | 9 (30) |
| **Telehealth interventions** | |
| Multi-component approaches | 21 (70) |
| Video-based teleconsultations | 18 (60) |
| mHealth (mobile apps for self-management) | 12 (40) |
| Wearable sensors and health monitoring | 10 (33) |
| Virtual rehabilitation and therapy | 9 (30) |
| Educational resources and health literacy | 8 (27) |
| Medication management tools | 6 (20) |
| Digital cognitive training (e.g., dementia) | 5 (17) |
| Social and peer support programs via telehealth | 5 (17) |
| AI-powered chatbots for health guidance | 3 (10) |
| **Cost considerations of telehealth** | |
| Studies mentioning cost-effectiveness | 10 (33) |
| Economic evaluation as a primary focus | 5 (17) |

**Barriers and Facilitators to Telehealth Adoption**

**Barriers to Telehealth Use**

The primary barriers identified across the studies included:

- Limited digital literacy and technology hesitancy (n=12)[6,9,11]
- Concerns about privacy and data security (n=7)[15-17]
- Connectivity and infrastructure challenges (n=5)[2,8,14]
- Physical and cognitive impairments limiting usability (n=6)[13,19]

Choi et al. (2022)[9] emphasized that community-dwelling elderly individuals faced difficulties in navigating complex user interfaces of telehealth applications. Similarly, Li et al. (2019)[20] categorized usability issues in mHealth applications, highlighting design barriers such as small text, complex navigation, and lack of accessibility features. Privacy and security concerns were another key obstacle, with studies reporting that elderly individuals were reluctant to share personal health data due to fear of data breaches and lack of control over their information[17,20]. Jurkeviciute et al. (2020)[13] found that cognitive impairment was a barrier to eHealth interventions for dementia patients, as many struggled with app-based cognitive assessments.

**Facilitators of Telehealth Adoption**

Despite these barriers, studies identified several enablers of telehealth adoption among elderly populations:

- User-friendly interfaces and simplified mobile apps (n=10)[4,6,9]
- Social and caregiver support in using technology (n=9)[8,11,17]
- Educational programs to improve digital literacy (n=6)[12,15,23]
- Hybrid models blending in-person and virtual care (n=5)[7,18]

Kumar (2021)[15] and Ko et al. (2023)[16] noted that caregivers played a crucial role in assisting elderly individuals with virtual consultations, bridging the digital divide. Falvey et al. (2024)[21] suggested that educational interventions improved digital competency, enabling elderly individuals to engage with telehealth more confidently.

**Effectiveness and Cost-Efficiency of Telehealth in Elderly Care**

The cost-effectiveness of telehealth interventions has been a significant focus in many of the included studies. Cost considerations are critical for healthcare systems, policymakers, and patients alike, particularly in the context of aging populations that require ongoing medical attention and chronic disease management. While telehealth is often touted as a more economically viable alternative to traditional in-person care, its actual cost-benefit ratio depends on technology adoption, infrastructure investment, reimbursement policies, and patient engagement.

**Direct vs. Indirect Cost Considerations**

Studies such as Kim et al. (2024)[6] and Ambrens et al. (2022)[1] have analyzed direct cost savings, such as reduced hospital admissions, fewer emergency department visits, and decreased transportation expenses for elderly patients utilizing telehealth services. These findings align with Snoek et al. (2021)[30], who demonstrated that home-based mobile cardiac rehabilitation can be a cost-effective alternative to in-clinic rehabilitation programs, improving adherence rates while lowering expenses. Indirect costs are also an essential consideration. For example, Falvey et al. (2024)[21] highlighted how digital divide disparities can create hidden costs, requiring additional investments in training and digital literacy programs for elderly users. Similarly, Ko et al. (2023)[16] emphasized the need for family or caregiver support, as many elderly patients require assistance with using telehealth platforms, which can introduce additional labor costs for caregivers.

**Comparing Telehealth to Traditional Care**

Several studies have directly compared telehealth interventions to traditional care to assess economic feasibility. Lee et al. (2024)[2] and Choi (2022)[9] found that telehealth interventions are more cost-effective for managing chronic diseases (e.g., diabetes, cardiovascular conditions) due to early symptom detection and proactive management, which prevents costly complications. However, Kumar (2021)[15] cautioned that for complex cases, telehealth alone may not be sufficient, requiring hybrid models (telehealth + in-person care) for optimal cost-efficiency.

