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Advances in Psychotherapy for Older Adults Using Video-to-Home Treatment



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KEYWORDS

• Telemedicine • Geriatrics • Telemental health • Video-to-home

KEY POINTS

- Video-to-home (VTH) is an effective means of providing telemental health to older adults.
- Older adults are willing to use telemedicine for mental health and in some cases prefer it.
- Barriers to using VTH with older adults include technology acceptance, access, and physical and cognitive limitations.
- Providers have used new and innovative methods to address barriers.

INTRODUCTION/BACKGROUND

Video-to-home (VTH) telemedicine allows providers to conduct synchronous clinical encounters over secure video connections (eg, VA Video Connect, thera-LINK, doxy.me). VTH for mental health care has grown rapidly over the past decade due in part to advances in telehealth platforms and digital infrastructure, as well as the availability of smartphones [1,2]. However, access to VTH is inconsistent geographically (rural and frontier communities), demographically (age, race, education), and institutionally (under-resourced health care systems) [3]. The rush to convert face-to-face to remote clinical encounters during the COVID-19 pandemic has only heightened disparities in VTH use

[4]. Older adults have become a population of particular concern—not only do they risk serious complications of the virus if they are exposed during face-to-face clinical care; but they are also less likely to use telemedicine for remote health care [5].

There is an urgent need to address the wide range of barriers that prevent older adults from using VTH, from age-related physical and cognitive decline to attitudes toward technology. Telehealth provides opportunities to improve care; VTH has improved access to providers, such as specialists, and helped patients obtain timelier diagnoses [6]. It can also cut drive time and provide access for patients who live at a distance from facilities, have physical barriers to attending visits, or behavioral

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issues that make in-person care difficult [7]. Incorporating VTH into routine care is important to providing high-quality health care for older adults, who make up the largest group of health care consumers in the United States. Because of shifts in demographics, the population of older adults grows considerably each year. More than 54 million people over 65 live in the United States; within the next 2 decades, the number of older adults is expected to double [8].

Although the barriers to older adults' use of VTH pose a challenge to health care systems, the landscape of current research is filled with innovative ways to address barriers and, importantly, is beginning to address negative stereotypes about older adults' ability to use VTH technology. In this article, we will discuss some barriers to using VTH with older adults and approaches to addressing those barriers. See Table 1 for a summary of barriers and strategies to address them.

VIDEO-TO-HOME AS A TREATMENT MODALITY FOR OLDER ADULTS

Although face-to-face visits are most common, a growing body of evidence shows that VTH is as effective as face-to-face for treating a variety of conditions in adults of all ages (Box 1) [9–12]. For example, noninferiority studies comparing VTH to in-person clinic visits for posttraumatic stress disorder in Veterans have shown that VTH can successfully function as a substitute for face-to-face care [9,13–16]. When compared with telephone visits, VTH has been shown to be more successful, with positive outcomes in treating conditions such as depression [17] and smoking cessation [18]. VTH is also a feasible treatment of obsessive-compulsive disorder [19], panic disorder [20], social anxiety disorder [21,22], and smoking cessation [18]. Reduced lengths of hospitalization, better medication adherence, symptom reduction, lower attrition, and more effective therapy have also been reported [23,24]. Additionally, when used as a treatment modality, VTH has had positive effects on symptoms [25,26].

Until recently, comparatively less research has focused on the effectiveness of VTH for treating older adults. Among the 3 modalities for clinic visits, face-to-face, telephone, and video conferencing, VTH requires skills that are still novel for some older adults, such as checking Internet connections and troubleshooting audio and video issues. Thus, older patients tend to prefer in-person interactions, which are most familiar [27]. Throughout the pandemic, more older adults received telephone visits than VTH [28]. Because of the ubiquity of telephones and comfort with that

technology, much of the telemedicine research involving older adults has focused on telephone-based interventions, many with positive outcomes [29]. However, VTH has been shown to be as effective as telephone interventions in screening for and treating depression in older adults [17,30]. Additionally, when used as a treatment modality, VTH has positively affected the quality of life; social isolation; and symptoms of anxiety, social isolation, and depression [25,26].

