Telerehabilitation for Geriatrics

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INTRODUCTION

Advancements in medical science and technology, along with global increases in life expectancy, are changing the way health care services are delivered to the aging society.1 Telerehabilitation is a specific area of telehealth that refers to clinical rehabilitation services involving evaluation, diagnosis, and treatment.2 It is an attractive option for older adults who may have multiple comorbidities and challenges in commuting to clinicians’ offices. The coronavirus disease 2019 (Covid-19) pandemic required clinicians to modify the way rehabilitation care is delivered to patients, particularly to the geriatric population, because of their increased risk of developing serious illness. Limited access to in-person services and the concern about potential exposure to severe acute respiratory syndrome coronavirus-2 (SARS-CoV-2) also accelerated the acceptance of telerehabilitation by many patients. In addition, recent changes in rules,

KEYWORDS
• Telehealth • Social isolation • Quality of life • Patient and caregiver centeredness

KEY POINTS
• Telehealth use was accelerated by the coronavirus disease 2019 pandemic and became an essential part of the rehabilitation service.
• Telehealth has a great potential in alleviating social isolation as well as addressing the medical needs of older individuals.
• Challenges to effective and efficient implementation include willingness to adapt to the technology by older adults, reliable Internet connections, identifying the area where telehealth is most effective, and evaluating the patients and administrative outcomes of telehealth interventions.
regulation, and insurance reimbursement allowed clinicians to use telerehabilitation more broadly than it has ever been used before.

The convergence of medicine and informatics will inevitably lead to the development of new interdisciplinary research models and products for the care of older adults. The widespread use of telerehabilitation provides an opportunity for clinical researchers to examine its outcomes and efficacy. This article reviews the scope, need, and implementation of telehealth and telerehabilitation in the aging population from the perspective of both clinicians, patients, and caregivers.

AGING POPULATION IN THE UNITED STATES

According to the US Census Bureau, the population of individuals aged 65 years and older is expected to double from 43.1 million in 2012 to 83.7 million in 2050. The proportion of older adults has been steadily increasing from 9.8% in 1970 to 13% in 2010 and is estimated to be more than 20% of the US population by 2030. The proportion of the oldest-old (aged ≥85 years) is also expected to increase dramatically, from 1.9% of the US population in 2012 to 4.5% in 2050. The potential burden of the dependent older population on the working-age population is measured by the old-age dependency ratio [(population aged ≥65 years /population 18–64 years) × 100]. The old-age dependency ratio is projected to increase from 21 in 2010 to more than 30 by 2030. Although older women are projected to continue to outlive men, life expectancy is expected to increase more for men than for women. This changing sex ratio has implications for the types of care that are available to the older population. Both men and women are expected to survive to older ages, spouses may be able to care for one another longer, and there could be an increased demand for assisted-care settings for couples. The older population in the United States will also become more racially and ethnically diverse because the proportion of minority individuals is projected to increase from 20.7% in 2010 to 39.1% in 2050. From a global perspective, although the percentage of older individuals in the United States is not the highest, it has the largest number of people aged 65 years and older among the developed countries. The projected growth of the older population in the United States poses major challenges to policy makers and programs (eg, Medicare) and will affect families, businesses, and health care providers.

