

HEALTH GERONTECHNOLOGY IN AGEING: A QUANTITATIVE STUDY

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Abstract

Over the last decade there has been a significant rise in Information and Communication Technologies [ICT] use among the elderly. Various recent studies highlight the benefits that ICT can provide to the elderly in terms of improvements to both mental and physical health, self-health assessment, satisfaction and quality of life, a reduction in the perception of loneliness, or favourable health behaviours. However, there are also reports that indicate that this age group continues to experience an equally significant digital exclusion. Researchers such affirm that use and access to digital technologies by older people is measured by different key factors that impinge on this digital divide such as level of education and/or income, gender, existence of any disabilities, place of residence, and even civil status. In response to the reduction of this digital divide, gerontechnology plays a fundamental role in this area. Gerontechnology can be defined as an interdisciplinary field that connects existing technologies and those that are developing with the aspirations and needs of the elderly, supporting in this way successful ageing. In this respect, the literature on this subject establishes that this new professional field, or applied discipline, presents five areas of study: living environments, communication, personal mobility and transportation, self-fulfilment and health. Specifically, our study focuses on this last area, which focuses on the development of technological devices geared towards preventing particular behaviours that are harmful to health and on improving the quality of life of those of an advanced age. Thus, this study has two main aims: on the one hand, to analyse the control that this age group possesses over the gerontechnology of health and, and on the other hand, the importance of its use to control various aspects of health and wellbeing.

For this research a quantitative study was used, with a sample of 383 people from Castile and Leon [Spain] over the age of 60. A questionnaire designed according to the research aims was used in order to collect the data. The tool was divided into three sections: the first was aimed at collecting socio-demographic data, the second was made up of items to collect information on control over devices geared towards the area of health; and lastly, the third was aimed at studying the importance of using devices geared towards the monitoring of various aspects of health and wellbeing among the elderly. The data obtained was then analysed through the application of descriptive tests.

The initial results of this study show that the majority of those surveyed are familiar with, but have never used the devices or apps geared towards health or for its monitoring. In spite of this tendency, the majority do recognise the importance of controlling aspects related to health and wellbeing through the use of technological devices. In both situations, differences regarding the age range of the participants can be noted. As a conclusion to this work, we highlight the existence of a digital divide among this age group. Therefore, we deem it necessary to expand this research with regard to the implementation and use of ICT among the elderly, providing innovative spaces where this age group can participate in an active way on the design, co-creation and assessment of efficient and useful products that are adapted to the needs of the end users.

Keywords: Technology, Education, Elderly, Health.

1 INTRODUCTION

In recent past decades we have witnessed a change in the current dynamics marked by over-ageing and the general digitisation of developed societies. Data on the global demographic transformation show that we live in an increasingly populous and ageing world. The global forecast for 2030 is for older people to reach 1.4 billion [16.5% of the world's population] and to represent 21.5% of the world's population in 2050 and even almost 24% in 2060 [1] Thus, we find that while in developed countries such as the United States, increases of up to almost 50 million citizens over the age of 65 are estimated in less than the next 40 years; in Europe, it is expected that in less than 30 years more than half of the population will be over the age of 65 [2]

In one hundred years, the world population will increase by a factor of 3.7 and the planet will be inhabited by more than two billion people aged 60 and over [3]. The causes of this situation are mainly due to the decrease in the mortality rate, the increase in life expectancy, the decrease in the birth rate, as well as the improvement in the development of social policies and plans aimed at modernising and improving people's quality of life. All of this implies a significant increase in the presence of older adults, which means that the industry of technology, in its continuous expansion, also takes this age group into account, especially in the field of health.

Research into gerontechnology—those studies of ageing and technology—as well as the development and distribution of technology products, environments and services [4] has piqued the interest of researchers from different fields over the last few decades. So much so that advances in this field have enabled older adults to make use of technology to solve certain problems and difficulties arising from ageing [5]

According to WHO reports [6], around 60% of people's quality of life and health depends on their lifestyle and personal behaviour, with 53% of causes of death being associated with lifestyle and health behaviours. These findings have led the technology industry to develop a range of products that make it easier for older adults to adopt behaviours that can maximise a healthy old age [7]. In this context, the significant advances in telecommunications and informatics have propitiated an incredible boost of new health care apps and devices in order to take special care of the importance of its use to control various aspects of health and wellbeing in elderly.

In this sense, we find a great corpus of scientific literature specialising in the adoption of technology by older adults, which focuses precisely on analysing the intention to use digital health technologies [8]. The most recent studies in older people [9,10], dealing with the adoption of health-related digital technology, focus around patient portals and personal electronic health records [11,12]; tracking technologies and activity trackers [13,14]; telemedicine systems [15]; smart care and healthcare systems or portable digital health devices and mobile health technologies [16–18].