Both older patients and providers have generally responded positively to VTH. Older adults are receptive to receiving both medical and psychiatric services via VTH [31,32]. Older adults have positive attitudes toward technology's benefits that are consistent across age groups, and older adults have reported high levels of satisfaction with participating in telemedicine visits [6,31,33]. Provider attitudes toward providing telemental health treatment of older adults are positive or neutral on the whole [34,35]. Providers believe that improved access to care, flexibility, cost-saving, and efficiency enabled by VTH are particularly valuable [36].

DISCUSSION

Addressing Barriers to Widespread Use of Video-to-Home

Acceptance of video-to-home

The successful adoption of VTH relies on the willingness of patients and providers to use it. Many older adults experience anxiety when using new technologies and feel less comfort, self-efficacy, and control when using communication technology specifically [33,37]. However, when new technology is introduced in a way that connects it to familiar experiences, it is more likely to be accepted by older adults [2,38]. The senior technology acceptance model (STAM) is the most widely used framework for understanding older adults' willingness to use new technologies. It includes factors that influence the adoption of new technologies such as VTH and takes into account social-cognitive variables (self-efficacy and computer anxiety), as well as attitudes (perceived usefulness and perceived ease of use), and usage behavior [39]. Additionally, the model captures characteristics unique to older adults, including age-related health conditions, self-reported health conditions, functional abilities, cognitive abilities, attitude toward aging, and life satisfaction [40].

Applications of the STAM model have found that different variables account for older adults' acceptance of technology. Many have found that acceptance of technologies such as telemedicine is explained best by

TABLE 1
Strategies for addressing barriers to VTH use with older adults

Barrier	Strategies
Acceptance of VTH	Provide effective training to both patients and providers <ul style="list-style-type: none"> • Emphasize <i>usefulness</i> and <i>ease of use</i> when introducing VTH. • Highlight <i>benefits</i> of using VTH regularly. • Teach troubleshooting and emphasize the <i>usefulness</i> of learning those strategies for general use of technology. • Train providers in documentation and reimbursement.
Physical and cognitive limitations	Educate patients and providers on a variety of adaptive strategies <ul style="list-style-type: none"> • Keep up to date on innovations in adaptive equipment. • Adopt adaptive equipment tailored to patient. • Focus on VTH repetition and practice. • Use simple analogies and metaphors. • Provide paper copies of instructions.
Access	Understand factors affecting equitable access <ul style="list-style-type: none"> • Assess availability of broadband, Internet, and equipment. • Understand that attitudes toward VTH are influenced by experience with technology. • Understand and address cultural barriers to using VTH • Adapt VTH programs for varying levels of health literacy.
Establishing rapport	Use rapport-building strategies during VTH visits <ul style="list-style-type: none"> • Encourage more patient participation in VTH visits. • Slow speech during visits to help with understanding. • Train providers in interpersonal communication strategies using VTH. • Practice technical troubleshooting strategies in advance.
Privacy	Train providers in methods of maintaining privacy during VTH <ul style="list-style-type: none"> • Provide training on issues such as HIPAA compliance, maintaining a secure virtual environment, and dealing with multiple participants during VTH visits.
Safety	Train providers in possible safety issues during VTH visits <ul style="list-style-type: none"> • Create a safety plan for medical emergencies. • Provide training in identifying abuse and neglect using VTH. • Practice methods of separating multiple participants during VTH visits for private interviews.
Reimbursement	Be aware of documentation and reimbursement <ul style="list-style-type: none"> • Document VTH visits in compliance with reimbursement rules. • Advocate for reimbursement parity for VTH visits.

specific attitudes (perceived usefulness and perceived ease of use) [41–43]. Others have found stronger relationships between social-cognitive variables and acceptance [44]: older adults may not accept communication technologies such as VTH that they do not perceive to be useful or have clear benefits [45–47]. This same concept applies to technical help—if the assistance provided (eg, possible troubleshooting methods) does not appear useful, older adults are less likely to accept it [48,49]. Studies have shown that repeated behavior,

or habit, fits into the STAM model, and emphasize that acceptance and adoption are also driven by repeated use, which explains why acceptance typically changes once an individual uses a communication technology multiple times [50,51].

