Relationships among technology use, social engagement, resilience, and access to healthcare

Sharon LIU, BHSc & Jeffrey W. JUTAI, PhD[1]

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[1] Faculty of Health Sciences, University of Ottawa, Canada

**Auteur(e) correspondant | Corresponding author: Sharon Liu,* sliu263@uottawa.ca

Abstract: The COVID-19 pandemic prompted measures to protect the most vulnerable populations that induced inequities by diminishing accessibility of healthcare services for older adults. It has been argued that assistive technologies can reduce health inequities by promoting access to healthcare through resilience and social engagement. We did a small exploratory study to investigate how technologies designed to support social engagement and resilience are related to healthcare-seeking behaviors and healthcare access with a sample of 8 community-dwelling older adults aged 65+. We hypothesized relationships among the following variables: technology use, social engagement, resilience, psychological impact of assistive devices, care-seeking behaviors, and access to healthcare. Variables were assessed using questionnaires administered in an interview format. The results give partial support to our hypotheses. For example, increased frequency and longer duration of technology use were correlated with improved social engagement. Increased social engagement and a positive psychosocial impact of assistive devices were associated with increased resilience. The findings demonstrate that technology can mitigating healthcare barriers by promoting social engagement, resilience, and care-seeking behaviors. Recommendations for future studies include using large sample sizes and a broader range of measures for the key constructs to produce generalizable findings consistent with our preliminary results.

Key Words: assistive technology, healthcare access, older adults, psychosocial impact, resilience, social engagement

Résumé: La pandémie de COVID-19 a donné lieu à des mesures de protection des populations les plus vulnérables qui ont induit des inégalités en réduisant l'accessibilité des services de soins de santé pour les personnes âgées. Il a été avancé que les technologies d'assistance peuvent réduire les inégalités en matière de santé en favorisant l'accès aux soins de santé grâce à la résilience et à l'engagement social. Nous avons mené une petite étude exploratoire pour examiner comment les technologies

conçues pour soutenir l'engagement social et la résilience sont liées aux comportements de recherche de soins de santé et à l'accès aux soins de santé auprès d'un échantillon de 8 personnes âgées de 65 ans et plus vivant dans la communauté. Nous avons formulé des hypothèses sur les relations entre les variables suivantes : utilisation de la technologie, engagement social, résilience, impact psychologique des dispositifs d'assistance, comportements de recherche de soins et accès aux soins de santé. Les variables ont été évaluées à l'aide de questionnaires administrés sous forme d'entretiens. Les résultats soutiennent partiellement nos hypothèses. Par exemple, l'augmentation de la fréquence et de la durée d'utilisation de la technologie est corrélée à un meilleur engagement social. Un engagement social accru et un impact psychosocial positif des dispositifs d'assistance ont été associés à une résilience accrue. Les résultats démontrent que la technologie peut atténuer les obstacles aux soins de santé en favorisant l'engagement social, la résilience et les comportements de recherche de soins. Les recommandations pour les études futures comprennent l'utilisation d'échantillons de grande taille et d'un éventail plus large de mesures pour les concepts clés afin de produire des résultats généralisables compatibles avec nos résultats préliminaires.

Mots-clés: technologie d'assistance, accès aux soins de santé, personnes âgées, impact psychosocial, résilience, engagement social

