

Original Article

Older Adults' Barriers to Use Technology in Daily Life: A Qualitative Study

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ABSTRACT

Background: Aging is associated with declines in individuals' physical and mental abilities. Technological assistance can improve older adults' independence, functional performance, and health. **Objectives:** The purpose of this study was to explore experiences regarding barriers to use technology in daily life among older adults. **Methods:** This qualitative study was conducted on twenty older adults referred to Urban Comprehensive Health Service Centers, Kashan. The main interview questions were "What does the word technology bring to your mind? Which electrical household appliances do you use during your daily life? and What are the barriers you experience during the use of technology?" Data were collected through semi-structured interviews and analyzed using conventional content analysis. **Results:** Three main themes emerged: aging-related barriers (physical and mental limitations), individual barriers (educational limitations, limited access to technology, and unfavorable attitudes toward technology), and barriers related to the appliances. **Conclusion:** Older adults experience multiple barriers to use technology in their daily life. Educational interventions may enhance older adults' utilization of technology in daily life of this population.

KEYWORDS: Daily life, Older adults, Qualitative study, Technology

INTRODUCTION

Aging is a phase of human life.^[1] Over the recent decades, socioeconomic and technological advances and increased life expectancy were associated with the growth of older adults population universally.^[2] Health and physical abilities decline with age.^[3] After the beginning of old age, physical and mental functioning is reduced by 1.5% annually.^[4] Studies reported that about 40% of older adults experience mobility limitations and about 50% experience chronic pain.^[5] These issues lead to decreases in quality of life and the ability to perform physical activities.^[6] Cognitive impairment is another age-related problem that reduces older adults' functional abilities.^[7] Aging also affects individuals' social activities and contribution that can result in social isolation and depression.^[8] Due to these issues, independence and ability to perform daily activities decline in older adults.^[9,10] Evidence indicated the prevalence of age-related deteriorations in activities of daily living, instrumental activities of daily living, and mobility.^[11]

The utilization of technology may potentially improve cognitive and sensory motor functioning and independence among older adults.^[12] For example, smart dishwashers and stoves with remote controls can help older adults with mobility limitation to independently perform their daily activities.^[13] Smartphones also can help older adults improve their social contribution,^[14] social support, and cognitive abilities and reduce their depression.^[15] However, studies indicated gaps in research regarding the use of technology among older adults.^[16,17]

Researchers reported that in Iran, 20% of adults aged 60–70 years were able to use smartphones and 6% used the Internet to find answers to their health-related


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questions.^[18] A study in the United States also indicated that 41.6% of adults 65 years and older were using the Internet and 61.0% were using computers in 2012.^[19] In Europe, it was shown that 37% of internet users were 55–74-year-old adults.^[20]

In this study, the technology related to older adults' daily life is defined as electrical household appliances. Electrical household appliances are electrical technologies developed for day-to-day use. These appliances include devices related to entertainment, communications, and home or office activities.^[21] Evidence indicated that there were different barriers to the use of electrical household appliances among older adults. In the United States, it was shown that physical problems, such as visual impairments, back pain, and hand tremor, were the main barriers for older adults to use technologies, such as computer and the Internet.^[22] Another study in the United States showed cognitive problems as the most important barrier related to the use of cell/smartphones, computers, and tablets in older adults.^[23] In Iran, it was found that the major barrier to the use of digital appliances, such as cell phones, among older adults was inefficiency in the English language.^[18]

Nurses can play a significant role in improving older adults' health, well-being, and functional abilities.^[24] To improve healthy aging, there is a need to enable older adults to have access to new technological resources.^[25] There is a gap in knowledge regarding barriers related to the use of technology in daily life among older adults.

Objectives

The purpose of this study was to explore older adults' experiences of barriers regarding the use of electrical household appliances in their daily life.

