Frailty in the clinical practice of nursing care

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1

General introduction

1.1 Introduction

Aging, the process in which the body's functional reserves decline, is not the same process for everyone. Some people stay fit and vital for a longer period of time, whereas others suffer chronic disease and handicaps (Eulderink et al., 1995). This last mentioned group of elderly people is also referred to as frail or frail and form the target population of geriatricians (Rockwood & Hubbard, 2004). Frailty can be described as a state in which a person's reserve capacity has decreased. As a consequence, relatively minor changes in the internal and external environment have considerable impact on physical and mental functioning (Slaets, 1998). As a result of their decreased physical and mental functioning these elderly people often depend on healthcare and have a higher risk of poor outcomes (Palmer, 1995). Offering support with daily problems caused by illness and/or handicap or the prevention thereof is within the domain of nurses. Nurses play a considerable part in the care for frail elderly people and it is important that they provide adequate care to this group of elderly people; care that is adequate taking into account the problems of the individual patient. This thesis focuses on frailty in elderly hospitalised patients and the nursing and geriatric care provided to them.

1.2 Aging

With aging, people may be confronted with a deterioration in several aspects of their functioning. This may be the loss of one aspect of

their functioning, such as loss of mobility, hearing or sight. In case more aspects are involved, this may lead to several problems, for example a combination of loss of mobility and aim in life may lead to depression. Elderly faced with a decline in their functional status have a higher risk of poor outcomes such as diminished well-being, hospitalisation, care dependency and death (Palmer, 1995; Morley et al., 2002). Besides, aging is often associated with the development of chronic disease (Gezondheidsraad, 2008) which may lead to impairments of daily functioning (Van den Berg Jeths et al., 2004), as a result of which care from others is required (Dijkstra, 1998).

For elderly people without any direct limitations in their daily functioning hospitalisation may lead to frailty and therefore have a higher risk of a decline in functioning (Hart et al., 2002; Graf, 2006; King, 2006), becoming care-dependent (Covinsky et al., 2003; Boyd et al., 2005), being hospitalised for a longer period of time, rehospitalisation and iatrogenous complications (Hart et al., 2002). This has a considerable impact on the well-being and social functioning of the elderly people. Maintaining their level of social functioning is very important to them. A slight decline in physical functioning is accepted by the elderly as long as this has no or little impact on their social functioning (Von Faber, 2002).

Another problem that becomes apparent in the treatment of elderly people in a general hospital is the high patient turnover. A hospital prefers short stays in hospital, during which examinations and tests take place, in order to help the patient quickly to enable him to go home. In elderly patients hospital treatment often has more impact, whereas elderly people recuperate more slowly compared to younger patients. Elderly patients often do not fit well current healthcare practices. Another disadvantage for elderly patients with multiple morbidity is the fragmentation of medical care as a result of the increasing specialisation (Huyse & Stiefel, 2006; Gezondheidsraad, 2008). Their health problems are often not covered by one specialism, as a result of which the patient has to consult several specialists. This may lead to lacunas or overlap in care. Frail elderly

people in particular have a higher risk of negative consequences of admission to hospital (Rockwood et al., 1994; Palmer, 1995; Morley et al., 2002). In order to be able to prevent negative outcomes and offer these frail elderly people the care they need, it is first of all important to know what frailty is and how it can be detected.

1.3 Frailty

Frailty is already an important concept in research in elderly people (Hogan et al., 2003) and in geriatric practice (Slaets, 1998). There is, however, no consensus on the definition of frailty yet (Rockwood, 2005a; Lally & Crome, 2007; Bergman et al., 2007) but it is considered as a useful concept in clinical practice (Hogan et al., 2003). Frailty is considered as a state that may change in time, shows limitations in many aspects of functioning, and is age-related and associated with frailty to deterioration (Hogan et al., 2003; Rockwood, 2005a). The relationship with care dependency as a result of limitations in functioning, the risk of further deterioration and the presence of illness (Hogan et al., 2003) makes frailty a very important issue in nursing. To elderly people, frailty means that relatively minor events, such as overstraining, illness or tragic life events may have serious consequences (Eulderink, 1995). This situation is also referred to as instable, which means that a more or less serious physical or psychosocial event goes beyond a person's ability to adapt and results in a distorted functioning with often a considerable functional loss (Sipsma, 1986).

Levers et al. (2006) conclude that the existing definitions focus on the declining reserve capacity in the physical aspects of functioning and that age and illness are the main contributing factors. Several definitions of frailty can be useful for different purposes such as case-finding in clinical practice or scientific research (Rockwood, 2005a; Martin & Brighton, 2008). The definition proposed by Fried et al. (2001) is often used. They describe frailty as ‘a state of high frailty for adverse health outcomes, including disability, dependency, falls, need for long-term care, and mortality’ and which is operationalised with five physical conditions. This definition only includes clearly

determinable physical criteria, it is very suitable for use in frailty studies (Fisher, 2005), and has therefore shown predictive value for negative outcomes (Fried et al., 2001; Ensrud et al., 2007). The basis thought behind this type of definition is that physiological and metabolic changes cause physical and cognitive limitations (Martin & Brighton, 2008). With a definition that is only focused on physical functioning the role of social and psychological aspects of functioning in the event of frailty is ignored (Morley et al., 2002; Hogan et al., 2003; Gobbens et al., 2007). Markle-Reid & Browne (2003), Hogan et al. (2003) and Rockwood (2005a), for example, state that the definition of frailty should be based on loss in all aspects of functioning. This would be more in line with the holistic vision of geriatric medicine (Rockwood, 2005b). From a holistic perspective, the various aspects of the functioning of human beings cannot be considered separately; they constitute a unity and continuously influence one another and their environment.

Frailty has a clear relationship with disability and the presence of medical diagnosis (Hogan et al., 2003; Fried et al., 2004; Rockwood, 2005a). Fried et al. (2004) conclude that disability, frailty and comorbidity are distinct clinical entities that are causally related. Disability is considered the problem when carrying out activities that are necessary for independent functioning (Slaets, 2006) or dependency from others and can also be referred to as care dependency (Dijkstra, 1998).

The definition provided in this study focused on physical aspects as well as cognitive psycho-social aspects of functioning. It describes frailty as an age-related state of diminished physical (mobility, health problems, physical tiredness, vision and hearing), cognitive, social (emotional isolation) and psychological (feelings of depression and fear) functioning, which results in a diminished reserve capacity for dealing with stressors (Steverink et al., 2001; Schuurmans et al., 2004).

As frail elderly people have an increased risk of poor outcomes (Palmer, 1995; Morley et al., 2002) the frailty concept may be used for case-finding in order to identify this group of elderly people for special care and improve outcomes (Slaets, 1998). In order to screen the increasing number of elderly people for frailty on admission, clinical practice needs an instrument that can be used in a simple and rapid manner and has a good negative predictive value (Bouter & Van Dongen, 1991). Chapter 2 of this thesis compares two operationalisations of frailty in order to study which operationalisation is more useful as case-finding of frail elderly people in a clinical setting. The focus is on their extent of overlap with the related concepts of disability and comorbidity. Therefore, it would be good to have a look at the care for the elderly in general hospitals first.

1.4 Hospital care

We have seen that elderly people suffering from deterioration in functioning, also referred to as frail elderly people, have a greater risk of poor outcomes, such as admission to hospital, but that admission to hospital also increases the risk of poor outcomes. The number of elderly people in the Netherlands increased, like in other western countries; from 12.8% of the total population in 1990 to 14.5% in 2007 (CBS, 2009). In 2007, 65% of the group of elderly people aged 65 or older had contact with a medical specialist, compared to 35% of the group aged 20-45. On average, the elderly people had 5.5 contacts, and the admission percentage was 13% (CBS, 2009). About 67% of the elderly people aged 65 have two or more chronic disorders, whereas at least 85% of the elderly people aged 85 have more than two chronic disorders (Gezondheidsraad, 2008). The group of elderly people is therefore a very important group of patients in general hospitals (Schrijvers et al., 1997) and this will increase with aging. It is important for elderly people that they receive proper care in order to prevent poor outcomes, if possible. From a healthcare perspective, it is important that health risks in elderly people with complex problems can be assessed prematurely and that the care for this group of patients becomes better organized (Gezondheidsraad, 2008).

When a patient is admitted to a hospital, the medical diagnosis usually determines the patient's specific treatment. Fiolet (1993) concluded, however, that it is not the medical diagnosis that predicts negative outcomes for elderly people but aspects related to daily functioning upon admission to hospital. Frailty defined as a decline in reserve capacity in physical, cognitive, social and mental functioning, is closely related to a decline in daily functioning. This makes frailty and the problems associated with it an important issue in relation to admission to hospital of a frail patient and frailty should be crucial in the treatment process. Because a decline in the physical aspects of functioning is associated with the presence of a medical diagnosis, it is reasonable to assume that frailty occurs to some extent in several clinical pictures. Chapter 3 studies whether the incidence of frailty in elderly hospital patients differs in different medical specialisations, in order to find out how frailty is a more apparent factor in some specialisations compared to others.

Upon admission to hospital, the patient is asked for his reason of admission, his medical history and any potential nursing-related problems, in order to be able to start up a suitable treatment plan. In the event that a patient is very ill and/or tired, this information is often obtained from family or other carers in a so-called hetero anamnesis. Information acquired in this way may differ from the information that would have been obtained from the patient. In several studies answers given by patients and their significant others have been compared as regards quality of life. Reasonable similarity was found on the individual level whereas on the group level significant others rated the quality of the patient's life lower than the patient himself (Sneeuw et al., 1999; Neuman et al., 2000), whereas others found less similarity, mainly for the more subjective interpretation of functioning, general health and quality of life (Neuman et al., 2000, Magaziner et al., 1997; Novella et al., 2001). The extent of similarity of answers of patients and their significant others was mainly influenced by the patients' cognitive functioning (Neuman et al., 2000; Novella et al., 2001) and the relationship between patient and significant others (Novella et al., 2001). Chapter 4 outlines the

usefulness of information provided by significant others with regard to the determination of frailty. The patient's frailty is determined on the basis of information obtained from the patient himself and is compared with his frailty determined on the basis of information obtained from the significant other.

With the close relationship between frailty, disability and comorbidity many problems resulting from or associated with frailty, will be problems related to illness and/or the consequences of illness and therefore a proportion of the frail elderly people will be care dependent. The preservation of health, the prevention of illness and limitations, contributing to healing and recuperation from illness and reducing suffering is the domain of the nursing profession (ICN, 2008; De Witte et al., 2007). Nurses care for example for people with existing and/or potential problems with regard to daily functioning in relation to illness (Gordon, 2000; Leistra et al., 1999). This gives them a central role in the care for frail elderly people. With regard to nursing care it is important to assess the problems of frail elderly people upon admission to hospital in order to be able to provide adequate care with the aim to prevent negative outcomes.

This nursing care starts with an inventory of the current and potential health problems, followed by an assessment of the problems and the nursing diagnosis with an associated objective. Subsequently, interventions are scheduled that are evaluated regularly. The aim of this nursing process is to align the care provided with the patient's needs. Assessing the possible problems and determining the nursing diagnosis in frail elderly people requires knowledge of their problems (Lee et al., 2006). Frail elderly people often have complex problems that are not typical for the specialism for which they have been admitted (Fried et al., 2001). Indications have been found that nurses lack knowledge with regard to the care for elderly patients (Courtney et al., 2000; Simoens et al., 2004).

Ford (2001) stated with regard to the situation in the UK that the increase in the number of elderly people and their specific needs

leads to a situation in which nurses specialised in geriatric medicine are becoming more and more important. Several Dutch hospitals have a special ward for geriatric medicine, with a consultative service for the other wards in the hospital. In this consultative service, Geriatric Nurse Specialists (GNS) play a part in clinical practice, with a focus on education and support of nurses of other nursing departments. Chapter 5 studies the role of the GNS in the diagnosis in frail elderly people, in order to gain insight into diagnosing the nursing problems in frail elderly people. The staff nurse assesses whether the GNS adds any nursing diagnoses. After determining the problems, adequate intervention must be applied that is aimed at the needs of frail elderly people.

1.5 Interventions aimed at elderly people

The above shows that a proportion of the elderly people is frail and has a high risk of negative outcomes. Several interventions have been developed to reduce risks of poor outcomes as a result of frailty or improve or delaying existing problems. Some interventions are aimed at a specific problem, for example physiotherapy in order to reduce the risk of falling (Cummings, 2002). Frailty, however, is associated with problems with regard to several aspects of functioning and geriatrics focuses on a broad spectrum of problems. The core of geriatric intervention is the Comprehensive Geriatric Assessment (GCA), in which a multidisciplinary team assesses the biomedical, psychosocial and functional and the environment-specific needs, in order to be able to initiate suitable treatment and follow-up (Stuck et al., 1993). The CGA is available in different forms. Frail elderly people can, for example, be admitted to a special geriatric ward, a Geriatric Evaluation and Management Unit (Cohen et al., 2002; Saltvedt et al., 2004; Rao et al., 2005). Geriatric Evaluation and Management involves long-term evaluation and coordination of care, and can also be applied for patients in their home situation (Burns et al., 2000; Boult et al., 2001; Caplan et al., 2004). Geriatric consultation only involves recommendations to the health care providers for the most suitable care to be provided (Winograd et al., 1993).

With regard to the role of nurses in interventions for frail elderly people it turns out that this is interpreted in different ways. Nurses assess the problems, write a care plan, carry out urgent interventions, present the patient in the multidisciplinary consultation and visit the patient at home after his discharge from hospital (Caplan et al., 2004). Sometimes nurses act as nurse practitioner and are responsible for discharge planning (Naylor et al., 1999), undertake the CGA, formulate advice about suitable care and visit the patient regularly at his own home (Büla et al., 1999) or is also responsible for nursing history and physical examination (Boult et al., 2001). The nurse can also act as case-manager; he/she visits the patient at home, assesses the problems, writes the care plan in cooperation with the other disciplines, undertakes follow-up visits and keeps in touch by telephone (Dalby et al., 2000; Schein et al., 2005). Another example is that the entire nursing staff of a clinical ward including a GNS is involved in improving the care for the elderly patients, in close cooperation with district nurses (Inouye et al., 2000).

Interventions that are not directly focused on improving a specific problem involves measuring effects on more general outcome measures such as physical functioning, health-related quality of life, care-dependency with regard to daily functioning, symptoms of depression, admission to a nursing home, admission to hospital and/or another care institution and death (Caplan et al., 2004; Cohen et al., 2002; Rao et al., 2005; Saltvedt et al., 2004; Boult et al., 2001; Büla et al., 1999). Besides, realising and maintaining subjective feeling of well-being is considered an important factor in successful aging (Steverink et al., 1998; Von Faber, 2002) and is therefore used to measure the outcome of studies of the effectiveness of interventions in elderly people (Schuurmans et al., 2004).

Interventions have different effects. Several reviews and meta-analyses show that geriatric intervention in frail elderly people admitted to hospital lead to a significant reduction of their stay in hospital; they are more independent and are less often transferred to a nursing home or a home for the elderly (Stuck et al., 1993; Slaets et

al., 1997; Wells et al., 2003). Positive results of geriatric intervention are also described for patients living at home (Morishita et al., 1998; Stuck et al., 2002; Gill et al., 2002). The core of successful geriatric interventions is identifying the specific target group in advance (Schelhaas et al., 2003; Wells et al., 2003; Schuurmans et al., 2004), continuity of the geriatric intervention (Luk et al., 2000; Schelhaas et al., 2003) and a long follow-up of the intervention (Stuck et al., 1993). A positive role of nurses within the framework of preventing negative outcomes in frail elderly people is also underlined (Inouye et al., 2000; Hart et al., 2002; King, 2006). Chapter 6 investigates the effectiveness of a recently established intervention programme for frail elderly people. The GNS plays the central part in this programme; the emphasis is on assessing the nursing diagnosis, formulating recommendations about the care to be provided and follow-up of the patient during admission to hospital and the six months after discharge. The outcome measurements of the study relate to several aspects of functioning.

The best method for investigating the effectiveness of an intervention is an experimental or quasi-experimental study design (Polit & Beck, 2007). However, in studies of more complex interventions as these are undertaken within the framework of nursing science, the assumptions a randomized controlled trial is based on often suffer (Wolff, 2001). The intervention is difficult to standardize, study groups are often hard to compare and the environment is not neutral. The environment in which the intervention has been studied may have influenced the effect founded. Publications do not provide clear information important for the implementation of an intervention in daily practice (Wells, 1999; Elkan et al., 2001; Lindsay, 2004). Few studies focus on diffusion and institutionalisation, as a result of which effective interventions are available to only a few people (Oldenburg et al., 1999). Other study methods must be found in which characteristics of the environment or organization in which the intervention is studied and outcome measures that are important in actual practice are also considered (Wells, 1999; Eccles et al., 2003; Roy-Byrne et al., 2003). The solution to the problem may partly be

found in the RE-AIM model. The RE-AIM model was developed to systematically study, on the basis of several aspects such as effectiveness, process, individual and organisation, the impact of a new intervention in daily practice and is thus focused on translating research into practice (Glasgow et al., 2001; Glasgow et al., 2006; www.RE-AIM.org). This model looks at the direct effect of an intervention on the individual and is therefore similar to the well-known methods used for an intervention study. Other points of attention include the representativeness of the environment in which the intervention was studies and the institutionalisation of the intervention in daily practice. Chapter 7 studies the usability of this model, by studying how this model can be used in setting up an intervention study and to evaluate the intervention study undertaken in Chapter 6.

1.6 The scope of this thesis

A number of aspects will be discussed with regard to frailty in hospitalised elderly patients and the role played by nurses. With regard to frailty, several definitions and operationalisations are used that may have an influence when frailty is used for case-finding. Frailty is related to disability and comorbidity and may occur more or less often in specific groups of patients. It is not clear whether information obtained from significant others is useful for assessing a patient's frailty and determining whether nurses of non-geriatric wards have sufficient experience to determine the specific problems of frail elderly people. Geriatric interventions have shown positive results with regard to frail elderly people. It can be studied whether an intervention with a central role for the Geriatric Nurse Specialist will also have a positive effect in frail elderly people and whether the RE-AIM model is useful in evaluating the intervention study undertaken.

On this basis, this thesis includes:
Chapter 2. Comparing two operationalisations of frailty for case-finding in clinical practice, focusing on the overlap with disability, comorbidity and burden of disease
Chapter 3. The prevalence and implication of frailty in elderly people

admitted to clinical wards with different medical specialisations.
Chapter 4. The usefulness of information obtained from significant others with regard to assessing the patient's frailty upon admission to hospital.
Chapter 5. The nursing problems of frail elderly persons and the role of the Geriatric Nurse Specialist in assessing these problems.
Chapter 6. The effect of newly developed intervention program with a central role for the Geriatric Nurse Specialist in the treatment of frail elderly people admitted to a non-geriatric ward of a general hospital.
Chapter 7. The usability of the RE-AIM model in evaluating the intervention study.
Chapter 8. A summary of the results, as well as the central conclusions of this thesis and their importance in clinical practice.

Several studies have been set up on wards of a large teaching and a university hospital, for the purpose of answering above questions. One of the inclusion criterions for all of these studies is that the patients must be aged 75 or older. Depending on the question to be studied other inclusion criteria apply; these are discussed in the relevant chapter. A survey was set up in a geriatric ward, a traumatology ward and a ward for pulmonary medicine and rheumatology of a large teaching hospital in the northern part of the Netherlands. Data have been collected from the patient himself/herself and from his/her significant others about the patient's frailty, disability, comorbidity and the nursing diagnosis; these data were used to answer the questions outlined in Chapters 2, 3, 4 and 5. For Chapter 3 data about frailty have also been collected in a survey among patients admitted to an internal medicine ward and a surgical ward of a university hospital. On two internal medicine departments of the teaching hospital a quasi-experimental study (non-randomized trial) was set up, with the aim to collect several outcome measures for Chapter 6. The data about frailty, disability, comorbidity and burden of disease collected in this study were also used in Chapter 2.

2

Comparison of two operationalisations of frailty for case finding in clinical practice

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Abstract

Frailty is defined and operationalised in different ways and has been used as case finding tools to identify older people who could benefit from specialized geriatric care. Various operationalisations have also been used for epidemiologic research. In this Chapter, physical frailty is based on physical components of functioning as compared with comprehensive frailty. The relationship between frailty and the concepts of disability, comorbidity and burden of disease will be examined in both operationalisations. In this survey respondents from an intervention study in a large teaching hospital in northern Netherlands were used. Data from 337 consecutive patients admitted to hospital were available for analyses. Comprehensive frailty was clearly more prevalent than physical frailty in the respondents. The age of the respondents had a positive correlation with the incidence of frailty. Physical frailty was present in 21% of the respondents in whom disability and/or comorbidity were also seen. Comprehensive frailty was present in 48% of the respondents in which disability and/or comorbidity were also seen. It can be concluded that if frailty is broadly operationalised and addresses psychosocial and cognitive aspects of functioning in addition to physical aspects, a larger group of patients will be found, in which also disability and/or comorbidity will be seen in addition to frailty. Therefore, a broad operationalisation

of frailty is better as case finder for patients at risk of poor outcomes of hospitalisation and therefore candidates for specialized geriatric intervention.