It is also important to consider the role of providers in VTH acceptance; provider resistance to using technology not only affects the use of VTH but also can influence the perceptions of patients [52]. Providers in some instances have been more deterred by technical

BOX 1**Video-to-home as a treatment modality****Key Points**

- Has been shown more successful than telephone for treatment.
- Feasible for screening for and treating a range of conditions.
- Outcomes include
 - Reduced hospitalization
 - Better medication adherence
 - Symptom reduction
 - Lower attrition
 - Positive change in the quality of life
 - Reduced social isolation

difficulties than patients, and patients are more satisfied with VTH, despite these difficulties [52,53]. Similar to older adults, provider acceptance of telemedicine is highly dependent on usefulness and ease of use. One difference for physicians is the effect of self-efficacy on the use of telemedicine—providers who were not able to successfully use telemedicine tended to be resistant to using it. The study suggests that training and education are essential to provider adoption of these technologies [52]. Finally, the ability to easily document visits inpatient records and receive reimbursement positively influences acceptance and adoption.

Physical and cognitive limitations

Telemedicine visits can be challenging for older adults because of age-related physical conditions, such as hearing impairment and vision loss, as well as progressive cognitive decline [53–55]. These challenges are complicated by a patient's psychological and behavioral issues, including the severity of symptoms, diagnosis, and lack social skills [56]. Physical conditions that can create challenges to the use of VTH include hearing impairment [5], visual impairment [49], touch sensitivity [57,58], and neurologic symptoms, such as tremors [58]. Adaptive equipment and techniques can assist with many of these challenges [59]. When the immediate challenges to the use of VTH platforms can be overcome, for patients with physical impairments that require transportation assistance, VTH can save time, energy, and money because patients can avoid commuting to facilities [60].

Older adults also face cognitive decline, which also impacts their ability to use VTH for psychotherapy. The

limitations caused by cognitive decline affect patients' ability to participate in telemental health through VTH [61]. For example, older adults are less able to learn new information (eg, instructions for using VTH), retain information (eg, to repeat the same kind of troubleshooting in VTH), and pay attention (eg, watching a video on features of VTH) [26,62]. Research suggests several methods for addressing these challenges, many of which include repetition and practice [50,51]. Others include drawing on semantic memory, where many of the earliest memories are stored, by making analogies and using metaphor (eg, explaining the way talking through VTH is similar to a phone conversation) and providing paper copies of simple written instructions [63]. VTH programs can and should be tailored to levels and types of cognitive decline, including advanced dementia [64]. VTH has been used successfully to treat patients with dementia and their caregivers. VTH delivery of psychosocial and cognitive behavioral therapy (including problem-solving training), has shown improvement in caregiver outcomes [65]. For example, caregivers benefitted from group therapy, with a decrease in anxiety and depression [66].

Access

Discussion of equitable access to telemedicine for older adults underscores the heterogeneity of the group. While there are characteristics common to older adults, research involving equitable access to VTH must also take into account the intersection of social characteristics and abilities [67]. For example, older adults from racial or ethnic minority backgrounds or Medicaid beneficiaries were less likely to use VTH [68]. Inequitable access to telemedicine is often associated with the *digital divide*, a term that describes the division between those who are able to access technology and those who are not, based on characteristics such as socioeconomic status, age, and race [69]. The digital divide refers to several factors that inhibit the use of telehealth. First is a lack of the equipment and Internet connectivity to participate in VTH, which affects many older adults [70]. More than 25% of Medicare beneficiaries did not have Internet access at home. People with low socioeconomic status, those 85 years or older, and those in communities of color were also less likely to have digital access [28].

The digital divide also refers to the skills, interests, and emotional and psychological conditions associated with an inability to access technology [71]. The digital divide affects older adults in unique ways; for example, although older adults recognize the power of communication technologies to help ameliorate

social isolation, the inability to successfully use this technology makes them feel more isolated [72]. Their attitudes toward technology such as VTH are also colored by their lack of experience with technology, cultural barriers, and lack of health literacy [72]. These complex issues must be addressed for VTH to be successfully implemented.

Using VTH with older adults in rural areas underscores the complexities of the digital divide. Rural-dwelling adults have less access to broadband and less willingness to participate in VTH than their nonrural counterparts [73]. This population tends to be in poorer health, more socially isolated, and more affected by unmet mental health needs [74]. Moreover, there is a shortage of mental health professionals in these areas [6]. Successful efforts to implement VTH in these areas must not only address the lack of digital infrastructure in these communities but also the attitudes, cultural beliefs, and literacy of rural older adults. If these barriers can be surmounted, patients who use VTH have access to a range of mental health services that may be unavailable in their own community [73,75].