METHODS

Design and participants

This qualitative study was a part of a mixed-methods study that was conducted in 2020 to develop Older Adults' Barriers to Use Technology in Daily Life Scale. Participants were older adults who had a health record at Urban Comprehensive Health Service Centers in Kashan, Iran. The researcher selected four centers (Lameh, Sadeghpur, Samimi, and Kitabchi) based on geographical areas of the city. Health volunteers informed older adults to attend the center on Tuesdays and Thursdays. Older adults who met the inclusion criteria for the study and were willing and able to complete the interview were included. For older adults who did not meet the inclusion criteria, blood pressure was measured, health advice about a healthy diet and daily activities was provided, and they were excluded from the study. Using

purposeful sampling, twenty older adults were recruited. Inclusion criteria were age over 60, residing in their own home, willingness to share experiences, and a lack of known mental or cognitive disorders.

Data collection

Data were collected via face-to-face semi-structured interviews by the first author. The main interview questions were "Think about your daily life. What are the greatest needs and challenges you have? What does the word technology bring to your mind? Which electrical household appliances (including washing machine, dishwasher, cooking machine, computer, cell phone, and digital TV) do you use during your daily life?" Participants who answered this question were asked the following question. "What are the barriers you experience during the use of technology?" Probing questions were also asked to collect in-depth data. Examples of the probing questions include "May you explain more about this?" "Can you clearly clarify what you mean by this?" and "Can you provide an example?" Interviews were conducted at participants' preferred time and in a private room in the health center and lasted 20–55 min. All interviews were recorded using a digital voice recorder. Data collection was continued until data saturation when no new data were obtained from the interview. The data saturation was obtained after interview with twenty older adults.

Data analysis and trustworthiness

Transcription and data analysis were started after completing the first interview and continued concurrently with data collection. Data analysis was performed through conventional content analysis method developed by Graneheim and Lundman.^[26] After each interview, the transcript was typed word by word in Microsoft Office Word. The data management was performed using the MAXQDA10 software (VERBI Software, Berlin, Germany). Each interview was considered as a unit of analysis. The first and third authors read each interview transcript several times to obtain a general understanding about the main ideas. Then, units of meaning were identified which consisted of words, sentences, and paragraphs related to the study subject matter. These units were condensed and coded. In total, 168 codes were derived from the significant statements.

The codes were compared to each other based on their similarities and differences and were grouped into abstract categories. Lastly, the categories were formulated into three themes. Trustworthiness of the study was verified using Lincoln and Guba's four criteria, including credibility, dependability, confirmability, and transferability.^[27]

To measure the credibility of data, the data were coded by all the authors independently, and then their results were compared regarding their similarity. In addition, credibility of the findings was established through member checking. The emerged codes and categories were provided to the participants for confirmation or modification, if needed. The study was also conducted by a team under the supervision of experts to ensure the credibility of data.

Dependability means that the findings need to be consistent, logical, and coherent. When the findings are credible, they are also dependable. Dependability of the findings was established through peer checking. Through member checking, a full transcript of the interviews, codes, and categories was provided to five random participants during and at the end of the data analysis. Therefore, the congruence between the results and personal experiences was verified. In the peer checking, the interview data and results of the analyses were provided to four qualitative researchers and their comments about the accuracy of analyses were obtained.

Confirmability was met via a detailed clarification of the research process, a full engagement with the data over the course of the transcribing data, reading and rereading the data and being immersed in the data, and openness to others' comments. Furthermore, recruiting an inclusive sample in terms of gender, marital status, occupational status, and level of education could be effective in improving the confirmability and credibility of our data. Transferability of the findings was verified through thick descriptions of the immediate context, the process of sampling, the characteristics of the study participants, and the process of data collection and analysis.

Ethical considerations

This study was approved by the Ethics Committee of Kashan University of Medical Sciences, Kashan, Iran (code: IR.KAUMS.NUHEPM.REC.1397.20). The participants were informed about the purpose and methods of the study, including the record of the interviews. They were ensured of the confidentiality of their data and their right to withdraw from the study without any penalty. The participants signed informed consents regarding the participation in the study.