More to the point, studies seem to be focused on the use of health-oriented mobile devices and applications; as well as devices for monitoring, emergency services or telecare [19,20]. Thus, we can find an increase in eHealth and mHealth-based interventions, which aim to increase the participation of older adults in the management of their health and well-being [21,22].

The main reasons for the interest in the creation and expansion of this type of health-related technologies in this age group is mainly due to the evidence that it is especially in this group where technologies offer the greatest benefits in terms of improving their quality of life [23,24]. Health technology allows people to have greater control over aspects related to their health [25]; evidencing a positive impact on their psychological development [26] and other aspects particularly related to dependence [27].

With that in mind, it is important to emphasise that through the use of technological devices in this area of health, there is an improvement in the health of the elderly, as well as a decrease in feelings of loneliness or levels of depression and social isolation [28,29]

However, despite the evidence of the benefits these technologies have on the health of the elderly, older adults also seem to be unfamiliar with medical and healthcare-related technologies [30], a significant field for improving their quality of life. Hence, in spite of the fact that more businesses and developers are launching technologies onto the market which target older adults [31], there is still a gap between this older generation and regular use of this technology compared to the rest of the population [32]. This is a problem that leads us to ask if said group finds this technology useful, and if factors like the age in this group impact their use. For this reason, and according to the specialised literature that clearly expresses the need to carry out studies that allow us to further understand their use and adoption [33,34], our study focuses on the health area of gerontechnology which focuses on the development of technological devices geared towards preventing particular behaviours that are harmful to health and on improving the quality of life of those of an advanced age.

2 METHODOLOGY

The research questions stem from the current increase on the development of technological devices geared towards preventing particular behaviours that are harmful to health and on improving the quality of life of those of an advanced age.

- Do older adults use digital health technologies?
- Do older adults consider their use important for monitoring various aspects of health and wellbeing?

There is one general objective and two specific objectives that seek to answer the research questions:
General objective: to analyse the relationship between older adults and gerontechnology for health.

Specific objectives:

- Know and analyse the control that this age group possesses over the gerontechnology of health
- To understand the importance of its use to control various aspects of health and wellbeing.

2.1 Sample participant

The full sample included 383 Spanish older adults from Castilla y León [162 men and 220 women] aged 60 to 94 years [M= 75.02, SD= 9.19]. In this study, people over 60 years of age were considered as older adults according to the World Health Organisation [WHO] criteria. The participants were divided into three age groups in order to be able to study whether there were differences between the group according to age: 163 older adults aged 60-70 years [M = 65.27, SD = 2.74]; 140 older adults aged 61-80 years [M = 74.92, SD = 3.22]; and 80 older adults over 80 years [M = 85.84, SD = 3.50]. Of these, 31.9% lived in an urban or city area and 68.1% in rural areas or villages; their living arrangements were mainly cohabitation as a couple [45.4%], followed by living alone [21.9%], in a care home or with at least one relative [14.7%]. 34.2% were found to have completed elementary studies, 31.9% higher education, 20% secondary education, and 19.9 % had no studies at all. In terms of social participation, most of the sample of participants regularly attended an education, cultural or social center or program [53%]. Specifically, 37% attended an Adult University Program and 23.2% different Senior Education or Culture Classes, among others. Most of the subjects had no prior experiences with digital devices during their working life [63.9%].

2.2 Instrument

This study included a standard informed consent form, an informative statement and an ad hoc questionnaire created for the purpose of this research.

The instrument developed for data collection is divided into three sections. The first section is dedicated to collecting identification data on older adults: age, gender, etc. The second section is composed of a 2-item Likert-type scale [1= Never heard of; 5= Frequently used [almost daily]] dedicated to collecting information on the domain of health gerontechnology. The third section includes a Likert-type scale [1=Not at all; 5=A lot] and is directed to the study of the importance of the use of gerontechnology to control various aspects of their health.

Cronbach's alpha coefficient was used to assess internal consistency to analyse the reliability of the questionnaire, which indicated excellent consistency [$\alpha = .97$]. Following the general criterion established by George and Mallery [2003, p. 231], indexes $>.9$ for the total questionnaire are considered excellent.