Establishing patient-provider rapport

Patients and providers have expressed concern about establishing therapeutic relationships through VTH. Although they find telehealth effective, both providers and patients perceive face-to-face interactions more positively [74]. In most patient-provider relationships, the provider is the dominant communicator, and that dominance makes the therapeutic relationship asymmetric, with the provider having more control in the relationship. In an analysis of psychotherapy sessions, one study found that some asymmetries in online relationships involved characteristics unique to VTH, including interruptions caused by technology failures, and privacy [76,77]. Other factors that influence relationship building during all therapeutic modalities include cultivating mutual trust [78], equitable participation in the visit [79], communication skills [80], and interpersonal competence [81]. Undoubtedly, developing therapeutic relationships can be challenging for both older adults and providers during VTH visits. Recent work has shown that providers have developed a rapport with older adults during VTH using adaptive strategies, such as slowing their speech and communicating with patience during technical difficulties [35]. Additionally, rapport can be developed as both providers and older adults become more comfortable with telemental health [82].

Privacy, ethics, and policy

Privacy concerns often affect older adults' willingness to use VTH. Older adults who are less familiar with technologies such as VTH can have concerns about the privacy of psychotherapy visits. A lack of trust in communication technology can fuel older adults' resistance to using telemedicine platforms [2,65]. Older adults from under-resourced populations tend to have less trust in privacy when using communication technologies; however, trust tends to improve with greater use [23]. Mental health providers also face privacy concerns that involve both HIPAA compliance and patient privacy. Providers can be trained in methods to address privacy concerns specific to VTH.

A related concern is a patient safety during a remote visit. Because providers are unable to physically assist a patient if, for example, the patient has a medical emergency during a visit, a safety plan specifies a procedure for whom to contact and what to document [83]. Additionally, a safety plan should specify procedures for patients who contact their provider while in distress. Providers must also have training in identifying potential safety issues, such as signs of self-harm, as well as abuse, and neglect by conducting virtual physical examinations and speaking separately with patients and caregivers.

Finally, concern for the growth of VTH visits for older adults hinges on Medicare reimbursement [6]. Reimbursement schemes that promote the use of telehealth generally help break down barriers to use, such as rurality and lack of infrastructure [3]. Before the pandemic, low reimbursement rates limited the use of telemedicine [84]. Although reimbursement for VTH has become common during the pandemic, issues persist in systematizing coding, billing, and clinic workflows. As support for VTH grows, continued parity in VTH reimbursement rates and clearer guidance on reporting will help ensure its use.

SUMMARY

Mental health providers have played an important role in the adoption of VTH since the beginning of the pandemic; providers have been early adopters of telemedicine and videoconferencing in particular [85]. Two studies note that mental health and psychiatry departments in large medical centers were among the first to shift completely to telehealth once the pandemic began [85,86]. Research into psychotherapeutic VTH must continue to discover ways to reach more patients, implement novel uses of VTH, and improve the quality of remote mental health care.

CLINICS CARE POINTS

- Clinicians should consider video-to-home a viable format for mental health treatment.
- Clinicians must consider factors that influence patients' use of video-to-home telehealth.
- Successful clinical use of video-to-home telehealth requires attention to boundaries to use.

DISCLOSURE

This work is supported by a grant from the VA Office of Rural Health, Veterans Rural Health Resource Center-Salt Lake City and partly the result of the use of facilities and resources of the Houston VA HSR&D Center for Innovations in Quality, Effectiveness and Safety (CIN13-413) and the VA South Central Mental Illness Research, Education and Clinical Center, which played no role in the design and conduct of the work; in the collection, analysis and interpretation of the data; and in the preparation, editing or censoring of the manuscript. The opinions expressed are those of the authors and do not necessarily reflect those of the Department of Veterans Affairs, the US government, or Baylor College of Medicine.

