Investigating the Effectiveness of Mobile Peer Support to Enhance the Quality of Life of Older Adults: A Systematic Literature Review

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Abstract—Aging is the biological, psychological, or social change that occur with the passage of time, which leads to functional impairment, and eventually chronic diseases. The number of people living older is rapidly increasing, and there is a natural decline in physical activity. The reduced mobility affects their daily life activities making them dependent on others for health. Therefore, mobile technologies such as m-health applications provide potential for enhanced health care among older adults. The present study highlights the factors that affect the adoption of smartphone applications, and potential factors such as mobile peer support can facilitate older adults to adopt latest technologies. However, previous studies have remained unsuccessful in explaining the moderating role of mobile peer support. Therefore, this paper aims to provide an insight with potential solution to the challenges of aging life, hence, enhancing their quality of life. This paper is only a conceptual explanation, which aims to identify the possible factors that influence their smartphone adoption using a systematic literature review on relevant peer-reviewed papers. It is expected that this work will lead towards the empirical findings on the explanation of the interplay of the peer support to address the relationship of assistive mobile health applications and quality of life. This paper provides directions for future studies in improving the quality of life of older adults by using technology.

Keywords—Older adults, quality of life, m-health application, smartphone, mobile peer support.

1 Introduction

Technological development has increased the population of older adults as a result of improved public health [1] which is evident as there is an increase in world aging population. For example, In England there was an increase in older adults by 39% [2]. Similarly, In 2015 Malaysia had approximately 2.4 million individuals (8.0%) aged...
60 and above; this number is expected to make up over 15% of the total population by [3] which has led the researcher’s interest in the improvement of quality of life of older age. For example, Canada’s population was approximately 5 million in 2011; this number is expected to be doubled in the next 25 years [4] and in 2015, Malaysia had approximately 2.4 million individuals (8.0%) aged 60 and above; this number is expected to make up over 15% of the total population by [3].

The term older adult is defined in the WHO as persons aged 65 years. Recent researchers have identified the subgroups of “older adults” as “younger old” (ages 65-75), “older-old” (ages 75-85), and “oldest old” (ages 85+) [5]. Older adult experience age-related changes both physical and cognitive. Physical changes associated with aging include declines in vision, hearing, and psychomotor coordination [6]. Similarly, cognitive changes consist of reduced attention span, declines in memory, and changes in spatial abilities are also observed.

There is an increasing likelihood of disease with age as older adult’s population are easily affected by diseases such as high blood pressure, heart problems, overweight, and diabetes. For example, according to Centers for Disease Control and Prevention (CDC) 30.3 million people in US have diabetes. Diabetes is a fast-growing disease affecting approximately 400 million people in 1980 [7] and it is expected that it will affect 642 million people in 2040 [8]. Hence, diabetes is found as one of the primary cause of premature death worldwide [9]. Moreover, 80% of diabetes cases were found in developing countries [9] such as Malaysia. However, it is difficult for older adult to see a medical specialist daily, as older adults are dependent and require support to visit a clinic [10] which act as a barrier to their wellbeing. Therefore, in order to overcome health [11], supporting independence [12], improving the wellbeing [10], and supporting the self-management of chronic diseases [13] technology plays a significant role and provide solutions for older adults [14]. Technology in the form of digital devices and/or applications can be used in various domains of everyday lives [15]. Assisted Technology (AT) is defined as; ‘any device or system that allows an individual to perform a task that they would otherwise be unable to do, or increases the ease and safety with which the task can be performed’ [16]. Assisted Technology (AT) offers a potential solution to this challenge of an ageing population such as through mobile health applications [17].

Previous studies have revealed that 80% of US citizens are mobile subscribers [18] it is expected that the number will increase to more than 256 billion or a third of the world’s population by 2018 [19]. However, not all age groups are accepting and using smartphones. For example only 18% of older adults have adopted to smartphone [20]. The possible reasons as revealed by literature is significant gap in terms of requirements of interface [21] as there is decline in cognition with age [22]. Moreover, the requirements of older adults are different from younger adults, and is poorly captured in the literature [23] as existing smartphone interface are based on suitability of younger adults who do not have cognitive decline [24]. As the requirements of older adults are different from younger adults [25]. Thus, there is a need to examine the patterns involved in technology adoption among older adults.

