



Telehealth use and Models for Geriatric Patients Since the COVID-19 Pandemic: A Systematic Review

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Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

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ABSTRACT

Introduction: The gaps in geriatric care provision has become prominent with the onset of the coronavirus disease 2019 (COVID-19 pandemic). Despite the potential capability of the telehealth model to address the specific needs of geriatric patients, only a few geriatric guidelines have

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focused on the telehealth model during the pandemic. The following systematic review explores the current evidence of telehealth use and applications in geriatric care, which emerged post the COVID-19 pandemic.

Methods: Three databases, including PubMed, Cochrane, and Google Scholar, were searched by three independent reviewers to identify relevant studies.

Results: Seven studies were included in this review; two focused on the effectiveness of telehealth, three focused on the experiences of patients and providers, and two focused on the use of telehealth. Telehealth did not underperform compared to traditional care models in terms of self-efficacy, patient convenience, reduction in deferred care, increased efficiency of healthcare delivery, reduced travel issues, and improved health education. However, common challenges were disparities in access in favor of urban, cognitively sound, and younger geriatric patients.

Conclusion: The current systematic review reported the latest evidence on telehealth use and access across geriatric care since the onset of the COVID-19 pandemic. Telemedicine is gaining support from literature for being non-inferior to traditional healthcare methods, as observed in our findings.

Keywords: Geriatric; elderly; telehealth; telemedicine; COVID-19; model; strengths.

1. INTRODUCTION

With the rise in the elderly population, their complex needs fall under geriatric medicine [1]. Elderly populations were vulnerable to severe morbidity and higher mortality after the coronavirus disease 2019 (COVID-19) pandemic was declared [2]. High-income countries (HICs) have a higher proportion of established telemedicine programs, likely due to already-established information and communication technology (ICT) systems [3]. The lowest proportion of established telemedicine programs is in the African and Eastern Mediterranean regions [4,5]. While telehealth access and use have been expanded across 25% of the countries globally, older populations are less likely to use telehealth due to barriers to technology and internet use compared to younger adults [6]. These barriers may include access to the internet and devices, challenges in design, and privacy concerns [7]. Telehealth use is increasing in the United States, particularly [8]. With the uptake of telehealth across the healthcare sector, challenges faced by older populations during the COVID-19 pandemic can be addressed, such as the lack of planned telehealth geriatric care delivery in the crisis [9].

Telehealth is the provision of healthcare remotely which may include screening, diagnosis, provision of consultations, treatment, education, rehabilitation, and monitoring [10]. Telemedicine is broadly defined into three categories, i) store-and-forward telemedicine, ii) remote patient monitoring, and iii) real-time telemedicine [11,12]. Telehealth is often used interchangeably with telemedicine, but it includes non-clinical health-

related services, which may be important to geriatric care [13]. The store-and-forward category does not directly have physician-patient interaction such that patient information may be reviewed at a convenient time available through electronic media to the healthcare providers [14]. Remote patient monitoring provides for the use of technological devices, the data of which may be available to healthcare providers and applicable in chronic conditions, e.g., diabetes and heart disease(s) [15]. Real-time services include interaction between the healthcare provider and the patient, e.g., videoconferencing, which addresses the needs during the virtual visit [16]. The American Geriatrics Society (AGS) released recommendations to address geriatric care in different settings such as nursing homes (NHS) and long-term care facilities (LTCFs) during the COVID-19 pandemic [17]. Despite the potential capability of the telehealth model to address the specific needs of geriatric patients, no guidelines have focused on the telehealth model [18–20].

The following systematic review explores the current evidence of telehealth use and applications in geriatric care since the onset of the COVID-19 pandemic.

2. METHODS

2.1 Search Strategy and Selection

We searched databases including PubMed, Scopus, and Embase from inception till August 1, 2022. A combination of Medical Subject Headings (MESH) terms was run through Boolean operators, including "geriatric," "older,"

“elderly,” “patients,” and “COVID-19.” Two investigators screened the studies for inclusion in the study. An umbrella review was also conducted to identify the studies from reference lists of all potential studies. First, the two investigators conducted a screening of the title and abstract. If there were discrepancies between the two investigators, a third investigator solved these with consensus. Second, the full texts were reviewed for eligibility against the selection criteria. There was no restriction on the search, such as time and language. Duplicates were removed using the software Endnote X9.

2.2 Selection Criteria and Endpoint (s)

Inclusion Criteria: Randomized controlled trials (RCTs), observational cohort studies (OCS), and systematic literature synthesis were considered. Only studies that reported telemedicine use and models in older patients aged > 65 years were considered. We considered studies conducted in the last three years, from 2020 to 2022.

Exclusion Criteria: Studies that included patients aged < 65 years and did not consider the telehealth medicine model were excluded.