REFERENCES

- [1] Weil AR. Telehealth. *Health Aff (Millwood)* 2018; 37(12):1915.
- [2] Jimison H, Gorman P, Woods S, et al. Barriers and drivers of health information technology use for the elderly, chronically ill, and underserved. *Evid Rep Technol Assess (Full Rep)* 2008;175:1–1422.
- [3] Lin CC, Dievler A, Robbins C, et al. Telehealth In health centers: Key adoption factors, barriers, and opportunities. *Health Aff (Millwood)* 2018;37(12):1967–74.
- [4] Wosik J, Fudim M, Cameron B, et al. Telehealth transformation: COVID-19 and the rise of virtual care. *J Am Med Inform Assoc* 2020;27(6):957–62.
- [5] van den Berg N, Schumann M, Kraft K, et al. Telemedicine and telecare for older patients—A systematic review. *Maturitas* 2012;73(2):94–114.
- [6] Lum HD, Nearing K, Pimentel CB, et al. Anywhere to anywhere: Use of telehealth to increase health care access for older, rural veterans. *Public Policy Aging Rep* 2020; 30(1):12–8.
- [7] Kruse C, Fohn J, Wilson N, et al. Utilization barriers and medical outcomes commensurate with the use of telehealth among older adults: Systematic review. *JMIR Med Inform* 2020;8(8):e20359.
- [8] World Health Organization. *10 Facts on Ageing and the Life Course*. 2017. Available from URL: www.who.int/features/factfiles/ageing/ageing_facts/en Retrieved 2022.
- [9] Knowlton CN, Nelson KG. PTSD telehealth treatments for veterans: Comparing outcomes from in-person, clinic-to-clinic, and home-based telehealth therapies. *J Rural Ment Health* 2021;45(4):243–55. <https://doi.org/10.1037/rmh0000190>.
- [10] Hersh WR, Helfand M, Wallace J, et al. Clinical outcomes resulting from telemedicine interventions: A systematic review. *BMC Med Inform Decis Mak* 2001;1:5.
- [11] Ekeland AG, Bowes A, Flottorp S. Effectiveness of telemedicine: A systematic review of reviews. *Int J Med Inform* 2010;79(11):736–71.
- [12] Fletcher TL, Hogan JB, Keegan F, et al. Recent advances in delivering mental health treatment via video to home. *Curr Psychiatry Rep* 2018;20(8):1–9.
- [13] Acierno R, Gros DF, Ruggiero KJ, et al. Behavioral activation and therapeutic exposure for posttraumatic stress disorder: A noninferiority trial of treatment delivered in person versus home-based telehealth. *Depress Anxiety* 2016;33(5):415–23.
- [14] Morland LA, Mackintosh MA, Glassman LH, et al. Home-based delivery of variable length prolonged exposure therapy: A comparison of clinical efficacy between service modalities. *Depress Anxiety* 2020;37(4):346–55.
- [15] Egede LE, Acierno R, Knapp RG, et al. Psychotherapy for depression in older veterans via telemedicine: A randomized, open-label, non-inferiority trial. *Lancet Psychiatry* 2015;2(8):693–701.
- [16] Morland LA, Mackintosh MA, Rosen CS, et al. Telemedicine versus in-person delivery of cognitive processing therapy for women with posttraumatic stress disorder: A randomized noninferiority trial. *Depress Anxiety* 2015;32(11):811–20.
- [17] Choi NG, Marti CN, Wilson NL, et al. Effect of Telehealth Treatment by Lay Counselors vs by Clinicians on Depressive Symptoms Among Older Adults Who Are Homebound: A randomized clinical trial. *JAMA Netw Open* 2020;3(8):e2015648.
- [18] Kim SS, Darwish S, Lee SA, et al. A randomized controlled pilot trial of a smoking cessation intervention for US women living with HIV: Telephone-based video call vs voice call. *Int J Womens Health* 2018;10:545–55.
- [19] Goetter EM, Herbert JD, Forman EM, et al. An open trial of videoconference-mediated exposure and ritual prevention for obsessive-compulsive disorder. *J Anxiety Disord* 2014;28(5):460–2.
- [20] Bouchard S, Paquin B, Payeur R, et al. Delivering cognitive-behavior therapy for panic disorder with agoraphobia in videoconference. *Telemed J E Health* 2004;10(1):13–25.
- [21] Nauphal M, Swetlitz C, Smith L, et al. A preliminary examination of the acceptability, feasibility, and effectiveness of a telehealth cognitive-behavioral therapy group for social anxiety disorder. *Cogn Behav Pract* 2021; 28(4):730–42.
- [22] Yuen EK, Herbert JD, Forman EM, et al. Acceptance based behavior therapy for social anxiety disorder through videoconferencing. *J Anxiety Disord* 2013; 27(4):389–97.