POTENTIAL ROLE OF TELEHEALTH AND TELEREHABILITATION FOR OLDER ADULTS

One of the main challenges in the aging population is a high prevalence of chronic diseases and need for medical care. Telehealth facilitates a broad scope of practice, which includes monitoring and assessment of patients and delivery of many interventions remotely (Box 1). Patients in the United States spend an average of 2 hours, including travel and wait time, for a 20-minute in-person office visit. Telehealth leads to improved quality of health care by facilitating compliance with home programs, with patient outcomes compatible with face-to-face service. Telehealth can be beneficial to both patients and caregivers, especially during transitions between different health care settings. Care transition is a high-risk period for care quality and patient safety, specifically for older adults with complex medical needs who often undergo multiple transitions. Transitions are plagued with discontinuity and a lack of coordination. Gaps in communication and timely delivery of information are known barriers for interprofessional teams working along the continuum of care. Strategies to improve transition of care can include telehealth to enhance communication and education of the patient and family caregivers to ensure that there are no gaps in information sharing and understanding.
Preventive home visitation programs are effective for older adults in preventing further functional decline and reducing the risk of nursing home admissions when multiple follow-up home visits are provided and the individuals have a lower risk for death. The limitations of home rehabilitation programs include the cost of travel, and the absence of health care personnel with detailed medical knowledge of the patient’s complex medical conditions. Several studies have shown the effectiveness of telerehabilitation in older adult populations in optimizing the management of chronic diseases or transition of care at home after being discharged from the hospital.

Telerehabilitation is an area in which the focus of care is on rehabilitation of individuals with cognitive, psychosocial, and/or physical impairments. Telerehabilitation has number of advantages, including reduced travel and the time and costs associated with it, longer consultation duration, and a potential increase in the pool of specialists who are available for consultation.

Although recent advances in technology have been rapidly adopted by health care to enable telerehabilitation, there is still a need to define what is delivered, how it is delivered, to whom, by whom, and how effective it is. The technology must facilitate accessibility and compliance, and also be adaptable and engaging to optimize use. In addition, without proactive efforts to ensure equity, current implementation of telehealth and telerehabilitation may increase disparities in health care access for vulnerable older populations with limited technology literacy or access.

### CONSIDERATIONS IN IMPLEMENTING TELEHEALTH AND TELEREHABILITATION IN OLDER ADULTS

Potential advantages and disadvantages of telehealth are summarized in Box 2. Despite the advantages of telehealth mentioned earlier, older adults are especially challenged in using and adopting telehealth technology widely. A large-scale study of 1.1 million patients who completed 2.2 million care visits was conducted to identify the characteristics of individuals who chose telehealth versus in-person visits. Patients aged 65 years and older were 2.4 times less likely to choose a video visit rather than an in-person office visit compared with young adults.

One of the greatest challenges in using telerehabilitation for older adults is limited digital literacy. Only 55% to 60% of Americans aged 65 years or older own a smartphone or have home Internet access. Only 60% of this population is able to send an email or search a Web site. Virtual health visits can be especially challenging for older patients with cognitive impairment, language barriers, or lack of access to...
technology. Guidance is also needed in converting a designated area at home into a distraction-free examination room for appointments or a therapy gym.

Several factors relate to the acceptance of telehealth in older adults. Performance expectancy, effort expectancy, and perceived privacy and security are direct predictors of their intention to use videoconferencing. Self-efficacy plays a role in their intention to use, as well as their actual use, of technology. Both self-efficacy and digital literacy play a major role in older adults’ capacity to use digital technology. In another study about perceptions regarding telehealth, older adults expressed concern about access to their personal health data by unauthorized persons and their need to be able to control authorization for third-party access and by close family members. Family caregivers are the primary source of help for older adults in using telehealth platforms. Older adults’ reluctance to allow family members to access their health records combined with their suboptimal ability to use the technology were found to be the main contributors to their anxiety about using telehealth services. This information underscores the importance of technical support to facilitate telehealth.

Key actions recommended for clinicians and health systems to ensure equitable access to telehealth include (1) identify potential disparities in access, (2) mitigate digital literacy and resource barriers by education and training to acquire a digital skill set and information about low-cost broadband Internet in their area, and (3) health system leadership buy-in and advocacy for policies and infrastructure to facilitate equitable telehealth access.

