Targeting modifiable risk and protective factors to prevent dementia

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Valorization of the acquired scientific knowledge

This thesis aimed to extend the knowledge on modifiable risk and protective factors for dementia and how this knowledge can be translated into preventive strategies. This paragraph describes the societal and scientific relevance of our findings as well as opportunities for implementation.

Societal relevance

In 2019, there were an estimated 55 million people living dementia worldwide. This number is expected to increase to 139 million people living with dementia by 2050.\(^1\) The associated disease burden and societal costs are immense. Estimated direct global healthcare costs of dementia alone were $263 billion in 2019 and are expected to reach $1.6 trillion by 2050.\(^2\) This number does not even include indirect costs originating from healthy life years lost or family members who alter their regular day-to-day activities to take care of their loved ones. The first disease-modifying treatments have come to market in the United States and might be available in Europe in due course, but these will not (yet) offer a solution for many of the current and future patients due to restricted indications and severe side effects.\(^3\) Importantly, however, there is a large consensus that dementia risk is partially modifiable by leading a “brain-healthy” lifestyle.\(^4\) This offers valuable opportunities to reduce the number of new dementia cases in the future, and their associated economic and societal costs. On top of this, primary prevention of dementia will undoubtedly also result in prevention of other non-communicable diseases such as type 2 diabetes, myocardial infarction, stroke, obesity, as risk factors for these diseases and those for dementia overlap. However, to date many individuals are still unaware of opportunities for dementia risk reduction and are faced with fear for a syndrome that they assume “normally” occurs as they age.\(^5\) We know from previous research that there is a high demand for information on dementia risk reduction, both from the general population and from health professionals.\(^6-8\)

This thesis provided further evidence in favor of targeting modifiable risk and protective factors for dementia and demonstrated that risk factors operate globally. It thus is paramount that countries worldwide include primary prevention through lifestyle in their national dementia plans, next to topics related to treatment and care. We observed lifestyle improvements and/or increases in awareness using population- and individual-level interventions of
dementia risk reduction: a public health campaign, a brain health promotion smartphone app, and the discussion of dementia risk reduction opportunities within primary care. Integrating dementia risk reduction in regular (primary) care seems particularly relevant for maximizing the reach of such preventive actions. We showed that this approach seems feasible, and our studies might be a first step towards dementia risk reduction at a large scale in the Netherlands and beyond. Ultimately, population-wide implementation of evidence-based strategies targeting modifiable risk and protective factors for dementia should be accelerated.

Who could benefit from these findings?

The work in this thesis is relevant for researchers, health professionals, policy makers, and society at large, especially individuals at high risk or individuals with a special interest in dementia (e.g., case managers). Researchers in the field of (primary prevention of) dementia, or primary prevention of other non-communicable diseases and health promotion in general can build on the current findings and potentially collaborate in the future. Various directions for future research were highlighted in Chapter 7. This includes further work on the relationship between modifiable risk factors and incident dementia (e.g., if this relationship is modified by ethnicity, geographical region, genetic risk, or timing of the exposure (with evidence on early life exposure being especially limited), how management or treatment of risk factors affects dementia risk, how different combinations of risk factors affect dementia risk) and additional research into the (cost-) effectiveness of implementation of dementia risk reduction in primary care.

Additionally, health professionals, especially primary care providers (PCPs) but also care groups that unite general practitioners (e.g., in our region “Huisartsen Oostelijk Zuid-Limburg”, “Zorg In Ontwikkeling” (ZIO)) or practice nurses (e.g., PoZoB), may be interested in these findings as they are the ones that can implement these interventions and discuss dementia risk reduction with their patients. For instance, they can refer interested patients to the freely available MyBraincoach app, discuss the provided LIBRA profile with them, and monitor change. An example comes from the United Kingdom, where they already implemented dementia risk reduction together with prevention of other non-communicable diseases within the National Health Service (NHS)
Addendum

Health Check, which is a regular health check-up within primary care that assesses risks for various non-communicable diseases and provides guidance on modifying them. Bodies that organize education for new or existing PCPs (e.g., colleges, universities, or organizers of further training such as “Vereniging Arts en Leefstijl”) are also important stakeholders who can include the topic of dementia risk reduction in courses or trainings for current and future health professionals. These bodies can – and likely will – play a significant role in spreading awareness on dementia risk reduction and providing support for its integration among PCPs, who can in turn share this knowledge with their patients.