- [23] Adams SM, Rice MJ, Jones SL, et al. Telemental health: Standards, reimbursement, and interstate practice. *J Am Psychiatr Nurses Assoc* 2018;24(4):295–305.
- [24] Simon GE, Ludman EJ, Tutty S, et al. Telephone psychotherapy and telephone care management for primary care patients starting antidepressant treatment: A randomized controlled trial. *JAMA* 2004;292(8):935–42.
- [25] Hirani SP, Beynon M, Cartwright M, et al. The effect of telecare on the quality of life and psychological well-being of elderly recipients of social care over a 12-month period: The Whole Systems Demonstrator cluster randomised trial. *Age Ageing* 2014;43(3):334–41.
- [26] Merchant RA, Liu SG, Lim JY, et al. Factors associated with social isolation in community-dwelling older adults: A cross-sectional study. *Qual Life Res* 2020;29(9):2375–81.
- [27] Bujnowska-Fedak MM, Mastalerz-Migas A. Usage of medical internet and e-health services by the elderly, . *Environment Exposure to Pollutants*843. New York: Springer; 2014. p. 75–80.
- [28] Roberts ET, Mehrotra A. Assessment of disparities in digital access among Medicare beneficiaries and implications for telemedicine. *JAMA Intern Med* 2020;180(10):1386–9.
- [29] Bashshur RL, Shannon GW, Bashshur N, et al. The empirical evidence for telemedicine interventions in mental disorders. *Telemed J E Health* 2016;22(2):87–113.
- [30] Şahin E, Yavuz Veizi BG, Naharci MI. Telemedicine interventions for older adults: A systematic review. *J Telemed Telecare* 2021 1357633X211058340.
- [31] Grubaugh AL, Cain GD, Elhai JD, et al. Attitudes toward medical and mental health care delivered via telehealth applications among rural and urban primary care patients. *J Nerv Ment Dis* 2008;196(2):166–70.
- [32] Hantke N, Lajoy M, Gould CE, et al. Patient satisfaction with geriatric psychiatry services via video teleconference. *Am J Geriatr Psychiatry* 2020;28(4):491–4.
- [33] Czaja SJ, Sharit J. Age differences in attitudes toward computers. *J Gerontol B Psychol Sci Soc Sci* 1998;53B(5):P329–40.
- [34] Hoffmann M, Wensing M, Peters-Klimm F, et al. Perspectives of psychotherapists and psychiatrists on mental health care integration within primary care via video consultations: Qualitative preimplementation study. *J Med Internet Res* 2020;22(6):e17569.
- [35] Goldberg EM, Jiménez FN, Chen K, et al. Telehealth was beneficial during COVID-19 for older Americans: A qualitative study with physicians. *J Am Geriatr Soc* 2021;69(11):3034–43.
- [36] Connolly SL, Miller CJ, Lindsay JA, et al. A systematic review of providers' attitudes toward telemental health via videoconferencing. *Clin Psychol (New York)* 2020;27(2):e12311.
- [37] Mitzner TL, Savla J, Boot WR, et al. Technology adoption by older adults: findings from the PRISM trial. *Gerontologist* 2019;59(1):34–44.
- [38] Mahmood A, Yamamoto T, Lee M, et al. Perceptions and use of gerotechnology: Implications for aging in place. *J Hous Elder* 2008;22(1–2):104–26.
- [39] Chen K, Chan AH. Gerontechnology acceptance by elderly Hong Kong Chinese: A senior technology acceptance model (STAM). *Ergonomics* 2014;57(5):635–52.
- [40] Chen K, Lou VWQ. Measuring senior technology acceptance: Development of a brief, 14-Item scale. *Innov Aging* 2020;4(3). <https://doi.org/10.1093/geroni/igaa016>.
- [41] Hauk N, Hüffmeier J, Krumm S. Ready to be a silver surfer? A meta-analysis on the relationship between chronological age and technology acceptance. *Comput Hum Behav* 2018;84:304–19.
- [42] De Veer AJ, Peeters JM, Brabers AE, et al. Determinants of the intention to use e-Health by community dwelling older people. *BMC Health Serv Res* 2015;15(1):1–9.
- [43] Wang L, Rau P-LP, Salvendy G. Older adults' acceptance of information technology. *Educ Gerontol* 2011;37(12):1081–99.
- [44] Niehaves B, Plattfaut R. Internet adoption by the elderly: Employing IS technology acceptance theories for understanding the age-related digital divide. *Eur J Inf Syst* 2014;23(6):708–26.
- [45] Lorenzen-Huber L, Boutain M, Camp LJ, et al. Privacy, technology, and aging: A proposed framework. *Ageing Int* 2011;36(2):232–52.
- [46] Czaja S, Beach S, Charness N, et al. Older adults and the adoption of healthcare technology: Opportunities and challenges. *Tech Active Aging* 2013;27–46.
- [47] Peek ST, Wouters EJ, Van Hoof J, et al. Factors influencing acceptance of technology for aging in place: A systematic review. *Int J Med Inform* 2014;83(4):235–48.
- [48] Thielke S, Harniss M, Thompson H, et al. Maslow's hierarchy of human needs and the adoption of health-related technologies for older adults. *Ageing Int* 2012;37(4):470–88.
- [49] Fisk AD, Czaja SJ, Rogers WA, et al. Designing for older adults: principles and creative human factors approaches. Florida: CRC press; 2019.
- [50] Kadylak T, Cotten SR. United States older adults' willingness to use emerging technologies. *Inf Commun Soc* 2020;23(5):736–50.
- [51] Berkowsky RW, Rikard R, Cotten SR. Signing off: Predicting discontinued ICT usage among older adults in assisted and independent living. In Zhou J, Salvendy G, editors. *Human Aspects of IT for the Aged Population. Design for Everyday Life. ITAP 2015. Lecture Notes in Computer Science*, vol. 9194. Springer, Cham (Switzerland). https://doi.org/10.1007/978-3-319-20913-5_36.
- [52] Rho MJ, Choi Iy, Lee J. Predictive factors of telemedicine service acceptance and behavioral intention of physicians. *Int J Med Inform* 2014;83(8):559–71.
- [53] Stronge AJ, Rogers WA, Fisk AD. Human factors considerations in implementing telemedicine systems to accommodate older adults. *J Telemed Telecare* 2007;13(1):1–3.