RESULTS

The participants included 11 women and 9 men aged 60–75 years. Fourteen participants were married, four were widowed, and two were divorced. Seven participants were illiterate, six had less than a high-school diploma, two had a high-school diploma, and four had a university-level degree. The participants'

experiences regarding the barriers to use technology in daily life were grouped into three main themes, including aging-related barriers, individual/personal barriers, and barriers related to the appliances. The aging-related barriers included two main categories: physical limitations and mental limitations. The individual/personal barriers included three main categories: educational limitations, limited access to electrical household appliances, and unfavorable attitudes toward technology. The barriers related to the appliances included the following two main categories: structural and instructional limitations [Table 1].

Aging-related barriers

Physical limitations

Physical limitations that prevented the participants from using technology were categorized into the following two subcategories: reduced physical abilities and chronic illnesses. The participants indicated that physical abilities declined with age, resulting in reduced ability to use technology. An older adult stated:

Using a smart phone is difficult for me because my hands shake (a 60-year-old woman).

I have a herniated disk in neck and osteoarthritis. I have discomfort in my hands and neck. I can't use a vacuum cleaner (a 76-year-old woman).

When I use the phone, I feel pain in my neck and numbness in fingers (a 70-year-old woman).

Mental limitations

This main category consisted of two subcategories: fears and concerns as well as mental and cognitive limitations. Some participants avoided using technology due to a fear about technology-related physical damages, such as electric shock, making mistakes while using technology, and safety threats while using the Internet.

I have a smart phone, but I avoid connecting to the internet because I am afraid to make a mistake and share family pictures through internet communications (a 67-year-old woman).

I am afraid about experiencing an electric shock. Whenever I want to use an electrical device, I need a person to connect it to the power outlet (a 64-year-old woman).

Moreover, they noted that when their relatives or friends were instructing them about how to use the appliances, the participants could not properly concentrate on their instructions or they quickly forgot the instructions.

I quickly forget instructions about using a device (a 75-year-old man).

Table 1: Participants' barriers to use technology in daily life

Themes	Categories	Subcategories	Codes
Aging-related barriers	Physical limitations	Reduced physical abilities	Visual impairment Inability to perform subtle things
		Chronic illnesses	Osteoarthritis
	Mental limitations	Fears and concerns	Fear and concern over physical self-damage Fear and concern about device damages Fear about safety threat Fear about making mistakes while using technology Fear about social isolation
		Cognitive functioning declines	Memory impairment Lack of concentration on learning
Individual/personal Barrier	Educational limitations	Knowledge deficit	Low literacy skills Limited electronic skills Unfamiliarity with foreign languages
		Barriers to learning	Lack of time and opportunities for learning Lack of motivation for learning Receiving limited instructions from others Prevention of learning by children Others' presence
		Limited access to technology	Technology-related costs Environment limitations
	Unfavorable attitudes toward technology	Heath-related issues related to technology	Harmful radiations from devices Reduced interpersonal interactions
		Technology uselessness for older adults	Suitability of technology for young people Lack of importance to use technology in an old age
		Structural limitations	Nonelderly-friendly design of devices
Barriers related to the appliances	Instructional limitation	Complicated user manuals	Small buttons Inappropriate font sizes and colors Touch screens Complex instructions Lack of detailed instructions

My children have taught me TV settings many times. But I always forget soon. Thus, I have to call them again (a 69-year-old woman).

Individual/personal barriers

Educational limitations

Most participants addressed educational limitations as a major barrier to using technology in daily life. The educational limitations included knowledge deficit and learning barriers. Most participants noted that their low levels of literacy, limited electronic literacy, or unfamiliarity with the English language and terminologies prevented them from using technology.

I'm illiterate and cannot read. So, I cannot use computer (a 69-year-old man).

I don't use the Telegram because I can't modify its settings. Settings are in English and I don't know English (a 74-year-old woman).

