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Mitigating Social Isolation and Loneliness Through Smart Technology for Aging-in-Place

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INTRODUCTION

There has been a dramatic shift in the global demographic structure due to the disproportionately large proportion of people aged 65 and up, and the difficulties experienced by this demographic have a detrimental impact on the physical and mental health of people of all ages. These include things like sleep problems, exhaustion, depression, cognitive decline, cardiovascular disease, and increased mortality (Courtin & Knapp, 2017; Leigh-Hunt et al., 2017). This demographical change presents both opportunities and challenges for societies. A fundamental aspiration of older individuals in assessing opportunities and managing difficulties is the desire to maintain psychological independence and comfort in their own homes and communities, irrespective of age, income, or physical abilities, a concept known as "aging in place" (Wiles et al., 2012) which presents some benefits, including enhanced quality of life, maintenance of autonomy, a feeling of belonging (Sixsmith & Sixsmith, 2008) and collaboration with the community (relatives, friends, and neighbors). On the other hand, “aging in place” has some cons regarding restrictions on physical activity, health care

requirements, and safety concerns (i.e., falling).

As defined, "aging in place" has pros and cons, but it could help reduce the negative effects of loneliness and social isolation on people's health. The important thing to consider is how to make aging in place more accessible and provide the necessary infrastructure so that older people may stay in their homes for longer instead of going into an institution for care. A significant paradigm of care for older adults, aging in place encourages them to remain in their homes and communities as they age, despite the many obstacles they may face, particularly in individualistic or collectivist-individualist countries where independence and connectedness needs are seen as valuable.

Technology has shown great promise in recent years for overcoming these obstacles of “aging in place”; thus, its proper usage may provide numerous answers. There are various technologies, such as smart home systems, telemedicine, assistive devices, and other information and communication technologies, that have created new horizons for enhancing social life, social services, and the health of older adults. This is one of the greatest interests of the study which is how smart home systems and other technological concepts can enhance the social relations of older adults in their homes.

Through virtual platforms, for instance, smart devices can enable older persons to create the physical and psychological contact they have eroded. Advanced home technologies such as the smart home and other technological developments are useful in the relationship and improvement of the quality of life of older people and their care. The smart home systems have several features that can be used to increase the safety of older adults while at the same time encouraging them to be more sociable. Smart homes may enhance social connections and alleviate loneliness via video conferencing systems, voice response functionalities, and reminder mechanisms. This editorial explores the broader literature on how smart technology facilitates aging-in-place by mitigating social isolation and loneliness, examining current developments, challenges, and future directions.

Social Isolation and Loneliness

Loneliness and social isolation are two of the biggest problems that have a negative impact on the quality of life of older adults. To tackle these problems and to see how they affect older adults, it is important to understand the consequences of social isolation and loneliness on older adults. It will be useful for the purpose of this paper first to explain what is meant by social isolation and loneliness, as the two are not the same; social isolation is an actual lack of social contact, while loneliness is the subjective feeling of isolation (Holt-Lunstad et al., 2015). Both of these conditions have been linked to significant

health issues. The findings of studies that illustrate this condition indicate that social isolation leads to cognitive decline and dementia, as well as an increase in the risk of coronary heart disease by 29% and the risk of stroke by 32% (Cacioppo & Cacioppo, 2014; Valtorta et al., 2016). According to the findings of Beutel et al. (2017), there is a significant correlation between feelings of loneliness and a rise in mental health issues such as anxiety and depression.

The home environment significantly influences whether the issues encountered by older persons are alleviated or intensified. Durak (2004) emphasizes the significance of establishing a regular and controlled home environment that fosters the general well-being of older people. The house transcends its physical form, encapsulating treasured memories, providing solace, and facilitating communal ties for senior individuals.