Frontline Clinicians’ Perception of Telehealth and Telerehabilitation

It has been shown that the perception of clinicians on telehealth greatly influences the belief of patients in the value of telehealth. A recent study surveyed physical therapists on telerehabilitation care of individuals with osteoarthritis, and suggested that telerehabilitation can (1) protect patient privacy (>75% agreed/strongly agreed), (2) save patients’ time (76% agreed/strongly agreed), and (3) increase convenience for patients (80% agreed/strongly agreed). The survey also revealed that lack of physical contact, low confidence in using Internet video technologies, and inexperience with telerehabilitation were barriers. These factors were significantly associated with reduced interest in delivering telephone and/or video-based services. Providers often struggle with platform connectivity, provider-directed patient self-examination, and establishing an emotional connection with patients. Because hands-on techniques cannot be implemented, clinicians should reevaluate their practice patterns and reallocate their time, resources, and focus. Only 54% of physical therapists

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<th>Potential advantages of telerehabilitation in geriatric populations</th>
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<tr>
<td>- Enhanced accessibility in older adults with limited transportation</td>
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<td>- Avoid potential exposure to SARS-CoV-2 virus</td>
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<td>- Avoid the hassle, time, and cost associated with transportation</td>
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<td>Potential disadvantages of telerehabilitation in geriatric populations</td>
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<tr>
<td>- Requires a certain degree of technology literacy</td>
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<td>- Individuals with hearing loss, visual impairment, or cognitive impairment may need caregiver assistance</td>
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<td>- Increases patient responsibility to report health status and self-examination</td>
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<td>- Patient safety issues</td>
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<td>- Human connection may not be established and patient engagement can be challenging</td>
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provided care based on the recommendations. It is important to emphasize that clinicians should provide care that is best practice for the patient’s conditions, regardless of the method of delivery. Well-designed telerehabilitation for specific populations with established protocols (eg, after total knee arthroplasty) showed high clinician satisfaction. Defining the patient population appropriate for telerehabilitation, and establishing best practices for what to deliver, and how to deliver it through an iterative processes will clarify future use of telerehabilitation by clinicians and patients.

Engagement and Communication with Patient and Family Caregiver

Patient engagement is a key driver of high-quality health care outcomes. Virtual health care places greater responsibility on patients to prepare for the visit, to examine themselves, and to report their health. This responsibility can be motivating for some older adults, but it can be challenging for many. Family caregivers are often involved in multiple aspects of clinical care of older adults, including making appointments and setting up telerehabilitation visits. Telerehabilitation can promote care that is centered on the patient and caregivers by placing emphasis on communication, education, and self-management. Best-practice guidelines are available for telepresence communication. The Academy of Communication in Healthcare (ACH) has published useful tips on their Web site. Key pointers include preparation with intention, listening intently and completely, agreement on what matters most, connecting with the patient’s story, and exploring emotional cues. Box 3 summarizes useful tips for clinicians for telehealth visits. It is important to educate therapists that telerehabilitation is an adjunct to in-person interventions, and to train them formally to maximize the benefits of telerehabilitation to facilitate self-management. In addition, physical examination tools for clinicians can be built into telerehabilitation software platforms (eg, goniometers and tape measures to assess range of motion or edema) to facilitate the sessions. Education sessions and a digital library for home exercise programs may also support clinicians’ ability to train and educate patients.

OUTCOMES OF TELEREHABILITATION

The effectiveness of telerehabilitation has been studied in older patients with diverse diagnoses to examine functional outcomes and satisfaction, although several studies had small sample sizes and no control group. Patient outcomes are reported to be satisfactory with telerehabilitation in those with humeral fractures, total knee arthroplasty, and heart failure. In terms of the cost analysis of telerehabilitation, the evidence is conflicting. Health care expenditure of telerehabilitation was comparable with in-person rehabilitation after total knee arthroplasty. Cost-utility analysis of cardiac telerehabilitation shows that it is effective and can increase participation, but

Box 3
Useful tips for clinicians providing telerehabilitation for older adults

- Coaching model for patients to increase patients’ accountability for each session
- Relationship-centered communication skills
- Teach-back techniques to ensure that the proper understanding of instructions and training is provided to the patients
- Listening to both content and emotions of patients
cost-utility analysis depends on the cost of the technology used. Hybrid approaches combining in-person interventions and telerehabilitation (eg, telephone calls, home visits, telerehabilitation visits) have shown improved patient outcomes in terms of function and depression, and reduced caregiver stress in the stroke population and those with total knee arthroplasty. Randomized controlled trials have recently been initiated to examine the effectiveness of telerehabilitation in patients with osteoarthritis and in those with chronic stroke.