Since, older adults face technical difficulties, which are defined as “interruptions that individuals encounter when interfacing with technology” [26], they have searched
for technical support to use smartphone [27]. As the interface of these devices are not
made keeping in mind the requirement of this population, which elicit stress [28] they
feel discouraged and confused [29]. Hence, to cope with such stress older adults look
for resources such as social networks and [27] family and friends [30] who act as a
facilitator in the learning process of technology-health application which can
influence their quality of life.

A variable which affects the linkage between two or more variables is known as
moderating variable, whereas moderation refers to the moderating effect on the
linkage [31]. Therefore, the present study integrates mobile peer support as a
moderator in the relationship between mobile-health applications and quality of life as
it is a source of facilitation in the use of m-health application, which in turn will
enhance their quality of life. The objective of present study is:

- To investigate the potential factors in the interface that affect the adoption of m-
health application.
- To examine the role of mobile peer support in the relationship between assistive m-
health application and quality of life.

2 Methodology

The present study used top down (review of the literature) approach to understand
the problems in the interface of assistive m-health application that hinders the
adoption, and hence, affects the quality of life.

2.1 Literature search and database selection

The first step used to search the relevant literature was choosing appropriate
database IEEE Xplore, Science Citation Index, Scopus, Science Direct, Science
Citation Index, and Web of Science. Database was searched using keywords related to
the concepts of assistive mobile health technology, older adults, diabetes, mobile peer
support and quality of life. The search was performed, using the search syntax as
shown in the table below:

<table>
<thead>
<tr>
<th>Search</th>
<th>Keywords</th>
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<tbody>
<tr>
<td>Search #1</td>
<td>Assistive technology [title/abstract] AND older adults’ [Title/Abstract] OR elderly</td>
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<td>Search #2</td>
<td>Older adults’ [Title/Abstract] AND Quality of life [Title/Abstract]</td>
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<td>Search #3</td>
<td>Assistive technology [title/abstract] AND older adults ‘AND Quality of life [Title/Abstract]</td>
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<tr>
<td>Search #4</td>
<td>Older adults’ [Title/Abstract] AND Quality of life [Title/Abstract] AND Peer support [Title/Abstract]</td>
</tr>
</tbody>
</table>

2.2 Inclusion and exclusion criteria

In the next step, we narrow down our search to be more specific and to narrow
down and evaluated based on following criteria:
• Articles, which were published between 2012 to 2018.
• Articles must be utilized a mobile phone as an intervention for their healthcare, involve or directly aim at older people quality of life of 45 years and over.
• Articles must address the question of how mobile services and applications that can be utilized to help improve, what are the barriers to mobile phone use how to overcome these barriers, what are the possible solutions to adopt to smartphones, and how technology can enhance the quality of life.
• Articles must include at least one combination of the search keywords (i.e. target group 1 mobile technology or mobile services and applications).
• Articles must be Scopus publications.
• Using several search keywords and increasing the complexity in the search inclusion criteria improves the quality of the search output.

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<td>International Journal of Human Computer Interaction</td>
<td>17</td>
<td>06</td>
<td>11</td>
<td>16</td>
<td>24</td>
<td>28</td>
<td>15</td>
<td>117</td>
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<tr>
<td>Behaviour &amp; Information Technology</td>
<td>11</td>
<td>06</td>
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<td>15</td>
<td>12</td>
<td>18</td>
<td>09</td>
<td>93</td>
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<tr>
<td>Journal of Assistive Technology</td>
<td>35</td>
<td>31</td>
<td>13</td>
<td>12</td>
<td>15</td>
<td>48</td>
<td>34</td>
<td>188</td>
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<tr>
<td>International Journal of Human-Computer Studies</td>
<td>42</td>
<td>47</td>
<td>52</td>
<td>60</td>
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2.3 Evaluating the relevance

In the third step, the researcher reviewed all relevant papers from both selected journals. Articles were selected based on the title of the paper, abstracts, methods, results and conclusion. In this step the researcher in decided whether or not a paper is relevant to this study. Once confirmed, then the full text articles were downloaded for thorough and detailed review. Furthermore, articles which were unclear either to include or exclude from the review process were resolved by discussing with a senior and knowledgeable researcher in the field.

3 Results and Discussion

Despite the fact that the relationship of m-health application and older adult’s quality of life has been widely explained in the body of the literature from different perspectives for example according to sociological perspective any person or group can serve as a influencing factors for older adults to adopt smartphone applications [32], however, the peer support in the literature in terms of moderator remains less clear which is the contribution of the present study.
The link between m-health application, mobile peer support and quality of life is dynamic in nature [33] specifically for applications that are associated with diabetes self-management. Czaja (2016) noted that older adult’s cognitive decline significantly affects the quality of life is routed through the m-health application.