- [54] Heart T, Kalderon E. Older adults: Are they ready to adopt health-related ICT? *Int J Med Inform* 2013; 82(11):e209–31.
- [55] Freese J, Rivas S, Hargittai E. Cognitive ability and Internet use among older adults. *Poetics* 2006;34(4–5):236–49.
- [56] Sugarman DE, Horvitz LE, Greenfield SF, et al. Clinicians' perceptions of rapid scale-up of telehealth services in outpatient mental health treatment. *Telemed J E Health* 2021;27(12):1399–408.
- [57] Armbrüster C, Sutter C, Ziefle M. Notebook input devices put to the age test: The usability of trackpoint and touchpad for middle-aged adults. *Ergonomics* 2007;50(3): 426–45.
- [58] Cheong Y, Shehab RL, Ling C. Effects of age and psychomotor ability on kinematics of mouse-mediated aiming movement. *Ergonomics* 2013;56(6):1006–20.
- [59] Stowers J, Verduzco-Gutierrez M. Parking meters to touch screens: The unforeseen barriers that expansion of telemedicine presents to the disability community. *Am J Phys Med Rehabil* 2021;100(11):1105–8.
- [60] Bashshur RL, Shannon GW, Krupinski EA, et al. National telemedicine initiatives: essential to healthcare reform. *Telemed J E Health* 2009;15(6):600–10.
- [61] Gentry MT, Lapid MI, Rummans TA. Geriatric telepsychiatry: Systematic review and policy considerations. *Am J Geriatr Psychiatry* 2019;27(2):109–27.
- [62] Lesch H, Burcher K, Wharton T, et al. Barriers to healthcare services and supports for signing deaf older adults. *Rehabil Psychol* 2019;64(2):237.
- [63] Mayhorn CB, Stronge AJ, McLaughlin AC, et al. Older adults, computer training, and the systems approach: A formula for success. *Educ Gerontol* 2004;30(3):185–203.
- [64] Harris MT, Rogers WA. Developing a healthcare technology acceptance model (H-TAM) for older adults with hypertension. *Aging Soc* 2021;1–21. <https://doi.org/10.1017/S0144686X21001069>.
- [65] Chi N-C, Demiris G. A systematic review of telehealth tools and interventions to support family caregivers. *J Telemed Telecare* 2015;21(1):37–44.
- [66] Austrom MG, Geros KN, Hemmerlein K, et al. Use of a multiparty web based videoconference support group for family caregivers: Innovative practice. *Dementia* 2015;14(5):682–90.
- [67] Johnson D, Clarkson J, Huppert F. Capability measurement for inclusive design. *J Eng Des* 2010;21(2–3): 275–88.
- [68] Schifeling CH, Shanbhag P, Johnson A, et al. Disparities in video and telephone visits among older adults during the COVID-19 pandemic: Cross-sectional analysis. *JMIR Aging* 2020;3(2):e23176.
- [69] van Dijk J, Hacker K. The digital divide as a complex and dynamic phenomenon. *Inf Soc* 2003;19(4):315–26.
- [70] DiMaggio P, Hargittai E, Celeste C, et al. Digital inequality: From unequal access to differentiated use. *Social Inequality* 2004;355–400.
- [71] Francis J, Ball C, Kadylak T, et al. Aging in the digital age: Conceptualizing technology adoption and digital inequalities. *Aging and Digital Technology*. Singapore: Springer; 2019. p. 35–49.