EXAMPLE OF TELEREHABILITATION USE

Hip Fracture Rehabilitation in Older Adults

Hip fractures occur predominantly in the geriatric population, with a lifetime risk of 9% for women and 4% for men. Hip fractures are a major public health issue in terms of morbidity, mortality, health care costs, and societal burden. Up to 20% of individuals die within a year following hip fractures. Thirty-five percent of older adults are not able to walk independently and approximately 30% do not regain their prefracture levels of activities of daily living (ADL) after sustaining hip fractures. After a hip fracture, older adults may develop delirium, weight loss, depression, pain, pressure injuries, falls, and urinary incontinence, which can increase the need for health care services. One-third of older adults with hip fracture are readmitted to the hospital within 30 days of their discharge home. These individuals typically have multiple risk factors for falls, including chronic medical conditions that require long-term follow-up care.

Telehealth has been recognized as a promising alternative to in-person care, especially during the Covid-19 pandemic. Home rehabilitation has generally been successful in facilitating recovery of ADL function and ambulation. Randomized controlled trials of the effectiveness of a telerehabilitation intervention compared with face-to-face home visits and usual care of community-dwelling older adults after hip fracture are ongoing. Older adults with hip fracture also have gait and balance disturbances that need to be addressed during telerehabilitation. The next part of this article also applies to older adults after hip fracture.

Rehabilitation for Older Adults with Balance and Gait Impairment

Telerehabilitation starts with proper assessment of gait and balance in older patients. Clinicians should be familiar with pathologic gait patterns and relate them to the history and physical examination findings. Gait needs to be examined both qualitatively and quantitatively. Key components of a fall prevention program include strengthening, increasing endurance, and balance training, which need to take place in a safe manner during telerehabilitation. Traditional testing may need to be modified because of space limitations at home. For example, the 10-m walk test to measure gait speed can be replaced by a 4-m walk test. Evaluation of proximal lower limb muscle strength can be tested by a 5-times chair rise test. Balance can be tested with a functional reach test.

In terms of telerehabilitation for balance training, a home exercise program with reported feasibility and effectiveness is generally recommended. Telerehabilitation using tai chi exercise has been studied for its compliance and effectiveness, as well as for balance outcomes and fall reduction, and was found to be more effective than a home-based video and as effective as in-person programs. Wu and colleagues reported that tai chi performed 3 times a week for 15 weeks in a televideoconferencing program showed 78% compliance and willingness to continue the tele-exercise program. This study also reported improvement in single-leg stance time by 43%, timed up-and-go test by 21%, and reduced body sway during quiet stance by 8%.
investigators have shown that Web-based tele-exercise using elastic resistance bands and balance exercises for 20 to 40 minutes, 3 times a week, for 12 weeks improves performance on the chair sit-to-stand test and Berg Balance Scale, and reduces fear of falling. A home exercise program delivered by telerehabilitation to 283 older adults discharged from the hospital reduced risk of falls by 40%. These studies suggest that balance training is feasible and effective through telerehabilitation.

**Older Adults with Sarcopenia**

Sarcopenia is age-associated decline in muscle mass, strength, and quality, which contributes to falls, disability, and mortality in older adults. The prevalence of sarcopenia ranges from 9.9% to 40% in community-dwelling older adults, depending on the definitions. Sarcopenia is not simply a gradual loss of muscle mass; it is exacerbated by periods of inactivity (eg, hospitalization). Patients with acute loss of muscle mass and function often do not recover fully to the level before the inactive period.