Introduction

Older adults (individuals 65 years and older) accounted for 64% of total deaths and 93% of deaths caused by the COVID-19 pandemic (Government of Canada, 2021) despite the implementation of many measures to protect the most vulnerable populations. Measures that included lockdown, stay at home, and shelter-in-place orders led to a reduction in community and health services, transportation, social gatherings, and volunteering (Wister and Kadowaki, 2022; Morrow-Howell et al., 2020). While many of these measures protected older adults against COVID-19 infection, they had a negative impact on their physical and mental well-being (Cocuzzo et al., 2022). Reduced social interactions can result in negative health effects such as anxiety, hypertension, obesity, and cognitive decline (U.S. Department of Health and Human Services, 2019). Among these outcomes, depression and cardiovascular disease are likely to pose the greatest mortality risk as they are associated with increased risk of stroke and death in older adults (Zhang et al., 2018). Furthermore, due to mobility and sensory limitations, and low income, many older adults are disproportionately affected by challenges in accessing healthcare services. Healthcare accessibility is a vital aspect of healthy aging as a reduction in access to healthcare may lead to an increased risk for mortality and morbidity (McMaughan et al., 2020). With the COVID-19 pandemic, many health services such as in-person medical care, wellness checks, elective procedures, and family visits were canceled to reduce the spread of COVID-19. Therefore, in addition to mobility and sensory limitations and low income, older adults experience increased health inequities resulting from the COVID-19 measures put in place (Cocuzzo et al., 2022).

Resilience refers to one's ability to respond and overcome stressors (Abadir et al., 2023). Research has shown that resilience can enhance older adults' capabilities to seek support and therefore improves their access to healthcare (Jutai and Tuazon, 2022). Technologies found to promote resilience include assistive devices and digital technologies accessible to the internet (Shabbir et al., 2023; Newmark et al., 2023). Assistive technologies allow for self-empowerment, improved satisfaction, enhanced facilitation in life, and has a positive influence on psychological health (Shabbir et al., 2023). Digital technologies allow for easy participation in day-to-day activities such as communication with friends and family, and participation in social groups (Newmark et al., 2023). Technologies found to support social engagement include devices and apps that allow for easy access to loved ones, email, community services, and information (Neves et al., 2019; Czaja et al., 2018). Studies in this area have examined the effects of technology use on resilience and social engagement independently. None have explored how these three variables are interrelated nor how they affect healthcare seeking behaviours and healthcare accessibility.

Jutai and Tuazon (2022) performed a scoping review to describe how assistive technology affects relationships among the variables: social isolation and loneliness, social support, resilience, healthcare seeking behaviors, and access to healthcare for older adults. The authors proposed a model of how social isolation can have a negative cascading effect resulting in decreased social support, resilience, care seeking behaviors, and reduced access to healthcare (Figure 1). In this model, different forms of technology can have a positive impact on this process when they are introduced in a specific sequence. Technology interventions

that can diminish the effects of social isolation and loneliness can, promote healthcare accessibility and reduce inequity. Devices used to encourage and support communication, such as social apps on smartphones, iPads, and personal computers, can increase older adults' perception of social support. Increased social support can encourage older adults to adopt assistive devices to address their functional needs, such as aids for mobility, hearing, and vision. Appropriate use of these devices will in turn increase older adults' sense of resilience, care-seeking intentions, and access to healthcare.

We did a small exploratory study to test predictions made by Jutai and Tuazon's (2022) model, focusing on the relationships among these important variables.

Hypotheses

This exploratory study used a mixed methods research design to see what evidence might support hypotheses derived from the Jutai and Tuazon model and to explore how the findings might be used to inform the design of studies with larger samples and controls. The hypotheses were:

1. More frequent use of communication devices, such as telephone, internet, and computer-based devices is associated with increased social engagement.
2. More increased social engagement, increased duration of assistive devices use, such as mobility and vision aids and more positive psychosocial impact of assistive devices are associated with increased resilience.
3. Increased resilience is associated with increased care-seeking behaviours.
4. Increased care-seeking is associated with greater access to healthcare.

The study received ethical approval from the University of Ottawa Research Ethics Board.

Methodology

Setting and Participants

The participants in this study were recruited from Perley Health in Ottawa. Perley Health operates a Senior's village with 450 long-term care beds and 139 apartments for older adults. Perley Health assisted in the recruitment of participants who were living in the assisted-living apartments and congregate living areas by publicizing a flyer.