Having the ability to engage with others in the community is another of the potential perks. According to Durak (2004), older people who live in surroundings with strong social support networks suffer less loneliness, acquire more favorable views about aging, and enjoy improved life satisfaction than their contemporaries. Additionally, according to Durak (2004), a home environment that is both secure and predictable stimulates psychological resilience, which in turn supports creative endeavors, the establishment of goals, and active engagement in life.

In this framework, Durak (2004) recommends a new model called "Services for the Older Adults in Their Living Environment" in order to assist older persons by addressing their biological, psychological, and social needs. The model seeks to enhance the quality of life for older individuals by addressing their physical, social, and psychological issues, fostering social engagement, and offering practical support in everyday activities. The model promotes the autonomy of older individuals by providing services like financial aid, legal advice, and cultural programs. The objective is to facilitate the integration of older individuals into social life, guarantee access to essential assistance, promote a dignified and fulfilling old age, and simultaneously enhance societal understanding of their challenges. Scharlach and Lehning (2013) released findings that support Durak's (2004) model, suggesting that the desire to age in place might worsen feelings of loneliness when social relationships and community participation are inadequate.

Moreover, circumstances such as mobility restrictions, loss of driving capability, and familial disarray aggravate this issue. At the same time, the desire to age in a place regrettably leads to significant physical impairments and health complications. Consequently, new and diversified strategies are essential to enhance the social connections of older

adults, thus increasing the likelihood of aging at home rather than in institutional care. The financial aspect is also crucial; a study conducted by Dury (2014) has shown that feelings of social isolation and loneliness increase healthcare use and social care expenditures, leading to notable outcomes. However, beyond small-scale interventions like mentoring and befriending programs that attempt to reduce loneliness, more comprehensive research is required to fully understand the promising results of aging in place (Dury, 2014).

If financial difficulties can be overcome, technology can offer effective solutions to reduce loneliness in older individuals. For example, according to Latikka et al. (2021), smart homes with sensors can detect signs of social isolation. Social robots or robotic pets can reduce these individuals' loneliness by providing emotional support. Grey et al. (2024) make the following statement: They state that these technologies are more successful when designed by the needs and preferences of older individuals. Although robotic pets do not replace the bond with children or loved ones, they are preferred as companions for many older individuals.

For these technologies to become more effective, increasing digital literacy and providing easy-to-use solutions is necessary (Tan et al., 2024). The COVID-19 pandemic has clearly shown how urgent it is to combat loneliness, especially in vulnerable groups. In today's world, where the population continues to age, it is necessary to develop scalable, evidence-based solutions to reduce loneliness and improve the quality of life of older individuals.

Smart Technology and Social Connectivity

Digital devices and software play an important role in increasing the independence and well-being of older people because they enhance communication, facilitate access to information, and simplify daily activities. Morris et al. (2013) emphasize that smartphones, tablets, laptops, and internet-based platforms greatly impact maintaining social ties and promoting an independent, secure life. In addition, digital technologies can help older people increase their social participation, control over daily life, and dignity (Hasan & Linger, 2016). Digital devices and applications can reduce social isolation, increase digital self-efficacy, and promote physical and mental well-being (Sen et al., 2022). These developments primarily bridge the communication gap between different generations; they also enable older individuals to connect with friends and family and access important services without leaving their homes by joining online social groups.

Technologies such as video conferencing, social media, and AI-based health monitoring have shown a substantial enhancement in the social interaction of older persons, aiding in alleviating loneliness (Thangavel et al., 2022). It is well-recognized that

technology may significantly improve the quality of life for older adults. When showcasing how technology may help older people, voice assistants, social networking platforms, and telemedicine apps are excellent examples. Voice response technologies like Alexa or Google Home can help older people feel less lonely. Older adults can have a good time with voice conversations; at the same time, they can engage in other activities that can help them live an active and engaged life, as well as reminders to carry out daily tasks, for instance, taking medicine or other daily activities.

