Mobile health: Barriers to Mobile Phone Use in the Aging Population

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Abstract

Due to the advancements in electronic communication and information technology, many different ways to maintain and access one's health information have been developed. One of the ways that individuals are able to maintain and improve their health is through mobile or wireless devices, or more specifically through the use of mobile phones. This popular technology, called mHealth or mobile health, can be used by healthcare providers to empower, assist, and educate their patients on ways to access health information and improve their health. One growing population that may have difficulty adapting to this new way of accessing their health information is the elderly population. This integrative review discusses the common physical barriers, acceptance barriers, and technology barriers found throughout the literature that can affect mobile phone use for health purposes within the aging population.

Mobile Health: Barriers to Mobile Phone Use in the Aging Population

Advancements in electronic communication and information technology have improved the way people are able to maintain and access their health information. One way that these technologies have become increasingly used in consumer health is through the use of mobile devices (Joe & Demiris, 2013). The use of portable and wireless devices "to meet the information and service needs of healthcare providers and consumers" (Mirza, Norris, & Stockdale, 2008, p. 310) is known as mobile health or mHealth. Mobile health technology has enjoyed increasing popularity among the aging population and is used to help individuals monitor their health and chronic diseases, to provide information and support, and to monitor their well-being (Joe & Demiris, 2013). One mobile device that has become frequently used for health purposes is the mobile phone. According to Joe and Demiris (2013), 69% of adults aged 65 years and older own a mobile phone. However, many in this age group experience difficulty using technology and mobile phones due to generational differences that culminate in decreased access and exposure to technology, also known as the digital divide (Joe & Demiris, 2013; Wallace, Graham, & Saraceno, 2013). This article describes a review of literature that identifies common barriers to the use of mobile phones for health purposes within the elderly population.

As advancements and innovations in technology are made that overcome health disparities and promote healthier lifestyles, the lifespan and number of adults over the age of 65 has continued to advance. The United States Department of Health and Human Services Administration on Aging (2013) reported that in 2012 the population of those aged 65 years and older grew to 43.1 million, a 21 percent increase from 2002. They also project that by 2040, the percentage of those over the age of 65 will increase from 13.7 percent to 21 percent (U. S. Department of Health and Human Services, Administration on Aging, 2013). As the elderly population continues to increase, so does the prevalence of chronic disease and demands on the healthcare system (Cheung, Wouters, Janssen, Spruit, & Amft, 2013; Rebola & Jones, 2011). In order to meet these demands, many healthcare professionals (HCPs) have begun to employ the use of mobile health to assist in the management of chronic diseases (Mirza et al., 2008).

Due to increasing proportions of those aged 65 years and older and their greater risk for chronic health diseases, it is important for HCPs to understand what barriers this population may have in using mobile phones for health purposes. Further, once the barriers are known, HCPs can determine how to help aging healthcare consumers overcome these barriers to improve their

health and well-being. The purpose of this integrative review is to identify barriers to the use of mobile phones for health purposes within the elderly population.

Methods

Literature Search

The review of literature was guided by the following research question: What are barriers to the use of mobile phones for health purposes in the aging population? Four databases were chosen based on content and relevance to the research question: Cumulative Index of Nursing and Allied Health Literature (CINAHL), Public/Publisher Medline (PubMed), Institute of Electrical and Electronics Engineers (IEEE), and Scopus. Google Scholar was also searched for additional research and information. All databases were searched using appropriate keywords and headings related to the concepts of mobile health, mobile technology, wireless communications, aged, elderly, cellular phone, and usability.

Inclusion and Exclusion Criteria

The purpose of this integrative literature review was to locate and evaluate articles discussing barriers to mobile phone use for health purposes in those aged 65 years and older, in order for HCPs to assist this age group in overcoming these barriers. Articles selected for inclusion involved either mobile phone use for health purposes, barriers to mobile phone use, or solutions to overcoming barriers to the use of mobile phones. The target population was persons aged 65 years and older. Searches were limited to English language articles. Articles chosen for inclusion included both non-research and research articles.

Results

After initial searches of each database were completed, titles and abstracts of literature were reviewed to see if they met the above mentioned criteria. A total of 893 articles were found from the initial search of all four databases, including 144 from PubMed, 35 from IEEE, 17 from Scopus, and 697 from CINAHL. The first 20 pages of Google Scholar were also searched using the previously mentioned criteria and three additional articles were found. After titles and abstracts were evaluated based on selection criteria, this number was reduced. The remaining 64 articles were then read in full text to determine whether they were appropriate for this integrative review. After further evaluation, only 22 articles were selected for review based on content. The following section contains a summary of information found in these 22 articles.

