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Cardiovascular risk self-management in older people: Development and evaluation of an eHealth platform

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Chapter 8

Summary

This thesis describes how self-management of the cardiovascular risk profile could be offered to older people using eHealth.

In **chapter 1** we describe the background and aims of this thesis. Global ageing contributes to the fact that in the near future the number of people with cardiovascular disease or with elevated risk will rapidly increase. Older people (people aged 65 years and older) form an important target group because they are often at high risk for cardiovascular disease and they will still benefit from interventions that reduce the risks. Current cardiovascular risk programmes do not yet completely address the specific needs of older people. Moreover, current cardiovascular risk programmes are not future-proof yet, because they do not have the capacity to support everybody at risk and their effectiveness in daily practice is markedly lower than expected based on scientific evidence. An important factor related to this is the fact that it is notoriously difficult to adhere to a lifelong healthy lifestyle and medication use. This requires an enduring health behaviour change. Innovative strategies are needed to make cardiovascular risk management more future-proof. Self-management is a promising strategy to stimulate adherence. EHealth provides many opportunities to provide online self-management programmes to large groups of patients. Older people do not yet use the internet as massively as younger people, but in Europe, the number of older people that frequently uses the internet is increasing rapidly. The European project 'Healthy Ageing Through Internet Counselling in the Elderly' (HATICE) therefore aims to develop an internet-platform for cardiovascular self-management in older people. The studies described in this thesis have been performed in the context of HATICE. In part 1 we describe the development of an internet-intervention for cardiovascular self-management in older people (the HATICE-platform). In part 2 we describe research on engagement of older people in innovative forms of cardiovascular riskmanagement.

PART 1: DEVELOPMENT OF AN INTERNET-PLATFORM FOR CARDIOVASCULAR RISK SELF-MANAGEMENT IN OLDER PEOPLE

In **chapter 2** we present the results of a systematic review and meta-analysis on randomised controlled trials (RCTs) testing the effectiveness of internet-interventions for cardiovascular risk management in older people. We found 57 studies that fulfilled inclusion criteria. The first conclusion was that research on internet interventions specifically targeting older people is still scarce; in only 7 out of the 57 trials, all participants were aged 50 years and older. In the other included trials, the mean age of the populations was 50 years or older. 47 out of the 57 studies could be used for the meta-analysis. The meta-analyses showed that the internet interventions lead to

small but significant improvements of the cardiovascular risk factors: blood pressure, LDL-cholesterol, weight and amount of physical activity. Compared to the control group, the systolic blood pressure in the intervention group was on average 2,66 mmHg (95%-confidence interval: -3,81 to -1,52 mmHg) lower and the level of LDL-cholesterol was on average -0,06 mmol/l lower (95%- confidence interval: -0,10- to 0,01mmol/l) lower. No difference was found between the groups in incidence of new cardiovascular events. However, this was measured in only six studies with a relatively short follow-up interval (on average 13 months). In further analyses, we found that the beneficial effects of the internet-interventions are smaller with longer study duration. Our hypothesis is that this may be mediated by reduced adherence to the intervention. Finally, we found that studies that combined the internet-intervention with human support induced larger effects than stand-alone interventions. We concluded therefore that internet-interventions have a beneficial effect on improvement of the cardiovascular risk profile, but that this effect is modest and declines with time. Future research should focus on interventions specially targeting older people, interventions combined with human support, maintenance of effects and measuring major clinical endpoints.

In **chapter 3** we present the results of one of the sequential steps in the development of the internet-platform. Here, we performed an international focus group study with six Finnish and seven Dutch primary care nurses that were experienced in cardiovascular risk management. We investigated their experiences with supporting health behaviour change for cardiovascular risk management. Next, we asked how they envisioned this guidance could be provided with a coach-supported internet-platform. The Finnish and Dutch nurses indicated three preconditions for good support of health behaviour change: building a relationship of trust, awareness and expectation management, and appropriate timing of support (matching the stage of change). To accomplish these preconditions the Finnish and Dutch nurses used largely the same practical approaches, but there were also small differences. The Finnish nurses were accustomed to frequent consultations by telephone, because their patients often lived at considerable distances. Further, the Finnish nurses took a supporting role with regard to both lifestyle and medical components of cardiovascular risk management. The Finnish nurses relied on telephone-contact and the Dutch nurses more on face-to-face contact. For the Dutch nurses, frequent face-to-face contact was essential for the development of a relationship of trust. They interacted with their patients in a supportive fashion when it concerned lifestyle but in case of medical issues, their attitude was more directive, because they found that these matters belonged to the responsibility of the general practice. Next, we discussed how an internet-intervention could provide optimal support for health behaviour change for cardiovascular risk management. Both groups of nurses

emphasised that an online intervention should be combined with human support and implemented in regular care. The Dutch nurses had a reserved attitude, they were not convinced a relationship of trust could be realised with mostly online contact. They also suggested that such a platform should only target lifestyle, because they regarded it more safe to limit the medical guidance to the general practice. The Finnish nurses had a more embracing attitude towards online cardiovascular risk management, regarding it a logical development towards the future of medicine, provided that human support was ensured and the first contact was face-to-face. We concluded that the differences in practical approaches and attitudes towards the internet-platform were associated with differences in geography, culture and local primary care organisation. Possibly, Finnish nurses are further ahead in adopting a self-management stimulating attitude than the Dutch nurses.