- [72] Ball C, Francis J, Huang K-T, et al. The physical–digital divide: Exploring the social gap between digital natives and physical natives. *J Appl Gerontol* 2019;38(8):1167–84.
- [73] Bujnowska-Fedak M, Grata-Borkowska U. Use of telemedicine-based care for the aging and elderly: Promises and pitfalls. *Smart Homecare Technol Telehealth* 2015. <https://doi.org/10.2147/shtt.S59498>.
- [74] Williams IC, Mattos MK. We're Still Here: Addressing the Diverse Healthcare Needs of Older Adults in Rural Areas. *Pub Policy & Aging* 2021;31(4):126–8. <https://doi.org/10.1093/ppar/prab017>.
- [75] Richardson LD, Norris M. Access to health and health care: How race and ethnicity matter. *Mt Sinai J Med* 2010;77(2):166–77.
- [76] Armas A, Meyer SB, Corbett KK, et al. Face-to-face communication between patients and family physicians in Canada: A scoping review. *Patient Educ Couns* 2018; 101(5):789–803.
- [77] Cipolletta S, Frassoni E, Faccio E. Construing a therapeutic relationship online: An analysis of videoconference sessions. *Clin Psychol* 2018;22(2):220–9.
- [78] Cook KS, Kramer RM, Thom DH, et al. Trust and distrust in patient-physician relationships: perceived determinants of high-and low-trust relationships in managed-care settings. *Trust and distrust in organizations: Dilemmas and approaches*. New York: Russell Sage Foundation; 2004. p. 65–98.
- [79] Roter D. The enduring and evolving nature of the patient–physician relationship. *Patient Educ Couns* 2000;39(1):5–15.
- [80] DiMatteo MR. A social-psychological analysis of physician-patient rapport: toward a science of the art of medicine. *J Social Issues* 1979;35(1):12–33.
- [81] Duffy FD, Gordon GH, Whelan G, et al. Assessing competence in communication and interpersonal skills: The Kalamazoo II report. *Acad Med* 2004;79(6):495–507.
- [82] Brooks E, Turvey C, Augusterfer EF. Provider barriers to telemental health: obstacles overcome, obstacles remaining. *Telemed J E Health* 2013;19(6):433–7.
- [83] Luxton DD, Sirotn AP, Mishkind MC. Safety of telemental healthcare delivered to clinically unsupervised settings: A systematic review. *Telemed e-Health* 2010; 16(6):705–11.
- [84] Devore PA, Paulich MJ, Talkington SG, et al. The slow pace of interactive video telemedicine adoption: the perspective of telemedicine program administrators on physician participation. *Telemed e-Health* 2007;13(6).
- [85] Rosen CS, Morland LA, Glassman LH, et al. Virtual mental health care in the Veterans Health Administration's immediate response to coronavirus disease-19. *Am Psychol* 2021;76(1):26.
- [86] Understanding Telemedicine's "New Normal": Variations in Telemedicine Use by Specialty Line and Patient Demographics. *Telemed e-Health* 2022. <https://doi.org/10.1089/tmj.2021.0041>.