Barriers to Mobile Phone Use

Many different barriers related to the use of mobile phones within the aging population were found and discussed throughout the literature. Barriers fell into one of three categories; physical barriers, acceptance barriers, and barriers related to technology design (Wallace et al., 2013). Physical barriers are those that limit skills and functions affected by cognitive, sensory, and motor decline or deficits. Acceptance barriers are those affected by a person's thoughts and attitudes. Barriers resulting from technological design are those that affect the user due to the design of the device. The following paragraphs discuss these three categories of barriers in further detail and describe how they affect phone use in the aging population.

Physical Barriers. There were many different physical barriers discussed throughout the literature that can affect mobile phone use in the aging population. Many of these barriers were related to decline in cognitive, motor, and sensory function from normal changes in the process of aging. The most commonly mentioned barriers to mobile phone and technology use in the elderly population are from decline or changes in cognition (Deng, Mo, & Liu, 2014; Duh, Do, Billinghurst, Quek, & Hsueh-Hua, 2010; Wandke, Sengpiel, & Sonksen, 2012). A change in cognition can effect elderly phone users in different ways and may include decreased memory function (Gitlow, 2014; Parker, Jessel, Richardson, & Reid, 2013; Ziefle & Bay, 2005); decreased spatial acuity or ability (Arning & Ziefle, 2009; Santa-Rosa & Fernandes, 2012; Zhou, Rau, & Salvendy, 2014; Ziefle & Bay, 2005); and decreased verbal memory (Arning & Ziefle, 2009). A decline in memory function and spatial acuity can affect the ability of phone users to understand and navigate hierarchical phone menus (Ziefle & Bay, 2005). Cognitive changes can also result in a decline in processing speed and memory capacity (Charness & Boot, 2009; Santa-Rosa & Fernandes, 2012; Wallace et al., 2013). These changes can impact the way elderly users interact with technology by slowing their performance and increasing the amount of errors during use (Charness & Boot, 2009). While the aging process affects each person differently, it is evident that cognitive changes can greatly influence the way older adults successfully use mobile phones and other technological devices.

Other physical barriers that impact the ability of the elderly to successfully use mobile phones are related to changes in fine and gross motor skills (Arning & Ziefle, 2009; Deng et al., 2014; Gitlow, 2014; Rodeschini, 2011; Wandke et al., 2012; Ziefle & Bay, 2005). Age-related changes and chronic diseases, such as arthritis, can cause changes in dexterity and fine motor skills making it

physically difficult for older adults to interact with and use mobile phones and technological devices (Bujnowska-Fedak, 2014; Charness & Boot, 2009; Joe & Demiris, 2013; Wallace et al., 2013). Changes in motor function cause decreased response times and unpredictability in movements resulting in inaccuracy and more difficulty when selecting buttons on devices such as mobile phones (Wallace et al., 2013).

Sensory changes can also be a physical barrier that affects the use of mobile phone and technology use in the elderly population (Rodeschini, 2011; Ziefle & Bay, 2005). Neuropathy resulting from many chronic disease processes along with normal age-related changes in sensation can cause a decline or loss of touch, movement, pressure, vibration, and perception of textures, size, and orientation of objects (Santa-Rosa & Fernandes, 2012). This lack of sensory function can make it difficult for many older adults to use touch screens and buttons on small mobile phones. Visual and auditory age-related changes can also create barriers that affect the use of technology and mobile phones (Gitlow, 2014; Joe & Demiris, 2013; Leung, McGrenere, & Graf, 2011; Parker et al., 2013; Santa-Rosa & Fernandes, 2012; Wandke et al., 2012). Many older adults experience difficulty adapting to changes in light, diminished color sensitivity, problems with glare, and a decline in visual acuity making it difficult to view phone screens and buttons (Arning & Ziefle, 2009; Charness & Boot, 2009; Wallace et al., 2013). Visual decline can also affect the older adults' ability to identify small icons and read or locate information on small or complex phone screens. Loss of auditory acuity can result in difficulty perceiving certain tones, problems understanding speech or sounds, and increased sensitivity to loud noises (Wallace et al., 2013).

While the physical barriers of cognitive, motor, and sensory deficits greatly impact the use of mobile phones, there are also many non-physical or acceptance barriers that can affect the use of mobile phones in the elderly population. These barriers to acceptance are related to one's thoughts and attitudes regarding technology or mobile phone use. The following paragraphs describe common acceptance barriers found throughout the literature and how they can affect the use of mobile phones in the elderly population.