2.3 Process and Analysis

The data collection procedure consisted of applying the scales to the sample of participants by means of an anonymous questionnaire structured on digital and analogue media. Due to the current situation caused by Covid-19, once the questionnaire was designed, participants were recruited through two main channels. On the one hand, through relatives, friends and other acquaintances, the questionnaire was self-administered digitally, using the Google Form tool, in which people over 60 years of age were asked to collaborate. On the other hand, the questionnaire was administered in analogue form through various professionals in day centres and programmes for the elderly. First, the "snowball" sampling was started by making the object of the research known by telephone and then, delivering the questionnaires in paper version in person or by post so that they could make the research known to all people over 60 years of age for their collaboration. The data collection process in both cases followed ethical criteria mediated by consent at the beginning of the questionnaire and participants completed the questionnaire in private. In the first case, participants were provided with a video tutorial to familiarise themselves with the platform, as well as email contact with the principal investigator to resolve any doubts. In the second case, participants had the professionals nearby for questions or any necessary clarification.

The fieldwork was carried out from March 2021 to July 2021. A sample of 510 units was reached, to which a filtering process was applied in order to eliminate incomplete or invalid records, as well as to refine the sample according to territorial scope, age and gender of the universe population. Once filtered, the useful sample for the study consisted of 383 units.

All data were compiled in Excel and a descriptive analysis was carried out using the statistical package SPSS version 20.0 [licensed by the University of Salamanca].

3 RESULTS

3.1 Use of health gerontechnology

Regarding the first objective, to know and analyse the control that this age group possesses over the gerontechnology of health, the results (Figure 1) indicate that in general, older adults do not use health gerontechnology. Only 7.4% say they frequently use devices and mobile apps oriented to the health area and 12.5% devices for monitoring, emergency services or telecare. The results show that almost 40% of the elderly have never heard of these first devices and almost 30% of these other second devices.

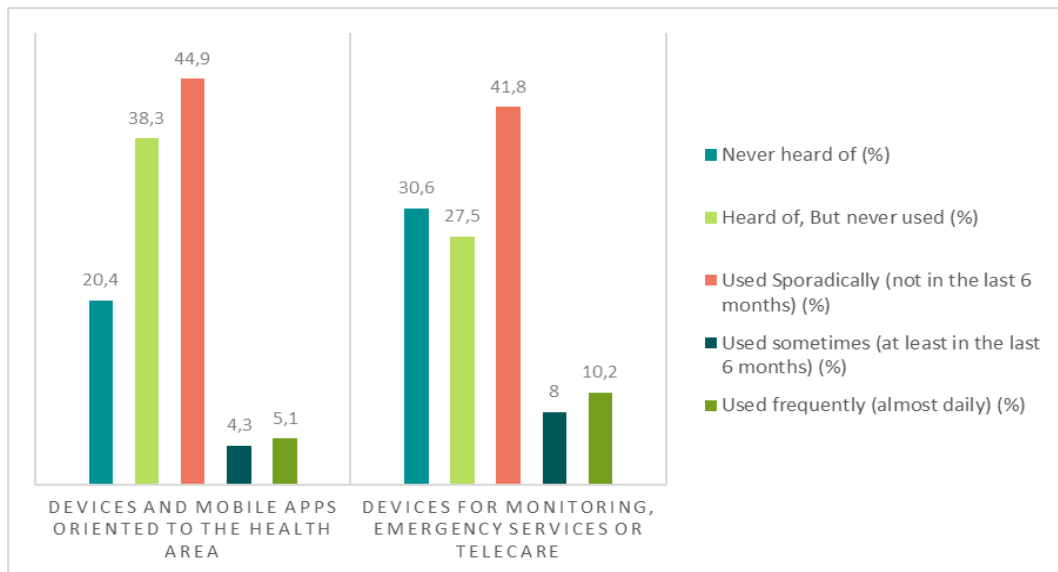


Figure 1. Responses to general use of health gerontechnology

A study of the relationship between age groups and use of health gerontechnology [Chi-squared test] yields results in terms of presence of the health gerontechnology domain in their daily lives with respect to their age group (Figure 2).

