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Chapter 9

Summary

SUMMARY

Chapter 1 provides a general introduction and the aims of the work presented in this thesis. The chapter outlines the need for risk stratification in older people, and describes the increase in the aged population as well as the focus on healthy aging in international health policy. According to the Health Council of The Netherlands, prevention (i.e. preventive care) in older people can be applied to contribute to the maintenance of independence and wellbeing by preventing and/or postponing disability and social isolation. However, because prevention traditionally refers to measures taken to prevent disease, injury and death, it is questionable whether prevention can in fact aim at maintenance of independence and wellbeing. Therefore, it is important to explore the possibility of developing strategies in preventive care for older people in order to prevent disease and/or to maintain their independence.

To develop aim-specific preventive care for older people, we not only need instruments to define/select subgroups of older people at risk for disease and/or for loss of independence, but we also require adequate collective or individualized strategies to prevent disease and/or to maintain independence. Therefore, the general aim of this thesis is to study the various strategies (that vary in aim and approach) in prevention for older people to facilitate the development of subgroup-specific, evidence-based guidelines for preventive care for older persons.

To explore the aims and approaches in preventive care, **Chapter 2** starts with an investigation of the views of general practitioners (GPs) on preventive care for older people. Six focus group discussions were held with 37 GPs and were analyzed using the framework analysis method. The main finding was that GPs' perspectives on preventive care are determined by their perception of the level of vitality of their older patients. Preventive care for older people with high levels of vitality may consist of a standardized disease-oriented approach, whereas those who are vulnerable will probably need an individualized approach to prevent functional decline. Based on these perspectives, a conceptual model for preventive care was developed which describes the different perspectives of GPs toward vital and vulnerable older people, focusing on five main dimensions: aim of prevention (disease vs. functional decline), concept of care (disease model vs. functional model), initiator (older persons themselves vs. the GP), target groups (people with request vs. specified risk groups) and content of preventive care (mainly cardiovascular risk management vs. functional decline).

In the aim to prevent functional decline and promote wellbeing, the possibility to identify subgroups of older people needing different types of care is investigated in the

following two chapters. **Chapter 3** describes the predictive value of multimorbidity for the development of disability in the general population of very old people and the role of cognitive impairment in this association. This investigation was part of the Leiden 85-plus Study, an observational prospective cohort study in the general population with 5 years of follow-up. In a total of 594 participants (aged 85+ years), without applying exclusion criteria, disability in activities of daily living (ADL) was measured annually for 5 years with the Groningen Activity Restriction Scale. At baseline, participants with multimorbidity had higher ADL disability scores compared with those without (median 11 vs. 9 ADL points, respectively). Stratified into four groups of cognitive functioning (measured with the MMSE), ADL disability increased over time in all groups, even in those participants without multimorbidity. Multimorbidity predicted accelerated increase in ADL disability in participants with optimal (higher) MMSE scores, but not in participants with lower MMSE scores. Therefore, in very old people the predictive value of multimorbidity for the increase in ADL disability varies with the level of cognitive function; multimorbidity predicts an accelerated increase in ADL disability in very old people with good cognitive function, but not in very old people with cognitive impairment.

GPs seemed to share an implicit concept of vulnerability (Chapter 2). When the vulnerability concepts of GPs appear to be identical, assessment by GPs can be a promising instrument to select older people for specific types of geriatric care. Therefore, **Chapter 4** explores the variation in vulnerability concepts between GPs. The analysis was embedded in the Integrated Systematic Care for Older People (ISCOPE) study, a cluster-randomized controlled trial investigating the effect of pro-active care provided to patients (aged ≥ 75 years) with complex problems. A total of 77 GPs categorized their registered patients (aged ≥ 75 years; $n=11,392$) into non-vulnerable, possibly vulnerable and vulnerable patients. The personal and practice characteristics of these GPs were collected as well as the characteristics of a sample of 2,828 patients, i.e. socio-demographic characteristics, and characteristics in the functional, somatic, psychological and social domains. The median percentage of vulnerable patients in this age group per GP was 32% (range 2.4-81%). The study showed that GPs share a medical concept of vulnerability because they take somatic and psychological characteristics into account in the vulnerability assessment, but differ in the way that they weigh the functional status.