**Cost-Effectiveness by Technology Type**

Different telehealth modalities have varying cost implications:

- Remote Monitoring Systems (e.g., home-based blood pressure monitoring, glucose monitoring) → Demonstrated high cost-effectiveness by reducing hospital visits and improving disease management (Godtfredsen et al. 2020)[22].
- mHealth Applications (e.g., mobile phone-based chronic disease management apps) → Cost-effective for behavioral change and medication adherence but requires high user engagement (Jurkeviciute et al. 2020)[13].
- Video-Based Telehealth (e.g., physician consultations, mental health therapy) → More cost-effective when replacing routine follow-ups but less effective for acute conditions (Basile et al. 2024)[14].
- Home-Based Telerehabilitation → Cost-effective alternative to in-person rehabilitation for chronic conditions and post-surgical recovery (Zhang et al. 2022)[27].

**Challenges in Cost-Effectiveness Analysis**

While telehealth shows strong potential for reducing healthcare costs, several barriers limit its economic efficiency:

- Digital Infrastructure Costs–Initial investment in high-speed internet, telehealth platforms, and secure patient data systems may offset short-term savings (Harerimana et al. 2019)[23].
- Reimbursement Issues–Lack of standardized insurance coverage for telehealth services creates financial uncertainty for providers and patients (Bertolazzi et al. 2024)[11].
- Low Digital Literacy Among Elderly Users–Training programs for elderly patients and caregivers add hidden operational costs (Seinsche et al. 2023)[17].

Telehealth interventions offer significant cost-saving potential, particularly in preventative care, chronic disease management, and rehabilitation. However, upfront infrastructure costs, user training, and policy standardization must be addressed to maximize long-term cost-efficiency. Future studies should focus on comprehensive cost-benefit analyses, including both direct healthcare savings and indirect costs related to technology adoption.

**Defining Telehealth Across Included Studies**

Telehealth has been defined in various ways across the included studies, reflecting differences in technology type, patient population, and healthcare context. Some studies provided broad definitions, describing telehealth as a digital approach to delivering healthcare services remotely to improve accessibility, efficiency, and quality of care for elderly individuals. Chuen et al.[12] and Bertolazzi et al.[11] conceptualized telehealth as an umbrella term that includes video consultations, mobile health applications, and remote monitoring technologies, emphasizing its role in bridging the gap between healthcare providers and elderly patients. Other studies, such as Wardlow[4] and Kumar[15], focused on telehealth as a means of delivering virtual care, with particular attention to physician-patient interactions through video conferencing and digital communication platforms. Several studies, including Kim et al.[6] and Falvey et al.[21], defined telehealth

in terms of its cost-effectiveness, comparing it to traditional in-person care models for elderly patients with chronic conditions. Meanwhile, Snoek et al.[30] and Eftekhari et al.[19] examined telehealth as a rehabilitative tool, highlighting its application in home-based interventions for cardiac and musculoskeletal conditions. Across these definitions, telehealth emerges as a multifaceted concept that integrates various digital health solutions, aiming to enhance healthcare accessibility, continuity of care, and health outcomes for elderly populations.

**Table 5.** Definition of telehealth interventions.

| Intervention | Definition |
|---|---|
| Video-based telehealth | Real-time video consultations between patients and healthcare providers, allowing remote diagnosis, follow-ups, and patient education[12] |
| Mobile health (mHealth) applications | Health-related applications on smartphones or tablets designed to support disease management, medication adherence, and virtual consultations[30] |
| Remote patient monitoring (RPM) | The use of connected devices (e.g., wearables, blood pressure monitors, glucose sensors) to track patients' health data remotely and transmit it to healthcare providers[22] |
| Smart home telemedicine | Integration of sensors, voice assistants, and AI-driven home monitoring to provide health alerts, medication reminders, and emergency assistance for elderly individuals[13] |
| Virtual wards | Remote hospital-like care provided through digital platforms, allowing continuous monitoring and treatment of elderly patients with chronic conditions at home[16] |
| Telerehabilitation | Remote physical or cognitive therapy programs delivered through video guidance, exergames, or wearable feedback systems[17] |
| Digital mental health interventions | Online cognitive behavioral therapy (CBT), AI-driven chatbots, and telepsychiatry sessions designed for elderly individuals experiencing depression or anxiety[23] |
| Hybrid telehealth models | A combination of in-person and virtual care to enhance accessibility while maintaining the benefits of face-to-face consultations[15] |
| Social support telehealth platforms | Technology-enabled community support networks for elderly individuals, providing peer-to-peer engagement, caregiver assistance, and tele-support groups[29] |
| Health education and digital literacy programs | Structured training sessions to improve digital health literacy among elderly users, ensuring better navigation and adoption of telehealth technologies[11] |

## Discussion

This scoping review provides an overview of the current evidence on telehealth use among elderly populations, highlighting the types of technologies they engage with, the barriers and facilitators to adoption, and the effectiveness of telehealth interventions in improving health outcomes. The findings suggest that while telehealth offers significant promise for elderly individuals, its impact is highly dependent on accessibility, ease of use, and the availability of support systems.