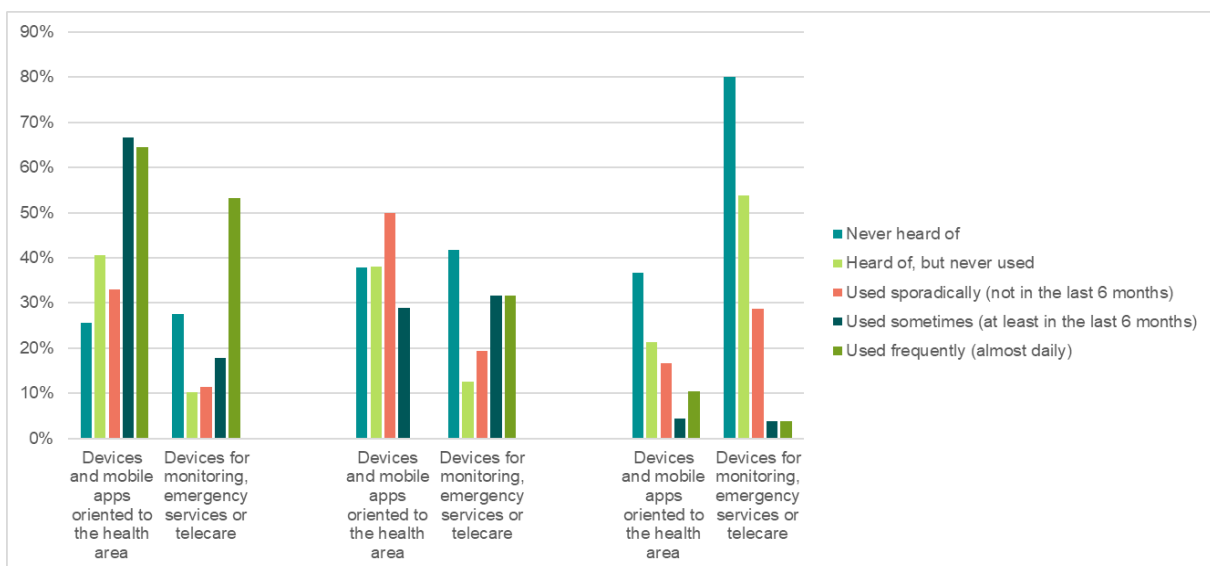


Figure 2. Responses to general use of health gerontechnology according to the age

We found age differences in the use of these health devices. On the one hand, people over 80 years of age use more frequently devices for monitoring, emergency services or telecare [35.3%] devices and mobile apps oriented to the health area [10.5%]. However, for the other two younger age groups, the results reveal a higher use of these services. Specifically, the 60-70 age group uses more than 10% more devices and mobile apps oriented to the health area of these services. In the same vein, the 71-80 age group uses 8% more of these services than devices for monitoring, emergency services or telecare.

3.3 The importance of monitoring health issues in the use of gerontechnology

Regarding the second objective, to know and analyse the control that this age group possesses over the gerontechnology of health, the results (Figure 3) indicate that in general, older adults consider that monitoring health issue is very important in their use of gerontechnology in their daily life [28.5%]. Only 6.5% say that it is nothing important do not use health gerontechnology. The results show that more than 75% of the elderly consider at least something relevant in their daily life

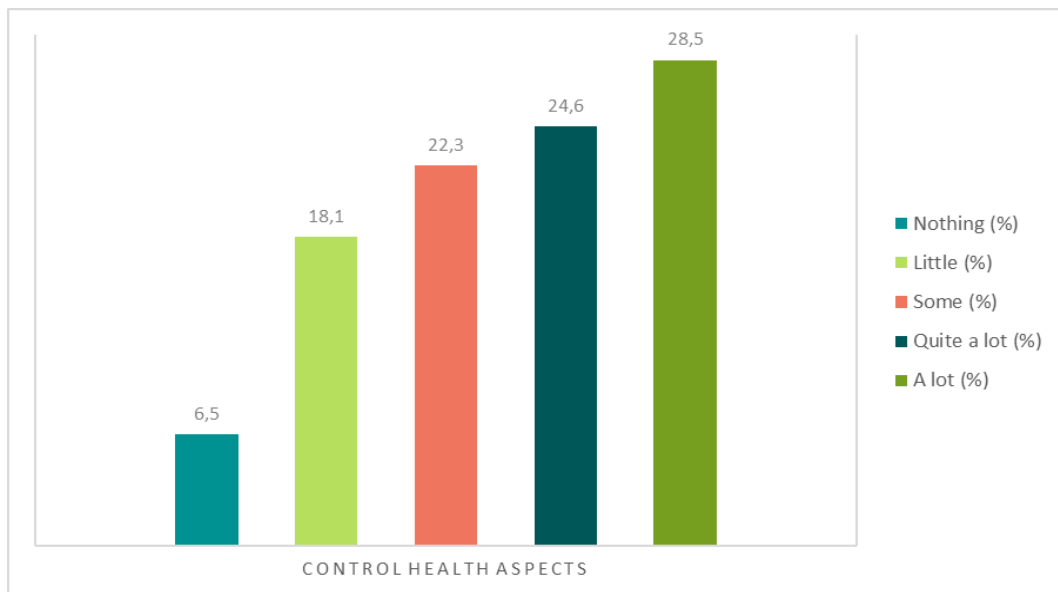


Figure 3. Responses to the importance of controlling health issues using gerontechnology

A study of the relationship between variables, according to age group and reason or purpose for using gerontechnology to control health aspects (Figure 4), highlights significant relationships regarding this reason.