Procedures

This study used a mixed methods approach. Quantitative data were gathered through questionnaires about assistive and communication devices, social engagement, resilience, the psychosocial impact of assistive devices, help-seeking behaviors, and access to healthcare. Qualitative data were gathered using open-ended questions about participants' history of technology use, focusing on communication and assistive devices. Participants were asked to complete questionnaires that were administered in an interview format. These interviews were 60 to 90 minutes in duration. The interviews begun by gathering demographic information and previous history of technology used for physical functional limitations and social engagement. Questionnaires on social engagement (Lubben Social Network Scale-6 (LSNS-6); Lubben et al., 2006), resilience (Making it CLEAR (MiC) questionnaire; Whitehall et al., 2021), psychosocial impact of assistive devices (Psychosocial Impact of Assistive Devices Scale (PIADS); Jutai & Day, 2002), help-seeking (General Help-Seeking Questionnaire (GHSQ); Wilson et al., 2005), and access to healthcare (Healthcare access questionnaire; Smith,

2008) were administrated verbally through the interview.

Measures

The LSNS-6 is a six-item scale assessing social isolation in older adults. It is comprised of six questions evaluating kinship ties and non-kin ties. Responses varied between 0 and 5. A value of 0 indicated no contact with friends or family members, while a value of 5 represented reaching out to 9 or more friends or family members. The creator of the scale has identified a mean value of 2, as a clinical cut point for LSNS-6, indicating those at risk for social isolation reached out to a maximum of two people (Lubben et al., 2006).

The MiC questionnaire addresses various factors that impact older adults' resilience. There are two subscales: individual determinants of resilience (IDOR), and environmental determinants of resilience (EDOR). Participants rated their level of agreement on a 4-point scale, ranging from 0, strongly disagree to 3, strongly agree. A poor IDOR ranges from 0 to 21, a moderate IDOR ranges from 22-42, and a high IDOR ranges from 43 to 63. A poor EDOR ranges from 0-13, a moderate EDOR ranges from 14 to 26, and a high EDOR ranges from 27 to 39 (Whitehall et al., 2021).

PIADS is a 26-item questionnaire which assesses the effects of an assistive device on functional independence, wellbeing, and quality of life using a 7-point range. There are three subscales: competence, adaptability, and self-esteem. The responses range from -3, maximum negative impact, to 0, no perceived impact, and to +3, maximum positive impact. Participants assessed their assistive device and its impact on different factors. High scores on the PIADS give a reliable indication of intention to use an assistive device (Jutai and Day, 2002).

GHSQ is a questionnaire that assesses an individuals' intention to seek help from various sources for health problems. Questions and help sources were modified to a "health problem" to match the target population. A Likert scale was used to determine degree of intentionality and preferences between various help sources. The GHSQ uses a 7-point scale ranging from 1, extremely unlikely to 7, extremely likely. Higher scores indicated higher care-seeking intentions (Wilson et al., 2005).

The Healthcare Access Questionnaire derived from the National Health Interview Survey addresses access to healthcare services. The questionnaire identifies barriers to healthcare using a dichotomous scale: an access problem or no access problem. Responses vary from 0, no access problem to 10, maximum barriers to healthcare (Smith, 2008).

The interviews were audio-recorded, and all responses were transcribed. A deductive thematic analysis was conducted to analyze the qualitative data from interviews (Braun & Clarke, 2006) and the responses to the surveys were analyzed quantitatively. Descriptive statistics and correlations among the measures were also identified. The findings gathered from the interviews were visualized using tables. Lastly, the COREQ checklist for qualitative data was used to properly report qualitative data (Tong et al., 2007).

