Across Europe, life expectancy is increasing and, along with this, so is the prevalence of chronic conditions including cardiovascular disease (CVD) which is a major cause of morbidity and reduced quality of life, especially among older people. Overall, these changes are generating growing demands for care, which challenge the healthcare systems.

The use of information and communication technology (ICT) has been seen as a solution to providing good quality care, while simultaneously making healthcare systems more efficient and sustainable in the long-term. Ever more research is being conducted into the design and evaluation of new ICT-based interventions. These ICT-based interventions are meant to be used for providing a broad range of services such as booking medical appointments online, managing e-prescriptions, engaging in online health education and promotion (e.g. for self-care), receiving remote monitoring and checking your medical journal.

These changes in healthcare provision involve all medical fields, including cardiology. ICT-based interventions have the potential to support the health and wellbeing of patients with CVD by providing tele-monitoring, supporting lifestyle changes and treating depression. Informal carers of older people could also benefit indirectly from the improved situation of the older person for whom they are caring and directly from tailored ICT-based interventions.

However, the effectiveness, the acceptance and the use of ICT-based interventions by older people can be reduced by some key aspects. Firstly, when designing and developing ICT-based interventions, it is crucial to consider that health-related limitations can hinder the engagement of older people with the intervention. Secondly, although the number of older persons using ICTs has been increasing over the last years, some of them are non-users or have little experience with the use of ICTs.

**Health-related challenges to ICT-based interventions for older people with CVD**

Older people with CVD can suffer from sensory, physical and cognitive limitations that can hinder the use of ICTs. Sensory abilities, such as eyesight and hearing can decline. Physical strength and control of the hands and bodily movement can decrease. There can also be a negative effect on cognitive functions such as memory, attention and ability to process written material.

All of these limitations should be considered when designing ICT-based interventions for older people with CVD. For example, designers can choose to incorporate reminders into ICT-based interventions, to integrate the possibility of returning to information when needed, or to implement self-explanatory features (e.g. guiding the user with the help of an avatar) in order to support those whose cognitive function has declined. Loss of power and control of the body require consideration of what features to incorporate into ICT-based interventions, e.g. using a computer mouse or

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touchscreen can represent a barrier for some. Other important considerations concern the opportunity to personalise the interface of the ICT-based interventions, e.g. making it possible to enlarge fonts, adjust colours for contrast, use vocal feedback or allow the modification of content.

Older people and the use of ICTs

Although the number of older people using ICTs has increased in recent years, some of them are non-users or have limited experience with new technologies. Providing healthcare services by the means of ICTs can represent a disadvantage for those older people who are not familiar with the use of ICTs.

Individual characteristics, personal attitudes and contextual aspects are associated with the use of ICTs among older people. Older people with a lower level of education and lower income are less likely to be digitally engaged, and likely to have lower digital skills and perform a more limited range of activities using ICTs. In addition, older people living alone and those who live in rural areas are less likely to be users compared to those who live in urban areas, presumably because of a lack of encouragement and help from family members or partners and poor infrastructure, respectively. Health status is a relevant predictor and both physical and cognitive impairment reduce the use of technology among older people. Older people who are non-users are more likely to demonstrate a lack of motivation and interest in using ICTs. Furthermore, they tend to demonstrate poorer perceived usefulness of ICTs, higher anxiety and lower self-efficacy towards the use of ICTs compared to their digitally engaged counterparts. Beyond individual characteristics and attitudes, contextual aspects such as dedicated public policies that foster and facilitate the use of ICTs among older people (e.g. free training, free Internet access in public spaces), well-developed infrastructure and low costs for Internet access can favour the use of ICTs among older people (Table 1).

Take-home messages

Older people with CVD do indeed represent a heterogeneous group with a broad range of different needs and preferences. The awareness of this heterogeneity should guide the design and evaluation of new ICT-based interventions.

When designing interventions, the possible impact of sensory, cognitive and physical decline can be reduced by including facilitatory features, which support the interactions between the users and the ICTs. The existing digital inequalities among older people should be considered. This includes considering if alternatives to ICT-based interventions should be available to the users. Moreover, in order to acknowledge future users’ interests and needs, the design and evaluation of interventions should involve samples of older people that reflect the target population of interest. For example, this can mean involving older people from different age groups, with different attitudes to ICTs and with different cognitive and physical abilities.

ICT-based interventions in healthcare should not prevent older people from accessing healthcare services, rather they should facilitate their use by this group. This means it is necessary to develop inclusive ICT-based interventions that are able to overcome barriers, capitalise on older people’s capabilities and facilitate broad and effective implementation.

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Table 1. Main aspects related to use and non-use of information and communications technologies (ICTs) among older people.

<table>
<thead>
<tr>
<th>Individual characteristics</th>
<th>Personal attitudes</th>
<th>Contextual aspects</th>
</tr>
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<td>Socioeconomic status</td>
<td>Interest in ICTs</td>
<td>Dedicated policies</td>
</tr>
<tr>
<td>Cohabiting status</td>
<td>Perceived usefulness of ICTs</td>
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<td>Health status</td>
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References

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