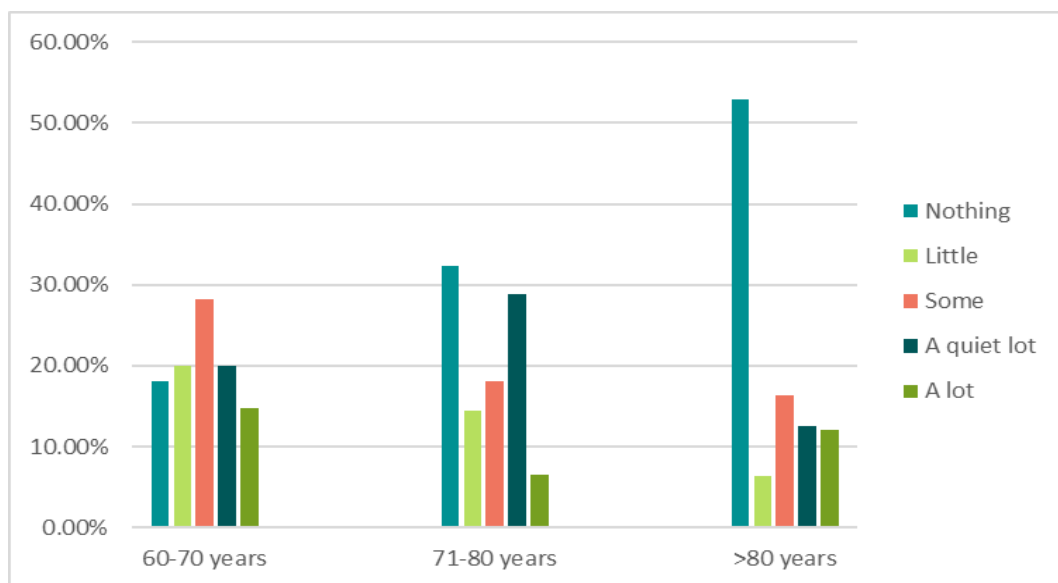


Figure 4. Responses to the importance of controlling health issues using gerontechnology according to the age

The results show that in general, as people get older, they find it less important to use gerontechnology to manage aspects of their health. The results show that users aged over 80 who generally consider the use of gerontechnology for control health aspects is least relevant in their everyday lives [only 41.3% consider that at least is something important] than for users aged 60-70 [62.9% consider that at least is something important].

4 CONCLUSIONS

The results obtained in this study have answered the two aims linked to the two research questions. Generally, older adults do not use health gerontechnology. The results show that almost 40% of the elderly have never heard of devices and mobile apps oriented to the health area neither devices for monitoring, emergency services or telecare. However, the results show that while people over 80 years of age use more frequently devices for monitoring, emergency services or telecare [35.3%], the other two younger age groups, use more of these devices and mobile apps oriented to the health area these services. On the other hand, the results show that in general, older adults consider that monitoring health issues is very important in their use of gerontechnology in their daily life [28.5%]. Specially, for users aged 60-70 who more than 60% consider that at least is something important.

Based on the results, despite the fact that they find technology useful for monitoring aspects of health in their daily lives, they are still not very present in personal lives. This may be due to the fact that, different researchers [35,36] have observed in their studies, older adults state that these technologies do not appear to be adapted to their needs and demand, making them feel uncomfortable and ill prepared for its use. It is worth highlighting the importance of decision-making in relation to digital competence training for older adults, to the degree that it can lead to a change of attitude in the use of technology. One resource that may allow for achievement of this objective is important and necessary for older adults to take part in their design to show designers other purposes that were not planned [37].

On the other hand, it is necessary to consider that in our study, we have expressly considered specific digital health technologies of everyday use: devices and mobile apps oriented to the health area and devices for monitoring, emergency services or telecare. Knowledge of technological use at this level can also be expanded in order to understand the acceptance of other assistive technologies, associated with health or related to other aspects of support for adaptive functional activities.

In short, despite the fact that health developments can help to improve the quality of life of older adults, literature clearly expresses the need to still conduct studies to understand how older adults adopt and use technology [38,39]. These results of this study, well integrated into appropriate learning designs, will improve the intention and use of technology and, therefore the quality of life for older adults.

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