The Covid-19 pandemic is an unprecedented health crisis that necessitated the implementation of travel restrictions, quarantine, and social distancing. These restrictions are particularly stringent for older adults because of the risk of serious illness in cases of Covid-19 infection. The restrictions have had a profound effect on reduction in physical activity and changes in dietary habits that could potentially lead to loss of muscle mass and function (Box 4). A recent study that investigated physical activity levels during the Covid-19 lockdown showed that participants had lower heart rate, longer sleeping hours, and increased phone usage. In addition, reduced physical activity may reduce the effectiveness of feedback systems for body mass regulation and affect appetite, resulting in potential weight gain. The skeletal muscles serve as an endocrine organ and produce myokines in response to physical activity, which regulates the immune system. Social isolation also may have significant implications on mental health and well-being in addition to reduced physical activities.

Exercise is the primary intervention to remedy the progression of sarcopenia. A recent qualitative survey study reported decreased participation of seniors attending group physical activity even before the implementation of quarantine measures. These seniors expressed the need for physical activity during the pandemic, indicating support for home exercise programs.

The first step in starting a home-based exercise training program is initial evaluation of physical performance. One home-based training strategy implemented during the Covid-19 pandemic recommends a structure that includes warm-up, main exercise, and cool-down activity. For each exercise, there are 3 levels of difficulty (easy, medium, and difficult), which are prescribed based on the functional level of the individual.

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**Box 4**

**Potential impact of the Covid-19 pandemic on older adults**

- Reduced physical activity and associated loss of muscle mass, increasing risk of falls
- Poor appetite control (potential overconsumption of ultraprocessed food, risk of poor nutrition, weight gain or loss)
- Reduced exposure to sun and vitamin D
- Impaired sleep and immunity
- Poor glucose control for patients with diabetes mellitus
- Social isolation affecting mental health and well-being, potentially affecting cognitive function
at the initial assessment. Ensuring the safety of the patient is essential for a tele-exercise program. Ming and colleagues\textsuperscript{65} created an exercise video for Japanese older adults consisting of 10 minutes of functional training performed 3 times a day, 7 days a week, with the goal of 150 minutes of physical activity per week. Setting goals and celebrating progress is no different from that needed for in-person training. In terms of equipment, simple and inexpensive tools are preferable. Resistance bands can be an excellent alternative to free weights or machines for strength training. In home settings, older adults may use exercise regimens that are of lower intensity, but at higher repetitions until momentary muscle failure is achieved to induce muscle hypertrophy.\textsuperscript{66} Hong and colleagues\textsuperscript{67} reported that a resistive exercise program delivered via telerehabilitation resulted in improved lower limb muscle mass, appendicular lean soft tissue, and total muscle mass.

Older adults may have misperceptions of increased risk of heart attack or stroke by participating in resistive exercise and it is important to answer any questions and concerns.\textsuperscript{68} Clinicians should also keep older adults motivated to increase adherence by involving participants in exercise selection and program design, seeking feedback for intensity of exercise, providing positive feedback, and being transparent about the future training sessions.\textsuperscript{60}

\textbf{Home Safety Assessment}

Home safety assessment and modifications recommended by occupational therapists have been shown to be effective in preventing falls. There is increasing demand for home modification services in the aging population, and the focus has shifted toward providing community-based services to enable people to live at home instead of in a nursing home. Gitlin and colleagues\textsuperscript{69} found that, after a home visit, 80\% of patients needed adjustments to assistive devices, 45\% of them needed additional equipment, and 65\% of them reported they were not using the recommended equipment because of safety issues or poorly fitting equipment. However, older adults may not receive home safety assessments because of service delivery costs, lack of available therapists, or because of an expansive geographic area.\textsuperscript{70} A pilot study reported that a telehealth occupational therapy home modification intervention was not only feasible but was also highly satisfactory to older adults.\textsuperscript{70} The intervention was delivered using participant-owned smart phones, tablets, or computers. Participants and caregiver assistants were provided a Web site with resources including educational handouts and instructional videos on how to record the problems related to the home and activity, and possible funding sources. The caregiver communicated with the occupational therapist in real time, and also sent video recordings of the problems related to the home and the activity before the session. During the intervention, the occupational therapist and the patient collaboratively generated a list of client-centered occupational problems to be addressed through home modification. The telerehabilitation intervention led to improvement in patients’ perceptions of performance in multiple areas, including in the shower, for mobility, transfers, carrying items, and cutting food, and also improved home safety scores. The challenges for tele–home safety assessment interventions are slow video processing speed and poor image quality. However, with increasing high-speed Internet connections, there is great potential for the use of tele–home safety evaluation and modification.

