Secondary End-Users' Perspectives on Gender Differences in the use of eHealth Applications in Older Adults

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Abstract: In the digital age, people with low digital skills and low digital literacy face marginalization. Here, the area of healthcare and its rapid digitalization deserves special attention, as the risks of health disparities increase for people with a low eHealth literacy. Within the AAL-funded project 'Got-IT: a toolkit for inclusive and understandable lifestyle data visualizations in eHealth solutions' (AAL-2020-7-51-SCP), we therefore aim to create an online toolkit to assist the design of inclusive eHealth solutions. As there already exists a large body of literature regarding (e)Health literacy in older adults that focuses on them as end-users of tools, apps etc. this study specifically focuses on secondary end-users of health applications in the field of healthcare. In this context, we conducted three focus group discussions with secondary end-users such as nurses, physiotherapists, psychologists, neurologists as well as social workers. As a result, it was noted that gender turned out to be an issue in terms of the familiarity and use of eHealth applications. The secondary end-users reported that the focus - when trying to be as inclusive as possible in familiarizing users with low eHealth literacy with health applications - should be on gender-sensitive use of language and gender-sensitive display of medical information. The results of our qualitative study give insights to gender-specific use of eHealth applications for older adults with low eHealth literacy, as well as recommendations of secondary end-users on how to take a more gender-balanced approach when developing, and familiarizing users with eHealth applications.

Keywords: gender, health applications, secondary end-user, digital divide, older adults

1. Introduction

Digital technologies have spread rapidly in much of the world. And while the digital revolution has brought immediate private benefits such as easier communication and information, as well as created a profound sense of social connectedness and global community, it also brought the digital divide.

When referring to the digital divide, we follow the OECD's definition of the term as "the gap between individuals, households, businesses and geographic areas at different socio-economic levels with regards both to their opportunities to access information and communication technologies (ICTs) and to their use of the Internet for a wide variety of activities" (OECD, 2001). This just defined divide however should not be understood as a sharp dichotomy. Many authors actually warn about using this metaphor, as it suggests a simple divide between two clearly split groups with a yawning static gap between them, which might be very difficult to bridge, while in fact the gaps observed are continually shifting (van Dijk, 2020). It is also important to mention that most inequalities of access to and use of digital technology are more of a relative kind, and not about absolute inequalities between those included and those excluded.

The constant further development of technology and ICTs has also given rise to different digital divides, as "digital inequalities are gaining new forms, shifting from a matter of access to a matter of intensity, frequency, and aim of Internet use" (Elena-Bucea *et al.*, 2021). While the first-order digital divide with its binary segregation of having, or not having access to ICTs has become outdated and imprecise, the second-order digital divide, representing ICT usage and proficiency, has become a relevant measure of digitalization. This distinct shift from the first-order digital divide representing unequal access to ICT, to a second-order digital divide embracing inequalities of skills and usage makes it clearly visible that people with low digital skills and literacy face marginalization (Elena-Bucea *et al.*, 2021). Here, the area of healthcare and its rapid digitalization deserve special attention, as the risks of health disparities increase for people with a low eHealth literacy. This is a challenge, as it is estimated that almost one in two Europeans have limited health literacy competencies (Sørensen *et al.*, 2015). When talking about eHealth literacy, we follow Norman and Skinner's definition of the term as the lack of the ability to "seek, find, understand, and appraise health information from electronic sources and apply the knowledge gained to addressing or solving a health problem" (Norman and Skinner, 2006).

Issues regarding inequitable access, usage or skills relating to ICT are strongly affected by sociodemographic factors such as age, gender, income, education, and ethnicity, which also have a huge impact on low eHealth

literacy and are associated with health disparities (Arcury *et al.*, 2020). With eHealth having the capacity to improve health outcomes, its systems need to match the (potentially low) eHealth literacy needs of the respective users.

One approach for equal access for people with low health literacy levels or other specific needs are purposefully designed, inclusive and understandable digital solutions. The 'Got-IT: a toolkit for inclusive and understandable lifestyle data visualizations in eHealth solutions' project, (hereafter described under the acronym Got-IT), addresses this need through the creation of an online toolkit that specifically supports the design of understandable, applicable and inspiring eHealth applications for older adults with low eHealth literacy (Simon, Prinzellner and Aumayr, 2021). Got-IT strives for understandable and applicable health data for the consumer and digital tools for all people, which includes better access to and sharing of health data (carried out under the Active Assisted Living Programme (AAL), which revolves around the mission statement 'Ageing Well in the Digital World'). Got-IT can also contribute to scientific innovation and the creation of new knowledge, due to scientific insights and applicable results which we collected and analysed in a co-creation approach with older adults with low eHealth literacy (Active and Assisted Living Programme (AAL), 2019). These specific considerations of engagement methods and materials will create insights for e.g., developers and designers of digital tools. The Got-IT project aims to promote healthy lifestyles and citizen empowerment among older adults with low eHealth literacy, as well as to contribute in the battle against health disparities in Europe (Cabrita *et al.*, 2020).