3.1 Older adult use of assistive m-health application and mobile Peer support

Older adult are the people that experience age-related physical and cognitive changes [23] which determines that older users will have different requirements in terms of interaction with technology [25]. Additionally, smartphone apps are helpful for older adults as they provide safety, security, privacy, and mobility (e.g., person location service, tracking devices, telecare monitoring, and an alarm system) [35] hence, supporting older adults’ lives. Such solutions can enable their broad communication with others (e.g., social network and community platforms), hobbies (e.g., digital games adapted for older adults’ requirements), or even religion and spirituality (e.g., services offering religious calendars, holy and prayer books, religious ringtones) [36]. Furthermore, older adults use assistive m-health application to integrate self-care activities for diabetes. Petrovčič, A. Rogelj, and V. Dolničar, (2018) examined the factors that plays significant role in the adoption of Assistive Smartphone Application among older adults, and their results showed that compatibility, effort expectancy, enjoyment, facilitating conditions and social influences significantly affected the older adult’s use of smartphone application [37] [36].

Mobile Peer support help older adults to enhance their functioning or may buffer them from adverse outcomes [38]. Moreover, older adult accept technology as they are being motivated by their social surrounding such as purchasing technology relying on their peers which act as a “technology champions” [39]. Based on this discussion, we propose the following hypothesis.

**Preposition 1:** There is a significant relationship between m-health application and peer support.

3.2 M-health application and Quality of Life

Assistive technology is defined as any device or system that allows an individual to perform a task that they would otherwise be unable to do with increased ease [40]. Smartphone applications can be used in various domains of everyday lives [10] such as medical and public health practices. Hence, support the health and wellbeing of older adults [12].

m-Health covers a variety of health and wellbeing apps which are designs for self-management of health, wellbeing and long-term conditions and they may or may not be required to communicate with a clinician [10]. Ventola, (2014) reported that patients can actively participate in their own care by receiving services to change their health behaviour as application provides the opportunity to access health information and maintain contact with health care professionals [42]. These applications are especially useful for monitoring and diagnosing health conditions for those older.
adults for whom the physicians work far away. Smart phone applications are beneficial as there are variety of applications on fitness, chronic disease management (e.g. diabetes) [43].

However, there are certain factors which act as the barrier in the usability which limit level of adaptation of the m-health Application [44] such as age-friendly interface design [45], accessibility [46], and launchers [47].

Past research has also suggested that Assistive Smartphone Application has impacts on older adults that would increase, maintain, or improve their quality of life [35]. However, Inadequate inquiries have been done in the past to address the relationship of the Assistive Smartphone Application as a driver of quality of life in relation with older adults [48]. Older adult’s cognitive decline can be the potential influential factor in the development of the quality of life as it has a direct effect on the Assistive Smartphone Application, but it remained unclear in the past literature, as systematic inquiry is needed to understand this relationship.

Therefore, based on the above-mentioned literature, it may be postulated that M-health application and older adult have direct link to define the quality of life of older adults as it remains an uncertain issue in the research. Thus, we propose the following preposition. Based on this discussion, we propose the following

Preposition 2: There is a significant relationship between M-health application and quality of life.

4 Conclusion

Considering the growing population and disease rate, and this article aims to shed light on the use of information technology such as m-health application to increase the quality of life of older adults. It conceptualizes the use of m-health application by incorporating some of the central concepts in the older adult and assistive mobile health application, and these concepts are defined in a way that permits prediction and understanding of quality of life. Findings suggested that age-related gaps in the interface of smartphone, which act as a barrier in the technology adoption. Therefore, these factors should be given some attention to accommodate the age-related changes to have optimal design for older adults that are user-friendly to offer promising healthcare.

5 Future Work

Although there has been significant research dedicated to the quality of life, however there is certainly still a plethora of opportunities for further studies in this field. It is expected that the present study will draw the attention of future researcher to this important area and provide researchers with a foundation upon which future knowledge can be built. This framework would provide guidance for usability specialists, product designers, interaction designers, product manufacturers and others involved in the design and development of user interfaces when seeking an ultimate design solution to support quality of life of older adults using assistive [49], [50].
6 References


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