The impact of acute hospitalization on older persons
Experiences, outcomes and improvements
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Chapter 1
General introduction
Acute care needs in an aging population
Along with an aging population, the number of people in need of acute care is increasing. Annually, 12% to 20% of individuals aged 65 and over are acutely hospitalized to the hospital and these numbers are growing: in The Netherlands, there has been a 19% increase in Emergency Room (ER) visits between 2015 and 2017 among patients aged older than 65.1,2 This is particularly due to an increasing burden of disability and multi-morbidity, that is, the presence of two or more chronic diseases.3 Older persons with these conditions are frequently acutely admitted to the hospital.4,5 However, rising numbers of patients in need of acute care are not only the result of demographic changes and growing numbers of individuals with multi-morbidity; health and social care reforms also play an important role.6 Due to budget cuts for nursing homes, older individuals tend to live independently for as long as possible.7 General practitioners (GPs) and home care nurses have to organize care as much as possible at home with limited resources available. Eventually, older individuals present themselves to the ER with complex and atypical health problems, whilst multiple factors may have played a role in causing the acute event.6,8

Adverse outcomes after acute hospitalization
Hospitalization itself is considered to be a high risk event - older individuals are at great risk of several adverse health outcomes after an acute admission. Over 30% of patients aged 65 and older experience functional decline in their activities of daily living (ADL), which is often referred to as hospitalization-associated disability (HAD).4,9-11 The first 30 days postdischarge have been marked as crucial to restore patients’ functional level and for a large number of patients HAD may result in persistent disability.11 Hence, after hospital discharge, older individuals are often no longer able to perform self-care activities such as bathing or dressing and are at risk to lose their independence, which, consequently, may result in decreased quality of life.12 Besides, older patients are susceptible to develop new acute medical conditions, resulting in an increased readmission risk. In fact, over 30% of patients require another unplanned hospitalization in the first 90 days postdischarge, often for a different reason than the initial-diagnosis.13,14 Furthermore, postdischarge mortality rates of 25% and higher have been reported among acutely hospitalized older individuals.15-17

Fragmentation in the Dutch health care system
Increasing numbers of chronically ill patients with acute care problems who are at risk for adverse postdischarge outcomes, require coordinated care and continuity of care.18,19 Besides, hospital stays are becoming increasingly shorter and full recovery often takes places at home,20 underscoring the need for a safe transition from hospital to home.21 However, many health care systems, including our Dutch health care system, are still characterized by fragmentation and patients are often discharged with little coordination or follow-up after discharge.22,23 The consequences of an inadequate discharge process can be far-reaching. A recent study, performed in the Netherlands, showed that half of the unplanned readmissions are deemed preventable and human-related factors, such as coordination failures, were the exclusive cause of these preventable readmissions.24 Besides, patients are often not involved in their own discharge
process, which may lead to uncertainties about aspects such as treatment or medication.\textsuperscript{22,23}

In 2015, the Dutch healthcare inspectorate (In Dutch: Inspectie voor de Gezondheidszorg en Jeugd (IGJ)), published a report on patient handovers in Dutch hospitals.\textsuperscript{24} According to the IGJ, hospitals are currently negligent with regard to patient handovers and standardized discharge procedures are lacking. Errors that occur during handovers are often resolved informally. In the Netherlands, primary care standards are relatively high and basically every person has a GP. When a patient is hospitalized, responsibility is taken over from the GP by a medical specialist. After hospital-discharge, the GP (or nursing home physician) becomes primarily responsible for the patient again. While it is clear that the GP can only take over responsibility for a patient when he or she receives a timely transfer of accurate information on, for example, medication and follow-up care, discharge letters are often lacking or not sent in a timely manner.\textsuperscript{26,27}

**The root of a safe transition from hospital to home**

Although it is policy for hospitals to provide patient handovers, clear guidelines on how to arrange the discharge process and patient handovers from the hospital to the primary care provider are currently thus missing. However, to ensure patient safety and continuity of care, organizational aspects that form the basis of a safe discharge process should be optimally arranged\textsuperscript{27,28} As shown in Figure 1, the root of a safe transition from hospital to home for all patients is an accurate and structured discharge process, using a checklist that includes elements related to discharge planning and a timely discharge letter from the hospital to the next care provider. To prepare patients for discharge, proper discharge conversations should also be an important aspect of the discharge process.\textsuperscript{29,30}