Results

Demographic and participants' characteristics

A total of eight (8) assisted-living tenants at Perley-Health were recruited. Table 1 summarizes the participants' characteristics. The gender distribution

included four males and four females. Participants' ages ranged from 67 to 97 years old (median: 79.5). Two participants attended but did not graduate high school, two achieved a high school diploma, and four achieved a college diploma or undergraduate degree. Four participants stated they were single, two were widowed, one was divorced, and one was married. Additionally, most participants' primary language spoken with friends and family was English, while one participant spoke Vietnamese. Previous studies on the use of technology by older adults reported similar age and marital demographics; however, our sample had a balanced gender distribution, and participants demonstrated higher levels of education (Neves et al., 2019; Czaja et al., 2018; Lee et al., 2022).

History of assistive device usage

All eight participants reported difficulties with mobility and the use of assistive devices. Most participants used one type of assistive device, while three used multiple assistive devices. Primary assistive devices included walkers, a cane, manual wheelchairs, a power wheelchair, a scooter, and a vision cane. On average, participants reported using assistive devices for 14.81 years. In addition, participants reported difficulties with vision, hearing, memory, bladder/bowel control, difficulties getting on and off the toilet, and difficulties with mobility due to poor vision, for which they used vision aids, hearing aids, memory aids, bladder/bowel control aids, grab bars in the bathroom, grab bars next to the bed, and mobile phones for text-to-speech. Previous studies that analyzed the use of technology by older adults reported similar health challenges and assistive device usage (Neves et al., 2019; Lee et al., 2022). Table 2 presents the participants' usage of assistive devices.

History of technology use

All participants had access to a telephone with most participants using the device everyday. Two participants reported less frequent usage: one participant used the telephone once a day and the other used the telephone less than once a month. Usage of other devices was noted. Participants primarily used smartphones, then tablets, and laptops, and no participant used a desktop. Furthermore, most participants reported using the devices with difficulty as opposed to without difficulty. Usage of these devices varied between 1 to 15 years. Most participants used the internet, with two participants without access. Preferred activities included accessing electronic mail, games, news, reading, watching shows, and researching. One participant reported their preferred activity as chatting with others. Contrary to our findings, a previous study reported older adults using technology and the internet to facilitate video calls with friends and family, as well as participating in religious or interest-based social gatherings (Newmark et al., 2023). Table 3 summarizes participants' previous technology use.

Questionnaires

Table 4 summarizes the distribution of variables from the questionnaires.

Social engagement

The average score for social engagement was 2.48. Participants on average were not at risk for social isolation. The scores ranged from 1 to 3. Participants identified a minimum of one or a maximum of three or four family members or friends. However, there were three participants with a mean social engagement level below 2, these individuals were at risk for social isolation.

The average score on the social engagement, family subscale was 2.04. Participants indicated on average reaching out to two family members. The scores ranged between 0 and 3. Some participants indicated no family members, while others identified three or four family members. The average score on the friend subscale was 2.92. Participants indicated on average reaching out to two friends. The scores ranged between 1 and 5. Participants indicated reaching out to a minimum of one friend or a maximum of nine or more friends.

Resilience

The average IDOR and EDOR score on the MIC questionnaire was 42.75 and 27.5, respectively. These values both indicate a moderate score. The IDOR scores ranged from 34 to 51, four participants reported a moderate IDOR score and four participants reported a high IDOR score. The EDOR scores ranged from 22 to 35, four participants with a moderate EDOR score, and four participants with a high EDOR score.

Psychosocial Impact of Assistive Devices

Device users with PIADS subscale scores equal to or higher than 1 have a greater intention to use their devices longer term. The range among participants for the competence subscale was -0.42 to 2.67. The range of scores for the adaptability subscale was -1.33 to 3.00. Lastly, the range among participants for the self-esteem subscale was -1.25 to 3.00. The average scores for the competence subscale, the adaptability subscale, and the self-esteem subscale were 1.24, 0.92, and 0.80, respectively. Participants found that their primary assistive device had no perceived impact on their adaptability and self-esteem; however, had improved their competence, “a little bit better”.

