Social networks in relation to infectious diseases and type 2 diabetes

Valorisation of the thesis

Valorisation addendum

Over the last decade, population ageing has become a global issue and, according to the WHO, one of the greatest challenges in the 21st century. The research presented in this thesis is of importance for both science and society, as it is driven by a societal problem and practical question, i.e. how can we increase health in the growing group of older persons?

Infectious diseases

Social relevance

Human aging is increasingly represented by frailty, with declining reserve function of many organ systems, including the immune system. The incidence and severity of infectious diseases among older individuals are often associated with several comorbidities, resulting in a large burden of morbidity and mortality. Part one of this thesis is based on a gap in the current management of infections in older persons: a growing population, living longer, and being more susceptible to infections. If we would be able to slightly lower the level of infectious disease prevalence, we might have more health impact at population level ('the population strategy') compared to individual treatment of patients (a much smaller group). Improved preventive strategies that are applicable to the growing group of older people living at home, are likely to render gains on the economic (i.e. reduced costs, such as treatments-costs), and individual level (improved quality of life, self-management).

Target groups, activities and innovations resulting from this thesis

An important purpose of scientific research is to ensure that the results will impact society by making it suitable for translation into products, services, processes or new activities. Part 1 of this thesis showed detrimental as well as beneficial associations with URI, LRI and GI. Based on the results of our studies and previous investigations, we feel that the potential of the social network parameters for infectious disease prevention strategies is twofold. First, the beneficial social network parameters may be used as potential determinants which can be reinforced by preventive interventions. Current EU policy expects older persons to take care of themselves as much as possible with help of their social network. New prevention strategies should fit this policy. For example, in future prevention strategies, the relation to close proximity and same-age network members could be reinforced. Moreover, future prevention strategies may aim to enhance practical and informational support from network members. Previously, higher levels of social support have already been shown to associate with enhanced immune function. Second, the prediction rules could be used to compute an individual's probability of an infection given a defined set of parameters. For example, the prediction models may be used in a practical tool which could be offered to middle-aged and older people in order to calculate their risk of infection, followed by an tailored advice on infection prevention (e.g.

hand and environmental hygiene). At this time, I am translating the prediction models (chapter 3) into a practical web-based intervention, a simple web-tool for independently living older persons. With this web-tool, we aim to achieve reduced infectious burden among older people using a practical infection-prevention strategy. The prognostic tool may help older people to raise awareness for their social network or to trigger early preventive actions (e.g. personalized advice). The tool may also help formal caregivers (such as GPs) in their practical infection-management of older people. For example, older people who visit their GP many times during the winter season because of common cold/ influenza-like symptoms may be advised to make use of the web-tool by their GP. In older people themselves, the web-tool may help them to become aware of their social network and to improve the beneficial social network aspects. The combination of social network and prediction models in a non-pharmaceutical web-based intervention to improve infection prevention and the quality of the social network in older persons is highly innovative.

Type 2 diabetes

Social relevance

To date, type 2 diabetes mellitus (T2DM) is one of the most prevalent diseases worldwide, and a growing public health burden in middle-aged and older persons.

The impact of diabetes on patients' quality of life is high as treatment of T2DM involves intensive daily self-management of glucose monitoring, dietary behaviors, physical activity, and when needed, diabetes medication. Moreover, patients with T2DM have an increased risk for the development of macro- (e.g. myocardial infarction, stroke, peripheral arterial disease) and microvascular complications (e.g. neuropathy, retinopathy, and nephropathy). T2DM and its' complications impose a substantial burden on patients, their surroundings, and society. T2DM can be prevented or even reversed with appropriate lifestyle changes such as healthy dietary behavior and sufficient physical activity. However, the social context of patients is often neglected in regular care. Patients at risk and those who already have T2DM usually receive lifestyle advice on dietary habits and physical activity, and when needed, medication. This thesis provided new insights for the prevention and treatment of T2DM and diabetes complications.

Target groups, activities and innovations resulting from this thesis

Findings in this thesis are of importance for all individuals at risk, and those having T2DM and related complications. Knowledge of a patients network and social support may render treatment strategies and lifestyle interventions more effective when tailored to the specific needs and network characteristics of the individual. The social context can be of crucial importance to adopt and succeed in lifestyle change, and therefore, prevention strategies aiming to generate behavioral change (e.g., dietary advice, physical activity) may also tailor the social network of the participant. Previous research has shown that network targeting increases the adoption of specific prevention strategies. Moreover, social network characteristics itself may prove an independent target in non-pharmaceutical and non-medical prevention strategies which aim to prevent the development of T2DM as well as in T2DM patients to prevent clinical complications. Our findings support the efforts to develop effective prevention strategies which tailor social network characteristics, however, it is important to assess whether these prevention strategies meet the specific needs of the participant.

Based on the results of our studies and previous investigations, we would suggest to consider structural as well as functional characteristics of the social network in future prevention strategies. For example, socially isolated individuals, with a smaller social network size, more often had T2DM and macro- and microvascular complications. Broadening the social network may be encouraged, as reinforcement of social networking has been shown to improve Hba1c and blood glucose. Moreover, lack of social participation was associated with pre-diabetes and previously diagnosed T2DM, therefore, stimulating participants to become member of a club may also be considered in future prevention strategies. Further, we would suggest to address the type of relationships and social support in future prevention strategies aiming to reduce the burden of disease in T2DM. Our results mirror previous findings, indicating that men living alone have a higher risk for the development of T2DM. Therefore, we feel that men living alone should be indicated as high-risk group.

Notably, when including social network characteristics in future prevention strategies, differences in social network characteristics between men and women should be taken into account, there is no "one size fits all" approach.