With older adults being primary end-users of the digital tools (i.e., the people who will use them), secondary end-users are persons who are in direct contact with primary end-users. As there already exists quite a large body of literature regarding (e)Health literacy in older adults that focuses on them as end-users of tools and apps (e.g. Arcury et al., 2020; Chesser et al., 2016; Choi & DiNitto, 2013; Hoogland et al., 2020), this study specifically focuses on secondary end-users of health applications in the field of healthcare, as there is a research gap when it comes to these user-types.

As gender is only one of many intersectional criteria that have effects on low eHealth literacy (especially in the population of older adults), the following chapter gives an overview on these mutual influences. Thereupon our research questions, as well as the research are being presented. The following chapter is dedicated to secondary end-users' opinions on eHealth applications, including their positive and negative experiences, as well as the role of gender aspects with these technologies and their users. Results are reflected in the conclusion.

2. Intersectional effects and low eHealth literacy

Sociodemographic factors and the socioeconomic status of a person can influence their eHealth literacy, as well as the degree to which they utilize personal health technology (Arcury et al., 2020). This can lead to serious health inequalities and possibly limit people's chances to live longer and healthier lives. Therefore, using an intersectional approach is recommended, as it takes into account the interweaving of different structural categories that generate inequality (Simon, Prinzellner and Aumayr, 2021).

Especially socially disadvantaged groups, such as people of older age, with less education, and lower income are at risk of becoming digitally marginalized, which could lead to a widening of health disparities (Cheng *et al.*, 2020). When looking into intersectional effects in the sector of low eHealth literacy, categories that show very strong influence are age and education. People with higher education are more likely to use the Internet in general, and for health information, than those with high school education or less (Arcury et al., 2020). With education playing a significant role in understanding health literacy, higher levels of education combined with younger people are therefore associated with higher health literacy. In the OECD's report 'Health for Everyone?' this is summed up, when stated: "No matter how it is measured, the least educated are more likely to be in bad health" (OECD, 2019).

The worldwide expansion of both the proportion of older adults in society, and innovations in digital technology play into the presence of a deep digital health divide (Cosco et al., 2019). Especially older adults over 65 have significantly lower eHealth literacy and are less likely to feel confident evaluating health resources on the Internet or knowing how to use health information found online. In this age group, computer stress maintained a significant inverse association with eHealth literacy and "older adults are currently the least likely age group to engage with such technologies" (Cosco et al., 2019).

These realities show a great need for educational interventions to help older adults successfully use technology and improve their eHealth literacy. Engaging with them in a meaningful manner, improving computer skills and limiting computer stress, as well as co-designing easy to use options, may be key to improve older adults' eHealth use and understanding thereof (Arcury et al., 2020).

In this age group (65+), there is another key predictor of internet use and online health information behaviour: Gender. There is a clear gender gap when it comes to internet use and self-directed health information seeking, which shows that women are more likely to engage in the latter. While more males use the Internet in general, they are less likely to use it for health information seeking. Men also have a lower trust in online (re)sources. Elderly women generally use fewer mobile services than men and are more likely to report greater levels of anxiety toward computers, less self-perceived competence, and lower perceived ease of use with respect to the internet as limiting factors for their internet usage (United Nations Educational, Scientific and Cultural Organization (UNESCO), 2018). Therefore they still face greater barriers than men regarding access to health information and services online (Manierre, 2015). These gender differences are reasons behind internet use and possible withdrawal and thus can provide new perspectives in preparing strategies that encourage especially older female adults to keep learning and engaging (Chiu & Liu, 2017).

Gender also influences people's experience of and access to eHealth services, as women may experience a lack of training from their healthcare providers and for the health systems they use (United Nations Educational, Scientific and Cultural Organization (UNESCO), 2018).

Barriers that prevent participation and inclusion are particularly relevant to consider in the ICT area, as their supportive potential is enormous. ICTs can also play an important role in achieving gender equality and enhancing women's empowerment and rights, as ICTs have the capacity to improve women's access to education, increase their involvement in politics, and enable women to report safety risks and access (mental) health services (Williams and Artzberger, 2019). As attention from politics and increasing societal awareness in general have also attracted the interest of developers and designers, high quality accessible and inclusive design is now more important than ever, especially as the benefits of accessible ICT services can be experienced by all people and not just specific groups (Persson *et al.*, 2015).