Keywords
Frail elderly, hospital admission, comprehensive frailty, disability, comorbidity

Submitted

2.1 Introduction

The concept of frailty has already a long history in geriatric literature but the debate on how it can be used in clinical practice still continues. Frail older people have less reserve capacity and/or suffer from illness, handicaps and/or impairments, require more care and have greater risk of problems growing older (Rockwood et al., 1994; Palmer, 1995; Morley et al., 2002). The concept of frailty can also be used as a screening tool in a multi stage case finding procedure to identify a group of older people at risk and therefore candidates for specialized care (Slaets, 1998). The aim is to limit the number of comprehensive geriatric assessments with a screening instrument that can be administered easily and quickly and has a good negative predictive value (Bouter & van Dongen, 1991). However, there is no gold standard and various definitions and operationalisations can be found for frailty, which can lead to the selection of different groups. Concepts such as disability and comorbidity (Fried et al., 2004; Boyd et al., 2005; Volpato et al., 2007) and burden of disease (Murray & Lopez, 1996; Feenstra et al., 2005) are also used in describing frail older people.

Regarding definitions of frailty, Levers et al. (2006) conclude that the emphasis lies on diminishing reserve capacity in the physical aspects of functioning, with age and illness playing the most important role in the development. Fried et al. (2004) define frailty as ‘a state of high frailty for adverse health outcomes, including disability, dependency, falls, need for long-term care, and mortality’. Others state that all aspects of functioning must be examined in the definition of frailty (Markle-Reid & Browne, 2003; Rockwood, 2005a). Schuurmans et al. (2004) define frailty as an age-related condition of reduced physical, cognitive and psycho-social aspects of functioning, which results in a diminished reserve capacity for dealing with stressors.

This article compares two operationalisations of frailty for the use of frailty as case finding in clinical practice in order to look at differences in the selected groups of older people at risk and therefore candidates for specialized care. Firstly physical frailty, based on physical

components of functioning and by Fried et al. (2004) measured with performance-based tests. Secondly comprehensive frailty, based on physical, cognitive and psycho-social aspects (Schuurmans et al., 2004) and measured with a short questionnaire. Both the incidence of frailty and how to the frailty concept is related to disability and comorbidity (Fried et al., 2004; Boyd et al., 2005; Volpato et al., 2007) and burden of disease (Murray & Lopez, 1996; Hoeymans et al., 2006), will be examined in a Dutch hospital population.

2.2 Method

Setting and participants

Data for this survey were used from respondents from a larger study on the effect of a geriatric intervention in frail older people in a large teaching hospital in northern Netherlands. Patients were approached at the traumatology ward, a pulmonology/rheumatology ward and two wards for internal medicine and nephrology. As inclusion criteria, patients were 75 years or older; capable of completing a questionnaire; had a minimum score of 6 on the MMSE 12 items (Kempen et al., 1995); a minimum admission of 5 days and were not terminally ill.

Procedure

The questions to establish the degree of frailty were posed by the nursing staff within two days after admission to the ward. Prior to the study, the nurses were briefed and trained. The respondents were checked by the researcher for inclusion and asked for further participation in the study. Questions on disability were included in a questionnaire that the patient could complete himself a number of days after admission. The researcher checked the file of the respondent for the medical diagnoses on comorbidity and the top 10 burden of disease medical diagnoses.

Instruments

The 15 item Groningen Frailty Indicator (GFI) was used for comprehensive frailty based on all aspects of functioning (see Appendix) (Schuurmans et al., 2004). The score ranged from 0 (not

frail) to 15 (very frail), with a cut-off of 4. The cut-off point (score $\geq$ 4) is based on clinical experience (Steverink et al., 2001). With the lack of performance-based tests to establish frailty, as conducted by Fried et al. (2004), an alternative was sought in the GFI items for physical frailty (see Table 1). Five items were chosen with questions on physical functioning (items 1, 2, 3, 5 and 8). Comparable to the cut-off point of the frailty operationalisation of Fried et al. (2004), respondents were designated as frail when three of these five items were present. Disability is defined as the difficulty or dependency on others in performing activities that are needed to function independently (Slaets, 2006). Disability was measured with the 15 item self-assessment version of the Care Dependency Scale (CDS) (Dijkstra, 1998). The score ranged from 15 (totally care-dependent) to 75 (independent); a cut-off score of lower than 68 was used to establish disability (Dijkstra et al., 2005). Comorbidity was established with the simultaneous presence of two or more medical diagnoses. For comparison with the study by Fried et al. (2004), the same medical diagnoses were used here: myocardial infarction, angina, congestive heart failure, claudication, arthritis, cancer, diabetes, hypertension, and chronic obstructive pulmonary disease.

Analysis

Descriptive statistics with absolute numbers and percentages were used to analyse the data. With physical and comprehensive frailty, Venn diagrams were made with percentages of the total group and absolute numbers of respondents. Data analysis was done using the statistical package social sciences (SPSS 11.0 for Windows).

Comparable items were used in the operationalisation of frailty and disability. A Spearman non-parametric test was used to examine the correlation of the items of the GFI and the CDS. Of the 225 correlation pairs, a significant correlation coefficient in 42 was found above $r = 0.20$ ($p < 0.05$), of which the highest was $r = 0.42$. Based on this, it was decided not to remove any of the GFI and CDS items from the further analyses.

Table 1: Operationalisation of frailty

Physical frailty (Fried et al., 2004)	Comprehensive frailty (Schuurmans et al., 2004)
Presence of three of the following conditions: 1. Weight loss > 10 lbs in past year 2. Weak grip strength (lowest quintile) 3. Exhaustion (by self report) 4. Slow gait speed (slowest quintile) 5. Low physical activity (lowest quintile).	Score of four or more on the Groningen Frailty Indicator: 1. Able to do shopping by yourself 2. Able to walk outside by yourself 3. Able to dress yourself 4. Able to go to the toilet by yourself 5. Mark (1-10) for physical condition 6. Problems due to poor eyesight 7. Problems due to poor hearing 8. Unintended weight loss 9. Use of more than 3 kinds of medication 10. Memory complaints 11. Feeling of emptiness 12. Miss having people around 13. Feeling abandoned 14. Feeling gloomy and depressed 15. Feeling nervous or frightened

Ethical consideration

Data gathered on the wards was obtained with permission of the hospital's health care authorities. The Local Research Committee also granted permission for the study on the wards of both hospitals. All staff agreed to participate on the basis of written and verbal information about the study including its objective and methods and the questionnaires to be used. The names of the participants were encoded to ensure confidentiality and anonymity.

2.3 Results

In total, data from 337 patients were available for this analysis out of the 1387 consecutive admissions of patients of 75 years and older. The selection of the study sample was due to the exclusion of patients, who were too ill to participate, admitted for less then five days or with incomplete data. The average age of the target population (82.58; SD = 4.78) differs significantly ($t = 3.37$; $p = 0.00$) from the study population (81.32; SD = 4.60). The patients who were too ill and therefore excluded for the study were also clearly older (84.55; SD = 5.22) than the study population. There was no difference in gender. Although not critical for the results of this study, the study population differs in some aspects from the target population of elderly admitted to the hospital.

First, the incidence of the concepts of frailty, disability, comorbidity and burden of disease was examined. Twenty-three percent of the respondents were designated as frail with physical frailty, while 62% of the respondents were frail with comprehensive frailty. There was an incidence of disability (44%) and comorbidity (47%) in nearly half of the respondents, while burden of disease was present in 72% of the respondents. Eighty-five respondents (25%) had no comorbidity or a disorder that appear in the burden of disease top 10. There was a positive correlation between the age of the respondents and the incidence of physical frailty ($r = 0.14$; $p = 0.01$), comprehensive frailty ($r = 0.15$; $p = 0.01$) and disability ($r = 0.16$; $p = 0.00$). Next, physical frailty and the overlap in incidence of disability and comorbidity were examined. Of the total of 337 respondents, physical frailty, disability

and comorbidity were absent in 97 (29%). The incidence of physical frailty, disability and/or comorbidity in the remaining 71% of the respondents can be seen in Figure 1. Physical frailty was seen in 23% of the respondents; in 7% of the frail elderly (2% of total) there was no disability or comorbidity and in 93% (21% of total) this was in combination with disability and/or comorbidity. The overlap of physical frailty with disability is more prevalent than the overlap with comorbidity. In 48% of the respondents, however, disability and/or comorbidity were seen without a designation of physical frailty.

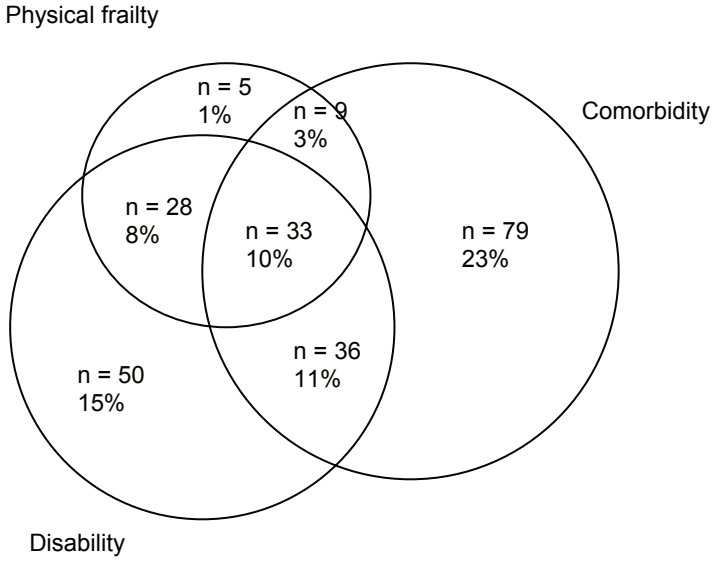

Figure 1: Prevalence and overlap of physical frailty, disability and comorbidity (% of the total: n = 337)

Comprehensive frailty, measured with the GFI, showed different relationships with disability and comorbidity. Comprehensive frailty, disability and comorbidity was absent in 55 of the 337 patients (16%). As for physical frailty, this group is not represented in the Venn diagram. For the remaining 84% of the respondents, the incidence of comprehensive frailty, disability and comorbidity can be seen in

Figure 2. Comprehensive frailty was seen in 62% of the respondents: in 23% of the frail elderly (14% of total) there was neither disability nor comorbidity and in 77% (48% of total) this was in combination with disability and/or comorbidity. As with physical frailty, the overlap between comprehensive frailty and disability was more prevalent than the overlap between comprehensive frailty and comorbidity. The overlap between disability and comorbidity without any comprehensive frailty was only present in 4% of the respondents.

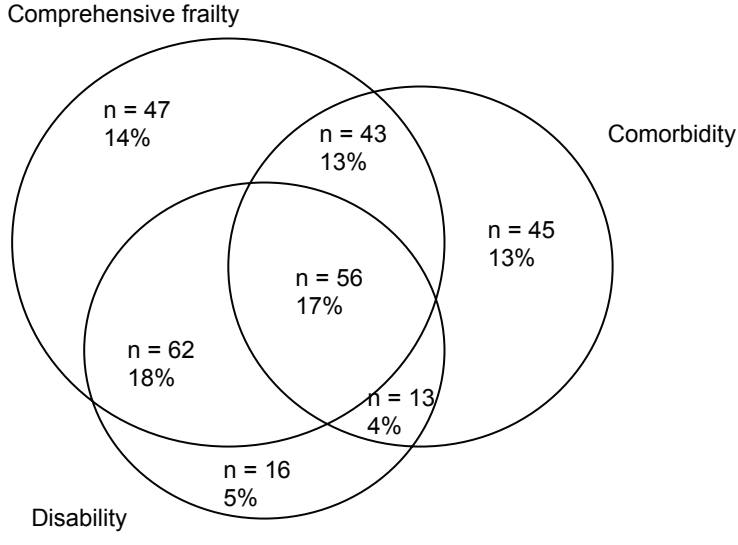

Figure 2: Prevalence and overlap of comprehensive frailty, disability and comorbidity (% of the total: n = 337)

Next, the incidence and overlap of comprehensive frailty, disability and burden of disease top 10 diagnoses was examined. Of the total of 337 respondents, no comprehensive frailty, disability or burden of diseases top 10 diagnoses was present in 32 (9%). The incidence of them for the remaining 91% of the respondents can be seen in Figure 3. Of the total of 337 patients, 243 (72%) had one or more disorders that appear in the burden of disease top 10 diagnoses. In 62% of the respondents in whom comprehensive frailty was seen, for 54% is was

in combination with disability and/or burden of disease. The group of respondents in which the combination of burden of disease, comprehensive frailty and disability was seen was the largest. The overlap between burden of disease and disability without comprehensive frailty was present in only 6% of the respondents.

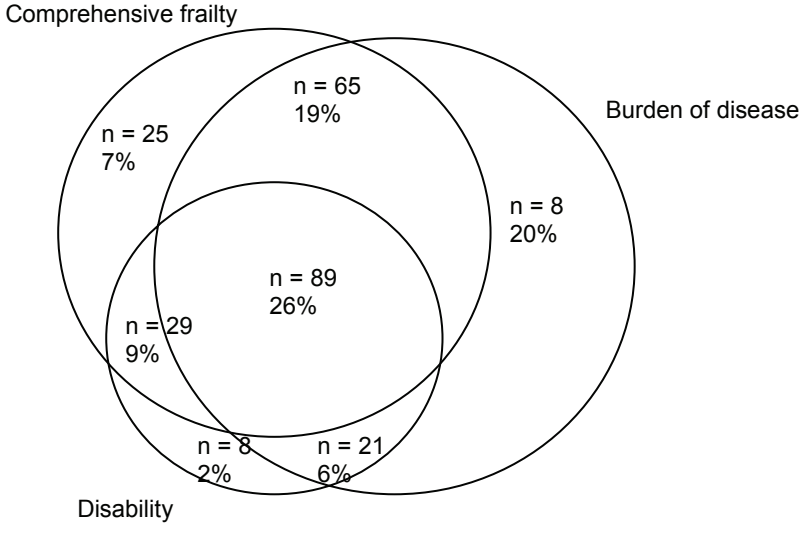

Figure 3: Prevalence and overlap of comprehensive frailty, disability and burden of disease (% of the total: n = 337)

There is a significant difference in the selected patients between physical frailty and comprehensive frailty as measured by the GFI. The use of psycho-social variables in the frailty indicator will yield much more patients with a positive screen for frailty: 62% versus 23% of the 75+ admitted elderly. And within this group relative more disability and/or comorbidity is seen than with the physical frailty screening. Of the 69 patients with disability and comorbidity, 81% (sensitivity) was positive on the GFI and only 48% was positive for physical frailty definition. The negative predictive value for a frailty screen to find disability and comorbidity is 90% for the GFI and 86% for the physical frailty definition. The differences between the two

frailty definitions as a diagnostic screen for disability in combination with comorbidity are mentioned in table 2.

Table 2: Two frailty definitions as a diagnostic screen for disability in combination with comorbidity in 75+ patients admitted to the hospital

	Disability and comorbidity			
	Positive	Negative		
Physical Frailty positive	33	42	75	Sens: 0.48 Spec: 0.84 PPV: 44% NPV: 86%
Physical Frailty negative	36	226	262	
Comprehensive Frailty positive	56	152	208	Sens: 0.81 Spec: 0.43 PPV: 27% NPV: 90%
Comprehensive Frailty negative	13	116	129	
	69	268	337	

2.4 Discussion

The use of frailty indicators in clinical decision making is becoming more and more popular because it is very difficult to establish comprehensive geriatric assessment for all elderly patients in routine health care systems. The use of a screening instrument can be very helpful to target specific geriatric care to those who will benefit the most of it. In doing so the diagnostic characteristics of frailty indicators are extremely important and they are depending very much on the criteria used in the instruments. Many frailty questionnaires are similar with one important distinction, weather they use psycho-social variables along physical variables or not. We feel that a balanced inclusion of all important domains in the GFI does more justice to the holistic vision that is emphasized in geriatrics (Fisher, 2005) and is also in line with the remarks made by Rockwood on the definition of frailty (Rockwood, 2005a). Other studies provided evidence in favour of a broad frailty definition in contrast to the use of physical functioning alone. For example, Mitnitski et al. (2002) and Mitnitski et

al. (2005) believe that by including many different shortcomings in functioning in a frailty indicator, such as sensory impairments and health problems, a more accurate prediction can be made of death. In addition to a relationship of physical factors, Puts et al. (2005a) finds a relationship between frailty markers cognition, mastery and depression, and an increase in disability. Katz (2004) also makes the relationship between symptoms of depression and frailty. Jones et al. (2004) finds that the frailty index including health problems, social and psychological, contributes toward identifying more frail patients.

The large overlap between comprehensive frailty, disability and burden of disease confirms that it covers a group of older hospital patients that is certainly in need of care. The incidence of comprehensive frailty without disability and/or comorbidity supports the idea that frailty can exist at a sub-clinical level (Slaets, 2006). The group of respondents in which disability and, or comorbidity is seen could score on a number of frailty items but would not go beyond the cut-off score. This was not specifically examined in this study. In the 158 respondents with comorbidity, no comprehensive frailty and/or disability was seen in 45. Good treatment of a diagnosis may mean that the patient recovers to such a degree that he does not need any help in daily functioning and is no longer designated as frail. This may also hold true for the reasonably large group of respondents who do have a burden of disease top-10 diagnosis but in whom no comprehensive frailty and/or disability is seen.

In comparison with the study by Fried et al. (2004), it should be noted that in this study, community-dwelling respondents 65 years and older participated. Physical frailty was found in 7% (65 years) to 30% (80 years and older) of the respondents while an average of 21% were designated as physically frail in our hospital population of 75 years and older. The positive relationship between age and frailty (Fried et al., 2004; Boyd et al., 2005), also confirmed in our study is part of the reason for this difference. A comparable difference in less frailty in community-dwelling older people and more for those admitted to the

hospital was also found by Mitnitski et al. (2005) and is expected from a theoretical perspective as well.

The random survey in our study will not be completely representative for the total hospital population of 75 years and older. Depending on the speciality for which the patients are admitted, differences may be possible regarding the incidence of comorbidity as well as comprehensive frailty and disability. Moreover, many admitted patients did not satisfy the inclusion criteria, among them the patients who were too sick or terminally ill and those with incomplete data were older than the respondents. With the positive relationship found between age and frailty and disability and the non-response group that is older, it can be hypothesized that in the entire population of hospital-admitted 75 year-olds, the overlap between comprehensive frailty, disability and comorbidity is greater. The results, therefore, may underestimate the actual figures.

This study does not address the scientific base of the cut-off points of comprehensive frailty. With the absent of consensus on the frailty definition and operationalisation there is no gold standard for frailty. Therefore it is complicated to establish a cut-off point for use in this study. The figures in this study of sensitivity and specificity are based on the two given operationalisations and can contribute to the discussion about the frailty definition.

In clinical practice, the Groningen Frailty Indicator should be taken for each new hospital-admitted older patient. This enables quick and easy patient screening for comprehensive frailty and concomitant risk of poor results. With this identification, diagnostics and treatment can be specifically directed in these patients for preventive treatment or to prevent further deterioration. It is also important for nurses to know whether a patient is frail. Treatment in this group of patients to prevent a rapid decline in functioning clearly lies within the scope of the nurses and doctors (Inouye et al., 1993: Inouye et al., 2000). Certainly with an associated presence of disability and/or comorbidity

they will have to be extra alert to a potentially more difficult recovery and/or a quicker deterioration of the patient.

2.5 Conclusion

The incidence of frailty in a hospital population of 75 years and older is clearly dependent on the operationalisation that is maintained. With the comprehensive frailty operationalisation which in addition to physical aspects also focuses on psychosocial and cognitive aspects of functioning (GFI) more older individuals are identified as frail if they have a greater risk of deteriorating function due to psychological and social problems. The fact that the top 10 burden of disease diagnoses is seen in nearly three-quarters of the respondents, half of which in combination with comprehensive frailty and disability, shows that a group of older people is involved that certainly requires attention. It must be concluded that with frailty as case finding in clinical practice, a larger group of patients can be identified with risk for negative outcomes as result of their frailty and in whom disability and/or comorbidity is also seen and who are then eligible for specialized geriatric care.

3

Prevalence of frailty on clinical wards: description and implications

RM. Andela, A. Dijkstra, R. Sanderman, JPJ. Slaets,

Abstract
This article describes the prevalence and frailty level of patients aged 75 or over upon admission to various wards of a large teaching hospital. The data collection for this survey took place on five wards of different clinical specialisms: geriatric medicine, traumatology, pulmonology/rheumatology, internal medicine and surgical medicine. The Groningen Frailty Indicator was used to assess the frailty of newly admitted patients. The presence of number and kind of the various frailty indicators was different for the wards, due to clinical diagnose, age and gender. On the geriatric ward almost all patients were indicated as frail. On the other wards 50% up until 80% of the patients were indicated as frail with most frailty indicators on the scale 'psychosocial'. The study shows a high prevalence of frail elderly on some wards and gives an indication of the various needs for other disciplines within the framework of the care for frail elderly people.