The learning barriers were the second subcategory of the educational limitations. Some learning barriers, such as a lack of motivation and time for learning, were related to the participants themselves. However, some other learning barriers were related to their relatives or friends. For instance, due to a fear about potential mistakes related to the use of technology, such as sharing private information or safety issues, some relatives avoided to instruct older adults or prevented others from instructing them about technology. Some participants noted that they had problems about using technology on their own, and others also prevented them from learning how to use technology.

I don't know how to set the TV and radio, use a flash drive, and play a movie because I don't have enough time for learning (a 72-year-old man).

My children tell me let's instruct you to use internet and Telegram but I don't have any motivation for learning (a 70-year-old man).

Limited access to technology

Some participants considered the limited access to technology as the major barrier to the use of technology. The limited access to technology was related to the financial costs and environmental limitations. Some participants noted that they could not use some household appliances due to financial limitations. For instance, they reported that they could not afford the purchase and maintenance of devices, such as cell phones, due to low incomes, high household expenses, and health-care costs related to chronic diseases.

I really need a blender; however, we couldn't afford it because our budget is limited, and our children's expenses grow as they grow up (a 60-year-old woman).

I cannot clean the walls and the curtains due to a pain in my legs and neck. Steam cleaner could help me in doing these tasks. However, we can't afford it (a 60-year-old woman).

I don't use internet because we can't afford the costs (a 65-year-old woman).

The other subcategory related to the limited access to technology was the environmental limitations. Some participants had limitations to use household electrical appliances because their houses were small, and they did not have enough space to buy new appliances.

I need a washing machine because I have rheumatoid arthritis. However, our home is small, and we have no room for a washing machine (a 66-year-old woman).

Living in rental houses also prevented some participants from having new appliances because they indicated that they would have problems when moving to a new home.

I don't have a dishwasher because my house is rental, and I should move to another place every year. The less household appliances, the easier relocation (a 60-year-old woman).

Unfavorable attitudes toward technology

Some participants believed that most electrical and electronic appliances, such as cell phones, computers, and microwave ovens, have radiations which may be harmful. In addition, they considered technology as one of the main causes of reduced interpersonal interactions. Most participants also believed that technology is not beneficial for older adults. They indicated that older adults can live a comfortable life without technology. They believed that technology is appropriate for younger people.

I never use microwave ovens because I believe they have radiation and cause diseases, such as cancer (a 60-year-old woman).

I don't like smart phones and computers. I think these devices produce harmful waves, which are not good for health (a 66-year-old woman).

I believe most of these devices are unnecessary. We can live a usual life without them. These devices would be good for younger people (a 69-year-old man).

Barriers related to the appliances

Structural limitations

Participants noted that the design of most electrical appliances, such as control panels' buttons sizes, font sizes and colors, and touch screens, does not meet older adults' physical and mental abilities.

I would not be able to use microwave ovens' control panels due to visual impairments and lack of concentration. I might set them at a high temperature or open them in a wrong time, which would cause burn injuries. In my opinion, control panels' large fonts or devices' extra alarms would be helpful for older adults (a 74-year-old woman).

Instructional limitation

The participants also reported that the appliances' instructions were complicated and general without necessary details. They indicated that the instructions were hard to follow and were not compatible with older adults' abilities.

Moreover, these appliances have complicated user manuals that make them inappropriate for older adults to use. The instructions are complicated or general (a 62-year-old man).

When I read the instructions, I get confused. It does not include step by step instructions (a 70-year-old man).

The instructions in some manuals are very general. Only a professional person can understand what they mean (a 70-year-old woman).

The manual is written by an engineer. It is not congruent with the consumer's language (a 72-year-old man).

DISCUSSION

The results clearly showed the frequent barriers to technology use in daily life among the participants. The findings indicated that these barriers included physical, mental, and educational limitations; limited access to technology; unfavorable attitudes toward technology; and barriers related to the appliances.

Physical and mental limitations were the main barriers related to the technology use as indicated by most participants. Other studies in developed and developing countries showed similar findings.^[16,28] The physical and mental limitations can prevent older adults from

using technology.^[12,28] The use of technology can be influenced by how well the technology meets older adults' daily needs and physical problems.^[29] Older adults' barriers related to sensory and fine motor deficits can be mitigated by modifying technology and settings. Technology can be used to increase older adults' social engagement and decrease their isolation.^[30] Health-care providers can give older adults guidance and direction regarding challenges related to new technologies in daily life.