2.3 Data Management and Analysis

Two investigators extracted data from the finalized studies using Excel's custom datasheet. The variables were pre-tabulated based on the consensus from three investigators and included author, year, country, study type, study duration, study population, sample size, objective, and outcome measures. All three reviewers utilized the Cochrane Risk of Bias (ROB) tool, and a qualitative analysis was conducted.

3. RESULTS

A step-by-step approach to the search strategy was reported as per the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) flow diagram. The overall search process is summarized in Fig. 1. In the first phase, 357 records were identified through different databases. After removing duplicates, 298 papers were screened for potential eligibility by titles and abstracts. In the second phase, 281 records were excluded, and 17 papers were screened for full-text eligibility. In the final stage, seven studies were included in the qualitative analysis.

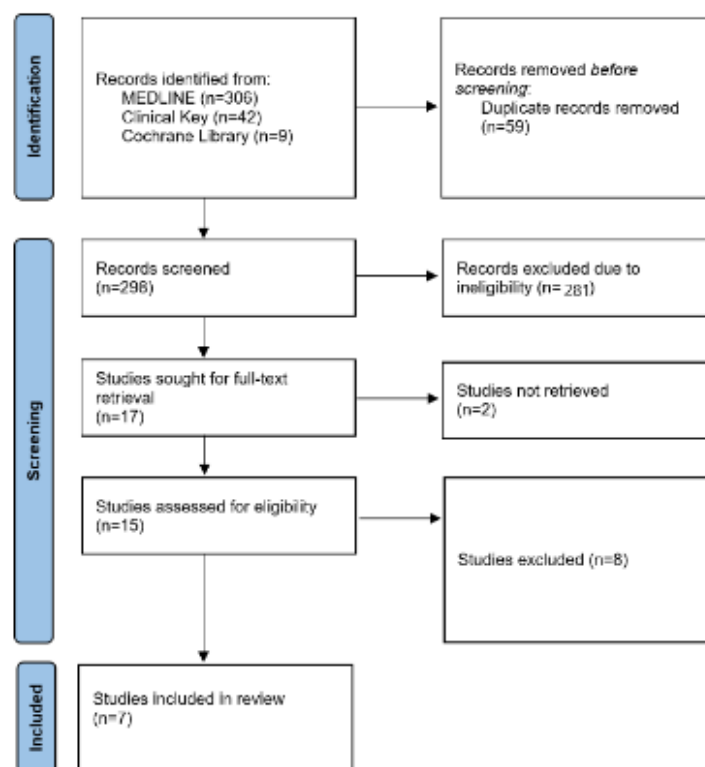


Fig. 1. PRISMA flow diagram for this study

Table 1. Key characteristics of the included studies

Author, year	Country	Study type	Study duration	Study population	Sample size	Objective	Outcome measures	Results
Wong et al. [21],	Hong Kong	Randomized Clinical Trial	3 months	Older adults	68	Determine effectiveness of a telecare case management program for homebound older adults	Primary: self-efficacy before and after the intervention at 3 months; Secondary: Differences in basic and instrumental activities of daily living, depression, and use of healthcare services	Self-efficacy did not differ between the telecare group and control group; Telecare group performed better for medication adherence and quality of life
Kaur et al. [23],	United States	Observational	5 months	Geriatric population with Alzheimer's	NS	Assess the patient and provider satisfaction with the hybrid model of outpatient memory care	Primary: Patient and provider satisfaction; Secondary: feasibility of full remote monitoring of patients	Patient and provider satisfaction levels were comparable when comparing partially remote monitoring to conventional monitoring; the model maintains patient satisfaction and minimizes the risk of infection
Cleveland Clinic [22],	United States	Observational	12 months	The geriatric population who are victims of abuse/exploitation or suffer from cognitive impairment	56	To assess the effectiveness of the hybrid telehealth model in geriatric patients	Primary: Prevention of elder abuse, Secondary: Physical and mental health needs of geriatric patients	Reduced risk of elder abuse; virtual appointment prior to an in-person visit reduced reluctance from patients, addressed transportation issues, and encouraged reconnection of patients with primary care providers
Ladin et al. [24],	United States	Qualitative	5 months	Clinicians, geriatric patients, and care partners	60 (clinicians, n=19, patients, n=30, care partners, n=11)	To assess the commonalities and differences in opinions and experiences of telehealth by patients through self-reported race and ethnicity	Primary: Gaps in telehealth experiences of geriatric patients with chronic kidney disease (CKD), their care partners, and nephrologists	Overarching themes in the qualitative analysis were inconsistent quality of care, patient experience and engagement; loss of connection and mistrust, and disparities in accessing telehealth
Goldberg et al. [25],	United States	Qualitative	2 months	Physicians	48 (geriatricians, n=18, primary care, n=15, emergency, n=15)	To understand the experiences of frontline physicians caring for older adults via telehealth	Primary: Themes emerging from the qualitative synthesis	48 frontline physicians identified key benefits including reduction in deferred care resulting in timely care, increased efficiency of healthcare delivery by physicians, better communication among healthcare workers and patients, reduced travel costs incurred by patients, and better healthcare outreach and education. The key challenges identified were inequitable access for urban, younger, and cognitively sound patients

