Screening, geriatric assessment and intervention strategies to prevent functional decline in hospitalized older patients
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Chapter 1

General Introduction

Excerpt of the introduction and general discussion submitted for publication

‘Acute hospitalization and disability’
Chapter 1

Chronic diseases and the onset of disability

The prevalence of chronic diseases gradually increases with age and has shown an overall growth in the past decades. This is partly due to early recognition of chronic diseases by screening programs and to aging of the population. Compared to patients younger than 65 years, older patients more frequently have a combination of chronic diseases. This co-occurrence of two or more diseases is defined as multimorbidity and its prevalence in community-dwelling patients ranges from 35-65% in patients aged 60-69 years, to 80-99% in patients aged 80 years and older.

Chronic diseases are often accompanied by disability. In order to structure and describe disease outcomes in a systematic and hierarchical manner the World health Organization developed the International Classification of Functioning, Disability and Health (ICF, Figure 1). According to this scheme the disablement process starts with a certain disease or health condition in the body. The specific disease can lead to impairments in body functions and structures, such as retinopathy (impairment) in diabetes patients (underlying disease). Impairments can be clinically silent or can be detectable and may lead to functional limitations (disabilities) which in turn may result in societal disadvantages (restrictions in participation or handicap). Important components of the ICF are the environmental and personal factors of the patients that can speed up or slow down the disablement process.

Environmental factors concern the presence of primary care givers, social support, technological devices and financial resources which can compensate a persons’ individual inability to perform certain activities. Personal factors such as personality traits, coping styles, educational level, and lifestyle are far more difficult to influence.
Although chronic diseases can lead to disability, there is evidence that the onset of disability is generally postponed to advanced age\(^1\). Better treatment options have strongly contributed to this “compression” of years with disability. About 20-30% of older people experiences disabilities in performing (instrumental) activities of daily living (IADL)\(^7\). Around 50% of these disabilities develop progressively, in combination with underlying chronic disease such as arthritis, diabetes or chronic obstructive pulmonary disease. The other half develops as consequence of an acute event, such as hospital admission, stroke, or hip fracture.

**Acute hospital admission and disability**
Acute hospitalization is a hazardous event for elderly people. Older people that are hospitalized have an increased risk to develop new disabilities compared to those never
been admitted. The disease where the patient is admitted for is often accompanied by a decrease in functional capacities before the start of the hospital admission. During the first days of hospitalization, many patient are bed ridden, which further decreases mobility and functional abilities. Activities of daily living that have been lost and are not recovered at hospital discharge are difficult to regain again.

Functional decline, mainly defined in terms of physical disability, is a common adverse outcome of hospitalization in older patients. Rates of functional decline after hospital admission in older patients vary between 15-60%, depending on the definitions applied, the setting of the research and related casemix of patients present on the inpatient wards.

Not all acutely admitted older patients are at equal risk for functional decline and mortality after hospitalization. Several clinical factors, especially multimorbidity, are related to an increased risk for poor outcomes. Current disease-related, evidence-based guidelines do generally not consider the presence of other morbidities, leading to conflicting advices concerning medication use and life style advices. Moreover, at hospital admission, frail older patients frequently attend to the emergency department or hospital with atypical disease presentation. Examples of atypical disease presentation are amongst others incontinence when patients have a urinary tract infection, falls and delirium. These conditions are poorly recognized by health professionals and mainly present in more frail older patients.

Besides multimorbidity, also patients’ premorbid functional status is predictive for hospital outcomes. Limitations in ADL, mobility difficulty, nutritional status, cognitive impairment, and depression are all part of functional status. Especially pre-existing disability in performing (instrumental) ADL frequently occurs in old age and is a strong predictor of further functional decline.
Towards prevention of functional disabilities: the DEFENCE-care model

In the last decade a clear shift has been demonstrated worldwide concerning outcomes of hospital admission in older patients. Several international reports on patient safety in older patients have contributed to this new focus on patient-related health outcomes. Maintaining functional abilities and preventing decline in functioning during and after hospital admission have gained more and more attention as an important and relevant outcome of hospital admission, instead of only focusing on the treatment of the disease the patient is admitted for. The ICF model demonstrates that to prevent (further) limitations or disabilities, a multifactor approach is needed, not only focusing on a patients’ diseases, impairments and risk factors, but extending the approach to environmental and personal factors that can affect or enhance functioning.