\textbf{Cognitive Telerehabilitation for Older Adults with Cognitive Impairment}

Dementia affects 46.8 million people worldwide and is an increasing burden on families and on society. In addition, cognitive disorders are common in many neurologic conditions (eg, stroke, traumatic brain injury). The Cognitive Rehabilitation Task Force
of the American Congress of Rehabilitation Medicine recently published a systematic review focusing on the recommendations for evidence-based practice of cognitive rehabilitation for attention deficits after brain injury or stroke, compensatory strategies for mild memory deficits, metacognitive strategy training for deficits in executive functioning, and comprehensive holistic neuropsychological rehabilitation to reduce cognitive and functional disability after brain injury or stroke. With limited success of pharmacologic agents, cognitive rehabilitation therapy has been an attractive adjunct intervention. Cognitive rehabilitation therapy is defined as functionally oriented therapeutic cognitive activities directed to achieve functional improvement. Cognitive rehabilitation programs are most effective when they are delivered intensively over a prolonged period of time. In the current pandemic situation with reduced access to care, cognitive telerehabilitation is a promising alternative to in-person programs. A recent systematic review of 5 publications showed that cognitive telerehabilitation interventions had effects comparable with conventional face-to-face rehabilitation in patients with mild cognitive impairment, Alzheimer disease, and frontotemporal dementia. Cognitive telerehabilitation uses several methods and technologies. In addition to delivering conventional cognitive rehabilitation using information and communication by the therapist, virtual reality, augmented reality, and games can also be used (Table 1). Virtual reality allows the user to be immersed in a computer-generated environment in a naturalistic way. Serious games (SGs) are digital applications specialized for purposes other than entertainment, such as training and educating, informing, communicating, or enhancing the user’s cognitive and/or physical function. Programs using SGs can offer challenging, rewarding, motivating, and interactive experiences that can be shared with other players. This method can provide constructive home-based learning opportunities at low cost. Programs using

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<th>Technology Used in Cognitive Telerehabilitation</th>
<th>Advantages</th>
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<td>VR</td>
<td>• Allow transfer skills by using diverse environment compared with repetitive training in a fixed conventional rehabilitation setting&lt;br&gt;• Adaptable to the individual’s skill level with immediate feedback&lt;br&gt;• Higher compliance than conventional rehabilitation&lt;br&gt;• Can be performed by the supervision of caregivers&lt;br&gt;• May aim to improve both physical and cognitive function</td>
<td>• VR systems can be cumbersome and expensive&lt;br&gt;• Lack of specific VR features (eg, immersion or sense of presence) may result in limited effectiveness</td>
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<tr>
<td>SGs</td>
<td>• Allows adaptation to the level of participants&lt;br&gt;• Highly engaging, can play with others&lt;br&gt;• Low cost and available at home&lt;br&gt;• Performance analysis in real time</td>
<td>• Lack of theoretic models behind development in many products&lt;br&gt;• Lack of regulation for development, marketing, and use of SG with vulnerable population for safety and respecting ethical principles</td>
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Table 1: Advantages and disadvantages of technologies used in cognitive rehabilitation

Abbreviations: SG, serious games; VR, virtual reality.
such technology can be tailored to focus on discernment, short-term memory, problem solving, attention, and spatial orientation for patients with early stages of cognitive impairment. The programs tend to focus on object recognition, communication, reaction time, and memory for patients with moderate cognitive impairment. Further studies with long-term follow-up are needed to evaluate the effectiveness of SGs in cognitive rehabilitation.