Keywords
Diagnosis, frail elderly, geriatrics, patient admission, prevalence

Submitted

3.1 Introduction

Elderly people represent an important patient group at the general hospitals (Schrijvers et al., 1997). According to 2007 statistics 65% of the people of 65 years or older in the Netherlands consulted a medical specialist, compared to 35% of the 20-45 year old age group. Elderly people have 5.5 contacts a year, on average. They also have a high percentage of admissions (13%) (CBS, 2009).

In general the group of older people is not homogenous; some have a good functional status and no medical or nursing diagnosis, whereas others suffer from diseases, handicaps and disabilities (Eulderink et al., 1995). This latter group has an increased risk of poor outcomes at hospitalisation, such as increased length of stay, functional decline, iatrogenic complications and nursing home placement (Rockwood et al., 1994; Palmer, 1995; Morley et al., 2002). In literature they are described as frail patients (Buchner & Wagner, 1992; Fried et al., 2001). Fiolet (1993) also found that it was not the medical diagnosis but the daily functioning related issues at the moment of admission that predicted negative outcomes of hospitalization. Frailty can be defined as the age-related loss of ‘resources’ in one or all of the 4 domains of functioning: physical, cognitive, social and psychological. Such a loss leads to a declining reserve capacity for dealing with stressors and can result in a complex mixture of separate or interacting problems (Schuurmans et al., 2004).

With the increasing number of the frail elderly and the problems healthcare encounters with this group when hospitalized, our knowledge about this group should be increased. Hospitalization may very well be the critical moment in a further deterioration and loss of independence. Identification of the frail elderly patient can be followed by accurate treatment decisions and efficiently launching various disciplines to prevent too much deterioration. The aim of this study is to describe the prevalence and frailty level of patients aged 75 year and older upon admission to various clinical wards and the implication for care.

3.2 Method

Setting and participants

Data collection took place on five wards of different clinical specialisms in a large teaching hospital (A) and a university hospital (B) both in North the Netherlands. In hospital A the geriatric medicine ward, the traumatology ward and the pulmonology/rheumatology ward were involved; the study period was six months. In hospital B, data was collected from two general internal medicine wards during one month and from the surgical medicine wards during two weeks.

Procedure

Data for this survey was gathered on five different wards (geriatric medicine, traumatology, pulmonology/rheumatology, internal medicine, surgical medicine,) within two days after admission. A nurse or research assistant interviewed patients based on written and verbal instructions, using the GFI. On all wards frailty was assessed routinely among patients of 75 years or older for whom participation was not too much of a burden.

Instrument

The Groningen Frailty Indicator (GFI) (Steverink et al., 2001) was used to assess the frailty of the patients at the time of, and leading up to admission to hospital. In the Netherlands, the GFI was developed to assess the extent of frailty in elderly persons (see Appendix). This 15 item instrument screens for the loss of the 4 domain of functioning: physical, cognitive, social, and psychological (Schuurmans et al., 2004). Each item can be considered an indicator of frailty. An item scores one point when an indicator for frailty is present. A sum-score can be computed by totalling the item scores of the 15 items as well as for the subscales, mobility (mobility and physical fatigue) health (i.e.: cognition and multiple health problems) and psychosocial (i.e.: emotional isolation, depressed mood and feelings of anxiety). The scores on the GFI range from 0 (not frail) to 15 (severely frail). GFI score four is convenient as a cut-off score for frail patients who would benefit from preventive intervention.

Analysis

Descriptive statistics with percentages and mean GFI sum-scores were used to analyse the data. Differences between groups were analysed using an ANOVA with alpha < 0.05 as the level of statistical significance. Data analysis was done using the statistical package social sciences (SPSS 11.0 for Windows).

Ethical considerations

Data gathered on the wards was obtained with permission of the hospital's health care authorities. The Local Research Committee also granted permission for the study on the wards of hospitals A and B. All staff agreed to participate on the basis of written and verbal information about the study including its objective and methods and the questionnaires to be used. The names of the participants were encoded to ensure confidentiality and anonymity.

3.3 Results

Table 1 shows the numbers of subjects on the various wards. Non-response was caused by incompletely filled in forms (n = 17) or non-cooperation of patients (n = 26). Finally, 276 patients were included in the following analysis. The non-response group did not significantly differ as regards gender and GFI score, however the non-respondents were slightly older (t = 1.90; p = 0.05).

Table 1: Amount of response and non-response

	Admission 75 or older	Not inclusion	Non-response	Remaining (response-rate)
Geriatric medicine	33		1 not complete data	32 (97%)
Traumatology	140	48	13 non cooperative 10 not complete data	69 (75%)
Pulmonology/ rheumatology	125	35	13 non cooperative 6 not complete data	71 (79%)
Internal medicine	76			76 (100%)
Surgical medicine	28			28 (100%)

Table 2 shows the characteristics of the respondents. Mean age and number of males and females differ for each ward. On the geriatric ward and the traumatology ward there were more women than on the other wards and the mean age was the highest. On average, the female subjects were two years older than the male subjects. With increasing age, patients had higher frailty (GFI) scores.

Table 2: Characteristics of the respondents

Ward	n	Female %	Age M (SD)
Geriatric medicine	32	65	83.8 (4.7)
Traumatology	88	62	83.3 (5.3)
Pulmonology/ rheumatology	72	41	79.8 (3.2)
Internal medicine	76	59	81.2 (5.1)
Surgical medicine	28	50	81.1 (4.9)

Figure 1 shows a box-plot of the GFI sum scores with a reference line at the GFI score of four, cut-off score for frail elderly who benefit from geriatric intervention. The mean sum-scores are presented in Table 3. On the geriatric ward just three patients scored below the cut-off point. On the surgical medicine ward 50% of the patients scored above the cut-off line, on the traumatology ward and the pulmonology/rheumatology ward this was 70%, and on the internal medicine ward this was 80% of the patients. Testing the differences with an ANOVA indicated that there was an overall significant difference between groups ($F = 3.69$; $p = 0.01$). However, when the geriatric ward was left out of the analysis, the F-value dropped to a non-significant value.

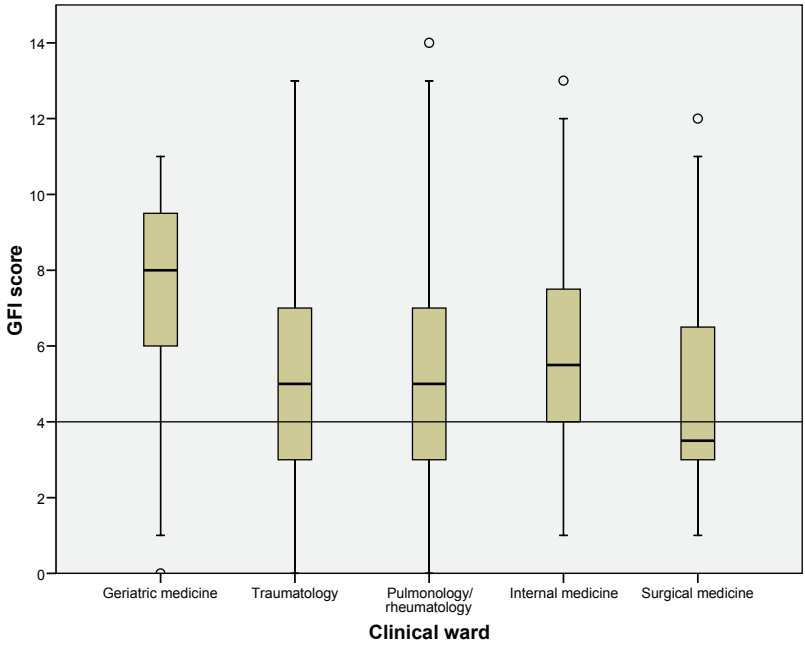

Figure 1: Box-plot of GFI sum-scores of the clinical wards

On the scale level and on the item level, several interesting trends can be distinguished. The prevalence of frailty indicators differed between the wards (see Table 3). On the scale level it was found that with an ANOVA only for de mobility scale the difference between groups was significant (F = 4.48; p = 0.00). Again, when the geriatric ward was kept out of the analysis the difference was non-significant. On the traumatology ward the highest score was seen on the variables 'using 4 or more different sorts of medication' and 'miss having people around', despite the hip-fracture in most patients. Patients on the pulmonology/rheumatology ward had fewer mobility problems as represented on the mobility scale, but a high score on 'low physical fitness' and 'using 4 or more different sorts of medication'. Frailty in patients on the internal medicine ward was seen on all three scales with the emphasis on 'low physical fitness' and 'using 4 or more different sorts of medication'. On the surgical medicine ward patients had the best mobility scores and just one frailty indicator, namely 'miss having people around', was found in

Table 3: GFI items and cluster scores for the clinical wards [mean (SD)]

	Geriatric medicine (n = 32)	Traumatology (n = 69)	Pulmonology/ rheumatology (n = 71)	Internal medicine (n = 76)	Surgical medicine (n= 28)
Mobility	**0.54 (0.32)**	**0.33 (0.33)**	**0.31 (0.28)**	**0.38 (0.27)**	**0.26 (0.34)**
To do the shopping by yourself	0.78 (0.42)	0.51 (0.50)	0.39 (0.49)	0.55 (0.50)	0.32 (0.48)
To walk outside by yourself	0.44 (0.50)	0.35 (0.48)	0.21 (0.41)	0.34 (0.48)	0.21 (0.42)
To dress yourself	0.56 (0.50)	0.19 (0.39)	0.18 (0.39)	0.22 (0.42)	0.18 (0.39)
To go to the toilet by yourself	0.19 (0.40)	0.16 (0.37)	0.08 (0.28)	0.05 (0.23)	0.14 (0.36)
Mark for physical condition	0.75 (0.44)	0.46 (0.50)	0.68 (0.47)	0.72 (0.45)	0.43 (0.50)
Health	**0.38 (0.25)**	**0.34 (0.21)**	**0.35 (0.19)**	**0.38 (0.21)**	**0.34 (0.24)**
Problems caused by poor sight	0.31 (0.47)	0.22 (0.42)	0.20 (0.40)	0.25 (0.44)	0.21 (0.42)
Problems caused by poor hearing	0.34 (0.48)	0.46 (0.50)	0.28 (0.45)	0.30 (0.46)	0.32 (0.48)
Lost weight without wanting to	0.31 (0.47)	0.30 (0.46)	0.39 (0.49)	0.38 (0.49)	0.36 (0.49)
Use more than 3 kind of medication	0.63 (0.49)	0.59 (0.50)	0.73 (0.45)	0.74 (0.44)	0.43 (0.50)
Complaints about your memory	0.28 (0.46)	0.14 (0.36)	0.17 (0.38)	0.22 (0.42)	0.36 (0.49)
Psychosocial	**0.55 (0.32)**	**0.42 (0.33)**	**0.38 (0.34)**	**0.39 (0.32)**	**0.38 (0.29)**
Experience emptiness	0.63 (0.49)	0.46 (0.50)	0.41 (0.50)	0.37 (0.49)	0.32 (0.48)
Miss heaving people around	0.69 (0.47)	0.54 (0.50)	0.41 (0.50)	0.41 (0.50)	0.54 (0.51)
To feel abandoned	0.34 (0.48)	0.25 (0.43)	0.25 (0.44)	0.21 (0.41)	0.25 (0.44)
Feeling gloomy and depressed	0.59 (0.50)	0.48 (0.50)	0.44 (0.50)	0.55 (0.50)	0.46 (0.51)
Feeling nervous or frightened	0.50 (0.51)	0.38 (0.49)	0.38 (0.49)	0.42 (0.50)	0.32 (0.48)
GFI total	7.38 (2.80)	5.45 (3.16)	5.21 (2.94)	5.75 (2.66)	4.89 (3.33)
Median	8.0	5.0	5.0	5.5	3.5
Range	0 - 11	0 - 13	0 - 14	1 - 13	1 - 12

more than half of the patients. Comparing wards showed that on the scale level the patients at the geriatric ward had the highest score on all scales and therefore had the highest frailty levels, irrespective of the domain under study. Within wards patients on all wards showed the highest score on the psychosocial scale.

3.4 Discussion

Results indicate that frailty is related to some extent to medical diagnosis (geriatric ward), age (older patients) and gender (female). The difference in frailty levels on the different wards was significant but was due to the high level of frailty in the patients in the geriatric ward in particular. They showed the most frailty indicators, divided on the three scales (mobility, health, psychosocial). On the other wards the score on the 'psychosocial' scale was the highest. The patients on the geriatric ward showed a mix of problems in the different aspects of functioning. This finding is in line with the definition of frailty which is defined as a frailty of the patient as a result from a complex relation of physical, psychological, social and environmental factors, as Markle-Reid & Browne (2003) stated.

It is obvious that the difference found between wards is partly due to the number of women and elderly on a ward. Like the geriatric ward, the internal medicine ward and traumatology ward with the highest number of women and the oldest patients, had the highest frailty level. As found here and in other studies, the prevalence of frailty increases with age (Schuurmans et al., 2004; Levers et al., 2006) and higher prevalence and level of frailty was found for women (Walston & Fried, 1999; Puts et al., 2005b; Borglin et al., 2005). The reason for gender difference is partly based on the difference in disability-related health conditions (Murtagh & Hubert, 2004) and perception of health conditions (Carmel & Bernstein, 2003). Importantly, despite this influence of age and gender frailty occurs more frequently on some wards.

In clinical practice it is seen that the reason for hospitalization is more related to problems related to the ´mobility´ and ´health´ scales. What

is striking in the results is the high prevalence of frailty indicators related to the ‘psychosocial’ scale. This scale seems to be more related to the actual age of the patients, than to their health problems. With the holistic vision in geriatric medicine (Fisher, 2005) and in nursing (Gordon, 2000), and the existence of interacting problems on different aspects of functioning this aspect surely needs attention in the diagnosis and treatment process.

A shortcoming of this study is that the sample is rather small, little is known of the non-response and the number of respondents on the different wards is not the same. It is not certain that the respondents are a representative sample of the patients on the wards. From other studies with elderly subjects it is known that older and more frail cannot be included (Naylor et al., 1999; Harris & Dyson, 2001; Van Heuvelen et al., 2005). Given the fact that non-responders were somewhat older, and the fact that age is related to frailty, it is reasoned that the results underestimate the problems in the population under study.

There is enough evidence that only the frail elderly patients benefit from preventive intervention (Markle-Reid & Browne, 2003; Slaets et al., 1997; Stuck et al., 1993). Screening can identify those frail elderly people. The GFI is developed to assess the extent of frailty in elderly people and the score can lead the decision for preventive geriatric intervention for these patients. From clinical evidence it is known that patients which score four or higher on the GFI can be considered frail patients that will benefit from a consultation with the geriatric nurse or medical specialist (Steverink et al., 2001). The group of patients scoring zero up to and including three, have little loss of functioning and ‘care as usual’ is appropriate. Another solution if the number of frail patients overcrowds the treatment capacity of the geriatric consulting service or the needed disciplines, is to raise the GFI cut-off point at first with one point to meet at least the needs of the more frail patients.

After identification of the frail elderly, a geriatric specialist should examine the care needed by individual patients. The results of the GFI in this study give an indication of the various needs for other disciplines on different wards. Beside nursing care, function loss in mobility can indicate a need for consultation of physiotherapists whereas loss of psychosocial functioning as indicated on the psychosocial scale can give an indication for consultation of a social worker.

3.5 Conclusion

The objective of this study was to describe the prevalence and frailty level in elderly patients of 75 years and older on various clinical wards and the implications for care. It must be concluded that the prevalence of frailty assessed with the GFI is found on the geriatric ward in particular, which is in line with what might be expected given the focus of treatment of such a ward. However, also on the other wards frailty was present, which varies from 50% of patients on surgical medicine up until 80% on internal medicine. Although the response group was rather small the results show that frailty is an important concept for a large group of the hospitalized elderly. This study shows that the various wards have quite different number of patients in need of care to prevent them from a further deterioration. With the use of the GFI as case finder on a ward in practice the geriatric consultation service can be offered selectively to those who will benefit from it. This given the fact that a lot of patients encounter problems which are quite often overlooked (psychosocial problems), but which can have considerable impact on the further course of their medical status. For an accurate estimation of the target group needing geriatric consultation and possibly other professional care, it is at least useful to assess the frailty level and indicators of the elderly patients admitted. These figures can lead accurate management decisions the treatment capacity of the geriatric consulting service or the needed disciplines.

4

Perception of patient's frailty by patient and proxy; a comparison

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Abstract

In case of acute hospitalization, where the patient is too ill or seems to be cognitively impaired, history taking may make use of information gathered from the person accompanying the patient. This study examines the 'proxy' information in establishing frailty of the individual patient. In this survey a sample of 179 patient-proxy couples completed the Groningen Frailty Indicator (GFI), which assesses patient frailty at the time of, and leading up to admission to hospital. The GFI assesses frailty using four domains of functioning: physical, cognitive, social and psychological. At group level patients without cognitive impairment and their proxies showed no significant difference in frailty assessment. However, noticeable differences were found at individual item level. Patients with a cognitive impairment showed a significant difference in scores compared to proxy scores. It was also found that the children of this group tended to rate patients more frail than the spouses. For both groups those items of a subjective nature showed less agreement between patients and their proxies. The GFI can be used for case-finding the frail older person and preferably by using the patients own perceptions. Certainly for the more cognitively impaired patients, proxy involvement is advised.

Keywords
Case-finding, hospitalization, cognitive impaired, proxy information, geriatric specialist

4.1 Introduction

The number of elderly people in the Netherlands, as in other western countries, is growing (CBS, 2009). In general, the group of older adults is not homogenous; some have a good functional status and no medical or nursing diagnosis, whilst others suffer from diseases, handicaps and disabilities (Eulderink et al., 1995). This latter group has an increased risk of poor outcomes related to hospitalization (Palmer, 1995) and are described as the 'frail elderly' in health care literature (Buchner & Wagner, 1992; Fried et al., 2001). The increased number of elderly people admitted to general hospitals combined with the higher risk of negative outcomes should make the frail elderly a high priority group for hospitals (Schrijvers et al., 1997). Beside health problems, frailty can lead accurate assessment and effective treatment decisions that need to be made in order to offer individual patients the most effective and efficient treatment**.**

There is yet no consensus on the definition of frailty (Rockwood, 2005a; Lally & Crome, 2007; Bergman et al., 2007) but is considered as a state that is multifactorial and implies frailty (Rockwood, 2005a). In some definitions frailty is identified by characteristics related to physical functioning (Fried et al., 2001) in others by characteristics of all aspects of functioning (Steverink et al., 2001). In this study, frailty was defined as having reduced levels of physical, cognitive, social and or, psychological functioning, which result in a declining reserve capacity for dealing with stressors (Schuurmans et al., 2004). Hospitalization itself can be a stressor and consequential negative outcomes should be prevented through early identification of those at risk. Early identification allows early treatment/prevention interventions that restore or even improve quality of life, and make efficient use of healthcare facilities. In cases of acute hospitalization, in situations where the patient is too ill or seems to be cognitively impaired, history taking usually involves gaining information from the accompanying person at admission. The quality of this 'proxy' information with regards to establishing the patient's frailty, could be questioned.

A number of studies have compared the similarities in answers of patients and their significant other (proxy) on quality of life scores. Whilst some found moderate agreement at individual case level (Sneeuw et al., 1999), others have found less agreement between proxy and patient assessment, especially for the more subjective aspects of functional status, general health and quality of life (Neumann et al., 2000; Magaziner et al., 1997; Novella et al., 2001). For patients with dementia proxies tend to describe more functional impairment compared to a patient's self-assessment (Neumann et al., 2000; Novella et al., 2001). Higher agreement was found for the more observable aspects of functional status, general health and quality of life, and more so between patients and their spouse than between patients and their children (Novella et al., 2001).

The focus of this study was to examine the usefulness of proxy information for establishing patient frailty at moment of hospitalization assessed with the recently developed Groningen Frailty Indicator. The assumption was that cognitive status and/or the patient-proxy relationship would be the most influential factors for explaining differences in scores between patients and proxies and therefore the rational to take only these into the study.

4.2 Method

Setting and participants

This survey took place in a large teaching hospital in the north of The Netherlands. Data was gathered from 3 wards: the geriatric ward for three months; a ward for traumatology and a ward for pulmonology and rheumatology for six months. All newly admitted patients in the geriatric ward and all patients above 75 years old on the other wards were included.

Procedure

Nurses completed the GFI instrument within two days after admission for those patients admitted to the unit who also met the inclusion criteria. Patients were asked to name a proxy who could fill in an adjusted version of the GFI within two days after the GFI was taken of

the patient. The GFI questions were rephrased for the proxy population e.g. ‘Is your relative able to do the shopping?’ The researcher checked patients’ records for dementia or cognitive impairment at time of admission assessed by the Geriatric Nurse Specialist (GNS).