General Help-Seeking

In the GHSQ, participants were unlikely to reach out to a parent, intimate partner, minister/religious leader, or work colleague and were more likely to reach out to a friend, family member, phone help line, or doctor/general practitioner when experiencing a health issue. The mean score of the GHSQ was 4.15. Participants on average reported a neutral intention when seeking help from various help sources. The range of responses vary between 3, an “unlikely” intention to 5, a “likely” intention to seek help. Most participants were reluctant or neutral, with one individual indicating that they were “likely” to seek help.

Healthcare Accessibility

The mean score for healthcare accessibility was 1.88. Participants reported an average of one barrier when accessing healthcare. In this sample, participants’ responses ranged from zero to three. One participant reported no barriers, four participants reported one or two barriers, and three participants reported three barriers to healthcare.

Tests of the Research Hypotheses

Please note that in this section, the emphasis was on the descriptive statistics and inspection of the distributions of questionnaire scores. Because of the small sample size, the results of significance testing were not considered reliable.

Hypothesis 1: More frequent use of communication devices, such as telephone, internet, and computer-based devices is

associated with increased social engagement.

A moderate correlation (r=0.412, n.s.) suggested that increased telephone use was associated with increased social engagement. Most individuals who used the telephone daily reported talking or intending to speak with more than two relatives or friends. Frequency of internet use was measured by how often an individual uses the telephone. A weak correlation (r=-0.285, n.s.), indicated that increased frequency of internet use was associated with lowered social engagement scores. Intensity of internet use was measured by the number of hours spent on the internet per day. There was a strong correlation (r=-0.795, p=0.018), indicating that greater intensity was associated with lowered social engagement scores. However, there was a very weak correlation (r=-0.107, n.s) that suggested that increased length of time of smartphone use was associated with lowered social engagement scores. There was a wide distribution of participants owning a smartphone, ranging from no prior use to a duration of eight years. Also, there is a very weak correlation (r=0.187, n.s), suggesting that longer lengths of time spent using a tablet (years) was associated with increased social engagement scores. Three participants have not previously used a tablet, with four participants with prior use. Lastly, there was no correlation found between duration of laptop use (years) and social engagement (r=-0.003, n.s).

Hypothesis 2: More increased social engagement, increased duration of assistive devices use, such as mobility and vision aids and more positive psychosocial impact of assistive devices are associated with increased resilience.

A moderate correlation (r=0.452, n.s.) between social engagement and resilience suggested that increased social engagement was associated with increased resilience. There was a weak correlation (r=-0.347, n.s.) between the length of time (months, years) of assistive device use and resilience. Increased duration of assistive devices use was associated with a reduction in resilience. Most participants report owning their assistive devices for less than 20 years and resilience levels vary among participants. Regarding the psychosocial impact of assistive devices as measured using the PIADS subscales (Competence, Adaptability, and Self-esteem), for Competence, there was a strong correlation (r=0.810, n.s.). Increased Competence levels were associated with increased resilience scores. There was no correlation (r=0, p=1, not significant) between resilience and Adaptability. There was a moderate positive correlation (r=0.611, n.s.) between Self-esteem and resilience. An increase in self-esteem was associated with an increase in resilience.

Hypothesis 3: Increased resilience is associated with increased care-seeking behaviors.

There was a moderate correlation between resilience and help seeking behaviors (r=0.619, n.s.). Increased resilience was associated with stronger help-seeking intentions.

Hypothesis 4: Increased care-seeking behavior is associated with greater access to healthcare.

There was no correlation (r=-0.062, n.s) between care-seeking behaviors and access to healthcare.

Discussion

This study explored predictions for variable relationships derived from the model proposed by Jutai and Tuazon (2022). We assessed the impact of technology on social engagement and resilience, looking at the role technology might play in these relationships. Furthermore, we look at the role of social engagement and resilience on help-seeking intentions and healthcare accessibility. Our findings provide preliminary support for the model and encouraging for future research on the model. It seems that telephone and tablet use may play positive roles as they have been associated with improved social engagement. On the contrary, frequent and longer intensities of internet use were associated with less social engagement. We also found that improved social engagement and assistive technologies which encourage self-esteem and competence can promote resilience. Moreover, resilience can play a positive role by increasing help-seeking intentions. However, increased care-seeking behaviors were not linked with improved healthcare access.