**Transitional care interventions**

As shown in Figure 1, complex patients with a high readmission risk (10% of the total patient population) require, on top of a solid discharge process, a (nurse) case manager or transitional care to ensure a safe transition from hospital to home. In the past decades, extensive research has been conducted to improve the transition from hospital to home for complex patients through the implementation of transitional care interventions.\textsuperscript{22-35} Transitional care interventions are initiated during hospital admission and continued for at least one month after discharge, for example, through home visits by a district nurse or a telephone follow-up. Further, they often include aspects such as patient education and caregiver involvement.\textsuperscript{36} In the Netherlands, transitional care was introduced by implementation of the Transitional Care Bridge (TCB, in Dutch: de Transmurale Zorgbrug).\textsuperscript{37,38} In short, the TCB targets frail hospitalized older persons and consists of a comprehensive geriatric assessment (CGA) at admission, the initiation of a care and treatment plan during hospitalization and several home visits by a community care nurse after discharge to provide follow-up on the treatment plan.

Although the Transitional Care Bridge had a significant effect on mortality, no intervention effect was observed on ADL-functioning.\textsuperscript{37} In line with this, many other efforts to improve the transition from hospital to home have resulted in decreased readmission rates, but also failed to promote functional outcomes postdischarge.\textsuperscript{30,33} This might be due to the focus on medication reconciliation.
and medical management rather than proper patient preparation for discharge and rehabilitation treatment to restore or prevent disabilities after an acute hospitalization. Further, Mary Naylor, who is the founder of transitional care, points out that symptom assessment and management should be important elements of transitional care. However, previous studies have mainly limited their focus to health outcomes and other medical aspects after hospital discharge and very little is known about patient experiences with regard to recovery and the symptoms they may experience in the vulnerable period postdischarge.

**Determinants of poor postdischarge outcomes**

Covinsky et al. conducted a comprehensive literature review to address risk factors of hospitalization-associated disability (HAD) and indicated that several factors may play a role in the onset of HAD, including pre-illness determinants of functional reserve, the severity of the acute illness, hospitalization factors, and post-hospitalization factors (Figure 2). However, as stated above, with regard to the latter, available research is scares. Besides, it is plausible that pre-illness determinants also play an important role during the postdischarge course of...
functioning and patients’ ability to recover from HAD.

For example, in acutely hospitalized older patients, geriatric syndromes are often present at time of admission, and it is likely that these remain present postdischarge, during which they may form a hindrance to optimal recovery. Geriatric syndromes are generally described as multifactorial, non-specific disease presentations, which exist of mostly single symptom states that are highly prevalent among older individuals, and, in fact, previous literature shows that older patients present with an average of six geriatric syndromes, such as pain, malnutrition, depressive symptoms, and cognitive impairment, at time of admission. While it has been observed that during the hospitalization period new syndromes may develop, up to now, little research has been conducted on the prevalence and course of geriatric syndromes during hospitalization and the critical months postdischarge. Moreover, the role of geriatric syndromes in the recovery process and their longitudinally association with adverse outcomes, including readmission, functional decline and mortality, remains yet unstudied. Hence, to aid professionals to provide adequate follow-up care during the critical months postdischarge and to develop interventions that help improve postdischarge functioning, a more complete view of the post-hospitalization period is required.

Implementation of the Transfer Intervention Procedure: the TIP study
To improve the discharge process and patient handovers from hospital to the primary care provider, we implemented the Transfer Intervention Procedure (TIP) in eight Dutch hospitals (from March 2016 until November 2016). The TIP bundle was developed using input from focus group meetings with professionals, patient surveys and literature and consists of four elements: 1) planning the discharge date within 48 hours after admission and communication of the discharge date with the patient; 2) start with arrangements for required postdischarge care within
48 hours after admission; 3) prepare patient handovers (medical, medication, nurse) and personalized patient discharge letter (PPDL) within 48 hours after admission; 4) plan a discharge conversation with the patient to explain information from the PPDL 12 to 24 hours before discharge. We tested whether the TIP improved timeliness of medical and nursing handovers. Secondary, we investigated the effect of the TIP on length of hospital stay and unplanned readmissions rates within 30-days postdischarge.