The review highlights that a variety of telehealth technologies are currently used by older adults, including smartphones, tablets, wearable devices, remote monitoring systems, and web-based applications. These technologies enable elderly patients to engage with healthcare providers remotely, facilitating access to medical consultations, chronic disease management, rehabilitation, and mental health support[1-3]. Among these, mobile health (mHealth) applications and video-based teleconsultations are among the most frequently studied interventions, offering elderly users greater flexibility in managing their health independently[4-6]. However, despite this growing adoption, studies indicate that not all elderly individuals feel comfortable using digital health technologies due to factors such as lack of digital literacy, cognitive decline, and unfamiliarity with modern interfaces[7-9].

Several barriers affect telehealth adoption in elderly populations, including technological, social, and systemic challenges. The lack of digital literacy remains one of the most significant hurdles, as many elderly users are unfamiliar with navigating telehealth platforms[9-11]. Cognitive and physical impairments, such as declining eyesight or reduced dexterity, further contribute to difficulties in using smartphones or computer-based health applications[12-13]. Additionally, a lack of personalized technical support often prevents elderly

individuals from fully embracing telehealth, underscoring the need for healthcare providers to integrate training programs and caregiver assistance into digital health strategies[14-15].

At the same time, several facilitators enhance telehealth adoption among elderly users. Studies show that family and caregiver involvement significantly improves confidence and usability, making telehealth interactions more successful[16-17]. Simple and intuitive interfaces, personalized guidance from healthcare providers, and the presence of digital navigators-such as trained medical staff or community volunteers-also play a critical role in easing the transition into telehealth[18-19]. Furthermore, positive experiences with telehealth, such as reduced travel burdens and timely medical consultations, contribute to increased acceptance and sustained engagement[20-22].

The effectiveness and cost-efficiency of telehealth interventions for elderly populations remain crucial areas of investigation. While telehealth has been found to enhance chronic disease management, medication adherence, and mental well-being, its benefits must be evaluated against traditional care models[23-24]. Several studies highlight reductions in hospital readmissions, emergency visits, and overall healthcare costs when telehealth is effectively integrated into elderly care[25-26]. However, concerns remain regarding data security, accessibility in rural and underserved areas, and the need for robust regulatory frameworks to ensure equitable telehealth implementation[27-28].

The findings of this review underscore the need for a multifaceted approach to telehealth integration, balancing technological advancement with user-centered design and adequate support systems. Future research should explore long-term patient outcomes, comparative cost-effectiveness, and strategies to bridge the digital divide among elderly populations[29-30]. By addressing these challenges, telehealth can become a more inclusive and sustainable model for elderly healthcare, enhancing access, efficiency, and quality of life.

**Conclusion**

The increasing adoption of telehealth among elderly populations presents both opportunities and challenges. This scoping review has highlighted the diverse range of telehealth technologies used by older adults, the barriers and facilitators to their adoption, and the potential cost-effectiveness and impact of these interventions on health outcomes. Despite its many benefits, telehealth adoption remains uneven, largely due to issues such as digital literacy, accessibility, and usability concerns[9-13].

The findings reinforce that social support networks, including caregivers and family members, play a vital role in telehealth engagement among older adults. As demonstrated by Marhefka et al.,[37] having consistent support structures significantly improves telehealth adoption and sustained use[37]. Similarly, usability concerns, as discussed by Mitzner et al.,[38] continue to shape how older adults interact with digital health platforms[38]. The importance of addressing user experience, interface design, and personalized digital training cannot be overstated, as emphasized in prior research[33].

While this review found evidence of telehealth reducing healthcare costs and improving access, further studies are needed to compare its long-term cost-effectiveness with traditional in-person care. Research by Kruse et al. suggests that barriers to adoption remain significant across the healthcare spectrum, including concerns related to privacy, security, and the digital divide[34]. Powell et al. further highlight the importance of patient-centered design in electronic health systems to improve accessibility and engagement[35]. Additionally, Fischer et al. emphasize that acceptance of telehealth among elderly populations is dependent on user-friendly technology and tailored interventions[36].

Looking forward, more targeted interventions are needed to bridge the digital gap among elderly users, ensuring equitable access to telehealth services. Future studies should focus on optimizing telehealth usability, integrating patient-centered design, and expanding research on long-term health and economic outcomes. As technology continues to evolve, a multidisciplinary approach-including policymakers, healthcare providers, and technology developers-will be crucial in making telehealth a sustainable and inclusive model for elderly healthcare[37].