Do communication devices encourage and support social engagement?

Our study indicated that technologies like increased telephone use encouraged social engagement. Our findings agree with Mierzeicki et al. (2024). Loneliness and social isolation measures were found to be significantly improved through implementation of telephone and video communication sessions. Other studies addressing internet use provide conflicting evidence. Cotten et al. (2013) found that internet use is associated with reduced loneliness in assisted living communities. Participants reported that increased internet use was associated with lowered perceptions of isolation. In our study, participants were asked about their preferred activities when using the internet, however, follow up questions were not asked to describe the activities' frequency, intensity, or duration. It is possible that some heavy users were using the internet and computer-based devices for activities other than socializing, such as, streaming TV shows and movies, playing games, and reading news stories. This contrasts with heavy telephone use, which would be for social contact and not be for those activities. The negative correlation between social engagement and internet use or duration of smartphone use may result from older adults' preference towards telephones over newer technologies for social engagement.

Does social engagement promote resilience?

The findings indicated that increased social engagement is linked to increased resilience. The results are consistent with previous studies. Blane et al. (2011) found that positive social relationships including regular contact with friends, social participation, and membership in social organizations, were linked to increased resilience in older adults. Furthermore, the Annual Report of Strengthening Personal Resilience in East Sussex (2016) highlighted that higher levels of social and community engagement serve as protective factors for resilience later in life.

Does frequency of assistive devices improve resilience?

Contrary to the hypothesis, the findings suggested that increased duration of assistive device use is associated with poor resilience. This finding was difficult to interpret. It may indicate that participants who had a long history of assistive device use had more functional limitations than those with shorter histories and, therefore, reported being less resilient. Future studies

of this kind should include the functional status of participants in their analyses.

Do feelings of increased competence, adaptability, and self-esteem from assistive device use improve resilience?

The PIADS results suggest that enhanced competence and self-esteem from assistive device use are associated with improved resilience. The absence of correlation between adaptability and resilience might be associated with the limited opportunities that the participants had for using their mobility and vision aids outside of their residences. Jutai (1999) argued that the Adaptability subscale was sensitive to whether the assistive device user felt inclined (or motivated) to exploit the functionality afforded by their devices. Existing studies address competence and resilience as independent variables. Zábó et al. (2023) found that psychological resilience and competence played an essential role by promoting wellbeing, improved physical health, and longevity in older adults. A strong sense of purpose contributed to psychological resilience and competence through fostering motivation, determination, and a positive mindset.

Does increased resilience improve care-seeking intentions?

The results indicate that resilience may be associated to increased care-seeking intentions. To date, no studies were found assessing the relationship between resilience and positive care-seeking behaviors among the older adult population. However, existing studies have been found among the youth and adults. Our results agrees with Hom et al. (2022). Resilience and lower help-seeking stigmas are related to improved wellbeing. Resilience is important among those who seek-help, leading to better psychological well-being. Alternatively, Grove et al. (2023) found that youth reported average resilience scores, however, viewed themselves as resilient. When addressing mental health problems, youth reported they would seek help from a healthcare provider, although, they also reported poor coping behaviors like the consumption of drugs and alcohol.

Does increased care-seeking behaviors lead to improved healthcare accessability?

The findings suggest that there is no relation between help-seeking behaviors and healthcare access. However, our results cannot be verified, as there is a lack of research assessing the association between care-seeking behaviors and access to healthcare. The lack of correlation may result from the questions posed in the General Help-Seeking Questionnaire. These help-sources may not accurately measure older adults' help-seeking intentions. For example, an intimiate partner may not have accurately indicated help-seeking intentions as most participants' were single, divorced, or widowed.