Instruments

The Groningen Frailty Indicator (GFI) (see Appendix) was used to assess patient frailty (Schuurmans et al., 2004; Steverink et al., 2001). It was developed in the Netherlands as a case-finding instrument which to assess easily the extent of elderly person frailty. Fifteen items of frailty are spread over 4 domains of functioning: physical (mobility functions, multiple health problems, physical fatigue, vision, hearing); cognitive (cognitive functioning); social (emotional isolation), and psychological (depressed mood and feelings of anxiety). The (occasional) presence of a frailty risk factor (item) is scored as 1 point. A GFI sum-score is calculated by adding up all 15 item scores. Total scores range from 0 (not frail) to 15 (severely frail). Of the 15 items some are more observable e.g. ‘questions on mobility’ and ‘medication usage’ and others as ‘miss having people around’ or ‘feeling rejected’ are more subjective in nature. Cognitive impairment was assessed by the GNS using the Mini Mental State Examination. The 12 item version was used with a range of 0 to 12 points, in which a score of 6 of lower can be considered a severe cognitive disorder (Kempen et al., 1995; Feinberg & Whitlatch, 2001).

Analysis

Descriptive statistics with mean GFI sum-scores and percentages were used to analyse the data. A t-test for independent groups was used to analyse differences in GFI sum-scores with alpha < 0.05 as the level of statistical significance. Data analysis was done using the statistical package social sciences (SPSS 15.0 for Windows).

Ethical considerations

Data gathered on the wards was obtained with permission of the hospital's health care authorities. The Local Research Committee also granted permission for the study on the wards. All staff agreed to participate on the basis of written and verbal information about the study including its objective and methods and the questionnaires to be used. The names of the participants were encoded to ensure confidentiality and anonymity.

4.3 Results

A patient and a proxy GFI was obtained from 79 of the 87 patients on the geriatric ward (response rate = 91%). Non-response was caused by proxies failing to complete the GFI, or nurses forgetting to ask for proxy participation. Eighty two of the 265 patients admitted to the wards could not be included due to: re-admission; being transferred shortly after admission; too short a stay on the ward; or were missed for recruitment. Of the remaining 183 patients, 27 did not wish to participate in the study and proxy data was missed for 56 cases. Missing proxy data was mainly caused by nursing staff forgetting to seek inclusion or proxy's forgetting to fill in the questionnaire. In total, 100 patients and proxy couples were recruited on the wards (response rate = 55%). Thus, data from 179 patient-proxy couples was available for further analysis. The response group did not significantly differ in age or gender from the non-response group.

Table 1 shows the distribution of the response group gender, age, cognitive impairment and relationship with the proxy. The majority of the proxies were spouses or children. Twenty patients had named a grandchild, a niece, a nephew, a neighbour or an acquaintance. This group was labelled 'other'. There was no registration of the relationship between the patient and proxy for fifteen patients.

Table 1: Patients' gender, age, cognitive status and proxy relationship (n = 179)

Gender	
Female	110
Male	69
Age	81.32 (SD = 5.83)*
Cognitive status	
No impairment	109
Impairment	70
Relationship with proxy	
Spouse	45
Child	100
Other	20
Unknown	14

Notes: * Mean (SD)

Table 2 shows the mean GFI sum-scores of patients and their proxies, as well as a paired t-test for the groups patients and proxies. To check the influence of cognitive impairment on the patient-proxy difference in GFI sum-scores, the group was divided into patients with cognitive impairment (n = 70) and without cognitive impairment (n = 109). Within these groups the influence of proxies being spouse or child was also checked. Those proxy groups with a different relationship to the patient were too small and varied to be included in this analysis.

Table 2: Patients' and proxies' GFI sum-scores

	Patients mean (SD)*	Proxies mean (SD)*	Difference** mean (SD)* (min.max)	CI of mean*** Lower: upper	Paired t-test
All respondents (n = 179)	5.68 (3.11)	6.83 (3.46)	-1.15 (2.70) (-7: 13)	-1.55: -0.75	t = 5.69; p = 0.00
Without cognitive impairment (n = 109)	5.72 (3.13)	6.06 (3.20)	0.35 (2.16) (-7: 6)	- 0.76: 0.06	t = 1.68; p = 0.10
spouse proxy (n = 28)	4.75 (2.21)	4.61 (2.90)	-0.14 (1.86) (-4: 4)	- 0.58: 0.86	t = 0.41; p = 0.69
child proxy (n = 64)	6.23 (3.27)	6.69 (3.10)	0.45 (2.33) (-7: 6)	-1.04: 0.13	t = 1.55; p = 0.13
With cognitive impairment (n = 70)	5.63 (3.10)	8.03 (3.54)	2.40 (3.00) (-5: 13)	-3.11: -1.69	t = 6.71; p = 0.00
spouse proxy (n = 17)	5.06 (2.75)	6.71 (4.24)	1.65 (2.42) (-2: 5)	-2.89: -0.40	t = 2.80; p = 0.01
child proxy (n = 36)	5.89 (2.99)	8.28 (3.00)	2.39 (3.03) (-5: 9)	-3.41: -1.37	t = 4.74; p = 0.00

Notes: * Mean GFI score, with range from 0 (not frail) to 15 (severe frail)

SD = standard deviation

** Difference GFI score proxy minus GFI score patient

*** CI = 95% confidence interval

At group level (n = 179), on average patients scored themselves lower on the GFI than their proxies. No significant differences were found for patients without cognitive impairment (t = 1.67; p = 0.10). For those classed as having a cognitive impairment, significant differences were found (t = 6.71; p = 0.00) whereas this for individual cases varied from 1 to 13 points. For both groups the difference between patient-spouse scores was smaller than that between patient-child on the GFI sum-score. For patients with cognitive impairment this difference was significant (respectively: t = 2.80; p = 0.01 and t = 4.74; p = 0.00). The difference in GFI sum-scores for patients with a spouse as proxy and patients with a child as proxy (see Table 2) was further examined on the group patients without cognitive impairment.

For patients without cognitive impairment the patient-proxy difference was not significant for GFI sum-scores. However, at individual case levels there were differences ranging from one to seven points. Table 3 shows the number of patient and proxy couples based on their GFI sum-scores. Figures in the diagonal represent the number of patient-proxy couples with the same GFI sum-score. The greater the distance from the diagonal line, the greater the difference in score between patient and proxy. Figures above the diagonal are the patient-proxy couples where the proxy scored higher than the patient. Patient-proxy couples where the patient scored higher than the proxy are found below the diagonal line.

To check varying differences between patient and proxy answering, the level of agreement between the patients' and proxies' was checked at item level. Table 4 shows the percentage of patient and proxy couples with full agreement in answering each GFI item. Regardless of cognitive status, full agreement between patients and their proxy is lower for those items of a more subjective nature e.g. 'miss having peopled around'.

Table 3: GFI sum-scores patients without cognitive impairment and proxies (n = 109)

Proxies Patients	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	total
0	3			1													4
1			1		1												2
1	1	2	1	4	1	2	1										12
3		1	1	2	5		1	1									11
4		2	1	1	2	2	2	2			1						13
5		1	1	1	1	1	7	3	1								16
6					2	2	1	4		1							10
7				1			1	4	1		1	2					10
8									2	2	2	2					8
9			1						1	5				1			8
10									1	1	2	1					5
11						1			1		1	3	1				7
12																	
13									1	1			1				3
14																	
15																	
Total	4	6	6	10	12	8	13	14	8	10	7	8	2	1			109

Table 4: Percentage of patients-proxies couples with full agreement on item level

GFI items	Cognitive status of patients	
	No impairment (n = 109)	Impairment (n = 70)
Able to do shopping by yourself	89	80
Able to walk outside by yourself	83	83
Able to dress by yourself	92	83
Able to go to the toilet by yourself	90	87
Mark (1-10) for physical condition	68	60
Problems by a bad sight	83	81
Problems by bad hearing	80	81
Lost weight without wanting to	78	77
Use more than 3 kinds of medication	89	84
Complaints about your memory	88	61
Experience emptiness	73	64
Miss heaving people around	70	63
To feel abandoned	80	61
Gloomy and depressed	77	74
Nervous or frightened	77	73

4.4 Discussion

Studies comparing patient and proxy for non-cognitively impaired patient groups, have shown various results in assessment of patient functioning. Most of these studies found a small difference between patient and proxy perceptions, in that proxies reported more impairment in functioning and emotional well being. The difference was also larger for the more subjective items on the instruments used (Sneeuw et al., 1999; Neumann et al., 2000; Ball et al., 2001). The current study showed similar results, although these were not significant. Comparable studies of patients with cognitive impairment found different results between patients' and proxy's assessment of quality of life, or other aspects of patient's functioning. Proxies tended to describe more impairment in functioning and emotional well being than the cognitively impaired patients themselves (Neumann et al., 2000). For Alzheimer patients and their proxies a stronger agreement was found between the more objective items (Demissie et al., 2001). The results of our study show that proxies tend to rate patients with cognitive impairment significantly frailer than the patients themselves, especially for the more subjective items.

We have found no suitable explanation for the sometimes large differences in GFI sum scores at individual level of these studies results. The differences between patients and spouses on objective items could be caused by misinterpretations of the GFI items. For example, the items questioning the patient's *ability to perform* an activity may have been interpreted as asking whether of not the patient *actually performs* the activity rather than their ability to do so. Another possible explanation for the differences in scores could be assigned to the inclination to underrate or overrate the patients frailty by patient or proxy. For example, an optimistic patient can underrate his frailty due to a less serious perception of health conditions. An overburdened proxy can overrate patients' problems (Neumann et al., 2000) when they are feeling depressed or regard that the home situation is becoming hazardous. This overrating can also be done on purpose to receive more support, or if they no longer wish to feel responsible for the patient's home situation. For lack of a gold

standard regarding frailty no statement can be made if the patient or proxy is over or underestimate the frailty rate.

It would be inappropriate to explain the differences between patient and proxy GFI sum scores solely as evidence of inaccurate proxy information. Patients with severe cognitive impairment often provide less realistic information about their mobility and health problems, which imply that information gained from their proxies would be more reliable. In saying this, there are studies that showing that patients with cognitive impairment are able to give reliable answers about their own subjective states (Mozley et al., 1999; Feinberg & Whitlatch, 2001; Trigg et al., 2007).

When using of the GFI in nursing practice, the authors advice to view the patients own perceptions as first interest. Certainly for measuring the more objective items in patients with a cognitive impairment, it is advisable to seek proxy and/or professional caregiver perceptions as well, as these may offer more reliable answers. In routine care situations health care providers are sometimes dependent on proxy information, but verification of the information supplied remains important. This can be achieved through direct feedback from patients, or by directly questioning their own perception of function (Sneeuw et al., 1999).

From literature it is known that frail elderly patients benefit from consultations with geriatric specialists (Morishita et al., 1998; Slaets, 1998; Stuck et al., 1993). General nurses can use the GFI as a case-finding instrument to screen for frail patients who would benefit from such consultations upon and during hospitalization. In light of this, the clinical significance of our findings on patient-proxy differences should be considered. When the GFI score is near the cut-off point, follow-up and further investigations could be dependent on one point/item. Based on clinical findings of the GFI the scores can direct the patients' most suitable care. Standard care would be sufficient for patients with a GFI score of less than 4 (lower risk of frailty). On the other hand, patients with a GFI score greater than 10 can be viewed

as very ill and in case of geriatric problems the geriatrician or Geriatric Nurse Specialist must be consulted. It can be questioned if these patients can benefit of geriatric intervention with the aim of prevention of negative outcomes. This leaves those scores between 4-10, which should be considered as benefiting most from this geriatric intervention. In saying this, we propose that the GFI score should be used as a 'guideline' for geriatric intervention. However, when there is reason for doubt on the patient and/or proxy rating, further investigation of patient frailty should be performed. If the number of frail patients overcrowds the treatment capacity of the geriatric consulting service, a less preferable solution is to raise the GFI cut-off point to meet at least the needs of the more frail patients. When a patient is already known to be cognitively impaired, the GFI has no function as a case-finding instrument. Patients with a diagnosis of cognitive impairment should always be referred for consultation with a geriatric specialist. Further research should be carried out to determine the GFI cut-off points by examining the false positives and false negatives in the assessment of frailty in the older person.

4.5 Conclusion

This study was designed to compare elderly patient and proxy perceptions of patient frailty before admission to hospital, using the Groningen Frailty Indicator (GFI). The effect of patient cognitive impairment and the type of proxy relationship on GFI scoring was also investigated.

For the patient population without a cognitive impairment the mean GFI scores did not significantly differ from that of the spouse, although some noticeable differences were found at individual and item levels. A moderate significant difference was found between patient and proxy scores for those patients with a cognitive impairment. For both the cognitive impaired as the non-cognitive impaired patient populations, the difference in GFI sum-scores for patient-spouse couples were smaller than those for patient-child couples, of which the cognitive impaired group showed a significant difference. The results also showed more agreement between patient

and proxy scores for the more objective items in both groups. When using the GFI in nursing practice, the authors recommend to view the patients own perceptions as first interest. However, when there is reason for doubt on the patient and/or proxy rating, further investigation of patient frailty must be performed.

5

Nursing diagnoses among frail elderly patients and the diagnostic role of the Geriatric Nurse Specialist

RM. Andela, A. Dijkstra, JPJ. Slaets, R. Sanderman

Abstract

The role of geriatric medicine in acute and primary care has been debated. With the positive outcome of geriatric teams for the frail older people, the well organised geriatric care for the hospitalised older people is important. This chapter describes an examination of the role of the Geriatric Nurse Specialist (GNS) consultations on diagnosing nursing problems for frail older people in clinical practice of a large Dutch teaching hospital. In this survey healthcare problems were diagnosed for 113 frail older patients admitted during a six-month period in two general wards in a large Dutch teaching hospital. Identified problems were screened and classified by an expert panel using the nursing diagnoses as described by Gordon. The most frequently diagnosed problems were ‘impaired physical mobility’ and ‘high risk for injury (falling)’. On average, the frail older patient had 4.4 nursing diagnoses, almost three of which were identified by the consulting GNS. Registered nurses in the ward mainly focused on diagnoses of a physical nature, requiring immediate care during hospitalisation. However nursing diagnoses related to hospitalisation, approximately half were identified by the consulting GNS. An overall conclusion is that GNS consultations are of added value to the identification of nursing diagnoses relevant during hospitalisation as

well as diagnoses that may still be relevant post-discharge. This can result in better and earlier mobilisation of multidisciplinary care that transcends the boundaries of an acute care hospital, into primary and long term care settings. These results support the need for active geriatric medical services in acute care settings.

Keywords
Geriatric Nurse Specialist, frailty, older people, hospitalisation, nursing diagnoses

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5.1 Introduction

In the debate within the British Geriatric Society on the role of the geriatric medicine in acute and primary care (Oliver, 2006), it was stated that while (acute) hospital-based geriatric medicine cannot meet the care needs of frail older people in, or close to, their home situation, it does anticipate the specific problems of the hospitalised older person (Oliver, 2006). There is evidence that treatment by geriatric teams have positive outcomes for frail older patients (Wells et al., 2003). In view of these positive findings, and the increasing number of older people, Rockwood & Hubbard (2004) argue that well-organised geriatric care for the hospitalised older patients is important.

Hospitalisation of frail older people often leads to a decline in their independence, both on the physical level (Covinsky et al., 2003) and potentially on the social or psychological levels (Birchall & Waters, 1996; Palmer, 1995; Cohen et al., 2002). Supporting patients during actual and potential health-related problems is a characteristic of nursing care (Gordon, 2000). Upon admission, the registered nurse of the ward is responsible for starting the process of nursing care by assessing the patient's problems and needs, and subsequently formulating nursing diagnoses, goals and a suitable care regimen. In order to formulate nursing diagnoses, the admitting nurse must have knowledge of the problems associated with frail older people (Lee et al., 2006). As the treatment options become more specialised, so do the knowledge and skills of registered nursing staff working within specific (medical) specialities (Arndt, 1999; Fulton, 2005). However, frail older patients often present complex problems that are not necessarily typical of the problems encountered within the speciality (Fried et al., 2001). As medicine becomes more specialised, whether or not registered nursing staff can still recognise problems outside of specific specialities becomes more questionable. Courtney et al. (2000) found evidence that nurses lack the knowledge necessary to care for older patients.

In view of the increasing number of older patients and their specific needs, the role of a nurse specialised in the geriatric speciality (Ford, 2001) is becoming more important. How this role is fulfilled in practice will depend on policy and the local setting (Reed et al., 2007). The hospital from which the patients were selected for the study has a special geriatric ward with Geriatric Nurse Specialists (GNS) in the consultation service for the other wards of the hospital. The GNS is based at the geriatric ward, and registered and experienced in geriatric nursing with bachelor-level degrees in the field. In the consultation service, the core elements are clinical practice, teaching and support of professional colleagues in other wards. In this clinical practice we examined the nursing diagnoses of the frail elderly and the role of GNS consultations in accurately diagnosing problems of hospitalised frail older people admitted to specialized wards other than the geriatric ward.

5.2 Method

Setting and participants

The survey took place in a large Dutch teaching hospital that has a geriatric ward with an in-patient geriatric consultation service. Data for this study was collected on two wards: traumatology and pulmonology/rheumatology. Inclusion criteria for patients were: 75+ years of age; a Groningen Frailty Indicator (GFI) score of ≥ 4 and/or a history of delirium in previous hospital admissions; oral fluency in Dutch and signed informed consent. Of the 265 patients of 75 or older admitted on these wards during a six-month period, 127 patients met the inclusion criteria and 113 participated in the study. Exclusion was mostly due to lack of frailty, incomplete or incorrect registrations or too short a hospital stay. The mean age was 82.87 (SD = 4.90; range 75 – 98), 70 were women and the mean GFI sum score was 6.91 (SD = 2.62; range 4 – 14).

Procedure

Upon admission to the ward, registered nurses assessed patients and should have documented nursing diagnoses and interventions in the patient's care plan. Each patient included had a GNS consultation

within 2 weekdays. The GNS visited the patient and screened the patient's nursing care plan for problems already identified by the registered nurse of the ward. The GNS then completed its own 'specialist assessment' of the patient for extra/missed nursing diagnoses by interviewing the patient and/or his family and the responsible ward nurse. If necessary the GNS screened the patient on depressed mood and cognitive impairment. Those problems identified by the ward staff, and the extra diagnoses identified by the GNS, were recorded for each patient. The GNS tracked the patient during his or her stay. Because ward staff did not consistently use nursing diagnoses as described by Gordon (Gordon, 2000), the GNS also recorded other relevant data such as interventions or observations recorded on the activity list, but related to a diagnosis or problem. Per patient, the problems registered by nurses of the ward and by the GNS with a summary of the patient's case were compiled into a case study for the expert panel, whose task was to translate any activities, observations and/or identified problems into nursing diagnoses.

Instruments

The Groningen Frailty Indicator (GFI) (Steverink et al., 2001; Schuurmans et al., 2004) is a case-finding instrument used to establish the level of frailty of patients. It screens loss of function at physical, cognitive, social and psychological levels (Schuurmans et al., 2004; Slaets, 2004). The 15 items of the GFI are scored dichotomously, and are completed by means of an interview of the older person (see Appendix). A result of 0 is classified as not frail, with 15 being severely frail. This frailty rating was used to screen respondents for inclusion in this study. The cut-off point (score $\geq$ 4) is based on clinical experience (Steverink et al., 2001). For patients with a score less than 4, standard care is generally sufficient. Gordon's model of Health Care Patterns (Gordon, 2000) was used for taking the patient's medical history at admission by as well the ward nurses and the GNS. Nurses can assess the patient's needs within the framework of 11 health care patterns, with the nursing diagnosis consisting of a description of the problem, the aetiology and the signs

and symptoms. The Mini Mental State Examination (MMSE) was used to assess the patient's cognitive functioning. The 12 item version was used with a range of 0 to 12 points, in which a score of 6 of lower can be considered a severe cognitive disorder (Kempen et al., 1995; Feinberg & Whitlatch, 2001). De 15 item Geriatric Depression Scale (GDS) was used for the measurement of symptoms of depression (Friedman et al., 2005). The answers were provided on a dichotomous (yes/no) scale and every item contributes 1 point to the final score, which ranges from 1 to 15. A score greater than 5 is commonly considered as indicative of a depressive trait.

Expert panel

The expert panel consisted of 14 members from the regional network of geriatric nurse specialists. They used the patient cases to translate the patient's problems into nursing diagnoses as listed in Gordon's taxonomy (Gordon, 2000). This taxonomy did not describe a problem statement for the risk of acute confusion. In view of the importance of this problem for frail older patients (Ski & O'Connell, 2006; Foreman et al., 2001; Pandharipande et al., 2005) and the possible nursing interventions to be organised with the aim of prevention (Inouye et al., 1999; Kalisvaart et al., 2005; Tabet et al., 2005), this item was considered to be a nursing diagnosis.

Each case could be screened twice, i.e. go through two rounds. In each round, 3 experts from the panel screened the case independently of each other. In the first round those diagnoses identified or confirmed by all 3 experts were removed from the case. The case then entered a second round of screening the remaining problems with 3 different experts. If after the second round, 4 out of 6 experts were in agreement (e.g. 2 from the first round, and 2 from the second round) the diagnosis was regarded as legitimate. Any cases retaining problems on which a consensus of less than 66.7% could be reached entered a third round of 3 experts. This time the experts discussed the case and problems identified until consensus was reached. During the first screening round, the experts were also

asked whether or not the diagnosis aetiology was related to hospitalisation.