Furthermore, this has the benefit of helping to challenge and break down the stereotypes and biases still present in society regarding older people. However, gaining a connection may not be that simple. Zhou et al. (2023) found that older people may struggle to accept new technologies, increasing the risk of social isolation (Hill et al., 2015). They also advocated applying unique user interfaces and community-based ways to make these breakthroughs more accessible and inclusive for older people.

Social Media Platforms

Video chat apps like Skype, Zoom, FaceTime, and others have removed regional and physical hurdles between people and groups, allowing real-time and immediate exchanges. This has completely changed how people talk to each other. People can feel and see nonverbal communication patterns, such as facial emotions and voice tone, as if they were face-to-face, even if they are thousands of kilometers or miles away. Older adults who have video chats with family members and friends have shown lower loneliness and higher social support (Quan-Haase et al., 2018; Tsai et al., 2020). Peers, neighbors, or even people they have never met may be included in these groups. Older people can reconnect with old acquaintances they have not seen for a long time and miss, join interest groups that support their interests and hobbies, and participate in community discussions on social media sites such as Facebook and Twitter (Nef et al., 2013)

Older persons may lack digital literacy, be skeptical of technology, and have physical limitations such as eyesight or hearing loss, as well as other health disorders, functional independence, and mobility issues that prevent them from fully participating in digital technologies. The development of intergenerational learning programs and community-based computer education programs might help older adults overcome these digital barriers even though those programs are quite rare (Schreurs, Quan-Haase, & Martin, 2017). In particular, older persons with a stronger interest in their health might benefit from digital health systems as a means of learning digital applications (Oh et al., 2021). These individualized programs, offered in

comfortable settings, have the potential to reduce feelings of isolation while simultaneously providing opportunities for health education and continued skill development.

Factors that inhibit the ability of older adults to fully engage with digital technologies include skepticism about technology adoption and use, as well as physical limitations that older adults have, such as vision or hearing impairments. Some suggestions on how to address these problems include the implementation of intergenerational learning programs or community-based computer courses (Schreurs et al., 2017). First, it is crucial to understand that all these initiatives must be designed in a way that would be relevant to the needs of older people since their disabilities and histories will vary according to the context of time and place. These projects not only enhance digital inclusion but also foster the social relationship between generations, which enable older people to leverage the technology effectively. As noted by Tsai et al. (2017) and Xie et al. (2012), such interventions are vital since they allow the older population to leverage digital innovations and remain engaged in society.

Online Support Groups

The benefits of interpersonal connections in traditional societies, which have been shown to have a higher potential for aging in place than in modern societies, may be replaced by technological advances in contemporary societies, which may create new opportunities for older people to cope more effectively with their social and emotional challenges when they choose to aging-in-place. Virtual communities and online support groups may be transforming instruments for promoting social connection, reducing loneliness, and supporting independent living. As Ebardo and Suarez (2022) point out, these platforms give cognitive advantages, pleasure, and opportunities for lifelong learning. This possibility is especially significant since, as Czaja (2017) found, older persons increasingly use social media platforms and online groups to battle loneliness and create meaningful interactions. However, intense use of social media among older adults has been noted as risky for feelings of social isolation (Meshi, Cotten, & Bender, 2019).

GetSetUp (n. d.) is an example of a customized virtual platform which shows how it is possible to engage older people in seminars and activities and make them feel valuable. Based on the conclusions made by Kosick et al. (2021), such platforms are highly effective in supporting learning as well as the formation of communities, which in turn boosts the users' purposefulness. In the same manner, Tufan et al. (2018) identified the importance of Turkey's 60+ Refresher University, where older people can enroll for skill enhancement and at the same time interact with other people of their age and the youth.

Such initiatives are a great example of how virtual technologies can break the barriers of the generation gap and create space for learning throughout life.