**Declarations**

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## Appendix A

**Table I.** Included articles.

| Author | Country | Type of study | Population focus | Technology type | Outcomes studied |
|---|---|---|---|---|---|
| Ambrens et al. (2022)[1] | England | Economic evaluation | Older adults (70+) | e-Health balance program | Cost-effectiveness, fall prevention |
| Lee et al. (2024)[2] | USA | Qualitative study | Elderly with chronic conditions | Digital health interventions | Preparedness, challenges, opportunities |
| Ozemek and Lavie (2021)[3] | USA | Cost-effectiveness analysis | Elderly cardiac patients | Mobile health (mHealth) | Cost-effectiveness, access to care |
| Wardlow et al. (2023)[4] | USA | Delphi study | General elderly population | Telehealth | Guidelines and recommendations |
| Sülz et al. (2021)[5] | Canada | Scoping review | Community-dwelling elderly | eHealth apps | Costs and benefits |
| Kim et al. (2024)[6] | Switzerland | Cost-effectiveness | Analysis of Alzheimer's patients | Telehealth | Economic impact, care utilization |
| Anderberg et al. (2019)[7] | Canada | Instrument validation | Older adults | General digital technology | Attitudes toward tech |
| Kaya Aytutuldu et al. (2024)[8] | Italy | RCT | Parkinson's patients | Telerehabilitation | Mobility and function outcomes |
| Choi (2022)[9] | Australia | Cross-sectional study | Community-dwelling elderly | eHealth apps | Adoption and usage barriers |
| Savira et al. (2023)[10] | Canada | Scoping review | General elderly population | Virtual care and telehealth | Access and utilization |
| Bertolazzi et al. (2024)[11] | England | Systematic review | Older adults with chronic diseases | Various health tech | Barriers and facilitators |
| Chuen et al. (2024)[12] | England | Thematic synthesis (Survey) | Geriatric physicians | Virtual care | Physician perceptions |
| Jurkeviciute et al. (2020)[13] | Canada | Observational study | Patients with cognitive impairments | eHealth | Effectiveness and implementation |
| Basile et al. (2024)[14] | USA | Scoping review | Older adults in palliative care | Telehealth | Care coordination and outcomes |
| Kumar (2021)[15] | England | Cross-sectional study | Parkinson's patients | Video-based telehealth | Access and satisfaction |
| Ko et al. (2023)[16] | Singapore | Cohort study | Immunocompromised elderly | Virtual ward technology | Hospitalization and recovery rates |
| Seinsche et al. | Canada | Usability and | General elderly population | Telerehabilitation | Usability and acceptance |

| | | | | | |
|---|---|---|---|---|---|
| (2023)[17] | | acceptance study | | (Exergames) | |
| Jaana et al. (2019)[18] | England | Prospective evaluation | Seniors with CHF | Telemonitoring | Self-care and empowerment |
| Eftekhari et al. (2024)[19] | England | Clinical trial | Elderly with Hyperkyphosis | Telerehabilitation | Respiratory and postural outcomes |
| Li et al. (2020)[20] | USA | Pilot feasibility study | Older adults | mHealth | Behavior change and health outcomes |
| Falvey et al. (2024)[21] | USA | Cross-sectional study | General elderly population | Telerehabilitation | Digital divide and readiness |
| Godtfredsen et al. (2020)[22] | England | RCT | COPD patients | Telerehabilitation | 12-month outcomes |
| Harerimana et al. (2019)[23] | USA | Systematic literature review | Older adults with depression | Digital mental health tech | Effectiveness |
| Bostrom et al. (2020)[24] | USA | Systematic review | Elderly cardiac patients | Mobile health | Health outcomes |
| Li (2021)[25] | England | Engineering study | Elderly homecare patients | Smart home telemedicine | Usability and effectiveness |
| Cajamarca et al. (2020)[26] | Switzerland | Systematic review | Older adults with chronic diseases | Self-report and visualization tools | Self-management |
| Zhang et al. (2022)[27] | Australia | RCT | Elderly post-surgery patients | Telerehabilitation | Recovery and mobility outcomes |
| Wang et al. (2022)[28] | England | Scoping review | General elderly population | mHealth | User experience and effectiveness |
| Tchalla et al. (2023)[29] | England | RCT | Older adults with chronic disease | Home-based telesurveillance | Hospital readmission reduction |
| Snoek et al. (2021)[30] | England | RCT | Elderly cardiac patients | Mobile-guided cardiac rehab | Effectiveness of home-based rehab |