Limitations

There are limitations within the pilot study, however, future studies can integrate the recommendations to produce generalizable findings. To begin, limitations include a small sample size, the convenience sampling method, the cross-sectional study design, and the data collection tools. Further studies can integrate a larger sample size, alternative recruitment designs, alternative study designs, and alternative data collection tools.

Conclusion

The goal of the small study was to perform a preliminary exploration of

predictions derived from Jutai and Tuazon's (2022) model. The findings suggest that the model's predictions seem to be supported by the findings. Increased frequency of telephone use, increased duration of tablet use, and a positive psychosocial impact of assistive devices can facilitate greater health seeking intentions through the promotion of social engagement and resilience. We expect that future studies will incorporate larger sample sizes and alternative measures for the key constructs. By integrating these recommendations, future studies may produce generalizable findings consistent with our preliminary results or produce relationships among the variables that align with the hypothesis.

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Appendix

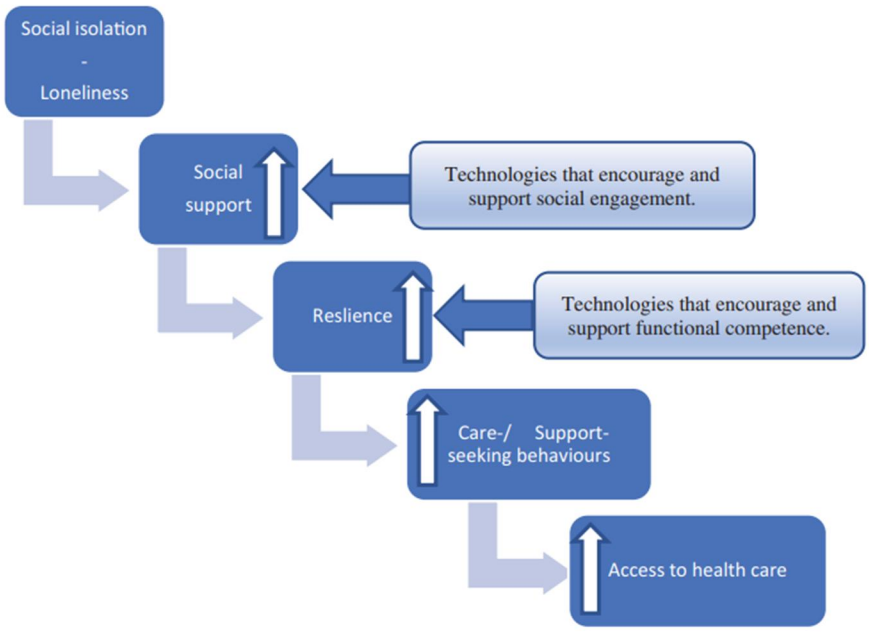

Figure 1: Model proposed by Jutai and Tuazon (2022)

		Participants
Occupation	No Occupation	0
	Technology Projects	0
	Royal Canadian Mountain Police	2
	Factory Worker	2
	Personal Support Worker	1
	Fiberoptic Company	1
	Secretary	1
	Security	1
Education Level	Less than High School	2
	High School Graduation	2
	College Diploma	2
	Undergraduate Degree	2
	Master's Degree	0
	PhD	0
	Prefer not to answer	0
Martial Status	Common-Law	0
	Divorced	1
	Married	1
	Single	4
	Widowed	2
	Other	0

	Prefer not to answer	0
Gender	Male	4
	Female	4
Age	Range	67-97
	Median	79.5
	Mean	80
Primary Language	English	7
	Vietnamese	1