**Remote Monitoring of Older Adults**

Several technologies allow individuals to be monitored without requiring caregivers to operate the devices. Home telemonitoring is intended to detect early deterioration to prevent medical emergencies and reduce hospital readmission. Ultimately, these technologies aim not only to increase older adults’ independence but also to reduce the burden and caregiving time of family caregivers and improve quality of life for both older adults and caregivers. Remote monitoring uses cameras, bed sensors, wearable sensors, and/or automatic lights to monitor the individual’s behavior. Alerts are sent to the caregiver if any unusual activity patterns are noted. A recent systematic review showed that remote monitoring reduced 6-month mortality but not readmission rates or 1-year mortality in patients with heart failure. A recent review on technology use in fall prevention showed that the effectiveness of these technologies needs further examination in real-world settings.

**Reduction of Caregiver Burden**

According to the report of the National Alliance for Caregiving (NAC) and the American Association of Retired Persons (AARP), more than 1 in 5 Americans (21.3%) are now caregivers, having provided care to an adult or child with special needs in the past 12 months. The number of caregivers in the United States is currently estimated at 53 million adults, up from the estimated 43.5 million caregivers in 2015. The increase of more than 8 million caregivers is primarily driven by the significant increase in those who care for adults aged 50 years or older (79% of all caregivers). The physical and emotional toll on caregivers has been documented and includes high incidence of chronic diseases and impaired psychological function. Caregivers also report that they spend more than 10% of their annual income on caregiving expenses, including transportation and travel and accommodating their work schedules using vacation and sick time. From this perspective, telehealth is an attractive alternative to conventional in-person care for many caregivers. Several telehealth programs have targeted support for family caregivers of older adults with dementia. The Veterans Health Administration’s Telehealth Education Program is designed to enhance the knowledge, skills, and feelings of support for the spouse caregivers of veterans with dementia through a teleconference once a week for 10 weeks. This intervention saved $2768 per patient at 6 months. Tindall and colleagues reported that telerehabilitation of 16 speech therapy sessions for patients with Parkinson disease saved 48 hours of time, more than 92 hours of work time, and $1024 for each caregiver.

**SUMMARY AND FUTURE DIRECTIONS**

The acceptance and implementation of telerehabilitation has been rapidly accelerated by the COVID-19 pandemic, and telehealth is expected to serve a greater role in the delivery of health care in the future. Clinicians should keep in mind that, regardless of the delivery method of care, they must provide care that aligns with clinical practice guidelines and recommendations with conscious effort to engage both the patient and caregiver. Future research on telerehabilitation should examine the impact of recent
regulatory changes on the delivery of rehabilitation, and further define the population that can most benefit from telerehabilitation. The future of rehabilitation will likely involve a balance of in-person and virtual care, with strategic use of various technologies. Supporting older adults with user-friendly technology with equity in mind and training of clinicians for patient engagement skills will be instrumental to the success of telerehabilitation in improving outcomes of older adults.

CLINICS CARE POINTS

- The older population is expected to double from 43.1 million in 2012 to 83.7 million in 2050. Prevalence of chronic diseases and need for medical care are expected to increase accordingly.
- Telehealth and telerehabilitation are increasingly used for monitoring, assessments, and intervention purposes in geriatric populations with diverse diagnoses.
- The role of telehealth and telerehabilitation during the Covid-19 pandemic has been expanded more than ever.
- Digital literacy in the geriatric population and proper training of clinicians based on best practice of virtual care are instrumental in the success of telehealth and telerehabilitation implementation.

DISCLOSURE

The authors have nothing to disclose.

REFERENCES