Here, the aspect of co-design is important, especially in the area of health applications. This field is particularly complex, as "clear risks may accrue to app users if the health information that is being accessed is erroneous, unclear or irrelevant" (Skuse *et al.*, 2021). While the need to involve users in app design processes is recognized in many places by now, many do not consider that co-design implies a process that is mostly non-linear, iterative, and frequently contested. However, it is precisely this contradiction that is important to note, "because a world of complexity, dialogue, creativity, tensions, naivety and sometimes incompetence is inevitably reflected in the app co-design process" (Skuse *et al.*, 2021). This also includes the analysis of problems that arise during this process, such as the app functionality, its visual appeal, and the digital and health literacies of the users. In fact, literacy issues are some of the most pressing problems associated with the app development process, which make user-centric approaches essential for tailoring to specific user needs and literacies. These are only a few complexities that make the process of user-centric app co-design "highly fluid, messy, often challenging and sometimes contested" (Skuse *et al.*, 2021).

Therefore, it is so essential for the Got-IT project to take the need for user engagement seriously, so that developers and other stakeholders can create new ways to engage with these issues more successfully when creating inclusive apps designed to benefit people with low eHealth literacy or other complex healthcare needs.

3. Research questions

While social support, health and wellbeing, internet use as well as health literacy of older adults have been studied with this specific target group as a focal point (Lam, Jivraj & Scholes, 2020; Heo et al, 2015; Shapira, Barak & Gal, 2007), perspectives and opinions of those working in the healthcare-sector - closely related to older adults - are still under-researched. Therefore, the empirical study was conducted with the target group of secondary end-users (e.g., health professionals und health related professionals) with a focus on their impressions of the use, familiarization, and problems, as well as benefits, of the use of eHealth applications among older adults they work with.

The analysis of the data was guided by the following research questions:

RQ1: What are the positive and negative experiences gained regarding eHealth solutions for older adults with a low eHealth literacy when using eHealth applications?
RQ2: What are the gender differences in the use of eHealth applications for older adults?

4. Research design

An explorative study with a qualitative approach was designed. In the study a total of three focus groups with secondary end-users were conducted. The secondary end-users were recruited via the network of the Johanniter Research and Innovation Centre. They were divided into different groups ranging from medical doctors to health care professionals and professionals working in a health-related field, to focus on the specific perspectives of the different levels of involvement with patients and older adults with a low eHealth literacy. Three participants took part in each focus groups discussion (n=9).

The focus groups took place in June and August of 2021 and had an average range from 45 to 90 minutes.

Because of the restrictions due to the COVID-19 pandemic, two discussions took place solely online, and one focus group discussion was conducted in a hybrid format (online participation as well as face-to-face participation).

The participants of the focus group discussions were briefed by the researchers beforehand and signed an informed consent letter. The discussions were recorded and transcribed. The transcriptions were anonymized.

The data was analyzed via a qualitative content analysis (Kuckartz, 2017).

5. Secondary end users' opinion on eHealth applications

Positive and negative Experiences

Concerning the positive and negative experiences the secondary end users referred to the following main findings (RQ1) (see table 1):

Table 1: Positive experiences

Time and location-independent use of eHealth solutions
Bottom-up approaches work best, when introducing new eHealth solutions
A low-threshold approach is ideal, when introducing new eHealth solutions

One of the main positive aspects the participants highlighted, were the flexible use of applications for the users. It is very important to take the time to give older adults the opportunity to familiarize themselves with new eTools for health. Here, a bottom-up approach is advisable. The acceptance of eHealth applications is far greater if peers educate each other and learn and foster new (health) knowledge within their social groups. Also, the process of introducing new eHealth applications should be approached at a slower pace as to not overwhelm the users. A positive word-of-mouth among the users seems to be very important to raise acceptance among older adults.