For the patients themselves the prevention of further disability is an essential outcome. Recent qualitative research revealed that older patients who expected to return home in a better condition than they had entered the hospital were actually disappointed by the fact that they were not informed about the effect of hospital admission on ADL functioning and were not actively rehabilitated during their hospital stay.

With a clear rise in the number of elderly people that are hospitalized annually and the knowledge that this patient group already accounts for half of all days spent in the hospital, a strategy for older hospital patients should at least take into the principles of efficiency and effectiveness: one should select those patients that are increased risk for adverse health outcomes and select those patients benefiting most from geriatric interventions. Furthermore, early recognition of patients at risk for functional decline was considered important, as this enables health care workers to both initiate preventive interventions, as well as interventions focused on rehabilitation.
Chapter 1

In the recent past a geriatric in-hospital consultation team performing detailed geriatric assessments followed by patient tailored intervention programs was relatively scarce in the Netherlands. In 2006 the Develop strategies Enabling Frail Elderly New Complications to Evade (DEFENCE-II) study started in three hospitals in the Netherlands, with the aim of developing a geriatric screening- and consultation model to prevent functional decline. Figure 2 demonstrates the DEFENCE-care model, consisting of three steps:

1. The first step comprises the screening of patients at risk for functional decline. Identified patients at risk should enter the second step.

2. This step consists of a diagnostic assessment on 18 commonly encountered geriatric conditions, and personal and environmental factors.

3. Those patients that are supposed to benefit from geriatric intervention by a consultation team should enter the third step: the intervention by the multidisciplinary geriatric consultation team.

Steps 1 and 2 together form the comprehensive geriatric assessment (CGA), which is a multidimensional, multidisciplinary diagnostic process on four domains of functioning (somatic, psychological, functional and social) leading to an integrated care plan and long-term follow up.

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Study cohorts
In this thesis three study cohorts are described. Data of the DEFENCE-II study cohort, on which most studies in this thesis rely on, were collected from 2006-2008. In total 639 patients were included into this cohort. All patients were acutely hospitalized and admitted for 48 hours or more, receiving a diagnostic assessment on 18 geriatric conditions. Follow-ups took place three and twelve months after hospital admission.

Two other cohorts preceded the DEFENCE-II study. Data collection on the first cohort started in 2002 when the geriatric team in the Academic Medical Center was founded. The main aim of the study was to describe the functional status of acutely hospitalized patients and the outcomes three and twelve months after hospital admission. All patients
had to be hospitalized for at least 48 hours. In total 461 patients were enrolled in the period between 2002 and 2005.

The third cohort study started in 2005 and included patients attending to the emergency department (ED) for any reason and who were subsequently discharged home. This study had a duration of 11-months and was aimed to optimize health care in the ED for older patients. All patients were interviewed one day after their visit to the ED and followed up one and three months after the ED visit.

Aim and content of this thesis

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, which was developed as part of this thesis.

The thesis consists of nine chapters. As functional decline is the main outcome parameter in the studies presented Chapter 2 starts with a systematic review on the measurement instruments of activities of daily living and the applied definitions of functional decline in hospitalized older patients.

The 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 patient at increased risk of readmission, hospitalization and mortality of older patients discharged home after an emergency department visit (data based on ED cohort). Chapter 4 covers a study on prognostication of physicians and nurses concerning mortality in acutely hospitalized older patients. The hypothesis tested in this study, was that the clinical impression of physicians’ and nurses would enhance prognostication, compared to
a prediction only based on objective measurable factors (data based on ‘first’ cohort).

**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. This study represents Step one of the DEFENCE-care model.

The chapters 6 and 7 describe the results of two studies on the diagnostic assessment of 18 geriatric conditions and 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. **Chapter 7** is related to the effectiveness principle. Growing evidence shows that not all patients equally benefit from geriatric intervention. In this study three subgroups of patients are identified with distinct clinical characteristics and outcomes. The results of the ISAR-HP are studied in more detail, relating the score on the ISAR-HP to the presence of geriatric conditions and functional trajectories until one year after admission.

**Chapter 8** focuses on an intervention to prevent functional decline in hospitalized older patients and is the workout of Step three of the DEFENCE-care model. The 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.

Finally, **Chapter 9** presents a general discussion on the results of the studies in this thesis. A summary in English and Dutch concludes this thesis.
Reference List

(9) Gill TM, Allore HG, Gahbauer EA, Murphy TE. Change in disability after hospitalization or restricted activity in older persons. JAMA 2010;304:1919-1928.