The course of geriatric syndromes and their role in recovery: the Hospital-ADL study
The Hospital-Associated Disability and impact on Daily Life (Hospital-ADL) study is a multicenter observational prospective cohort study that was conducted between October 2015 and June 2017. Participants were recruited from internal medicine, cardiology, or geriatric wards at six Dutch hospitals. A total of 401 patients aged 70 years and over, who were acutely admitted for at least 48 hours participated. The primary aim of the Hospital-ADL study was to unravel the potential mechanisms of hospitalization-associated disability. At admission, discharge, one month, two months and three months postdischarge, a tremendous amount of data was collected on cognitive, behavioral, psychosocial, physical, and biological factors, hence including a wide range of geriatric syndromes. The primary outcome measure was functional decline, defined as a loss of independency in at least one of the basic Katz-ADL activities at three months postdischarge compared to two weeks prior admission. Secondary outcome measures included mortality and unplanned readmission within three months postdischarge.

Aim and content of the thesis
The overall aim of this thesis was to work towards better postdischarge outcomes in older patients after acute hospitalization. Therefore, we first aimed to improve the hospital discharge process, since this forms the basis of a safe handover from hospital to home for every patient. Secondly, to aid professionals to provide adequate follow-up care during the critical months postdischarge and to develop interventions that help improve postdischarge functioning, a more complete view of the postdischarge period is required. Therefore, we aimed to characterize older patients’ perspectives on the postdischarge period. Further, our objective was to gain insight into the course of geriatric syndromes from admission until the first months postdischarge and their association with adverse outcomes. Based on these sub-aims, this thesis is divided into three parts.

In Part I, we aimed to improve the discharge process. In Chapter 2 we present the design of the TIP-study; in Chapter 3 the results. In the TIP-study we aimed to improve patient handovers by implementing a structured discharge procedure; the Transfer Intervention Procedure (TIP). We tested whether the TIP improved timeliness of medical and nursing handovers and had an effect on length of hospital stay and readmission rates. In Chapter 4, we conducted a qualitative study in which we aimed to gain insight into ways to better align medical patient handovers with primary care, by exploring experiences and preferences of primary care providers and reflecting upon these with hospital physicians.
In Part II, we aimed to gain insight into older patients’ perspectives on the postdischarge period. In Chapter 5, we conducted a qualitative study to characterize patient experiences regarding recovery at home during the first month after an acute hospitalization. During semi-structured interviews patients were invited to describe which post-hospital symptoms they experienced and how they perceived those symptoms impacted their daily life. In Chapter 6 we used a qualitative approach to characterize how older patients’ rehabilitation goals change over time and we explored professionals’ attitudes towards patient-centered goal-setting and their perspectives on rehabilitation goals. Chapter 7 presents a literature review that assessed goal-setting instruments within geriatric rehabilitation.

In Part III, we aimed to gain insight into the course of geriatric syndromes from admission until the first months postdischarge, and how these syndromes might intervene with recovery. Chapter 8 presents a literature review on the prevalence and course of geriatric syndromes in acutely hospitalized older patients, including the admission and postdischarge period. In Chapter 9, we present results from the Hospital-ADL study. In this study we aimed to establish the prevalence and course of geriatric syndromes from hospital admission up to three months postdischarge and we tested the within-individual stability of syndromes to investigate how likely patients are to retain geriatric syndromes postdischarge once they are present at admission. In Chapter 10, we aimed to analyze the association between patterns of syndromes, as they develop between admission and one month postdischarge, and functional decline and readmission. Further, we aimed to assess longitudinal associations between the presence of geriatric syndromes over the course of five time-points (admission, discharge, one, two, and three months postdischarge) and functional decline, mortality and readmission. In Chapter 11 we present a study in which we aimed to describe healthcare utilization in the post-acute phase and to identify patient characteristics that are associated with high post-acute care costs.

Chapter 12 and Chapter 13 conclude with a general discussion and summary of the main findings of this thesis.
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