Analysis
The central outcome variable is the nursing diagnosis. Data analysis was done using the statistical packages social sciences (SPSS 11.0 for Windows). Descriptive statistics were used to analyse the data. Percentages were calculated for the number of nursing diagnoses registered by the ward nurse and the additional diagnoses identified by the GNS. Association was examined with the Pearson correlation test with alpha < 0.05 as the level of statistical significance.

Ethical considerations
Data gathered on the wards was obtained with permission of the hospital's health care authorities. The Local Research Committee also granted permission for the study on the wards of the hospital. All staff agreed to participate on the basis of written and verbal information about the study including its objective and methods and the questionnaires to be used. The names of the participants were encoded to ensure confidentiality and anonymity and they were asked to sign informed consent.

5.3 Results
Over the 113 patients, 567 patient problems were identified. Of these, 496 problems could be classified as a nursing diagnosis using Gordon's taxonomy (Gordon, 2000). Of the remaining 71 problems, 56 were medical diagnoses or symptoms of diseases as subject to observation and the rest were classed as nursing interventions not clearly referring to a nursing diagnosis. The registered nurses of the ward identified 55 of the 70 non-nursing diagnoses. All 70 problems were excluded from further analysis.

Nursing diagnoses
A positive correlation was found between the patient's GFI-score and the number of nursing diagnoses identified ($r = 0.37$; $p = 0.00$). This implies that the higher the frailty, the greater the number of diagnoses

identifiable. Figure 1 shows the prevalence of all nursing diagnoses identified ranked according to frequency. Table 1 shows the key to Figure 1 and the absolute numbers of the identified diagnoses. The most frequently diagnosed problems were: ‘Impaired physical mobility’, ‘Nutritional deficit’, ‘Risk of injury (falling)’, ‘Impaired memory’, ‘Hopelessness’ and ‘Pain’.

Nursing diagnoses by ward nurses and by GNS
Table 1 gives the number of diagnoses made by registered ward nurses and GNS. In total, the GNS formulated 317 nursing diagnoses in addition to the 179 already registered by the ward nurses. On average, the GNS made an additional 2.81 nursing diagnoses (range 0 – 9; median = 3) per patient. Registered ward nurses made (on average) 1.58 nursing diagnoses per patient (range 0 – 10; median = 1). The number of additional diagnoses of the GNS varies per diagnosis (Figure 1). Of the ‘top 10’ nursing diagnoses, approximately 65% were added on to the ward nurse diagnoses by the GNS. There were 41 patients for whom the registered ward nurse had made no nursing diagnosis while the GNS registered at least one. Of all the 113 cases, only 7 patients received no additional nursing diagnosis by the GNS.

Type of nursing diagnoses made by ward nurses and by GNS
The nursing diagnoses most frequently identified by registered ward nurses were ‘Impaired physical mobility’, ‘Pain’ and ‘Impaired respiration ability’. Nursing diagnoses such as ‘Nutritional deficit’, ‘Risk of injury (falling)’, ‘Impaired memory’ and ‘Hopelessness’ were more frequently identified by the GNS and added to the registered ward nurses’ diagnoses (Table 1). This implies that registered ward nurses tend to focus on diagnoses of a ‘physical’ nature, requiring support mainly during hospitalisation, e.g. ‘Impaired physical mobility’, ‘Pain’ and ‘Impaired respiration ability’. The GNS, on the other hand, is also attuned to diagnoses of a psycho-social nature e.g. ‘Social isolation’ (15 v 0 respectively) or ‘Hopelessness’ (30 v 4 respectively).

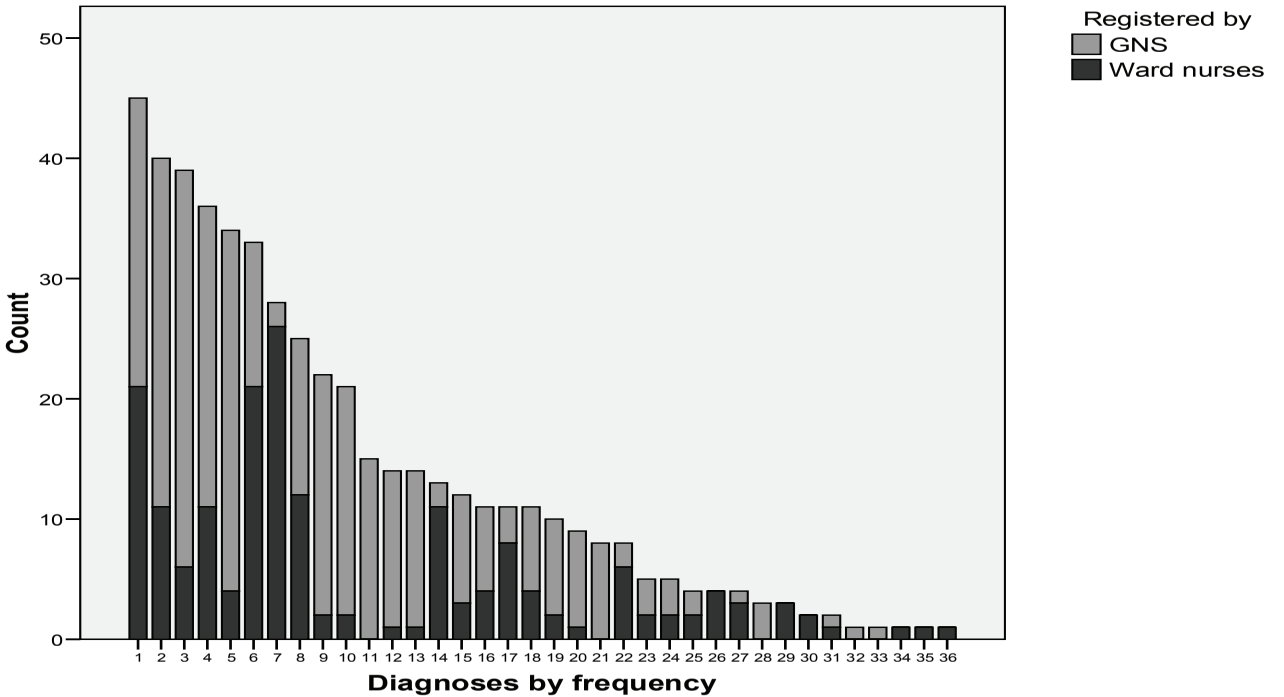

Figure 1: Nursing diagnoses by frequency
(numbers of the bars corresponding with numbers of nursing diagnoses in table 1)

Table 1: Nursing diagnoses by frequency

Number Figure 1	Nursing diagnosis	Inventoried by ward nurse	Added by GNS	Total
1	Impaired physical mobility	21	24	45
2	Nutritional deficit	11	29	40
3	Risk for injury (falling)	6	33	39
4	Impaired memory	11	25	36
5	Hopelessness	4	30	34
6	Pain	21	12	33
7	Impaired respiration ability	26	2	28
8	Self-care deficit	12	13	25
9	Hearing problems	2	20	22
10	Risk for acute confusion	2	19	21
11	Social isolation		15	15
12	Ineffective coping	1	13	14
13	Urinary incontinence	1	13	14
14	Pressure ulcer	11	2	13
15	Vision problems	3	9	12
16	Acute confusion	3	7	10
17	Constipation	8	3	11
18	Risk for pressure ulcer	4	7	11
19	Disorientation	2	8	10
20	Sleep pattern disturbance	1	8	9
21	Anxiety		8	8
22	Fatigue	6	2	8
23	Bowel incontinence	2	3	5
24	Risk for fluid volume deficit	2	3	5
25	Impaired swallowing	2	2	4
26	Hyperthermia	4		4
27	Nausea	3	1	4
28	Sorrow		3	3
29	Activity intolerance	3		3
30	Fluid volume excess	2		2
31	Fluid volume deficit	1	1	2
32	Caregiver role strain		1	1
33	Impaired verbal communication		1	1
34	Chronic confusion	1		1
35	Non-compliance	1		1
36	Risk for aspiration	1		1
Total		179	317	496

In total, there were 5 ‘high risk’ diagnoses identified within the patient population. The ‘top 3’ high risk diagnoses were: ‘Risk of injury (falling)’, ‘Risk of acute confusion’ and ‘Risk of pressure ulcer’. Of these, 82% were added by the GNS after the nursing diagnoses registered by the ward nurses. The diagnosis ‘Pressure ulcer’ was adequately identified by registered ward nurses (seen by the low number of additions made by the GNS), which further supports the conclusion that registered ward nurses are well-attuned to problems principally requiring support during hospitalisation.

Of the 496 nursing diagnoses, 385 were screened as having aetiology related to hospitalisation. The diagnoses 'Pressure ulcer', ‘Impaired respiration ability’ and ‘Risk of acute confusion’ were mostly seen as having aetiology related to hospitalisation. Others, such as ‘Risk of injury (falling)’, ‘Nutritional deficit’, ‘Impaired physical mobility’, ‘Impaired memory’, ‘Hopelessness’ and ‘Sight and hearing problems’ were least often seen as having aetiology related to hospitalisation. There were approximately twice as many diagnoses not having aetiology related to hospitalisation than diagnoses with such a relationship. This implies that these nursing diagnoses could potentially still be relevant post-discharge. Of those nursing diagnoses classified as having aetiology related to hospitalisation, approximately 46% were extra identified by the GNS. For those not related to hospitalisation, this figure was approximately 72%.

5.4 Discussion

The objective of this study was to examine the role of the GNS in a stepped diagnostic model in diagnosing the needs of frail elderly patients hospitalised on non-geriatric wards. On these wards the ward nurses have the primary responsibility for registering the nursing diagnoses of the patients. For patients who were considered to be frail, the GNS was consulted and could add nursing diagnoses based on his or her specific expertise to the diagnoses already registered.

Our finding that a geriatric consultation service leads to more diagnoses for the frail older patient is in accordance with findings from

literature (Rubenstein et al., 1991; Fabacher et al., 1994; Rockwood et al., 1998). While there is a possible bias in GNS diagnoses caused by awareness of being studied, there is also the difference observed in the type of diagnoses made. We expected registered ward nurses to be more focused on those diagnoses related to hospitalisation and their particular speciality; however, many failed to formulate even these nursing diagnoses. As Chang et al. (2003) also found, it appears that inadequate diagnosis resulted not only from a lack of knowledge on the specific problems of frail older people. The fact that registered general nurses are less interested in offering basic care (Palmer, 1995) may also have played a role in these findings. Another reason for not registering all nursing diagnoses may lie in the increase of the number of patients with complex problems (Slaets, 2006; Gezondheidsraad, 2008) and in the increase in work pressure (De Veer et al., 2007), forcing nursing staff to make choices in what they can do. This may also force the nursing personnel to focus on the patients' most acute problems. On the other hand, it must be noted that an appropriate assessment of the patient's needs is not a guarantee of good nursing care, but is a necessary start of the nursing process (Gordon, 2000). A critical look must be taken at whether the GNS should be engaged for the identification of nursing diagnoses not specific to the elderly. If knowledge and/or lack of time is the reason that diagnosis is not being done correctly, education and/or augmented staffing would be appropriate responses.

The registered ward nurses in this study mainly registered nursing diagnoses of a physical nature, requiring immediate support during hospitalisation. It was interesting to note, however, that of those nursing diagnoses classified as having aetiology related to hospitalisation, approximately half were diagnosed by the GNS. More than half of the remaining diagnoses (i.e. without aetiology related to hospitalisation, and potentially still relevant post discharge) were also diagnosed by the GNS. Those problems needed treatment during hospitalisation as well as still requiring or potentially requiring care post-discharge. Based on this study we can support Oliver’s (2006) arguments for a geriatric service being active within the acute care

setting, and working across boundaries into primary and long-term care settings.

Due to the fact that registered ward nurses were inconsistent in using Gordon's taxonomy (Gordon, 2000) of care problems, other data (such as planned activities and observations) had to be used in order to identify relevant nursing diagnoses for each case. This necessitated retroactive interpretation of data found in observation and/or action lists into (relevant) nursing diagnoses by an expert panel. On the other hand, a realistic view of daily practice has been presented and an expert panel was needed to prevent researcher bias, but even this cannot exclude the possibility of overzealous or irrelevant diagnoses. Being aware of the research study, the GNS may have been either more conservative or more liberal in diagnosing patient problems, which would have increased the extra number of diagnoses identified by the GNS. The assessment of nursing diagnoses by the GNS could also have been influenced by the priming effect of the nursing diagnoses already registered by the ward nurses.

Further research needs to address the possible reasons for incomplete diagnostics by registered general ward nurses caring for frail older patients. There is considerable doubt as to whether educating registered ward nurses about the specific problems of frail older people will lead to better diagnostics, as they failed to adequately diagnose problems specific to their own speciality. In the meantime, consultation by a GNS is of added value in diagnosing problems needing treatment during hospitalisation, as well as those requiring care post-discharge. Further research also needs to address the question of whether the GNS's identification of additional care needs actually led to improved care for these frail older patients.

5.5 Conclusion

This report describes the prevalence of nursing diagnoses of frail hospitalised patients in a large Dutch teaching hospital, and the role of the Geriatric Nurse Specialist (GNS) in this process. The most

frequently used nursing diagnoses for hospitalised frail older patients were: ‘Impaired physical mobility’, ‘Nutritional deficit’, ‘Risk of injury (falling)’ and ‘Impaired memory’. On average, each frail patient had 4 nursing diagnoses, 3 of which were registered after GNS consultation. Registered ward nurses mainly registered nursing diagnoses of a physical nature, requiring immediate support during hospitalisation. The GNS added nursing diagnoses both not having aetiology related to hospitalisation and potentially still relevant post discharge, and ‘high risk’ diagnoses. Despite the shortcomings of the study, it can be concluded that nurses personnel on a general ward is inadequate in registering all the complex problems and needs of frail older patients. GNS consultations on a ward with no special geriatric knowledge are of great value to the diagnosing process for hospitalised frail older patients. Early identification of multidisciplinary problems can result in early involvement of allied healthcare professionals during the acute phase of care that may, where relevant, be continued into the primary care setting.

6

A nonrandomized trial of a Geriatric Nurse Specialist consultation for hospitalized frail older patients

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Abstract

Apart from the interests of the individual patient, the increasing number of elderly patients makes it necessary for general hospitals to organise the care for frail elderly patients adequately. As many of the problems associated with frailty are in the domain of nursing care, the Geriatric Nurse Specialist (GNS) plays a central part in geriatric care for the elderly on non-geriatric wards. A quasi-experimental study had a non-equivalent control group design (Polit & Beck, 2007) on two wards. Following the non-intervention period in which data was collected in a group of patients in each ward. The intervention program was introduced on one ward, whereas care as usual was maintained on the other ward (see Diagram 1) and data was collected again in two groups of patients. The non-response group is significantly older and more frail than the response group and the respondents attrited were more frail than those who continued participation. During the intervention more other disciplines, such as a physiotherapist and a dietician, are involved and the intervention group had more contacts with the medical specialist. At baseline the intervention group uses more medication than the control group but at two and six months after baseline this difference is no longer found. The sample is too small to demonstrate effect (underpowered). The progression of subgroups does not show any difference for the

intervention and the control group either. This intervention study is underpowered in order to be able to demonstrate an effect of consulting the GNS for frail elderly patients admitted to non-geriatric wards. No obvious trend is found that might reveal a positive effect of the intervention in a sufficiently large sample. The intervention as this was designed for this study does not make sufficient difference with care as usual.

Keywords
Frail elderly patients, intervention study, Geriatric Nurse Specialist

6.1 Introduction

With regard to the prevention of negative outcomes of hospitalisation of frail elderly patients, geriatric interventions have proven their value. Positive results include shorter stay in hospital, less admissions to a care institution, better functional status and lower mortality (Stuck et al., 1993; Stuck et al., 2002; Wells et al., 2003). Not all studies show positive results. Successful programs are usually characterised by: pre-identification of the specific target group (Wells et al., 2003; Schuurmans et al., 2004), continuity of the geriatric intervention (Luk et al., 2000; Schelhaas et al., 2003), and a long follow-up of the intervention (Stuck et al., 1993). The increasing number of elderly patients admitted to general hospitals combined with a high risk of poor outcomes makes the group of frail elderly patients an important group for hospitals to focus on (Schrijvers et al., 1997). Besides, it is important to organise geriatric care for these patients as adequately as possible (Rockwood & Hubbard, 2004).

Fiolet (1993) concluded that not the medical diagnosis but mainly aspects related to daily functioning at the moment of an admission to hospital predicted these negative outcomes. Frailty defined as a decrease in reserve capacity in the four domains of functioning (Schuurmans et al., 2004) and thus related to a decrease in daily functioning, should be prominent in the treatment process, next to the medical diagnosis. As problems with regard to daily functioning are the domain of nursing care (Gordon, 2000), nurses play an important part in the care for frail elderly patients in hospital. Some of the Dutch hospitals have special geriatric wards with a consultation service for the other wards of the hospital. This is also the case in the teaching hospital in the northern region of the Netherlands where this study is carried out. There are, however, no clear protocols for consultation in frail elderly patients admitted to other wards. The objective of the new intervention program described in this study is a better organisation of the geriatric care for frail elderly patients on non-geriatric wards. The emphasis is on case-finding of the frail elderly, cooperation with the disciplines at the hospital that specialise in the treatment of elderly patients but also in the phase after discharge. In the new intervention

program, the Geriatric Nurse Specialist (GNS) plays a central part. This study focuses on the effectiveness of the new intervention program for frail elderly patients admitted to non-geriatric wards.

6.2 Method

Design

A quasi-experimental study had a non-equivalent control group design (Polit & Beck, 2007) on two wards. Following the non-intervention period in which data was collected in a group of patients in each ward. The intervention program was introduced on one ward; whereas care as usual was maintained on the other ward (see Diagram 1) and data was collected again in two groups of patients.

Diagram 1: Design

	Intervention ward	Control ward
Non intervention period	A (care as usual)	B (care as usual)
Intervention period	AI (intervention)	BC (care as usual)

Setting

Two wards (internal medicine department) of a large teaching hospital in northern Netherlands with a similar organisation and similar patient groups participated in this study. The intervention ward has 27 beds and the number of nurses working there is 19, with an average employment of 81% (range: 44 – 100%). The control ward also has 27 beds and 18 nurses with an average employment of 72% (range: 39 – 100%). On both wards, the nurses work on bachelor level and have 5 years experience on average (range: 0 to more than 10 years). The patient groups are similar. The average age and admission period are slightly higher on the control ward. Patients admitted for a short period often have a haematological disorder. Patients with a longer admission period often have a malignancy, a renal disorder or an intestinal disorder.

Participants

For a period of 18 months, all admitted patients aged 75 or older were screened for the following inclusion criteria: expected period of admission > five days and not staying in a nursing home. The responsible nurse was subsequently asked if the patients are not too ill or too tired to participate. The suitable patients were approached by the researcher (or a trained assistant) within three days following admission, to ask them to participate. Patients who were willing to participate were subsequently checked for the presence of frailty and absence of any severe cognitive disorders. The total sample size of n = 51 in the control group and n = 51 in the intervention group is based on one-sided tests with an alpha of 0.05 a power of 0.80 and a difference to be found of 0.5 standard deviation on a sub scale of the Medical Outcome study 36 Item Short-Form General Health Survey (SF-36). For the SF-36 a difference of 10 points is about similar to a 0.5 standard deviation and this is what Cohen (1988) uses for a moderate effect. Blinding of respondents and nurses on the intervention ward was not possible because they have been asked to cooperate. The respondents and nurses of the control ward did not receive any explanation about the intervention and the outcome measures used in the study. During data collection the care providers involved have not been informed about the study findings.