Author, year	Country	Study type	Study duration	Study population	Sample size	Objective	Outcome measures	Results
Doraiswamy et al. [27],	Qatar	Systemic synthesis	8 months	Geriatric population	79 articles	To summarize telehealth use in geriatric care	Primary: Strengths, weaknesses, opportunities, and threats	Strengths included convenience and affordability, whereas weaknesses included the inability to care for the needs of older people with special physical and cognitive limitation
Der-Martirosian et al. 2022	United States	Observational	24 months	Patients, healthcare providers, sites	64,362 patients 12-months before COVID-19 onset and 48,729 patients 12-months after COVID-19 onset	To assess the use of telehealth 12 months during versus 12 months before the COVID-19 pandemic	Primary: Use of any telehealth; Secondary: Use of video-based care versus telephone	The use of telehealth increased from 13.9 to 63.1%; the use of video-based monitoring increased from 0.3% to 11.3% in the 12 months before (n=64,362) and 12 months after (n=48,729) the pandemic onset

The key characteristics of the studies included in the review are summarized in Table 1. Overall, seven studies were included in this review; two focused on the effectiveness of telehealth [21,22], three focused on the experiences of patients and providers [23–25], and two focused on the use of telehealth [26,27]. Wong et al. [21] conducted a pilot randomized controlled trial whereby they randomized 68 patients to the control arm (n=34) and the intervention arm (n=34). The intervention arm received weekly case management from a nurse through telephonic communication and video messages covering self-care. The control arm received monthly social telephone calls. The outcome was to assess patients' self-efficacy in either arm three months after initiation of the program. Kaur et al. [23] conducted a comparative analysis of patient and provider satisfaction in an Alzheimer's clinic. The patients were partially remote-monitored, whereby they were placed in a separate room for their appointment, and only when indicated, direct short contact made for a complete physical examination. Cleveland Clinic [22], in collaboration with Cuyahoga County Adult Protective Services (APS), identified 56 geriatric patients who were victims of abuse/exploration or had cognitive/functional impairment and followed these patients for 12 months through a hybrid telehealth model. In this model, patients were scheduled for a virtual visit followed by a visit to the patient's house with the help of a nurse; this was followed by necessary next steps such as continued monitoring or moving the patient to supervised settings.

Ladin et al. [24] interviewed 60 individuals, including 19 nephrologists, 30 patients, and 11 care partners, to identify their telehealth experiences when managing patients with chronic kidney disease (CKD) in the United States. Goldberg et al. [25] recruited 48 physicians from different specialties, including geriatrics (n=18), primary care (n=15), and emergency (n=15) physicians in the United States. The study was a qualitative analysis of transcriptions of semi-structured interviews conducted across two months. Doraiswamy et al. [27] conducted a scoping review and evidence synthesis using a systematic review of research databases between January and August 2020. The authors identified 79 articles that addressed telehealth use in geriatric care. Der-Martirosian et al. [26] conducted a comparative analysis of telehealth use 12 months before and 12 months after the onset of the COVID-19 pandemic. The focus was on the use of any telemedicine and

the use of video-based versus telephonic communication among a total of 54,730 primary care visits, 64,362 patients before and 247,849 patients after the onset, in the 24-month study period.

Key outcome measures are summarized in Table 1. Wong et al. [21] determined the effectiveness of a telecare case management program within three months for older adults with a mean age of 71.8 (SD: 6.1). The primary outcome measure, self-efficacy, did not differ between the telecare group and control group. The secondary outcome measures were significantly better in the telecare group for medication adherence and quality of life. Kaur et al. [23] found that patient and provider satisfaction levels were comparable when comparing partially remote monitoring to conventional monitoring of geriatric patients with Alzheimer's. The authors suggested the application of full remote monitoring through normalizing remote monitoring in this hybrid model of telemedicine. Cleveland Clinic [22] found that of the 56 patients who were observed virtually over the 12 months, 41 (74%) started receiving primary care, 30 (53%) were assigned a guardian, 31 (55%) stayed at their house, and 25 (45%) were moved to a supervised setting. Regarding patient well-being, 41 (74%) began receiving primary medical care after enrolling in the telehealth program. The study found that the virtual appointment before an in-person visit improved reluctance from patients, addressed transportation issues, encouraged reconnection of patients with primary care providers, and reduced the risk of elder abuse.