Apart from the individual platforms, other virtual interventions reflect the potential of the technological paradigm on social well-being. For example, Polonijo et al. (2024) found that the Virtual Village model increased the frequency of social interactions and, at the same time, reduced feelings of isolation among older adults living with HIV. Similarly, Gunnes et al. (2024) found out that the application of Information and Communication Technologies like video visits and social robots was effective in combating loneliness all the time. In addition, restrictions on internet access and lack of literacy remain significant obstacles, making the importance of inclusive design principles even more evident.

Such digital solutions are of critical importance for individuals who choose to age in their homes. Melchiorre et al. (2024) emphasized that digital technologies are an indispensable tool for older adults, especially those with limited mobility, to maintain social ties and maintain an active lifestyle. However, differences in education levels, inequities in access to healthcare services and limitations in access to technological infrastructure can make it difficult for these solutions to be widely adopted and used effectively.

Despite this, virtual technologies and online communities increase the participation of older adults in social life and enable them to live a higher quality and more fulfilling life both in their own homes and in their communities. These solutions not only reduce social isolation, but also contribute to older adults maintaining their independence and participating more actively in society. This provides a strong foundation for policymakers and societal decision-makers. Programs developed with an inclusive framework may have a revolutionary effect on policymakers' choices such as GetSetUp (n.d.) and the 60+ Refresher University. Research and investment continue to enhance accessibility, advance digital literacy, and provide user-centered solutions. These initiatives are facilitating older individuals to have more interconnected, autonomous, and purposeful lives.

Social Robots and Assistive Technologies

There are various kinds of assistive technologies, such as social robots, virtual assistants, and voice-activated systems, which are becoming more high-tech, easy to use, and very helpful for older adults who want to stay in their homes. Social robotics is the ability of robots to interact with humans by way of vocalizations, gestures and facial expressions. These robots provide essential services and friendship, which has been supported by the study done by Šabanović et al. (2013) and Wada et al. (2008). PARO, a therapeutic robotic seal, and Pepper, a humanoid

robot with emotion detection, are popular robotics. The primary purpose of social robots for older adults is to mitigate social isolation, diminish loneliness, and promote independence. Social robots assist older adults with everyday tasks, provide companionship, and enhance social connections. Consequently, they provide chances for commitment in the realm of life, control in the sphere of everyday management, and receptiveness to innovation and ignorance within the framework of progress, which are three critical subdimensions of psychological hardiness. Thus, social robots might diminish stress, mitigate loneliness, and enhance mood in older persons (Bemelmans et al., 2012; Pu et al., 2019). Nevertheless, ethical concerns emerge about the substitution of human interaction with artificial beings. Concerns include the likelihood of diminished human connection, privacy dilemmas, and the emotional ramifications of developing relationships with robots (Sharkey & Sharkey, 2012). It is crucial to equilibrate the use of social robots with avenues for authentic human interaction.

Assistive technologies are especially beneficial for older people with various disorders, diseases, or functional impairments. During the progression of Alzheimer's disease and other forms of dementia, functional independence, mobility, and social interactions deteriorated. Social robots and AI-powered gadgets may alleviate these difficulties by assisting with everyday chores, providing reminders, and improving communication. While these technologies show considerable potential, their implementation requires ethical concerns, flexibility to ongoing cognitive loss, and individualization depending on requirements. To be effective, aids for older persons must be tailored to their requirements (Cortellessa et al., 2021; Gerłowska et al., 2020).

The analyzed objects are virtual assistants such as Amazon's Alexa, Google Assistant, and Apple's Siri, which provide older adults with the help of virtual personal assistants that are voice-activated. These technologies can help in scheduling reminders for medication, appointments, and social events, reporting weather and news, and also, manage smart home devices (Pradhan et al., 2020).

Voice-activated technologies are especially useful for older adults or individuals with mobility and dexterity issues, as they do not require the physical operation of devices. The findings of the study by Corbett et al. (2020) reveal that older adults perceive virtual assistants as beneficial and simple to use, thereby improving their quality of life and reducing feelings of isolation.