Intervention

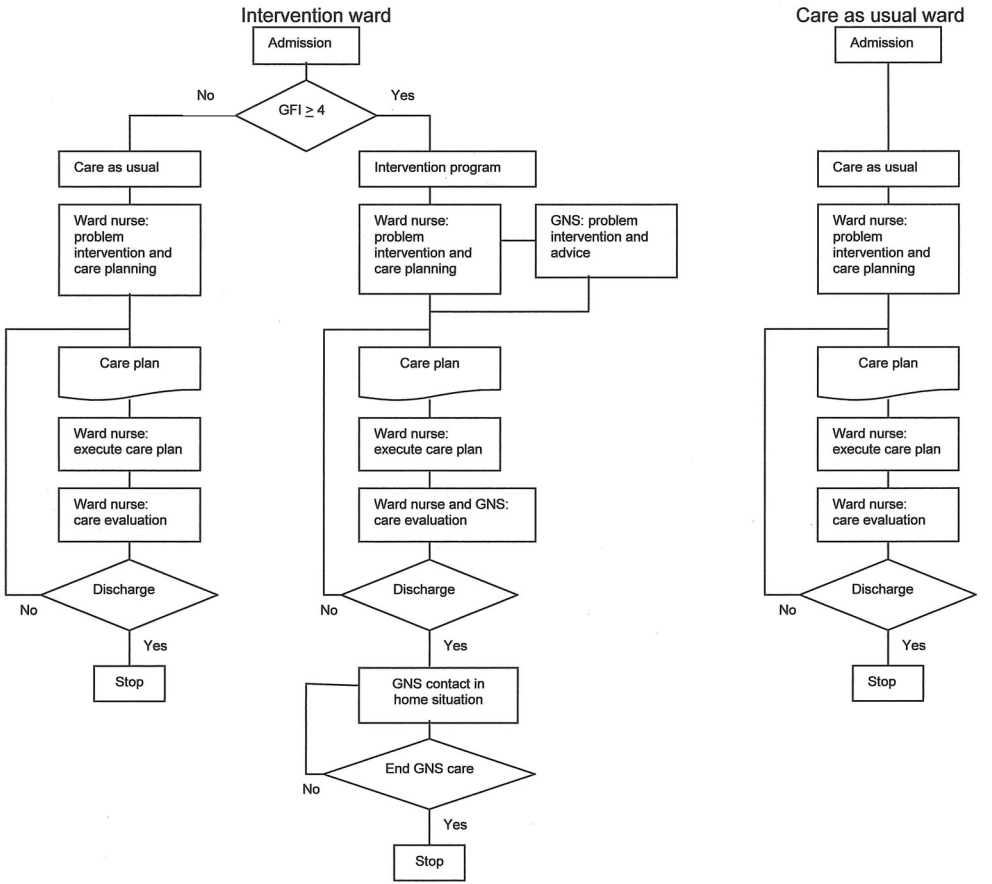
The intervention program and the care as usual are shown in the diagram in Figure 1. The Geriatric Nurse Specialist (GNS) is a registered nurse on the bachelor level, works from the geriatric ward and has experience in and was trained in the field of geriatric medicine. The focus of the consultation service is on clinical practice, education, instruction and supporting registered nurses on the bachelor level on non-geriatric wards. At the start of the intervention period, the ward nurses have attended a short course on frail elderly patients, their problems and the new intervention program. The GNS visited the patients considered as frail a few days after their admission to hospital. The GNS analysed the patient's health problems, any potential problems and their consequences based on

the information in the medical and nursing dossier, by interviewing the patient and/or his/her family and the responsible ward nurse. The patient's care needs were formulated and recommendations were given to the ward nurse about the patient's treatment. Where available they referred to standardised nursing plans, when necessarily the GNS gave the ward nurse specific education, instructions or support and/or the GNS discussed with the physician for possible supplementary diagnostic procedures or medical treatment. Responsible to act upon these recommendations and care plans were the ward nurses and the attending physician by insert them respectively into the nursing care plan and the medical record. Every day the GNS visited the patient during his/her admission depending on the problems or expected problems (e.g. patients with delirium) to one or two times before discharge (e.g. vision problems). Beside that the GNS took part in multidisciplinary consultations during which all patients on the ward were discussed. In this way any changes in the patient's care needs could be anticipated and suitable measures with regard to the patient's discharge could be taken. After the patient's discharge, the GNS monitored the patient for a period of at least six months, unless the patient's care was transferred to the social geriatric team or the patient was admitted to a nursing home. After the patient's discharge from hospital, the findings of the GNS were provided to all care providers involved. The care of the GNS was stopped when patient's care needs were no longer present or well treated and no new problems were envolved.

Care as usual

On the control ward the patients received care without consulting the GNS, in accordance with the new intervention program. In the event of geriatric problems the geriatric specialists could of course be consulted.

Figure 1: Procedure intervention and care as usual



Outcomes

Table 1 shows the various measurement moments and outcome measures. This was the same for all groups. During the intervention the questionnaire measuring the extent of frailty was conducted by the ward nurses. They received written and oral instructions in advance. The patients received a questionnaire plus return envelope two and six months after the moment of admission. Those who did not return their list or did not fill out the list completely were approached by telephone (not more than twice). The patients who could not be contacted by telephone received a reminder by mail. The data in the medical and nursing dossiers were collected by the researcher.

Instruments

The Groningen Frailty Indicator (GFI) was used to determine the extent of frailty of the patients (Schuurmans et al., 2004). This instrument, which includes 15 items, was developed in the Netherlands as a case-finding instrument to determine the extent of frailty quickly and screens for the loss of functions and abilities in the functioning domains (see Appendix). The GFI sum score is calculated by adding the points with a range of 0 (not frail) to 15 points (very frail) with a score of $\geq$ 4 as cut-off for geriatric intervention (Steverink et al., 2001). The Mini Mental State Examination (MMSE) was used to assess the patient's cognitive functioning. The 12 item version was used with a range of 0 to 12 points, in which a score of 6 of lower can be considered a severe cognitive disorder (Kempen et al., 1995; Feinberg & Whitlatch, 2001). The Medical Outcome study 36 Item Short-Form General Health Survey (SF-36) consists of 36 items, organized into eight scales. The physical, social and mental functioning was mapped with the aid of the Dutch version of the SF-36. The number of response choices per item ranges from two to six, with each scale having a range from 1 to 100, whereas a higher score represents better functioning. Scores from a Dutch community sample of 70 years and older on the physical functioning scale were 58.9 (SD = 30.8), on the social functioning scale 75.6 (SD = 27.0) and on the mental health scale 73.0 (SD = 19.9) (Aaronson et al., 1998).

Table 1: Measurement moments and outcome measures for all groups

Time of:	Baseline	2 months after baseline	6 months after baseline
Frailty*	GFI		
Cognitive functioning	MMSE		
Self-assessment questionnaire:			
Personal characteristics	Living situation, education, children		
Physical functioning	Sub-scale SF-36	Sub-scale SF-36	Sub-scale SF-36
Social functioning	Sub-scale SF-36	Sub-scale SF-36	Sub-scale SF-36
Mental functioning	Sub-scale SF-36	Sub-scale SF-36	Sub-scale SF-36
Symptoms of depression	GDS	GDS	GDS
Subjective feeling of well-being	SSWO	SSWO	SSWO
Care-dependency	CDS	CDS	CDS
Medication	Number of medicines used	Number of medicines used	Number of medicines used
Number of days admitted			Number of days admitted to hospital and other institution
Contacts with medical specialists			Number of contacts with doctors
Status of investigation by researcher:			
Medication	Which medicines		
Medical situation	Medical diagnoses		
Number of days hospitalised			Number of days admitted from baseline
Contacts with medical specialists			Number of contacts from baseline

* Undertaken by the researcher, except within the framework of the intervention program (undertaken by the ward nurse)

The Dutch Scale Subjective Feeling of well-being Elderly patients (SSWO) 8 item version, was developed to assess the various aspects of subjective feeling of well-being in elderly patients (Van Linschoten et al., 1993). The items are answered on a 3-point Likert scale and the score ranges of 0 to 20, whereas a higher score represents lower feeling of well-being. De 15 item Geriatric Depression Scale (GDS) was used for the measurement of symptoms of depression (Friedman et al., 2005). The answers were provided on a dichotomous (yes/no) scale and every item contributes 1 point to the final score, which ranges from 1 to 15. A score greater than 5 is commonly considered as indicative of a depressive trait. The Care Dependency Scale (CDS) (Dijkstra, 1998) was used to describe to what extent the respondent depends on help from partners with regards to basic needs. The answers on the 15 items must be entered on a 5-point Likert Scale. The score ranges of 15 (totally care-dependent) to 75 (independent); a cut-off score of lower than 68 can be used to establish disability (Dijkstra et al., 2005). All measurement instruments are sufficiently valid and reliable. The researcher checked the patients' records for use of medicine, days of admission and contacts with doctors in the hospital of study.

Analyses

Descriptive statistics was used to present the data. In order to assess differences between groups and the effectiveness of the intervention, an effect size of the outcome measures was calculated according to Cohen (1988). Both wards were compared on the group of respondents approached in the non intervention period (A and B, see diagram 1) in order to analyse a possible ward-related effect. To analyse a possible time effect, the groups of respondents on the control ward from the non intervention period and the intervention period (B and BC) were compared. To analyse the intervention effect on the group level, the groups of respondents from the intervention period on the intervention ward and the control ward (AI and BC) were compared. A t-test for independent groups and the chi² test were used. In all tests an alpha < 0.05 was used.

Ethical consideration

Data gathered on the wards was obtained with permission of the hospital's health care authorities. The Local Research Committee also granted permission for the study on the wards of the hospital. All staff agreed to participate on the basis of written and verbal information about the study including its objective and methods and the questionnaires to be used. The names of the participants were encoded to ensure confidentiality and anonymity. The patients received oral and written information about the study and they were asked for informed consent

6.3 Results

Respondents

A total of 1122 patients aged 75 and older were admitted during the pre measurement period and the intervention period (15 months). 129 patients from this group participated in the study, 69 of them in the non-intervention period and 60 in the intervention period (see Table 2). The most frequently mentioned reasons for exclusion were: admission period too short, re-admission, not frail, MMSE too low (MMSE $\leq$ 6) or participation too much of a burden. The non-response group is significantly older ($t = 2.48$; $p = 0.01$) than the response group (resp: 82.56; SD = 4.89 and 81.46; SD = 4.58) and the non-response group is significantly more frail ($t = 2.40$; $p = 0.02$) than the response group (GFI score = resp.: 5.09; SD = 2.90 and 4.31; SD = 2.52). A GFI was conducted among 475 patients, 319 of which had a GFI score of four or higher (67%).

According to the power calculation, the inclusion of the number of respondents in the intervention and control group was smaller than required to find a moderate effect. During the study period 58 respondents discontinued there participation. Table 3 shows the reason for the attrition of respondents during the study period. The incompleteness of the data was mainly caused by the fact that respondents did not return their second and/or third questionnaire because they felt they already had enough worries because of their illness. The moment of attrition was concentrated around the

Table 2: Response group distributed among the wards

Group	Admission	Short admission, readmission	Too ill	MMSE too low	GFI too low	Suitable	Non-response	Response (rate)
A	175	44	23	24	20	64	26	38 (59%)
B	207	46	20	25	28	88	57	31 (35%)
AI	296	160	20	23	26	67	42	25 (37%)
BC	444	226	36	32	28	122	87	35 (29%)
TOTAL	1122	476	99	104	102	341	212	129 (38%)

Table 3: Reason of respondents for attrition during the study

Group	Incomplete data	Non-cooperation	Death	No follow-up	TOTAL
A	1	9	6	1	17
B	2	9	5		15
AI	0	5	2		7
BC	3	8	6	2	19
TOTAL	6	30	19	3	58

measurement moments (2 and 6 months after the admission moment). The factors contributing to attrition were more days of admission to a hospital, nursing home or home for the elderly and more indications for depression. The respondents who attrited were slight older than those who stayed in the study (resp.: 82.17; SD = 4.44 and 81.65; SD = 5.12) but this difference was not significant. Attrition occurred in those who were significantly more frail (t = 0.89; p = 0.38) than those who stayed in the study (GFI score resp.: 6.05; SD = 1.89 and 5.77; p = 1.65). The respondents who attrited also had less contact moments with a medical specialist during the study period. In intervention group AI and control group BC attrition was related to age and frailty. The ages of those who attrited and those who stayed in the study was 83.19 (SD = 4.15) and 81.38 (SD = 5.24) years, respectively (t = 1.45; p = 0.15), and the GFI of those who attrited and those who stayed in the study was 6.65 (SD = 2.06) and 5.62 (SD = 1.37), respectively, (t = 2.22; p = 0.03).

The characteristics of the respondents at baseline (the moment of admission) are presented in Table 4 and their characteristics of two months and six months after baseline are presented in Table 5. Most of the respondents were women, living alone and independently, however at admission the mean score of the respondents on the CDS was below the cut-off of disability (CDS = 68). Compared with the normative data of Aaronson et al. (1998) the respondents scored lower on the SF-36 subscales in the different groups on the three measurement moments, except for the SF Mental Health scale of the intervention group on baseline and six months after baseline. On the Geriatric Depression Scale was seen that respondents in group B score had indicators for depression. These characteristics were further examined to establish a possible ward-related and a time-related effect.

Table 4: Characteristics of respondents at baseline

	Non intervention period		Intervention period	
At baseline	A (n = 38)	B (n = 31)	AI (n = 25)	BC (n = 35)
Age *	82.00 (4.38)	81.34 (5.31)	80.76 (4.07)	83.17 (5.15)
Women	22	17	17	22
Living independently	25	24	20	26
Primary school	18	14	17	26
Living alone	21	21	19	23
GFI *	5.68 (1.63)	5.84 (1.91)	6.32 (2.04)	5.89 (1.59)
MMSE *	9.84 (1.29)	10.16 (1.32)	9.72 (1.65)	9.57 (1.61)
SF Physical Functioning *	30.31 (24.22)	30.34 (23.95)	35.04 (23.80)	36.20 (24.40)
SF Social Functioning *	63.82 (26.28)	50.40 (24.26)	71.50 (21.20)	66.79 (23.86)
SF Mental Health *	71.92 (17.22)	65.81 (19.81)	76.48 (16.86)	70.82 (22.10)
Subjective Well-being *	12.31 (4.27)	10.93 (3.74)	12.88 (4.28)	12.21 (3.84)
Geriatric Depression Scale *	4.70 (2.75)	4.16 (2.42)	3.68 (2.14)	4.71 (3.13)
Care Dependency Scale *	61.31 (11.71)	62.97 (9.51)	67.88 (7.79)	66.41 (5.91)
Medication *	7.27 (4.62)	6.06 (4.02)	6.92 (3.63)	5.51 (2.77)

* = Mean (SD)

Table 5: Characteristics of respondents at two months and six months after baseline

Two months after baseline	A	B	AI	BC
SF Physical Functioning *	23.00 (20.67)	28.27 (22.78)	27.59 (32.61)	31.67 (26.90)
SF Social Functioning *	54.38 (34.00)	55.68 (24.01)	64.29 (29.66)	54.17 (21.48)
SF Mental Health *	64.05 (17.28)	70.32 (23.02)	67.81 (15.41)	62.13 (18.94)
Subjective Well-being *	11.32 (4.20)	11.89 (4.57)	11.13 (3.64)	10.69 (4.89)
Geriatric Depression Scale *	3.95 (3.20)	3.62 (3.11)	4.62 (2.33)	4.53 (3.18)
Care Dependency Scale *	60.40 (14.06)	63.05 (10.24)	59.95 (13.71)	61.60 (11.99)
Medication *	7.48 (4.03)	6.46 (4.33)	6.90 (3.43)	4.47 (2.17)
Six months after baseline				
SF Physical Functioning *	22.62 (21.94)	23.04 (22.63)	37.50 (29.66)	29.04 (20.06)
SF Social Functioning *	58.13 (26.99)	61.72 (24.35)	69.12 (16.01)	65.91 (23.11)
SF Mental Health *	66.80 (21.60)	67.50 (19.26)	77.88 (15.50)	63.64 (16.73)
Subjective Well-being *	11.94 (4.30)	10.39 (5.40)	12.87 (3.50)	11.36 (3.93)
Geriatric Depression Scale *	4.10 (2.10)	5.25 (3.75)	3.63 (2.16)	4.09 (2.12)
Care Dependency Scale *	60.90 (12.98)	62.38 (13.11)	65.13 (9.30)	61.09 (10.96)
Medication *	5.86 (2.54)	7.63 (6.05)	6.41 (3.02)	4.82 (2.52)
Hospital days *	35.92 (49.32)	28.46 (35.81)	36.75 (42.89)	21.73 (16.97)
Contact medical specialist *	7.21 (4.68)	8.48 (4.86)	10.00 (5.06)	7.10 (5.17)

* = Mean (SD)

Ward-related effect

In order to establish a possible ward-related effect, the two wards in the non-intervention period were compared (groups A and B). At baseline, there was only a significant difference ($t = 2.18$; $p = 0.03$) for SF Social Functioning; group A had a higher score, which represented better social functioning. Two months after baseline a significant difference was found for SF Mental Health only ($t = 2.46$; $p = 0.02$); group A showed a decline in SF Mental Health and group B functioned better compared to their baseline score. At six months after baseline no significant differences were found.

Time effect

In order to assess a possible time effect, the group of respondents on the control ward in the non-intervention period were compared with the group on that ward in the intervention period (groups B and BC). These groups only had a significant difference at baseline with regard to SF Social Functioning ($t = 2.76$; $p = 0.01$). Group BC had a higher score, which represented better social functioning. At two months after baseline a significant difference was found for SF Social Functioning ($t = 2.23$; $p = 0.03$) and SF Mental Health ($t = 2.60$; $p = 0.01$). As regards social and mental functioning group BC performed worse and group B performed better compared to their baseline. At six months after baseline a significant difference was only found for SF Social Functioning ($t = 2.26$; $p = 0.03$). Group BC still functioned below their baseline level.

Intervention effect

In order to assess the effectiveness of the intervention, intervention group AI was compared with control group BC. During the intervention, the 25 respondents in group AI were visited by the GNS. The number of consultation visits varied from 1 to 7 (2.38 on average; SD = 1.50) with an average duration per patient of 56.54 minutes (SD = 19.22; range = 30-125). Nursing diagnoses mostly seen were ‘Impaired physical mobility’, ‘Impaired memory’, ‘Risk for acute confusion’, Risk for injury (falling)’ and ‘Nutritional deficit’. During hospitalisation, more other disciplines, such as dietician and

physiotherapy, were involved; 22 times in group AI compared to 14 in group BC. The average number of telephone contacts with the GNS was 1.88 (SD = 0.78; range 0-3). In all cases the problems diagnosed by nurses in hospital were stable or recovered and no new problems had developed in the home situation. None of the respondents was referred to the social geriatric team or the geriatric nursing out-patient department following discharge from hospital. At baseline (see Table 4), no significant differences were found for intervention group AI and control group BC. Table 6 shows for the intervention group AI and the control group BC the scores of two and six months minus baseline. On the outcome measurements only for the intervention group AI significantly more contacts with a medical specialist were registered than for control group BC.

Although there were sometimes large differences on the outcome measures between the intervention and control group, the analyses did not show more significant differences for the intervention group than described above. This is probably caused by the large standard deviation of the mean scores and the small number of respondents. The respondents in intervention group AI and control group BC were studied further. The respondents had a lower score after two and six months on almost all outcome measures than at baseline (see Table 6). For the intervention group however this difference on the SF subscales was smaller compared to the control group. This would mean that the intervention group showed fewer declines during the period after hospitalisation. The intervention group on the other hand had a higher number of days of hospitalisation during the study period compared to the control group.

The respondents with poor/good physical functioning and a low/high subjective feeling of well-being were assessed at baseline. For this purpose, the groups were subdivided based on these variables. These groups were very small and no differences were found for the intervention and the control group.

Table 6: Two and six months minus baseline of the intervention and control group [mean (SD)]

Two months minus baseline	AI		BC		t-test (effect size)
	Scale score	Effect size	Scale score	Effect size	
Medication	0.15 (2.83)	0.04 (0.74)	- 0.13 (1.92)	- 0.03 (0.50)	n.s.
SF Physical Functioning	- 6.75 (28.40)	- 0.27 (1.13)	- 12.15 (16.50)	- 0.49 (0.66)	n.s.
SF Social Functioning	- 4.17 (32.68)	- 0.16 (1.23)	- 17.50 (23.53)	- 0.66 (0.89)	n.s.
SF Mental Health	- 6.29 (19.12)	- 0.33 (1.00)	- 10.13 (14.65)	- 0.53 (0.77)	n.s.
Subjective Well-being	- 1.22 (3.16)	- 0.30 (0.76)	- 1.56 (3.57)	- 0.38 (0.86)	n.s.
Geriatric Depression Scale	0.67 (2.22)	0.24 (0.79)	0.33 (3.04)	0.12 (1.08)	n.s.
Care Dependency Scale	- 7.71 (11,85)	- 0.70 (1.08)	- 5.80 (11.25)	- 0.53 (1.02)	n.s.
Six months minus baseline	Scale score	Effect size	Scale score	Effect size	t-test (effect size)
Medication	- 0.05 (3.05)	- 0.14 (0.64)	- 0.27 (1.90)	- 0.07 (0.49)	n.s.
SF Physical Functioning	- 5.58 (25.14)	- 0.19 (0.89)	- 8.43 (17.27)	- 0.37 (0.56)	n.s.
SF Social Functioning	- 2.50 (23.86)	- 0.10 (0.97)	- 5.68 (31.31)	- 0.41 (1.19)	n.s.
SF Mental Health	0.71 (15.18)	- 0.12 (0.88)	- 9.09 (8.41)	- 0.52 (0.79)	n.s.
Subjective Well-being	- 0.63 (2.89)	- 0.25 (0.71)	- 0.68 (2.26)	- 0.38 (0.74)	n.s.
Geriatric Depression Scale	0.50 (1.79)	0.06 (0.74)	- 0.36 (2.58)	0.26 (1.25)	n.s.
Care Dependency Scale	- 3.19 (8.43)	- 0.38 (1.02)	- 4.55 (9.00)	- 0.67 (1.05)	n.s.
Six months after baseline					t-test
Hospital days	36.75 (42.89)		21.73 (16.97)		n.s.
Contact medical specialist	10.04 (5.06)		7.10 (5.17)		t = 2.11; p = 0.04

6.4 Discussion

The intervention program focused on frail patients. With regard to the identification of frail elderly patients several definitions of frailty can be found in literature (Rockwood, 2005a; Bergman et al., 2007). There may therefore be discussion about what exactly is the ultimate target group for the intervention. In this study, the definition of frailty is aimed at all aspects of functioning, which is in line with the holistic view on geriatrics and experience with frail elderly patients in actual practice. Many people, however, attrited during recruitment of the respondents and during the survey. As a result, the sample continued to be smaller than required according to the power calculation to be able to find a moderate effect. The reason for the inclusion of an insufficient number of respondents in the sample was partly for practical reasons such as short admission, re-admission or transfer. On the other hand, elderly patients in particular and/or frail persons refused to participate. According to our definition, this last-mentioned is the group the intervention is focused on. Other studies focused on frail elderly patients also identify the problem of insufficient recruitment of respondents (Naylor et al., 1999; Harris & Dyson, 2001; Cohen et al., 2002) and attrition of frail people in particular, which may result in samples that are too small to demonstrate effectiveness (Schuurmans et al., 2004). In our study as well attrition during the study has led to obtaining a sample that functions relatively well but had less profit from the intervention and less chances of better functioning.