Table 1: Demographic Information

		Count	Mean
Mobility Difficulties	No	0	
	Yes	8	
Assistive Device Usage	No	0	
	Yes	8	
More than one type of assistive device	No	5	
	Yes	3	
Primary Assistive Device	Does not use device	0	
	Cane	1	
	Crutches	0	
	Walker	3	
	Wheelchair - Manual	1	
	Wheelchair - Power	1	
	Scooter	1	
	Prosthesis	0	
	Vision Cane	1	
Primary Assistive Device Duration (Years)			14.81
Difficulty with Vision	No	2	
	Yes	6	
Difficulty with Hearing	No	5	
	Yes	3	
Difficulty with Memory	No	5	

	Yes	3	
Difficulty with Bladder/Bowel Control	No	5	
	Yes	3	
Difficulty getting on and off toilet	No	7	
	Yes	1	
Difficulty getting in and out of bathtub	No	7	
	Yes	1	
Difficulty with mobility due to poor vision	No	7	
	Yes	1	
Use of vision aids	No	2	
	Yes	6	
Use of hearing aids	No	5	
	Yes	3	
Use of memory aids	No	5	
	Yes	3	
Use of bladder/bowel control aids	No	6	
	Yes	2	
Use of grab bars in the bathroom	No	0	
	Yes	8	
Use of grab bars next to the bed	No	7	
	Yes	1	
Use of cellphone for text to speech	No	7	

Yes	1	

Table 2: Demographic information of Assistive Device usage

		Count	Mean
Telephone use	No	0	
	Yes	8	
Frequency of telephone use	Everyday	5	
	More than once a day	1	
	Once a day	1	
	Once a month	0	
	Less than once a month	1	
Usage of the following devices in the past 3 months:			
Smartphone	Yes (Without Difficulty)	2	
	Yes (With Difficulty)	4	
	No	2	
	I don't know	0	
Tablet	Yes (Without Difficulty)	1	
	Yes (With Difficulty)	3	
	No	4	
	I don't know	0	
Laptop	Yes (Without Difficulty)	3	
	Yes (With Difficulty)	0	
	No	5	
	I don't know	0	
Desktop	Yes (Without Difficulty)	0	

	Yes (With Difficulty)	0	
	No	8	
	I don't know	0	
Duration of smartphone use (years)			3
Duration of tablet use (years)			2
Duration of laptop use (years)			3
Duration of desktop use (years)			0
Frequency of internet use	Everyday	4	
	More than once a day	0	
	Once a day	2	
	Once a month	0	
	Less than once a month	2	
	Less than 1 hour a day	3	
	1-2 hours	1	
	2-3 hours	2	
	3-4 hours	2	
	More than 4 hours a day	0	
Preferred activities done online:			
No access to internet	No	5	
	Yes	3	
Electronic mail	No	7	
	Yes	1	

Games	No	7	
	Yes	1	
Research	No	3	
	Yes	5	
News	No	7	
	Yes	1	
Read	No	7	
	Yes	1	
Chatting with others	No	7	
	Yes	1	
Watching shows	No	7	
	Yes	1	

Table 3: Demographic information of previous technology use

Outcome Measure Questionnaires	Mean	Range
Lubben Social Network Scale (Total)	2.48	1.33-3.50
Lubben Social Network Scale (Family Subscale)	2.04	0-3.33
Lubben Social Network Scale (Friend Subscale)	2.92	1.33-5.00
Making it CLEAR questionnaire – Individual Determinants of Resilience	42.75	34.00-51.00
Making it CLEAR questionnaire – Environmental Determinants of Resilience	27.50	22.00-35.00
Psychosocial Impact of Assistive Device Questionnaire - Competence	1.24	-0.42-2.67
Psychosocial Impact of Assistive Device Questionnaire - Adaptability	0.92	-1.33-3.00
Psychosocial Impact of Assistive Device Questionnaire – Self-Esteem	0.80	-1.25-3.00
General Help-Seeking Questionnaire (GSHQ)	4.15	3.22-5.56
Healthcare Access Questionnaire	1.88	0.00-3.00

Table 4: Distribution of Main Variables