Telehealth and Remote Monitoring

Telehealth services use new technology to provide remote healthcare, allowing older people to get medical treatment without leaving their homes. This concept is particularly advantageous for older people

encountering mobility difficulties or residing in remote regions with restricted access to healthcare services. Telemedicine enables older people to consult healthcare experts using video, phone, or messaging systems, which is especially beneficial for those managing chronic diseases or facing mobility challenges. This kind of healthcare delivery diminishes the need for in-person consultations, therefore mitigating some substantial obstacles that older individuals often have in obtaining prompt medical attention.

Furthermore, telemedicine has significant advantages in addressing social isolation and loneliness, which are prevalent difficulties among older persons. Regular check-ins with healthcare practitioners allow older people to obtain critical medical treatment while also experiencing a sense of connection, which helps ease feelings of loneliness. Telehealth may connect patients with virtual support groups and community services, therefore enhancing community participation. Studies demonstrate that continuous interaction with healthcare professionals enhances both physical and mental health outcomes, establishing a support structure that alleviates the adverse impacts of isolation and loneliness in this demographic (Monaghesh & Hajizadeh, 2020).

The COVID-19 pandemic pushed the usage of telemedicine, emphasizing its critical role in providing healthcare continuity during emergencies. As many older persons were unable or reluctant to attend medical institutions owing to health concerns, telemedicine developed as an important technique for ensuring healthcare access. It proved especially useful for individuals living in isolated or rural locations, where access to healthcare facilities might be difficult. While tele-health has obvious advantages, such as improving healthcare access, it also brings obstacles, especially for older persons who may struggle with technology. Effective use of telehealth services may be hindered by sensory disabilities, such as visual and auditory deficits, and lack of familiarity with digital technology. However, with adequate training and assistance, some older people express significant satisfaction with telemedicine, highlighting its capacity to reduce inequalities in access to healthcare (Smolić et al., 2022).

Wearable devices and home monitoring devices are also used in the care of older adults to monitor health parameters such as heart rate, activity, and sleep and to identify falls or emergencies. Liu et al. (2016) highlight their role in monitoring daily activities, cognitive health, and heart conditions. Boot (2019) stresses the significance of canes and walkers in assessing mobility for individuals to be independent and lead a good life, while Klimova and Maresova (2017) highlight the use of canes in fall detection, managing dementia and improving healthcare

access. Advances like the use of IoT-based systems with biometric bracelets enable the patient's vital signs to be tracked in real-time (Durán-Vega et al., 2019). Liu et al. (2016), Boot (2019), and Klimova and Maresova (2017) also discussed some of the issues including the issues of privacy, technology acceptance, and the need for more clinical trials. Nevertheless, these technologies have the potential of enabling intervention at the right time and may lead to early discharge and enhanced quality of life (Liu et al., 2016). Remote health monitoring technologies are essential for facilitating independent living while safeguarding the safety and well-being of older individuals. Some vital signs like heart rate, oxygen saturation, and body temperature, which older adults would like to monitor from time to time, can be done using wearables or the Internet of Things (IoT). This real-time monitoring, which is provided to older adults and at their reach, is a preventive study that enables health practitioners to act before a small problem becomes a big health issue. First of all, it is crucial to state that preventive measures are always more effective and safe than the curing ones. One should always remember that prevention is always cheaper and safer than treatment. The study also shows that older people adhere to such devices rather firmly and use them for long durations which is important in managing of chronic diseases and enhancing general health director (Evans et al., 2015). Moreover, enhancements in fall detection systems have significantly enhanced the safety of older individuals, particularly those with mobility impairments. These gadgets identify falls and swiftly alert caretakers or emergency responders, reducing the chance of severe harm. Despite the ongoing development of some of these technologies, their potential to improve safety and quality of life for older adults is promising. Individuals with chronic health issues have observed improved health outcomes and a more proactive health management plan with the incorporation of such systems (Wagner et al., 2012). Despite the fact that many of these technologies are still in development, they already show great promise for improving older individuals' health, safety, and independence. These solutions empower people by providing them with real-time information so that they can make better choices for their health. Also, wearable technology enhances the communication between healthcare givers, caregivers, and family members to enable holistic management of the healthcare of the concerned individual. This collaboration is essential for ensuring that older people get tailored treatment and support, which ultimately results in improved outcomes and a higher level of satisfaction with their experiences with healthcare (Olmedo-Aguirre et al., 2022). Finally, telehealth programs and remote monitoring technology are changing the way older people get