Table 2: Negative experiences

Not all eHealth applications are created for the same purpose (medical vs. health-related)
An abundance of eHealth solutions leads to a feeling of being overwhelmed, technical fatigue and technology stress
If there is a lack of support for the users in using the application, frustration leads to abandonment of the solution

According to the health professionals, there should be a clear distinction between health-related applications (e.g., step-count) and medical applications, which are used as part of medical treatments and therapies. This is especially crucial considering the rise in prevalence of chronic illness in older adults. The participants stated that technology must support the users in their health needs and improve their health status. Often, especially older adults with a low digital and eHealth literacy feel overwhelmed by the many devices they are being offered, which leads to technical fatigue. Additionally, not knowing how to set up the device to suit ones' needs, creates technology stress. Support at every stage (from the introduction of an eHealth device to using it as part of a daily

routine) is stated as highly important. "The support needs to be part of the system. To learn how to use the software, is not so complicated, if you have a guide." (Psychologist, focus group 3)

Gender Aspects and eHealth applications

Table 3: Gender aspects

eHealth applications should be designed in an inclusive, accessible, and non-discriminatory manner

Gender was one among many crucial aspects that were discussed regarding older adults' use of eHealth applications to benefit their own health and wellbeing. "I think there should be a distinction made between men and women. In modern medicine they also found out that there is a big difference between men and women. A modern eHealth application should therefore be designed, keeping these differences in mind." (Physiotherapist, focus group 2). The participants state, that if eHealth applications do not regard the physiological differences in the sexes this could lead to impactful decisions in terms of medical treatments and therapies. Additionally, there is more women in older age groups due to the differences in life spans. "We have more women in the support calls. But this is natural as in the full population of our age group and target group are more women." (Psychologist, focus group 3)

Language also plays an important role. Here, more intersectional aspects should be included when designing an eHealth app (e.g., language barriers, cognitive disabilities). The participants recommend opting for inclusive design elements whenever possible to address the needs of a broad and diverse user group. The participants agree that the socio-economic factors play a huge role in terms of accessibility (e.g., education, financial resources, previous experiences). If these factors are considered, when designing an eHealth application users have an easier time using the app. This can also increase the intrinsic motivation to stick to a routine using an eHealth application, thereby increasing the wellbeing and health of the users.

6. Conclusion

This study focused on the view of secondary end users and the positive and negative experiences as well as the gender differences they reported when working with older adults with a low (e)Health literacy and (e)Health applications.

The secondary end users highlighted the importance of including end-users in design processes. Here, the gender differences in the use of eHealth applications for older adults play an important role when the aim is to create high quality accessible and inclusive design solutions. As shown in other studies the rate of self-confidence related to being on the internet is higher in men than in women (Hunsaker & Hargittai, 2018), which could especially be true for older adults with a low eHealth literacy.

The positive experiences for older adults with a low eHealth literacy reported by the secondary end-users showed that bottom-up approaches are important, also in terms of introducing new technologies into daily routines for people with a low eHealth literacy. Support is another main area that must be taken into consideration when introducing new eHealth applications for target groups with special needs. Here, media literacy plays an important role. Older adults who can navigate the internet and receive social support online, also perceive offline social support as more positive (Benvenuti et al, 2020) which could help to foster the familiarization with new eHealth applications. Support should be available at all stages of the roll-out of an application. Here, gender is an important factor. Most of the target groups of older adults with a low eHealth literacy are women. Still, up to this day their needs are not considered (enough), when designing eHealth applications, which could potentially benefit their health and wellbeing and enable them to be part of their community for as long as possible.

This study can only be looked at as a first pilot study. In this paper the results of one of many stakeholder groups which should and need to be involved in the process of designing, supporting, and implementing eHealth applications for older adults with a low eHealth literacy, are considered. Studies on a larger scale must be conducted in the future.

From the data gathered, recommendations for eHealth developers can be concluded. Motivation is one of the key elements for a successful implementation and use of an eHealth app. The secondary end users agreed that the motivation among the users is a main factor. Also, the app itself should have a design that enables engagement (e.g., gamification). eHealth applications for people with low eHealth literacy, especially within the group

of older adults, should provide interfaces with other medical applications, to simplify the coordination of health treatments and therapies between different medical providers. The information provided in the eHealth application must be evidence-based, for this specific target group to enhance their knowledge on health and health related topics and to further foster their eHealth literacy. In terms of funding, the financial resources of the target group must be made a priority to guarantee access to necessary technical and digital infrastructure (e.g., apps). Most importantly an inclusive design of the digital applications is important to avoid discrimination and enable accessibility for all, especially considering physical changes due to age-related impairments (Farage et al, 2012).

Considering the vulnerable target group of this study, we suggest a stronger focus on more co-creative research projects, to design eHealth applications that suit the users' needs, in terms of inclusion and gender as well as age. When (co-) designing applications or other digital solutions, it has to be kept in mind that 1) "gender relations play a fundamental role in access to information and ICTs, 2) gender inequality is expressed in the use of communication technologies and 3) how these technologies are used by women" (Garcia, 2011).

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