In this study, no positive effect was found for the geriatric intervention, but the results show a minor trend in favour of the intervention. It seems to be right to conclude that the intervention was not intensive enough and the difference between intervention and usual care was too small. Involving the GNS, however, led to a better problem assessment, which was followed by a more frequent involvement of other disciplines. However, the total effect of the recommendations made by the GNS for nursing care and involving other disciplines did not lead to any changes in the outcome measures. In the study undertaken by Slaets (1997) the involvement of additional care

providers in particular had a positive result for intervention in frail elderly patients.

A disadvantage of the consultation of the GNS on the ward is that the implementation of the recommendations is left to others, who may be less educated, experienced and motivated (Schelhaas et al., 2003) or have less resources. Literature also reveals that geriatric consultation is less effective than admission to a geriatric ward (Schelhaas et al., 2003). However, considering the number of frail patients admitted to the two wards involved in this study in one year (67% of about 900 patients) and the capacity of the geriatric ward of the hospital (about 400 patients a year) admission of these patients to the geriatric ward cannot be realised. The situation in other hospitals in the Netherlands is probably about the same. The objective should be an integration of adequate geriatric care for elderly patients on the wards. The intervention as studied will have to be implemented with more power. This study shows that the GNS may play a positive part in assessing the problems of the frail patient. During the intervention clearly more care demands of frail elderly patients have been registered, as a result of which the involvement of other disciplines was necessary. The improved identification of care demands and the involvement of more disciplines did not automatically lead to improvement for the patient. With a complete identification of the care demands conscious choices can be made with regard to treatment. Apart from assessing the problems of these patients, the GNS should play a decisive role with regard to the care for these patients, as a result of which the implementation of the recommendations can be monitored by the GNS. Besides, it is necessary that ward nurses have sufficient knowledge of, and resources for, care for elderly patients, to enable them to achieve a sufficient implementation of the recommendations made by the GNS with regard to the care for frail elderly patients. Apart from this, the GNS in the role of case-manager would have more say in and control of the implementation of these recommendations.

It is important that this care for frail elderly patients on the various wards is in line with the needs of the individual patient. Considering the heterogeneity of the aging process (Eulderink et al., 1995) and the resulting diversity of care demands, the need for care and the intended outcome measure of this care will also be diverse. One moderately frail patient may agree with intensive treatment and therefore a long stay in hospital, whereas others only want improvement of their problems and a short stay in hospital. Further investigation of the effect of this new intervention program for frail elderly patients in daily practice is necessary. Effect should be measured on the basis of outcome measures that are also important to the individual frail elderly person him or herself.

6.5 Conclusion

On the basis of this study, no conclusion can be drawn about the effectiveness of the new intervention program for frail elderly patients with a central role for the Geriatric Nurse Specialist (GNS). Insufficient recruitment and attrition of frail patients in particular has led to a sample that is too small to demonstrate a significant effect. In the intervention the GNS has already identified more nursing diagnoses in frail elderly patients, as a result of which other disciplines have been consulted. However, the overall care is probably still too limited to be able to achieve any improvement with regard to the problems of these elderly patients. It will also be necessary in further research of the effect of this geriatric intervention to take into account the differences in importance of outcome measures in individual patients and economic outcomes of such an intervention

7

The RE-AIM model in studies of practical interventions

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Abstract

The results of a randomized controlled trial are considered the proof for an intervention, but publications not always provide sufficient information about the overall impact of interventions. The RE-AIM model may provide a solution to this and will be explained in this article. The model includes five dimensions and focuses on: the representativeness of the sample (Reach), the effect for the individual (Effectiveness), the representativeness of the settings or organisations (Adoption), the extent of compliance and consistency of actions with regard to the various components of the intervention (Implementation) and the extent to which the new intervention is institutionalised and the long-term effect in the individual (Maintenance). This article explains the model and the various dimensions and indicates how these can be included in the design of an intervention study. The model is also used for the evaluation of the intervention studies. Based on the aim of the intervention study as carried out in Chapter 6 only the dimensions reach and effectiveness can be substantialised with figures. Little can be concluded about the dimensions adoption, implementation and maintenance with regard to the intervention studied. This evaluation shows that many aspects of the study that are important for the translation of the intervention into another setting remain unclear, as a result of which only little can be

said about the external validity and durability of the intervention studied.

Keywords
Intervention study, RE-AIM model, geriatric care, availability, study data

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7.1 Introduction

For evidence based practice, published study data are used to improve daily practice. The aim is to find effective proven interventions, whereas the results of a Randomized Controlled Trial (RCT) are considered the best possible proof of effect (Polit & Beck, 2007). Studies of more complex interventions such as those frequently discussed in nursing science however jeopardise the basic assumptions of a RCT (Wolff, 2001). The intervention is difficult to standardise, study groups are hard to compare and the environment is not a neutral environment.

The requirements available for the publication of a RCT, for example with the CONSORT statement (Altman et al., 2001) do not always provide the necessary clarity. With regard to publications, the study method used can be questioned (Wells et al., 2003), for not always providing clarity about the patient recruitment method (Gross et al., 2002) and with regard to the exact intervention method (Elkan et al., 2001; Lindsay, 2004). Often little is mentioned about environmental characteristics in which the intervention is studied and which stimulate or rather impede the intervention effect. Intervention studies first and for all aim at demonstrating the effect (Dzewaltowski et al., 2004a). Oldenburg et al. (1999) conclude that only a few studies focus on diffusion and institutionalisation, as a result of which effective interventions are only available for a limited proportion of the population. Other study methods must be found that study characteristics of the environment or the organisation in which the intervention is studied and outcome measures that are important in actual practice (Wells et al., 2003; Eccles et al., 2003; Roy-Byrne et al., 2003).

The solution to the problem may be found in the RE-AIM model. This model can be used in the design of an intervention study as well as for the evaluation of a completed study. In this way, various intervention studies can be compared (Glasgow et al., 2001). This article explains how the RE-AIM model can be used in the design of an intervention study and a completed intervention study is evaluated

with the aid of this model. For the last mentioned purpose, a completed intervention study of the effect of geriatric care for frail elderly persons admitted to hospital (as carried out in Chapter 6) is used as an example (see text box below).

Text box: The intervention study

Introduction

A new intervention program was designed with the aim to improve the organisation of geriatric care for hospitalised frail elderly patients.

Intervention

Frail patients were visited by the Geriatric Nurse Specialist (GNS) within a few days following their admission to hospital. On the basis of information recorded in the medical and nursing dossier, talking to the patient and/or family and the responsible ward nurse the care needs were established and recommendations formulated with regard to the treatment. The GNS monitored the patient during admission and also looked into suitable measures for after discharge, such as asking for involvement of the social geriatric team, a visit to the geriatric nursing out-patient department or contact with the GNS by phone.

Care as usual

Consultation of the GNS or the geriatric medical specialist took place on indication, as usual.

Method

On two internal medicine wards of a large teaching hospital a study was designed in the form of a non-equivalent control group design (diagram 1). The inclusion criteria were age 75 years and older, hospitalisation for more than 5 days, not residing in a nursing home and a minimum level of cognitive functioning (Mini Mental State Examination) and frailty (Groningen Frailty Indicator). The researcher approached the patients for the study and collected the data. The frailty questionnaire was only conducted by the nurses during the intervention at the intervention ward. On both wards, data were collected during the non-intervention period of a group of patients. During the intervention, the patients joined the intervention program upon admission and continued to be included until at least six months following the moment of admission to hospital. Apart from personal

characteristics, a questionnaire was conducted upon admission, which included existing measurement instruments: the health-related quality of life (SF-36), feeling of well-being (Schaal Subjectief Welzijn Ouderen), symptoms of depression (Geriatric Depression Scale) and care-dependency (Care Dependency Scale). Besides, information was collected about the medical history, medication and days of admission. The questionnaire was conducted two and six months following the moment of admission.

Results

Of the 1122 patients admitted in the non-intervention and in the intervention period 341 were suitable; ultimately, 129 respondents participated in the study (response = 38%) (see Table 1), 25 of which were included in the intervention group AI (see Diagram 1). Ultimately, the sample was smaller than necessary according to the power calculation. Seven respondents discontinued their participation during the intervention. For the purpose of the effect analysis, groups AI and BC were compared. On the baseline level the intervention group used significantly more medication than the control group. Upon discharge from hospital the control group had received relatively more medication, as a result of which there was no longer a significant difference. The intervention group had significantly more contact moments with a medical specialist and a physiotherapist or dietician was consulted more frequently. On the other variables and outcomes measures no significant differences were found. There seems to be a slight trend for the benefit of the control group. The groups were too small and too diverse to be able to assess the progression of respondents whose physical functioning was good or poor, respectively and had a high or low feeling of well-being. The differences found are too marginal to come to a conclusion about the effect of the intervention.

Diagram 1: Study groups

	Intervention ward	Control ward
Non-intervention period	A (care as usual)	B (care as usual)
Intervention period	AI (intervention)	BC (care as usual)

7.2 The RE-AIM model

The RE-AIM model was developed with the aim to study the impact of a new intervention in daily practice on the basis of several aspects such as effectivity, process, individual and organisation and is therefore aimed at the translation of the study into actual practice (Glasgow et al., 2001; Glasgow et al., 2006; www.re-aim.org). It consists of the five dimensions: reach, effectiveness, adoption, implementation and maintenance. Subsequently an explanation is provided for each dimension in relation to the design of an intervention study. Besides, it is explained what can be said about the intervention study as regards the dimension.

Reach

This dimension refers to the percentage and representativeness of the individuals from the target group who wish to participate when they are approached for a study. It is important to determine the target group and the inclusion criteria on the basis of the available literature and experience and respond to factors that evoke resistance against participation. An estimation can be made of the number of people that satisfy the target group criteria and the number of suitable participants that will agree with participation. Finally the differences between participants and non-participants with regard to discontinuation will be studied, as well as their reason for participation or non-participation (Polit & Beck, 2007; Gross et al., 2003; www.re-aim.org).

The study described in the text box above, is aimed at frail elderly patients. Frailty, however, is not defined uniformly, as a result of which defining *the* frail elderly patients is difficult. In the intervention study, 70% of the admitted elderly patients were excluded (see Table

1), for reasons including re-admission, too low level of cognitive functioning or feeling too ill. 38% of the suitable respondents agreed with participation in the study. The non-response group was older and more frail than the response group. The reach of this study is moderate because many patients in this population could not be included, whereas the less frail elderly patients participated in the intervention.

Table 1: Number of potential respondents and (non) respondents

	Potential respondents	Excluded	Suitable	Non-response	Response
A	175	111	64	26	38 (59%)
B	207	119	88	57	31 (35%)
AI	296	229	67	42	25 (37%)
BC	444	322	122	87	35 (29%)
Total	1122	781	341	212	129 (38%)

Effectiveness

This dimension concerns the impact of an intervention on important outcome measures on an individual level, including potential negative effects, quality of life and economical outcomes (www.re-aim.org). Within the framework of the design of a study, the efficacy or effectiveness of experimental or quasi-experimental designs can be considered (Polit & Beck, 2007), with different outcome measures for triangulation of the intervention effect. A theoretical model can be used to determine the relationships to be studied and the expected change in outcome measures. By recording unintentional negative outcomes, quality of life and costs incurred, the advantages and disadvantages of the intervention can be described (www.re-aim.org).

The design of the intervention study described in the text box is based on the success factors of geriatric intervention in frail elderly patients as described in literature (Stuck et al., 1993, Stuck et al., 2002; Wells et al., 2003). As a result of the educational effect of the intervention

for the nurses, randomisation of respondents was impossible and therefore a quasi-experimental design was opted for, with less internal validity and generalisability (Polit & Beck, 2007; Eccles et al., 2003). Within the framework of triangulation of the intervention effect the outcome measures represented different aspects of functioning. According to the calculation of the power, the control and the intervention group were ultimately smaller than was required to find a moderate effect. During the intervention 7 respondents discontinued their participation. They were more frail than the respondents who completed the study period (n = 18). The intervention group hardly differed from the control group on the various outcome measures. The groups were small and the variance in functioning on the baseline level made it difficult to evaluate the effect on the group level. Due to the regular visits the GNS paid to the wards, the GNS was consulted sooner in the event of geriatric problems such as acute delirium. This was a positive side-effect of the intervention. Effectiveness has not been demonstrated.

Adoption

Adoption provides organisational-level insights and relates to the number, percentage and representativeness of organisations and stakeholders with an interest in working with the intervention (www.re-aim.org). Difference in adoption is influenced by opportunities, level of expertise and willingness of those involved with regard to working with new intervention programs (Inouye et al., 2006; Grol & Jones, 2000; Grol & Grimshaw, 2003), by the role of management (Meredith et al., 2006; Dückers & Wagner, 2007) and the factors of the new intervention itself (Grol & Grimshaw, 2003). It is important to assess among those involved their possibilities to introduce the intervention program in their own practice. In order to assess the representativeness of the participating organisations, it can be assessed how many organisations comply with the inclusion criteria, how many of them are excluded and why, and how many are willing to participate. Moreover, the participants are compared with those who refused, and those who remained are compared to those who no

longer participate. The reason for refusal and withdrawal is also recorded.

In the study described in the text box, this dimension was not included. What can be said about it, is based on the researcher's and the GNS's experience. In the design of the intervention, the success factors described in literature were adapted to the own situation. The intervention study was undertaken in two internal medicine wards, assuming that the intervention would be in line with the care provide on these wards and would therefore be easy to introduce. Indeed the management and the nurses were enthusiastic about the introduction of the intervention but no comparison was made between other potentially suitable wards. Within the framework of this study, no statements can be made on the dimension adoption with regard to the intervention in frail elderly patients.

Implementation
This dimension refers to the extent of compliance and consistency of those involved with regard to the various components of the intervention. Sometimes components are introduced in daily practice to some extent (Inouye et al., 2006). This can be determined on the basis of figures concerning the process elements of the intervention, for example how many flyers have been distributed, but also the costs incurred and the time invested by those involved. A negative result need not be the result of an ineffective intervention but e.g., of an ineffective provision of the intervention (www.re-aim.org). It is important with regard to this dimension that potential users of an implementation in the organisation are involved in the design and that insight is gained in the way in which the new intervention fits within the daily work of those involved. Finally, those involved who use the program and/or parts thereof more frequently can be compared to those applying the intervention to a lesser extent.

The dimension implementation was not included in the design of the study described and the evaluation is based on the researcher's and the GNS's experience. The screening on frailty became only a minor

part of the daily routine of nurses. The recommendations given by the GNS were not always followed either. The nurses mentioned lack of time or not enough practical options. On the other hand, the availability of the GNS was not always sufficient to undertake the intervention properly. They got used to consulting the GNS in the event of an acute delirium (positive side-effect) quickly. The direct perception of an additional value for the ward nurses involved was probably a positive factor. The implementation of the study described in the text box was low. The ultimate intervention in actual practice was not carried out as intended. Activities with regard to the positive side-effect on pilot values have been accustomed to, however.

Maintenance

The dimension maintenance is used on the organisational level to study the extent to which the new intervention is institutionalised and becomes part of the own practice as well as the organisation policy. On the patient level, the effect of the intervention is monitored until at least 6 months after the last intervention contact. An intervention that is no longer applied when the official implementation and/or study has been completed, has less impact on the target group compared to when the intervention continues to be part of daily practice (www.re-aim.org). In order to gain insight into the durability of the intervention, it is important to evaluate the intervention afterwards, with those involved and their direct managers and keep in touch. It should become clear what in particular appealed to those involved with regard to the new intervention and what they would like to continue or adjust. The effect on the individual level is important but the same goes for the possibility to apply the intervention in the long term (Glasgow et al., 2001). In order to be able to say more about this, one needs to compare organisations that continue to work with the new intervention and those who decide not to. The context will play a part in this, just like it does with regard to using study results in actual practice (Rycroft-Malone, 2004).

The maintenance dimension is not included in the design of the study described. After completion of the actual study, the screening on

frailty was hardly applied. However, the GNS's participation in the multidisciplinary consultation on the wards and the rapid response to acute delirium were continued. As a result of this positive side-effect, the possibility of consulting the GNS more quickly was also studied on similar wards. There is, however, not enough attention for problems resulting from frailty. The maintenance of the new intervention can therefore be referred to as low. This is, however, high with regard to the side-effect.

7.3 Discussion

A possible limitation of the RE-AIM model may be that the study design and the collection of data may take more time and resources. Apart from a literature review in order to determine the sample, intervention and outcome measures as in any other study method, the factors in the study setting that may influence the intervention effect should also be explored. More data should be collected in order to be able to make statements about adoption, implementation and maintenance. In this way, a complex study will develop in which, apart from an intervention study, more emphasis will be on the process of implementation in possibly different settings. Within the framework of the study described in the text box limited resources were available, whereas it is doubtful whether all data could have been collected in accordance with the RE-AIM model.

In order to gain insight into possible influencing environmental factors on the intervention effect, knowledge from earlier intervention studies, implementation models such as the PARISH framework (Rycroft-Malone, 2004) and implementation strategies such as that of Grol and Wensing (Grol & Wensing, 2006) which are mainly aimed at studying the implementation of study data. Studies undertaken by for example Inouye et al. (2006) are focused on studying the implementation, adoption and success of proven intervention in several organisations. The RE-AIM model however, is directly focused on studying the total impact of an intervention on daily practice, inclusive of influencing and/or conditions of the intervention effect. When using the RE-AIM model in designing an intervention study, statements can be made

about the external validity and durability of the intervention, items that are important within the framework of translating the study results into other organisations (Dzewaltowski et al., 2004b).

The evaluation of the intervention study with the aid of the RE-AIM model shows that non-equivalent control group design involves only two dimensions of the RE-AIM model, namely reach and effectiveness. For reach in this study, similar problems were found as in earlier studies among elderly patients, such as problems with regard to including and keeping the elderly patients in the study (Naylor et al., 1999; Harris & Dyson, 2001; Van Heuvelen et al., 2005). The older and more frail respondents, however, dropped out because they were feeling too ill (Van Heuvelen et al., 2005). In this study, only little could be said about adoption, implementation and maintenance, publications of other intervention studies reveal little or nothing about it (Dzewaltowski et al., 2004a). For the purpose of the evaluation of an intervention and its implementation in an other organisation, this study does not provide sufficient information. There is no clarity about the use of intervention, important organisational characteristics for familiarising with the intervention and the long-term effect of the intervention on the patients and the organisation.

7.4 Conclusion

This article explains the RE-AIM model and uses it to evaluate a study that has already been completed. By using the model in the design of a study, a more complex picture is obtained of the impact of an intervention in daily practice. The use of the model in the evaluation of an intervention study makes clear on which aspects of the intervention the study has found an answer. Wherever possible, use should be made of the RE-AIM model. Also if not all dimensions can be included, in the design of an intervention study, the dimensions about which a statement can be made become clear. On the basis of this information specific follow-up studies can be undertaken.

8

General discussion

8.1 Introduction

The elderly are an extremely heterogeneous group; some stay fit and active long into old age while others struggle with chronic diseases and handicaps. The decline in functional reserves creates a condition we refer to as frailty. There is little consensus on the definition of frailty (Rockwood, 2005a; Lally & Crome, 2007; Bergman et al., 2007), but it is said that frail elderly people have a greater risk of poor outcomes as they age (Rockwood, 1994; Palmer, 1995; Morley et al., 2002). For frail elderly people and the health care sector, it is important to identify this group of patients and offer them the care that will help them the most. Because the problems that result from or go hand in hand with frailty are problems that relate to diminished functioning and are often related to illness and/or the effects of illness, and these problems lie within the area of nursing care, the nurse has a pivotal role in the care for these patients. With the positive results of geriatric interventions among the frail elderly, such as shorter hospitalisation, fewer complications and fewer placements in care homes (Schelhaas et al., 2003; Wells et al., 2003), a study was conducted on the use of specialised geriatric nursing in the clinical practices of a large teaching hospital in the north of the Netherlands. The central objective of this dissertation is the establishment of frailty among elderly people aged 75 and older, their care problems and research into the effect of the engagement of the Geriatric Nurse Specialist (GNS) in regard to the patient's functioning.