In line with other studies,^[14,18,28] our findings showed educational limitations as another main barrier to technology use among older adults. Researchers believed that the barriers include lack of training and support,^[31] lack of the devices' age-friendly design,^[32] and complicated user manuals.^[28] Researchers indicated that a lack of educational programs to train older adults about daily life changes and improvements was an external educational barrier, and a lack of confidence and motivation about learning was an internal educational barrier among older adults.^[33] Health-care providers can use the results of related studies to reduce the barriers of technology use among older adults. Educational limitations were frequent barriers to technology use. Educational programs for older adults can be provided to help them learn how to use technology in daily life.^[30]

Limited access to technology was the other main barrier to technology use by the participants. In line with this finding, a study in the United States reported that older adults' internet utilization was associated with their age, income, literacy, and place of residence. For example, those with a lower income used the Internet less frequently compared to others.^[34] Another study also reported that the cost of electronic devices was the main barrier related to the device access and use by older adults.^[28] Low incomes and high health-related and household costs can reduce older adults' ability to access necessary devices.

In our study, some participants did not use technology due to their unfavorable attitudes toward technology. For instance, some participants considered technology unnecessary or a threat to their health. This finding was in line with other studies.^[17,32,35] Peek *et al.* showed that older adults' acceptance of technology was associated with their attitudes toward the benefits of technology, perceived consequences of using technology, perceived personal proficiency in using technology, perceived need for technology, and willingness to use technology.^[29] Geriatric nurses can help improve older adults' knowledge and attitudes toward the use of technology through educational programs about electrical household appliances.

The barriers related to the devices were another main theme about technology use among the participants. Our participants reported that they were unable to use technology because electronic household appliances were not age friendly, and their user manuals were complicated. The participants also reported that the appliances' instructions were complicated and hard to follow. In a qualitative study, it was reported that the complexity of the device and the user manuals were the main barriers to older adults' use of tablet computers.^[28] Another study indicated that the design of electronic devices, such as small sizes of keypads, is not age friendly, which is a main barrier of their utilization by older adults.^[32] Older adults may feel confused or frustrated when using technology. The results can inform further research in order to notify manufacturers and designers to address older adults' limitations and needs when designing new products.^[36]

As the population of older adults living with chronic diseases is growing universally, it is important to enhance older adults' self-management in terms of social, physical, and emotional challenges related to the diseases. Technology can be valuable to improve interpersonal relationships, physical and psychological health, well-being, quality of life, and management of depressive symptoms,^[29] while also decreasing loneliness.^[37] Using the results of multiple studies, geriatric nurses can inform older adults' family members and policymakers of older adults' barriers to technology use. Policymakers, technology suppliers, professional caregivers, and family members frequently encourage older adults to use technology to improve their quality of life. They need to consider personal, social, and physical context when introducing or implementing technology in older adults' daily lives.

Data collection by a single person using in-depth interviews was the strength of this study. Data analysis was performed and verified by all authors. However, the study was limited to a lack of observation when the participants used the appliances. Moreover, the participants' ages ranged from 60 to 70 years, and people older than this age range were not included in this study.

CONCLUSION

This study showed that the participants' main barriers to technology use in daily life were physical, mental, educational, and technological limitations; limited access to technology; and unfavorable attitudes toward technology. Nurses and health-care providers can inform technology designers about older adults' barriers to use new appliances. With advances in technology, access

to new technological resources has been increasingly important to improve healthy aging. Geriatric nurses have a significant role in improving older adults' functional, physical, mental, and social well-being. They can provide older adults with guidance and support to meet the challenges related to the use of technology in daily life. The findings can inform researchers to develop instruments for assessing the barriers related to older adults' use of technology.

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Conflicts of interest

There are no conflicts of interest.

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