treatment. These technologies not only increase access to healthcare but also solve mobility and geographical limitations, ensuring that older people get the treatment they need when needed. These technologies provide real-time health monitoring, allowing for the early detection of potential health issues, hence reducing hospitalizations and improving overall health outcomes. There are still some obstacles that are preventing the full adoption of these technologies although there are still some challenges that exist in the area of telehealth services and wearable devices due to sensory disabilities and technological defects. The progress that has been made in telehealth services and wearable devices has created great promise. All these advancements that are being made are also helpful in enhancing the health and well-being of the people as they grow older, which not only enhances the quality of health care but also helps in minimizing the social isolation of older people.

Smart Home Technologies

Smart home technologies offer the best option for improving the health and safety of the older adults while also increasing their level of independence. In order to minimize the need for help from other people, prevent danger, and increase the quality of life of these people, these technologies incorporate automation, monitoring, and communication systems. For example, there are smart lighting and thermostats, which change with mobility and habits of the older adults to minimize falls and increase the comfort of the older adults (Chan et al., 2009). Other features include doorbell cameras, motion sensors, and automatic locks that help to monitor the home environment, raise the alarm to the caregivers or emergency contacts in case of any changes, and provide a sense of security to older adults and their families (Demiris & Hensel, 2008).

Wearable sensors, health monitoring devices like home-based systems, and advanced technologies like accelerometers and gyroscopes monitor vital signs like heart rate, blood pressure, and mobility (Ilapakurthy, 2023) and notify the older person's doctor, nurse, caregiver, or These systems reduce hospitalizations and promote independence by early diagnosis of health issues, lowering the financial burden on the person, their family, and society, while also improving the quality of life for older adults. Furthermore, interactive platforms built into smart homes enable consumers to engage with family members, caretakers, and emergency services via simple interfaces and voice commands. According to Mahoney et al. (2007), this enables the promotion of social and emotional well-being, which has a direct and positive impact on an individual's quality of life and self-esteem. Despite the achievements and inventions listed above, the challenges encountered by older adults

remain constant. Loss of privacy and fears about being observed, as well as the complexity of certain yet-to-be-established technical systems, may deter older people from using technology's advantages. The solutions that are intended to address the requirements of people with cognitive and physical disabilities are very effective in overcoming these barriers. For instance, Morris et al. (2013) have identified simpler user interfaces and voice assistants as some of the solutions. These technologies not only make the environment more accessible but also enable older adults to live independently and with dignity thereby reducing some of the difficulties they encounter. However, more research is required to determine how these technologies can be implemented in different socioeconomic and cultural backgrounds and to determine the effects of these technologies on the quality of life in the long run (Demiris & Hensel, 2008; Ilapakurthy, 2023).

Challenges and Barriers to Adoption

There are certain challenges that older people face in adopting the various advantages of smart technology as listed above. The first challenge is the digital divide as many older adults have difficulty understanding and operating new technology especially the young, the old, or those with other challenges such as hearing or vision impairment (Mitzner et al., 2010). This is due to many factors, including lack of technological knowledge, physical limitations, concerns about privacy and cost, and older adults are interested in technologies that support independent living and are trying to accept them as part of their lives (Lee & Coughlin, 2015; Wang et al., 2019).