Ladin et al. [24] thematically analyzed the perceptions of 60 patients, care partners, and nephrologists regarding the benefits and drawbacks of telehealth compared to traditional visits. There were a total of 19 (32%) clinicians, 30 (50%) patients, and 11 (18%) with care partners. Among the healthcare workers, 16 clinicians (84%) were nephrologists, 17 patient participants (43%) were non-Hispanic Black, and 38 (67%) were women. Overarching themes in the qualitative analysis were i) inconsistent quality of care, ii) patient experience and engagement, iii) loss of connection and mistrust, such as when breaking bad news, and iv) disparities in accessing telehealth. In terms of the quality of care, clinical effectiveness and limitations of physical examinations were identified as key themes. The next key theme was patient experience and engagement which had advantages including improved convenience

and care partner engagement. Mistrust was another theme that was commonly observed which was due to the limitations of the virtual settings and its negative impact on the trust of the patients. Another prominent theme was the mistrust and disparities in telehealthcare which is potentially due to widening disparities in access and the lack of a proper patient-clinician relationship.

Goldberg et al. [25] identified the benefits and challenges of telehealth as identified by 48 frontline physicians. The benefits included i) reduction in deferred care resulting in timely care, ii) increased efficiency of healthcare delivery by physicians, iii) better communication among healthcare workers and patients, iv) reduced travel costs incurred by patients, and v) better healthcare outreach and education. The challenges include inequitable access for urban, younger, and cognitively sound patients. Doraiswamy et al. [27] identified evidence of older people's prevention, cure, and rehabilitative services. Strengths included convenience and affordability, whereas weaknesses included the inability to care for the needs of older people with special physical and cognitive limitations. Challenges included i) greater focus on curative services and ii) greater availability of telehealth services in high-income countries. Der-Martirosian et al. found that the use of telehealth increased from 13.9 to 63.1%, and the use of video-based monitoring increased from 0.3% to 11.3% in the 12 months before (n=64,362) and 12 months after (n=48,729) the pandemic onset.

4. DISCUSSION

In this systematic review of 7 studies, we reviewed the evidence about telehealth use for the provision of geriatric care during the COVID-19 pandemic. We found that two studies focused on different hybrid telehealth [21,22], demonstrating measurable benefits in geriatric patients. Both these studies were conducted in high-income countries. Most of the studies included in this review were from the United States. A wide range of limitations and challenges of telemedicine were self-reported by physicians and patients across the studies, such as inequitable access in and across high-income countries, a greater focus on curative services, inconsistent quality of care, compromised quality of care, loss of connection, and mistrust. Similarly, strengths of telemedicine were also identified in the studies, including convenience, reduced travel costs, increased efficiency and

use of healthcare resources, better communication among healthcare workers and patients, and improved uptake of primary care services.

Our findings have implications for the global status of geriatric care. Since the onset of the COVID-19 pandemic, geriatric care has been identified as vulnerable to both direct and indirect effects of the outbreak [28]. The hospital-centered model has failed to address the complexities of the aging society [29]. The unique needs of geriatric patients in different settings, e.g., acute care units, LTCFs, NHS, and primary care, are met with numerous challenges [30]. While the COVID-19 pandemic was unprecedented, it is critical when moving forward to develop new care models that consider the geriatric syndromes such as delirium, malnutrition, communication impairment, and social isolation [31]. Integration of geriatric care with telemedicine models may be beneficial and can account for the lack of vital community services through remote monitoring of geriatric patients [32]. It is noteworthy that geriatric patients have been affected by the pandemic as they have multidimensional needs that are not entirely clinical e.g., psychological, cultural, and economic [33]. Thus, it is crucial to understand the needs of geriatric patients and facilitate their care through multidisciplinary action [34]. This study's strength is that most of the data, including an RCT, were observational. Such data is not based on theoretical insight and is focused on real-world concerns of geriatric patients. Also, all studies indicated non-inferiority of the telehealth model of care, which is noteworthy and suggests that the future of telemedicine in geriatric care can be explored.

5. LIMITATIONS

There are certain limitations to this study. The outcome measures were variable across the included studies. The models of telehealthcare were inconsistent across the studies. The findings of this study are limited to high-income countries (HICs), given the lack of representative data in other countries.

6. CONCLUSION

The current systematic review reported the latest evidence on telehealth use and access across geriatric care since the onset of the COVID-19 pandemic. In this review, models of telehealth delivery, strengths, and weaknesses were

identified across seven studies. Overall, telemedicine is gaining support from literature for being non-inferior to traditional healthcare methods, as observed in our findings.

CONSENT AND ETHICAL APPROVAL

It is not applicable.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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