Next, local, regional, and national policy makers, as well as interest groups and knowledge centers should make use of our findings and may be good collaborators for future projects. Currently, we closely collaborate with Alzheimer Netherlands, the Brain Foundation (“Hersenstichting”), the Public Health Service (GGD), the Flanders Centre of Expertise on Dementia, Alzheimer Europe, Alzheimer’s Disease International (ADI), and the World Health Organization’s Department of Mental Health and Substance use Brain Health Unit. Policy makers would be especially interested in the second part of thesis, as this includes information on actionable interventions and lessons learned thereon, which can be used as a starting point for future preventive strategies. For instance, the findings discussed in Chapter 3 provide valuable information and a good starting point for other public health campaigns on the topic of dementia risk reduction. Our group previously also showed that people reached by a public health campaign about dementia risk reduction are more aware, more knowledgeable of risk factors, and more motivated to change lifestyle. The MyBraincoach app is another example of a tool which is effective at increasing knowledge on dementia risk reduction and can be adapted and implemented to other settings. Dementia risk reduction is already an important pillar in terms of research in the Dutch National Dementia Strategy, but it is now time to translate the scientific research into real-world public health policy. As such, dementia risk reduction should be mentioned alongside other partially preventable conditions in the National Prevention Agreement.

Lastly, there is of course the general public. We know there is a substantial demand for information on how to maintain good brain health. On top of the already existing interest in the subject, raising further awareness of
dementia risk reduction opportunities will likely result in additional motivation to make improvements to one’s lifestyle, especially for individuals with an increased risk (e.g., all patients within cardiovascular risk management). In this regard, our finding that improvement of the modifiable dementia risk profile is associated with reduced MCI/dementia risk and slower cognitive decline is a potentially motivating, empowering, readily interpretable, and important finding for the general public.

Translation of findings into products and activities

All results in this thesis have been described in scientific papers that have already been published open access in scientific journals or that are going to be submitted. Findings have also been presented at national and international conferences including Alzheimer Europe Conference 2021 (virtual), Alzheimer Europe Conference 2022 (Bucharest, Romania), the Australian Dementia Research Forum 2023 (Gold Coast, Australia), Alzheimer Europe Conference 2023 (Helsinki, Finland), and Alzheimer’s Association International Conference 2023 (Amsterdam, the Netherlands). Results were further shared with other researchers and health professionals, e.g., at our institutional MUMC+ Science Day. We are planning to disseminate findings with the general public via lay audience articles distributed via Alzheimer Nederland and ZonMw. Additionally, workshops and lectures were given on dementia risk reduction for health professionals and lay audience. The findings of this thesis will also be taken into account in the development of educational material for health professionals on the topic of dementia risk reduction, which is being done by the Netherlands Dementia Prevention Initiative (NDPI). Importantly, the brain health promotion smartphone app, MyBraincoach, continues to be updated and improved in terms of both content and delivery, based on new findings. MyBraincoach will continue to be freely available. The app has also been adapted and implemented internationally (in Belgium, Luxemburg, Denmark, and Norway). In addition, the study described in Chapter 5 demonstrated that the Lifestyle for BRAin health (LIBRA) profile is very usable as a conversation guide in primary care to discuss opportunities for dementia risk reduction with patients and increase their risk perception. LIBRA can also be employed to identify individuals at increased risk, which can for example be used to select study participants as was done within several studies in this thesis. Furthermore, in order to reach more people with information on how they can improve their brain health, we
are closely collaborating with Alzheimer Nederland. Together, we improved and extended their existing free online e-learning on the topic of dementia risk reduction for the general public. Over the course of seven weeks, users get one module per week covering information on a certain theme (e.g., physical activity or diet), including a quiz, a video, and practical recommendations and tips. At this moment, the e-learning has been fully developed and we are currently conducting a study to evaluate user satisfaction, as well as changes in knowledge, attitudes, motivation, and behavior over the course of the e-learning and up to three months later. These results will also be shared in an open access scientific article. If proven effective, the e-learning can be easily adapted for implementation in other settings or as part of other interventions.
References