Screening, geriatric assessment and intervention strategies to prevent functional decline in hospitalized older patients

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Summary

Approximately 20-30% of all older people experience disabilities in performing (instrumental) activities of daily living. Around 50% of these disabilities develop progressively, in combination with an underlying chronic disease such as arthritis, diabetes or chronic obstructive pulmonary disease. The other 50% develops as a consequence of an acute event, such as hospital admission, stroke, or hip fracture. Acute hospitalization itself is a hazardous event for elderly people. Older people that are hospitalized have an increased risk to develop new disabilities compared to those never admitted. Activities of daily living lost and not recovered by hospital discharge are often difficult to regain. Approximately a 100,000 Dutch older people annually experience new disabilities after hospitalization, defined as functional decline. Not all acutely admitted older patients are at equal risk for functional decline and mortality after hospitalization. Several clinical factors, in particular, the presence of multiple morbidities and the presence of geriatric conditions, are related to an increased risk for poor outcomes.

The general aim of this thesis was to investigate strategies for screening and diagnostic assessment on geriatric conditions to prevent functional decline and other hospital related complications in acutely hospitalized patients. One of these strategies is the DEFENCE-care model; a three-step systematic approach to prevent functional decline that was developed as part of this thesis.

Chapter 1 starts with an introduction on chronic diseases, the related onset of disability and the effect of hospitalization on daily functioning. The hypotheses and basic assumptions for the development of the DEFENCE-care model are expressed and the three study cohorts of this thesis are further described. As functional decline is the main outcome parameter in the studies presented, chapter 2 starts with a systematic review on instruments to measure activities of daily living and the applied definitions of functional decline in hospitalized older patients. In total, 28 studies were included in the systematic review and there was a large variability in item content and scoring between and within
the measurement instruments. The minimal amount for decline, as defined by the authors, referred to a decrease in functioning between two and twenty percent. This signifies that most cohort studies and clinical trials that are conducted on prevention of functional decline cannot be properly compared on effectiveness because of the divergent operationalization of functional decline.

Chapters 3, 4 and 5 focus on the screening of patients at risk for adverse health outcomes. **Chapter 3** compares the prognostic abilities of four screening instruments to detect patients at increased risk of readmission, hospitalization and mortality of older patients discharged home after an emergency department visit. In total, 381 patients were included in this cohort. Three months after the visit, 15% of the patient returned to the emergency department, 17% were hospitalized and 13% died. Of the screening instruments studied, none were able to clearly discriminate between patients with and without poor outcomes. Differences in organization of health care systems might influence the prognostic abilities of screening instruments.

**Chapter 4** covers a study on prognostication of physicians and nurses concerning mortality in acutely hospitalized older patients. The hypothesis tested in this study in 463 patients, was that the clinical impression of physicians and nurses would enhance prognostication, compared to a prediction only based on objective measurable factors. In total, 24% of patients died within three months after admission. Four parameters were significantly associated with mortality risk; functional impairment, diagnosis malignancy, co-morbidities and high urea nitrogen serum levels. The AUC for this model was 0.76 (95 % CI 0.71 to 0.82). Adding a clinical impression of physicians or nurses did not significantly improve the accuracy of the model, signifying that prognostication should be based on objective measurements.

**Chapter 5** presents the development and validation of the Identification of Seniors at Risk-Hospitalized Patients (ISAR-HP), a brief screening instrument to detect patients at
increased risk for functional decline. Approximately 35% of all patients in the development cohort and 32% in the validation cohort suffered functional decline. The prediction model could accurately predict functional decline with only four items: pre-admission need for assistance in instrumental activities of daily living, use of a walking device, need for assistance in travelling and no education after age 14. This simple measurement instrument can easily be used in daily practice. This study represents step one of the DEFENCE-care model; a quick assessment at hospital admission to select patients that need further diagnostic assessment on the presence of geriatric conditions.

Chapters 6 and 7 describe the results of two studies on the diagnostic assessment of 18 geriatric conditions, their association with functional decline and other adverse health outcomes. Together they provided information for step two of the DEFENCE-care model. Chapter 6 evaluates the prevalence of geriatric conditions and related outcomes in terms of mortality, functional decline and cognitive impairment. In this study, 639 patients from three hospitals in the Netherlands were included. Patients presented with a mean of six geriatric conditions at hospital admission. Instrumental activities of daily living impairment (83%), polypharmacy (61%), mobility difficulty (59%), high levels of primary caregiver burden (53%), and malnutrition (52%) were most prevalent. One year after admission, 35% had died, 33% suffered from functional decline and 26% had cognitive impairment. Higher age, severe comorbidity, malnutrition, obesity, fall risk and IADL impairment were associated with mortality. Higher age, comorbidity and the presence of an indwelling urinary catheter were associated with functional decline. The results indicate that screening for geriatric conditions reveal many health problems that can be either prevented or treated during the hospital stay. This might lead to better health outcomes after hospital discharge and reduce the burden of hospital admission for older patients.

Growing evidence shows that not all patients equally benefit from geriatric intervention. Chapter 7 describes a study, in which three subgroups of patients are identified with distinct clinical characteristics and outcomes. Patients were divided into risk categories for
functional decline (low, intermediate or high risk) according to the Identification of Seniors at Risk-Hospitalized Patients. Overall, 27%, 33% and 40% of the patients were at low, intermediate or high risk, respectively, for functional decline. Low-risk patients had fewer geriatric conditions (mean of three conditions) compared with those at intermediate (mean of six conditions) or high risk (mean of seven conditions). Approximately 12 months after admission, 39% of the low-risk group had an adverse outcome compared with 50% in the intermediate risk group and 69% in the high risk group (p<0.001). The categorization of patients into risk profiles is becoming more and more propagated by expert opinion and the Health Council of the Netherlands. It might assist health care professionals to select patient in need for active rehabilitation or supportive care.

Chapter 8 focuses on an intervention to prevent functional decline in hospitalized older patients and is the workup to Step three of the DEFENCE-care model. This chapter describes the design of a randomized clinical trial using the DEFENCE-care model followed by a nurse led transitional care program, the Transitional Care Bridge. Three hospitals in the Netherlands participate in this multi-centre, double-blind, randomised clinical trial comparing a pro-active multi-component nurse-led transitional care program to usual care after discharge. All patients acutely admitted to the Department of Internal Medicine who are 65 years and older, hospitalised for at least 48 hours and are at risk for functional decline are invited to participate in the study. All patients will receive integrated geriatric care by a geriatric consultation team during hospital admission. Randomization, which will be stratified by study site and cognitive impairment, will be conducted during admission. The intervention group will receive the transitional care bridge program, consisting of a handover moment with a community care nurse during hospital admission and five home visits after discharge. The control group will receive ‘care as usual’ after discharge. The main outcome is the level of ADL functioning six months after discharge compared to premorbid functioning measured with the Katz ADL index.
The general discussion in Chapter 9 elaborates on the observed results and discusses both methodological issues in research in hospitalized older patients as well as implications for daily practice and further research. In conclusion, this thesis demonstrated that in the field of measuring ADL functioning and functional decline, substantial differences exist in the methods of measurement and applied definitions of functional decline. Older people that are acutely hospitalized are at high risk for mortality, functional decline and cognitive impairments three and (up to) twelve months after hospital admission. We developed a geriatric screening- and consultation model, the DEFENCE-care model that can be applied in daily practice consisting of screening, diagnostic assessment on geriatric conditions and geriatric interventions. Several practice-based tools have been developed to enhance implementation in daily medical and nursing care. Currently, the DEFENCE-care model is tested out in eight hospitals in the Netherlands.