In **chapter 4** we describe the complete development process of the internet-platform and the pilot in which we tested platform feasibility among 41 older people from the Netherlands, Finland and France. The development process included systematic literature research (described in chapter 2), evaluation of clinical guidelines and health behaviour theories, discussions with experts in communications with older people and in cardiology, meetings with representatives of patient organisations, extensive brainstorm sessions by researchers and software developers, consultations with end-users (older people and nurses (described in chapter 3)), testing sessions with older people and the international pilot study. The final platform is a personalised, secured, interactive internet-platform for self-management of the lifestyle components of seven modifiable cardiovascular risk factors (hypertension, overweight, elevated cholesterol levels, smoking, unhealthy diet, physical inactivity and diabetes) with support from a health coach. The development process and the pilot resulted in a series of recommendations for a senior-friendly internet-platform. These recommendations included: big font size, a simple lay-out, a limited amount of webpages to simplify navigation, clear and concise information texts, no links to locations outside of the platform, simple login procedure and a positive tone of voice focusing on health instead of disease. The pilot revealed that the login procedure needed to be simplified further and that the platform was not accessible easily from outdated browsers. During the pilot, participants self-monitored their blood pressure, weight and level of exercise. The self-monitoring functionalities for smoking cessation and diabetes were not used. During the evaluation session people were positive about the platform, emphasising mostly the support from the health coach.

PART 2: ENGAGEMENT OF OLDER PEOPLE IN EHEALTH OR NURSE-LED CVRM

In **chapter 5** we present the results of an interview study with 17 Dutch participants of the HATICE trial. In the interviews, it was discussed how the participants used the internet-platform in order to identify factors associated with engagement with the internet-platform. We distinguished initial and sustained engagement. The following factors stimulated initial engagement: computer self-efficacy (trust in own computer skills), platform senior user friendliness, acceptability and perceived appropriateness of the intervention and initial interaction with the health coach. For sustained engagement, building a relationship of trust was the most important factor. Other stimulating factors were regular automatic and personal reminders, having clear expectations of the platform, incorporating the use of the platform into daily routine, getting social support and having a loyal and persistent attitude. These findings confirm the importance of incorporating human support into an internet-platform for older people, and suggest this may enhance engagement with the intervention. The participants further preferred the internet-platform to be implemented into regular primary care. If a practice nurse would adopt the role of health coach, this could augment continuity of care, which potentially would also lead to enhanced engagement to therapy.

In **chapter 6** we present research into engagement of older people with another cardiovascular risk management intervention, the nurse-led intensive vascular care intervention. This intervention was tested in the Prevention of Dementia by Intensive Vascular Care (preDIVA) trial. This randomised controlled trial included 3,526 Dutch community dwelling older people and investigated whether 6 years of intensive vascular care provided to older people could prevent dementia. We explored factors associated with dropout from the trial and with non-adherence to the intervention. We found that higher age, lower levels of cognition, symptoms of depression and disability were associated with a higher risk on dropout. In the control group, more people with lower levels of cognitions and/or symptoms of depression dropped out than in the intervention group. This finding may be important for other dementia prevention trials to take into account, because this differential dropout could bias study outcomes. A solution is to choose a major clinical endpoint (such as incidence of dementia) or to invest in dropout retrieval. This was both done in the preDIVA trial. The findings of this research also suggest that, in clinical practice, it may merit to regularly see older people with these characteristics to stimulate engagement with care. The factors associated with dropout were not associated with non-adherence. We found that people with overweight were more often non-adherent and, on the other hand, people

with hypertension or physical inactivity were more often adherent to the intervention. These findings are novel and need to be reproduced. We expect the external validity of our findings to be large, because the preDIVA population constitutes a good reflection of a normal Dutch population of older people and because the intervention was offered in the setting of people's own general practices.

In **chapter 7** we discuss the main findings of this thesis, some methodological considerations, recommendations for future studies and for clinical practice. The main findings are: (1) there exist only few internet-interventions for cardiovascular self-management that specifically have been developed for older people; (2) internet-interventions for cardiovascular risk self-management have a beneficial effect on reducing cardiovascular risk, but effects are modest and decline with time; (3) internet-interventions for cardiovascular self-management are more effective if combined with human support; (4) provided that the developmental process was meticulous with close involvement of the end-users, an internet-intervention can be developed that is feasible and acceptable to use for older people; (5) the additional value of human support of an internet-intervention may lay in, among other factors, the establishment of a relationship of trust and increasing engagement of the participants with the intervention; (6) integration of an internet-platform into regular care could contribute to continuity of care; (7) participants with lower levels of cognition and/or symptoms of depression have a higher risk to dropout from a dementia prevention trial, this risk is more pronounced for control group participants than for intervention group participants.

Worldwide, health care systems face large challenges due to the large increase in people with cardiovascular disease or at elevated risk. This thesis provides starting points on how to develop an eHealth application for cardiovascular self-management for older people. The results of this thesis indicate that human support forms an essential component of internet-interventions to increase their effectiveness. Currently, the effectiveness of the HATICE-platform is being tested in a large randomised controlled trial with 2,725 older participants in the Netherlands, Finland and France.