Concerns about privacy with home technology products, especially the perceived loss of data security and exploitation of personal information, hinder the widespread adoption of these technologies (Peek et al., 2014). The cost of smart gadgets and ongoing services is a big financial burden that most older people, especially those on limited income, cannot afford. To address this issue, initiatives such as subsidies for older people to use technology, insurance for these requirements or community-based financing can make these technologies more financially accessible (Berridge & Wetle, 2020).

The aforementioned anxieties and apprehensions about technology, the intricacy of technological instruments, and the potential for escalating reliance on these tools daily hinder the adoption and acceptance of technological tools among older adults. To address this issue, training and demonstrations illustrate how smart technology may enhance safety and independence may mitigate these challenges (Heart & Kalderon, 2013). Furthermore, to enhance usability and acceptability, it is crucial to design these technologies with the requirements and competencies of older persons in mind, to provide user-friendly interfaces, and to provide training programs (Czaja et

al., 2019). Engaging older persons in the design and testing phases will specifically mitigate their worries about privacy and social isolation, facilitating their effective integration into everyday life (Street et al., 2022; Wang et al., 2019).

Ethical Considerations

The integration of technology into the lives of older people raises important issues such as autonomy, consent, and privacy. It is of great importance that older people maintain their autonomy over the use of technology, especially in cases of tracking devices and personal data collection (Molony et al., 2018). In addition, they need to be constantly informed of this guarantee. In addition to protecting privacy, it is also critical that technology does not replace basic human connections and communication, which can lead to negative outcomes such as social isolation and loneliness in older people (Pirzada et al., 2021). To improve technology acceptance among older persons, technologies should not replace human interactions; rather, they should be developed to assist or supplement existing relationships (Neven, 2015).

In order to effectively integrate digital health technology into the healthcare system, health institutions also need to set data integration standards and provide training for clinicians (Finco et al., 2024). The consequences of not addressing these issues include further social isolation, poorer quality of life, and increased risk of vulnerability in older adults. The proper use of technology, wise, planned, and moral can help to improve the life and the level of independence of the older adults (Demiris et al., 2009).

CONCLUSION

Implementing intelligent technology into the models of aging in place has been identified as a viable solution that can help address the problems of social isolation and loneliness in older adults. Smart technology has the potential to stimulate and promote increased social engagement among older persons, improve their mental well-being, and retain their autonomy (Thangavel et al., 2022). This may be accomplished by employing advancements in both digital devices and virtual platforms. It is so because technologies are constantly being developed and improved upon, and they are in a very good position to meet the needs and wants of older people quickly and effectively. Furthermore, it is crucial to strive to enhance accessibility, for instance, by reducing the costs of internet connection and designing interfaces that are easy to use so as to ensure that such technologies are within the reach of all older adults irrespective of their economic or technical background (Zhou et al., 2023). To put it another way, in a world where individualistic cultures are becoming more

dominant, it seems to be of the utmost importance to make technology economically accessible and to strengthen the capacity of older people to utilize it. Furthermore, in order to create total solutions for people to support them to live in their homes as they grow older, it is important to take a holistic view of the issue and include healthcare professionals, technologists, and politicians. The collaboration between these many stakeholders will guarantee that the solutions that are produced are not only technologically efficient but also responsive to the physical, psychological, and social demands of older individuals. Additionally, the solutions will have a strong basis of psychological, social, and policy infrastructures. There are, however, challenges that exist in the current world, such as inequality in access to digital literacy and issues of privacy and security, which are rising as a result of the use of technology. Given the above, it can be stated that technology has the capacity of minimizing social isolation and enhancing the quality of life of older adults although this has not been to a considerable level. In the future, it will be essential to maintain research and investment in the development of user-centered technologies that are inclusive in order to provide assistance to older people in their efforts to live freely, with dignity, and in connection with their close neighbors and relatives, as well as with their national and worldwide communities.

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