Acceptance Barriers. For many older adults, learning to use new technology, such as a mobile phone, can be an overwhelming and difficult process due to little experience and knowledge about the use of mobile phones (Wallace et al., 2013). For this reason, one of the most common acceptance barriers is perceived ease of use (Barnard, Bradley, Hodgson, & Lloyd, 2013; Deng et al., 2014; Parker et al., 2013; Wallace et al., 2013; Ziefle & Bay, 2005). Another common acceptance barrier that may cause or further impact perceived usability is lack of confidence or self-efficacy (Arning & Ziefle, 2009; Barnard et al., 2013; Bruder, Blessing, & Wandke, 2014; Mitzner et al., 2010; Rodeschini, 2011). Because many older adults have less experience and knowledge with technology and mobile phone use, they underestimate their abilities and believe they do not have what it takes to learn how to use them. Many older adults also have concerns about privacy and security when using mobile phones for health purposes (Charness & Boot, 2009; Gjevjon, Oderud, Wensaas, & Moen, 2014; Parker et al., 2013, Rodeschini, 2011; Wallace et al., 2013), creating a barrier and preventing many older adults from feeling comfortable using mobile phones to access and share health information.

Lack of perceived usability is also a common acceptance barrier to the use of mobile phones in the elderly population (Barnard et al., 2013; Deng et al., 2014; Gitlow, 2014; Wallace et al., 2013, Wandke et al., 2012; Zhou et al., 2014). Because many older adults are new to the use of mobile phones, they are unaware of the many benefits and advantages of their utilization (Wallace et al., 2013). Another one of the most consistently mentioned barriers is concern for cost (Barnard et al., 2013; Deng et al., 2014; Gitlow, 2014; Mitzner et al., 2010; Parker et al., 2013; Rodeschini, 2011; Wallace et al., 2013). Many older adults without previous mobile phone use have apprehension due to the potential monthly costs (Rodeschini, 2011). Less commonly mentioned acceptance barriers to the use of technology and mobile phones include lack of time (Barnard et al., 2013), lack of prior experience or familiarity with the device (Barnard et al., 2013; Leung et al., 2011), perceived learning effort (Barnard et al., 2013; Parker et al., 2013; Zhou et al., 2014), lack of training (Barnard et al., 2013; Gitlow, 2014), loss of face to face contact or human interaction (Gjevjon et al., 2014; Parker et al., 2013), mistrust (Gitlow, 2014; Gjevjon et al., 2014), and anxiety (Arning & Ziefle, 2009; Charness & Boot; 2009; Deng et al., 2014).

Technological Design Barriers. In addition to physical and acceptance barriers, there are also barriers related to mobile phone designs that can affect their use within the aging population. One problem with mobile phones and technological devices is that they do not take the aging process into account (Charness & Boot, 2009; Rodeschini, 2011; Wandke et al., 2012). Many mobile phones are not designed for the needs of the elderly population, making it difficult for them to use. Other barriers related to the design of mobile phones and technological devices in the elderly include difficulty knowing and recognizing what icons represent (Santa-Rosa & Fernandes, 2012), getting lost within the device menu (Arning & Ziefle, 2009; Zhou et al., 2014; Ziefle & Bay, 2005), difficulty using soft keys and touch screens (Zhou et al., 2014), and concern about the battery dying (Parker et al., 2013). In a study completed by Ziefle and Bay (2005), old and young mobile phone users were observed using mobile phones

of different complexity. Older adults experience more difficulty navigating mobile phones, take more time and detours when completing tasks, and return to higher levels of the menu hierarchy more frequently than younger adults. The aging population learned life skills, including healthcare, during a time when technology was much less complex, e.g. calling the doctor's office on a rotary phone (Ziefle & Bay, 2005). Therefore, intricate and multifaceted mobile phones can be an obstacle for many aging adults, discouraging them from their use.

There are many different barriers related to the aging process, thoughts and attitudes, and technological design that can affect the use of mobile phones for health purposes within the elderly population. It is important for HCPs to assess elderly individuals for these barriers and how it may impact their use of mobile health. Knowledge of these barriers and finding solutions to overcome them can be a useful tool in understanding, implementing, and encouraging the use of mobile technology within the elderly population.

Limitations

There are several limitations to this review. First, the research found for this review is mainly from the health science databases, CINAHL and PubMed. While several articles were also found from searching IEEE, Scopus, and Google Scholar there could be other information and research regarding this topic published in other outlets or reports. Another limitation to this study was that some of the research was based on mobile devices as a whole including devices other than mobile phones. While this information was still pertinent to the use of mobile health and mobile phones, it was not specifically focused on mobile phones alone, but rather mobile devices as a whole. The final limitation of this study includes the use of English only research which may have excluded some non-English studies that would have been included in the review.

Conclusion

As described previously, the elderly population experiences many barriers that may prevent them from using mobile phones for health purposes. Cognitive, sensory, and motor deficits or decline can create physical barriers; negative thoughts and attitudes towards the use of mobile phones can create acceptance barriers; and design of some mobile phones can create technological barriers. In order to assist this growing population in the use of mobile health, it is important for HCPs to understand what barriers are present. This integrative review found many different barriers that prevent the use of mobile health devices, but as technology continues to advance, other barriers may arise. It is important for HCPs to search for the best solutions possible to aid the growing older population in the use of mobile health. By doing so, they will be able to empower and assist their patients in taking control of their health and accessing their healthcare in the most efficient and easiest way possible.