After investigation of the possibility to select vulnerable older people (Chapter 4), the appropriateness of preventive strategies to contribute to the maintenance of independence and wellbeing is studied in **Chapter 5**. A RAND/UCLA appropriateness method was applied to identify appropriate screening conditions to prevent functional decline in older people, stratified for age and vulnerability. A multidisciplinary panel of 11 experts assessed the appropriateness of screening for 29 conditions mentioned in guide-

lines from four countries, stratified for age (60-74, 75-84 and 85-plus years) and health status (general, vital, and vulnerable). The experts received a literature overview for each condition, including the guidelines and up-to-date literature. After an individual rating round, the expert panel discussed their disagreements and then performed a second individual rating. The expert panel rated screening to be appropriate in 3 of the 29 conditions, indicating that screening was expected to prevent functional decline for these conditions. Screening for insufficient physical activity was considered appropriate for all three age and health groups. Screening for cardiovascular risk factors and smoking was considered appropriate for the general and the vital population aged 60-74 years. When the experts considered the conditions to be inappropriate, this was mainly due to the lack of an adequate screening tool or lack of evidence on effective interventions for positively screened persons. Based on their experience, the expert panel expected some benefit from developing valid applicable tests and effective interventions, especially for the group of vulnerable older people.

To investigate strategies for prevention of disease in the older population, our studies then focused on cardiovascular disease. Therefore, in **Chapter 6** we investigated differences in prognosis between very old people with various levels of prevalent cardiovascular disease, compared to those without manifest cardiovascular disease. The rationale is that, if this classification on the degree of cardiovascular history proves to reveal differences in risk, it will be a simple instrument for GPs to select those persons most in need of maximization of cardiovascular preventive efforts. Again, this study was performed within the Leiden 85-plus Study and was limited to 570 participants with available cardiovascular history. The participants were divided into three groups: no history of cardiovascular disease (CVD), 'minor' CVD (angina pectoris, transient ischemic attack, intermittent claudication and/or heart failure), and 'major' CVD (myocardial infarction, stroke and/or arterial surgery). Investigation of the prognosis took into account not only incident cardiovascular morbidity/mortality, but also functional status. At baseline, 270 (47%) participants had no history of CVD, 128 (22%) minor CVD, and 172 (30%) had major CVD. A history of major CVD almost doubled the risk of a recurrent cardiovascular event or cardiovascular mortality compared to a history of minor CVD; also, this minor CVD group had a 1.6 fold higher risk compared to the no CVD history group. Both minor and major CVD were associated with an accelerated decline in cognitive function and accelerated increase of disability score, being most pronounced in participants with major CVD. These results emphasize the need for physicians and very old patients with a history of major CVD to maximize their cardiovascular preventive efforts. However, in the case of adverse effects or harmful interactions of medication in a very old patient with minor cardiovascular disease, the balance between benefit and harm might change and strict continuation of preventive medication might need to be reconsidered.

Chapter 7 explores ways to optimize the selection of subgroups that will benefit most from preventive cardiovascular medication in old age. This study examines the effect of preventive pravastatin treatment in older people stratified into three groups at risk for cardiovascular disease based on their plasma levels of homocysteine. A post-hoc subanalysis was performed in PROSPER (a large double-blinded randomized placebo-controlled trial) to assess the effect of pravastatin on the risk for coronary heart disease and mortality in older persons, stratified for plasma levels of homocysteine. In the placebo group, participants with high homocysteine ($n=588$) had a 1.8 higher risk of (non) fatal coronary heart disease compared to those with low homocysteine ($n=597$). Also, the number needed to treat (NNT) with pravastatin to prevent one (non)fatal coronary heart disease was 15 persons for 3.2 years (the average follow-up period) in the case of high homocysteine, whereas in the low homocysteine group the NNT to prevent an event was 65 persons for the same period. This study suggests that homocysteine may be a promising risk predictor in older people, since high plasma homocysteine not only selects older persons at high risk for (non)fatal coronary heart disease and all-cause mortality, but also identifies those with the highest absolute risk reduction by pravastatin and lowest NNT to prevent (non)fatal coronary heart disease.

Finally, **Chapter 8** presents a general discussion on the main findings of the work in this thesis. The chapter addresses the clinical implications of our results and makes some recommendations for further research. The aim of prevention to maintain independence and wellbeing seems to be appropriate for the vulnerable population. Although a 'gold standard' to stratify for vulnerability in the general older population is lacking, GPs share the same concept of vulnerability for somatic and psychological patient characteristics. However, within the vulnerable older population, there is no evidence (except for physical activity) that a collective screening approach, with a standardized intervention program, will be the most appropriate way to contribute to the maintenance of independence and wellbeing. Moreover, since the majority of vulnerable older people already receive medical care for their chronic disease(s), more benefit can be expected from improving the individual regular care than from a separate collective screening program. The traditional aim to prevent disease can be applied to the general older population, including both vital and vulnerable persons. According to GPs, cardiovascular risk management is the main topic in the prevention of diseases in the general older population, apart from the national programs on cancer screening and vaccination. A collective approach in preventive care, consisting of high-risk stratification and treatment, appeared to be possible for cardiovascular risk management even at high age. Because of the great diversity in the health status and vitality of older people, it will be challenging to incorporate vulnerability in future research into risk stratification for preventive interventions in old age.