References

Arning, K., & Ziefle, M. (2009). Effects of age, cognitive, and personal factors of PDA menu navigation performance. *Behavior & Information Technology, 28*(3), 251-268.

Barnard, Y., Bradley, M., Hodgson, F., & Lloyd, A. (2013). Learning to use new technologies by older adults: Perceived difficulties, experimentation behavior and usability. *Computers in Human Behavior, 29*, 1715-1724.

Bruder, C., Blessing, L., & Wandke, H. (2014). Adaptive training interfaces for less-experienced, elderly users of electronic devices. *Behavior & Information Technology, 33*(1), 4-15.

Bujnowska-Fedak, M. (2014). Support for e-health services among elderly primary care patients. *Telemedicine and e-Health, 20*(8), 696-704.

Charness, N., & Boot, W. (2009). Aging and information technology use potential and barriers. *Current Directions in Psychological Science, 18* (5), 253-258.

Cheung, A., Janssen, A., Amft, O., Wouters, E., & Spruit, M. (2013). Usability of digital media in patients with COPD: A pilot study. *International Journal of Technology Assessment in Health Care, 29*(2), 162-165.

Deng, Z., Mo, X., & Liu, S. (2014). Comparison of the middle-aged and older users' adoption of mobile health services in china. *International Journal of Medical Informatics, 83*, 210-224.

Duh, H., Do, E., Billinghurst, M., Quek, F., & Hsueh-Hua, V. (2010). Senior-friendly technologies: Interaction design for senior users. In *CHI'10 Extended Abstracts on Human Factors in Computing Systems* (pp. 4513-4516). ACM.

Gitlow, L. (2014). Technology use by older adults and barriers to using technology. *Physical & Occupational Therapy in Geriatrics, 32*(3), 271-280.

Gjevjon, E., Oderud, T., Wensaas, G., & Moen, A. (2014). Toward a typology of technology users: How older people experience technology's potential for active aging. *Studies in Health Technology and Informatics, 201*, 25-31.

Joe, J., & Demiris, G. (2013). Older adults and mobile phones for health: A review. *Journal of Biomedical Informatics, 46*, 947-954.

Leung, R., McGrenere, J., & Graf, P. (2011). Age-related differences in the initial usability of mobile device icons. *Behavior & Information Technology, 30*(5), 629-642.

Mirza, F., Norris, T. & Stockdale, R. (2008). Mobile technologies and the holistic management of chronic diseases. *Health Informatics Journal, 14*(4), 309-321.

Mitzner, T., Boron, J., Fausset, C., Adams, A., Charness, N., Czaja, S., ...Sharit, J. (2010). Older adults talk technology: Technology usage and attitudes. *Computers in Human Behavior, 26*, 1710-1721.

Parker, S., Jessel, S., Richardson, J., & Reid, M. (2013). Older adults are mobile too! Identifying the barriers and facilitators to older adults' use of mhealth for pain management. *BMC Geriatrics, 13*(43). doi:10.1186/1471-2318-13-43

Rebola, C. B., & Jones, B. (2011). Sympathetic devices: Communication technologies for inclusion. *Physical & Occupational Therapy in Geriatrics*, *29*(1), 44-58.

Rodeschini, G. (2011). Gerotechnology: A new kind of care for aging? An analysis of the relationship between older people and technology. *Nursing and Health Sciences, 13*, 521-528.

Santa-Rosa, J., & Fernandes, H. (2012). Application and analysis of the affinities diagram on the examination of usability problems among older adults. *A Journal of Prevention, Assessment, and Rehabilitation, 41*(1), 328-332.

U. S. Department of Health and Human Services, Administration on Aging. (2013). *A Profile of Older Americans: 2013.* Retrieved from http://www.aoa.acl.gov/Aging_Statistics/Profile/2013/docs/2013_Profile.pdf

Wallace, S., Graham, C., & Saraceno, A. (2013). Older adults' use of technology. *Perspectives on Gerontology, 18*(2), 50-59.

Wandke, H., Sengpiel, M., & Sonksen, M. (2012). Myths about older people's use of information and communication technology. *Gerontology, 58* (6), 564-570.

Zhou, J., Rau, P., & Salvendy, G. (2014). Older adults' use of smart phones: An investigation of the factors influencing the acceptance of new functions. *Behavior & Information Technology, 33*(6), 552-560.

Ziefle, M., & Bay, S. (2005). How older adults meet complexity: Aging effects on the usability of different mobile phones. *Behavior & Information Technology, 24*(5), 375-389.

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