These topics were covered in the preceding chapters. This chapter summarises and discusses the results, and follows with a central discussion of the dissertation and recommendations.

8.2 Main findings

Frailty can be used as a case-finding to identify elderly people who have a higher risk of negative results, and may benefit from preventive treatment. Many conventional definitions of frailty are based primarily on physiological aspects of functioning. Others argue for a definition of frailty that includes all aspects of functioning. Chapter 2 considered the significance of the use of two different operationalisations of frailty for case-finding of the risk patients in clinical practice: physical frailty, based on physical aspects of functioning (Fried et al., 2004) and comprehensive frailty, based on all aspects of functioning (Schuurmans et al., 2004). Both consider the overlap with disability, comorbidity and burden of disease. Among the respondents, a positive correlation with age was found for both frailty operationalisations and disability. Physical frailty is clearly less observed than comprehensive frailty. Additionally, with comprehensive frailty relatively more elderly persons are identified by whom disability and/or comorbidity are also observed alongside frailty. Physical frailty is not often encountered independently, but usually in combination with disability and/or comorbidity, and as such seems less distinguishable from these terms. In comprehensive frailty, the overlap with disability is larger than the overlap with comorbidity. From the fact that in slightly over half of the respondents, comprehensive frailty occurred in combination with disability and burden of disease can be concluded that this group of elderly people clearly require care. With the limitations on functioning resulting in part from illness, these people must seek care. In comparison with physical frailty, comprehensive frailty measured with the Groningen Frailty Indicator (GFI), by recording health problems, social and psychological functioning, besides physical functioning, identified more frail elderly who can be recipients of specific care.

The relationship between illness and frailty was examined in Chapter 3, which looked at how frailty occurs in patients aged 75 years and older in five clinical wards with different medical specialisms: geriatric medicine, traumatology, pulmonology/rheumatology, internal medicine and surgical medicine. It was found that at geriatric medicine, nearly all patients were designated as frail, and with the most commonly reported problems spread across mobility, health, and psycho-social aspects of frailty. At surgical medicine, frailty was seen in a solid 50% of the patients, while at traumatology and pulmonology/rheumatology that figure was nearly 75%, and even higher at internal medicine. Frailty is more frequently encountered at more advanced ages, and this is a factor in the number of frail elderly persons at internal medicine. Looking at the psycho-social aspects of frailty, it can be reported that the number of frail patients in this area was virtually the same as at other medical specialisms. However, the scores on the mobility aspects of frailty differed across the various specialisms. The average GFI score of patients at geriatrics differed significantly from the GFI scores of patients at the non-geriatric specialisms. The average GFI score of the non-geriatric specialisms did not differ significantly from each other. It can be concluded that from half to over three-fourths of the patients aged 75 and older hospitalised in that ward are frail. This makes frailty a very important topic for this ward, and one that must be taken into account in the diagnostics and treatment of these patients.

Chapter 4 examined how information from the patient’s proxy is usable in the establishment of the frailty of the patient. In an acute hospitalisation situation, the proxy is often the best person to provide information about the patient's medical history and symptoms. Other studies comparing responses of patients and close relatives in regard to the functioning and quality of life of the patient make clear that it is principally the cognitive functioning and the relationship with the proxy that have the biggest impact on this. This study found that for all patients, the proxy evaluates the patient as more frail than the patient does. Although differences at the individual level are found between patients without cognitive impairment and their proxy, no significant

difference is observed at the group level. By contrast, among patients with cognitive impairment a significant difference is seen in the patient's own assessment of his or her frailty and the assessment of the proxy. For patients with and without cognitive impairment, the study found that the difference between patient and spouse is less than the difference between patient and child, but in both situations the proxy assesses the patient as more frail than the patient does. It was also shown that for both groups of patients, there was more correspondence in responses for the more observable frailty items than the more subjective items. Because the lack of consensus on a definition of frailty means that there is no "gold standard" for determining whether a patient is frail or not, the influence of perception must be taken into account in the determination of the frailty of a patient. Consequently, there is no way to indicate what score is an overestimate or underestimate of a patient's frailty. In case of doubt about the accuracy of the screening, further frailty investigation is required.

Chapter 5 examined the significance of the consultation of the Geriatric Nurse Specialist (GNS) in the diagnosing of nursing problems in the frail elderly patient. The question of whether a ward nurse not specialised in geriatric care is capable of identifying the nursing diagnoses of frail elderly people is a relevant one. One aspect to look at would be whether in a consultation, the GNS can supplement the nursing diagnoses already established by the ward nurse. A total of 4 nursing diagnoses on average were identified among the frail elderly, with 'impaired physical mobility', 'nutritional deficit' and 'risk of injury (falling)' being the most commonly registered. Over half of the nursing diagnoses were added by the GNS on top of the diagnoses already established by the ward nurses. The ward nurses registered primarily diagnoses of a physical nature and those requiring immediate care during hospitalisation. Of the 'high risk' diagnoses, such as 'high risk of injury (falling)' and 'high risk of acute confusion', over three-fourths were established by the GNS. The GNS established nearly half of the diagnoses of which the aetiology was related to the hospitalisation, and three-fourths of the diagnoses that

could still be relevant post-discharge. It can be concluded that among frail elderly people hospitalised in a non-geriatric ward, the consultation of the GNS results in many and significant extra nursing diagnoses, allowing a more complete picture of the patient's care issues to be obtained and more appropriate care to be applied.

Chapter 6 presented an investigation the effect of a geriatric intervention among hospitalised frail elderly patients. The intervention is characterised by identification of the frail elderly patient, continuity of the geriatric intervention by GNS and a long follow-up on the intervention. The outcome measures selected to evaluate the effect of the intervention programme are the physical, psychological and social functioning, subjective well-being, care independence, medication and days of hospitalisation. In a quasi-experimental study (non-equivalent control group design) set up in two internal medicine wards, frail elderly patients in one of them were visited by the GNS. They formulated recommendations for treatment and tracked the patient during hospitalisation. They also continued to maintain contact with the patient after discharge. During the intervention, more problems among the frail elderly patients requiring the engagement of other disciplines were identified. Many elderly people, and the more frail patients, however, could not be included in the study or dropped out in the study period, so ultimately the sampling was smaller than required according to the power calculation to be able to find a moderate effect. The sampling included a great deal of variation in functioning at the moment of hospitalisation (baseline). Looking at the progress of the respondents, the intervention group did somewhat better than the control group in a number of results standards. This would appear to justify the conclusion that the intervention allowed a good inventory of the individual needs of the frail elderly patients, but that the response in terms of care should be engaged more effectively. Just as with the care, in the follow-up study the differences in the importance of results standards in individual patients need to be taken into account, and should therefore be the leading indicator for diagnosis and treatment.

Chapter 7 discussed the use of the RE-AIM model in the setup of an intervention study. The model was also used to evaluate the intervention study described in Chapter 6. The RE-AIM model, consisting of the dimensions reach, effectiveness, adoption, implementation and maintenance focuses on the areas of an intervention with an impact on situation in the daily practice, and thereby on the translation of research into the practice. The five dimensions are used to look at individual and organisational effects in the short and long term in the daily practice. Reach refers to the percentage and representativeness of the individuals from the target group wishing to participate when approached for a study. Efficacy looks at the impact of an intervention on significant results standards, including potential negative effects, quality of life and economic results. Adoption provides organisational-level insights and relates to the number, percentage and representativeness of organisations and stakeholders with an interest in working with the intervention. Implementation indicates the degree to which working in accordance with the new intervention is applied in the daily practical situations. Maintenance is the dimension used to look at the organisational level and the degree to which the new intervention is institutionalised and becomes part of the internal practice and policy. At the individual level, this refers to the effect of the intervention at least six months after the last intervention contact. The evaluation of the effect study with the RE-AIM model described in chapter 6 makes clear that the study structure used focuses only on the dimensions reach and effectiveness. The conclusions concerning the other dimensions can only be drawn based on the experiences of the researcher and GNS. For the setup of an effect study, the RE-AIM model offers solid tools allowing specific conclusions to be made about external validity, generalization and sustainability of the programme. In addition, the model can be used to evaluate a study conducted to obtain more information about the utility of the intervention in the daily practice. For the daily practice, this means that a study set up with the RE-AIM model offers more information for translation into the internal practice. This also means the RE-AIM model must always be used in intervention studies to provide more information for evidence-based practice.

8.3 Discussion of the main findings

Frailty as case finding

Because aging does not follow the same pattern with all elderly people, and preventive interventions can offer positive outcomes among elderly people with a higher risk of poor outcomes of aging, it is important to identify these risks among the elderly at an early stage. The results in Chapter 2 showed that the group of elderly hospitalised patients is a heterogeneous one. Among a small portion of the patients, no frailty, disability and/or comorbidity was observed, but among the majority of them, two to three of these were seen in various combinations. The large overlap found between the simultaneous prevalence of comprehensive frailty, disability and illness burden confirms that this is a group of elderly hospital patients that certainly requires care. The care for this group of elderly patients will have to be multidisciplinary and complex (Slaets, 2006) and demands a clear controlling hand (Gezondheidsraad, 2008).

Frailty can be used as case finding to select the elderly people with a higher risk of poor outcomes, to allow preventive interventions to be applied at an early stage (Slaets, 1998). Many conventional definitions of frailty are based primarily on physical aspects of functioning (Hogan et al., 2003; Levers et al., 2006), also referred to as physical frailty. Others argue for the inclusion of all domains of functioning (Hogan et al., 2003; Markle-Reid & Browne, 2003), which can be referred to as comprehensive frailty, because this can also be used to designate elderly people who have more of a risk of poor functioning due to psychological and social problems as frail. In addition to this broad operationalisation doing more justice to the holistic vision central to geriatrics (Fisher, 2005) and nursing care (Gordon, 2000), it clearly identifies more elderly people who also have disability and/or comorbidity. Comprehensive frailty is more in line with the desired definitions of frailty (Rockwood, 2005a; Markle-Reid & Browne, 2003) and utility in clinical practice (Slaets, 1998), and a broader operationalisation is supported by other research (Mitnitski et al., 2002; Jones et al., 2004; Katz, 2004; Mitnitski et al., 2005; Puts et al., 2005a; Deeg & Puts, 2008). The fact that frailty was diagnosed

among nearly all patients in the geriatric ward (see Chapter 3) confirms the correct focus of the GFI and follows Markle-Reid & Browne's (2003) thesis that frailty is a result of a complex interaction of physical, psychological and social factors. This means that comprehensive frailty measured with the GFI allows more people in the target group to be identified and therefore receive specific care they need. Because the GFI is a short questionnaire and can be incorporated into the intake interview by the nursing staff, it is a solid and simple instrument for identifying the elderly people with a higher risk of poorer functioning and for whom preventive treatment is desirable.

Frailty and the relationship with disability and comorbidity
Levers et al. (2006) argue that age and illness are the most important factors in the occurrence of frailty, and Hogan et al. (2003) show that definitions of frailty often make a connection to dependence on the help of others and the existence of medical diagnoses. Our study also found a positive correlation between frailty and age, and in a large group of patients, frailty was found in combination with disability and/or comorbidity. As life expectancy increases, and as the group of elderly people grows, so does the number of elderly people dealing with frailty as well, making this group an increasingly important target group for which hospitals must organise good care. With the specific issues of this group of patients in the field of geriatrics, there is a clear role for the GNS and the geriatrician in this care.

The fact that frailty is an important item for all medical specialisations is made clear in Chapter 3 of this dissertation. Frailty, and as such the need for specific care among frail patients (Slaets, 2006) is found in at least half of patients in every medical specialisation included in the study, and in some wards even more than three-quarters of patients. Murray & Lopez (1996) also argue that some conditions have more impact on the patient's functioning than others. In our study, it was primarily the mobility aspects of frailty that were linked to the medical specialisation. It can be noted that the psychosocial aspects of frailty always scored higher than the other aspects, and occurred at

essentially the same rate across the different medical specialisations. This would appear to indicate not a correlation with the type of condition of the elderly patient, but more with the process of aging itself. Assessing which individual patients have a high risk of poor outcomes requires screening with the GFI. To be able to engage preventive interventions at an early stage, the screening for frailty must be carried out at the start of the hospitalisation. To get even more out of prevention in regard to poor outcomes such as hospitalisation, the screening for frailty should ideally already be carried out in the home situation. The general practitioner or nursing caregiver can be an important part of this.

Usability of proxy information in diagnosing frailty

In an acute hospitalisation situation, the patient's proxy is often the best person to provide information about the patient's medical history and symptoms. The study considered the usability of information obtained from the proxy in diagnosing frailty. The fact that patients are deemed to be more frail by their proxy, and that more difference is seen in subjective terms between the patient and the proxy is comparable to the results of studies addressing quality of life and degree of functioning (Sneeuw et al., 1999; Neumann et al., 2000; Ball et al., 2001). If the GFI is used as case finding, the score directs further diagnose the frailty and corresponding problems. Personal characteristics and/or circumstances of patients and proxies can, however, influence the responses, and accordingly, the GFI score, which is why it is always important for the nursing personnel to check the responses on the GFI against his or her own evaluation of the patient's situation and, if possible the responses of the proxy against the patient's (Sneeuw et al., 1999). The nursing caregiver can have an important identifying role in this through daily contact with the patient and family. If there is any doubt on the correct assessment with the GFI, further investigation of the frailty of the patient is required. If the patient is known to have a cognitive impairment, the GFI is not useful as case finding. Patients with cognitive impairment are virtually always eligible for further examination and/or geriatric support.

Nursing diagnoses and nursing care

Among the group of frail elderly patients, many nursing diagnoses are registered in regard to the basic care during hospitalisation, health risks and problems that may be relevant after discharge. This further confirms the perception of a group of elderly hospital patients that have a clear need for and dependence on care. It can be expected that problems specific to frail elderly patients will be registered by the GNS. As such, it is striking that the ward nurses did not register many nursing diagnoses in basic care, i.e., diagnoses not specific to elderly patients. Poor diagnostics can be caused by a lack of knowledge of the specific problems of frail elderly patients (Chang et al., 2003), but may also be the result of a lack of interest in providing basic care on the part of the ward nurses (Palmer, 1995). Simoens et al. (2004) also identified a lack of knowledge of geriatric issues on the part of ward nurses. From the perspective of the frail elderly patient, the most desired explanation is that these nursing diagnoses are not made because they are simply assumed, and will be given the required attention in the course of the care. Another reason for not registering all nursing diagnoses may lie in the increase of the number of patients with complex problems (Slaets, 2006; Gezondheidsraad, 2008) and in the increase in work pressure (De Veer et al., 2007), forcing nursing staff to make priority choices in what they can do. Rafferty et al. (2007) found a correlation between high workload, low assessment of quality of care by nursing staff and higher patient mortality rate. Another study demonstrated a negative correlation between educational background of nursing staff and patient mortality rate (Aiken et al., 2003). These would appear to be reason enough to invest in this group of patients and the nursing personnel who must care for them.

The fact that in our study, more diagnoses were established in the GNS consultation is in line with the results of other studies (Fabacher et al., 1994; Rockwood et al., 1998; Wells et al., 2003). Although there is a potential influence affecting the results, i.e. the GNS was aware of being the subject of study, a difference in type of diagnoses was also found. The GNS supplemented nursing diagnoses relating

to basic care, but also registered many potential problems (high risk diagnoses). It became clear that the GNS have a broader scope than the ward nurses, who were more focused on physical problems and problems requiring immediate care. This last point is confirmed by the findings of Simoens et al. (2004), who argue that care for geriatric patients is often focused on the acute condition that was the reason for hospitalisation. Engaging the GNS for identifying nursing diagnoses among this group of patients appears to offer clear added value. The fact that ward nurses are less than complete in their nursing diagnoses may be due to factors other than lack of knowledge. Lack of time and high work pressure in nursing (Chang et al., 2003) may also force the nursing personnel to focus on the patients' most acute problems. A critical look must be taken at whether the GNS should be engaged for the identification of nursing diagnoses not specific to the elderly. If knowledge and/or lack of time is the reason that diagnosis is not being done correctly, education and/or augmented staffing would be appropriate responses. Further research into incomplete diagnostics of care issues is needed. The proper identification and establishment of patient problems is not necessarily a precondition for proper care, but it is the first necessary step in the nursing process (Gordon, 2000).

Effect of engaging the GNS

The early identification of frailty in elderly patients, GNS consultations with these patients and a long follow-up after intervention were the central features in the setup of the intervention programme. The expectation was that the intervention programme would have a positive effect on the functioning and well-being of the frail elderly patient. For various methodological and theoretical reasons (as presented in Chapter 6), it became clear that the study was underpowered. Too few respondents who met the selection criteria, and drop-out from the target group of respondents over the course of the study, ultimately resulted in a sampling that was too small to be effective. Despite the fact that the engagement of the GNS allowed for a more complete inventory of the nursing diagnoses to be made, the performance of the recommended interventions was most likely

insufficient to achieve clearly positive results among the frail elderly patients. To be able to achieve positive effects, the intervention must be put into practice more vigorously than was done in this study. Other problems in the study of a new intervention in daily practice became clear by evaluating the intervention study with the RE-AIM model. Application of this model in the study setup could have resulted in more concrete information on the representativeness of the study setting, on the application of the intervention in practice and its use in the longer term. This would have allowed to draw conclusions on the external validity and the process of generalising the results.

In the setup of the intervention programme, a clear choice was made to make the programme very compatible with the existing situation in geriatric consultation practice. Although the literature describes consultation as less effective in comparison with hospitalisation in a geriatric ward (Stuck et al., 1993; Schelhaas et al., 2003), in our situation, hospitalisation of all frail elderly patients in a special geriatric ward on the level of a Geriatric Evaluation and Management Unit was not feasible in practical terms. Better organisation of the consultative service in the intervention programme did allow care to be provided that was feasible in financial and practical terms, and which could be continued after the end of the study. The care providers in the study found the intervention programme positive, and the frail elderly patients received more attention from them. Despite the fact that the intervention programme as set up for this study is hardly being used at this time, the GNS is still being engaged more frequently and quickly, and at an earlier and earlier stage, in consultations with frail and non-frail elderly patients at risk of or suffering from geriatric problems.

8.4 Methodological restrictions

Looking back at the sampling used in the first study (Chapter 2) and the intervention study (Chapter 6), the representativeness for the hospital population aged 75 and over may be called into question. The older patients in this group frequently did not meet the inclusion

criteria, and those that did were more likely to drop out because they were too sick or terminal. This meant that the sampling consisted mainly of the younger patients in this group aged 75 and older. The positive correlation between age and frailty/disability leads to the assumption that in the entire population of hospitalised patients aged 75 and older, there would be even more elderly frail patients, and the overlap between comprehensive frailty and disability would be even greater. Consequently, the figures found on the number of frail elderly patients and the overlap with disability and/or comorbidity in the sampling is an underestimation of the actual figures.

Studying the nursing diagnoses among frail elderly patients was based on the existing patient files (Chapter 5). This minimized the influence of external sources, such as a list of possible nursing diagnoses, on the nursing staff in the establishment of their nursing diagnoses. A known factor was that the ward nurses made relatively little use of recognised nursing diagnoses as in Gordon’s taxonomy, in registering patients' problems in their files. The disadvantage of this was that the problems, observation points and interventions in the files had to be translated into recognises nursing diagnoses. The information obtained may be less reliable due to influences in the process, but do reflect the realistic situation encountered in the daily practice. And this is the situation in which care for frail elderly patients happens.

A controlled trial in the form of a quasi-experimental study was chosen to research the effect of engagement of the Geriatric Nurse Specialist (GNS) (see Chapter 6). Because the learning effect of the intervention for the nursing staff precluded randomisation of the respondents, a choice was made for two comparable wards. This choice had the disadvantage that not all differences may have been accounted for. To verify the comparability of the two nursing divisions, patient data was collected in the two wards prior to the introduction of the intervention. As a result, there was less time to collect patient data during the intervention period, and the study remained underpowered. After the intervention was started, data collection from the intervention

group began immediately. It may be that the GNS and the ward nurses in the intervention ward required more time to get a feel for the intervention, and that initially the intervention was not carried out in the manner it was later. Because of its complexity, and because it may exhibit a great deal of variation in performance, the intervention was not standardised. Additionally, there was no monitoring on the performance of the GNS's recommendations.

Despite spreading of the outcome measures across the various aspects of functioning, a critical look could be taken at whether this allows demonstration of the effectiveness of the intervention. The choice for these outcome measures was dictated by the idea that the functioning of the respondents can indeed be changed, and that effectiveness results in different functioning. In some frail elderly patients with many different functional problems, little if any improvement can be expected. For them, the most feasible result may be slowing their decline and/or relieving symptoms. For these patients it is still important, however, that all their problems are identified and that they receive appropriate care and attention, but the effect of this care may be difficult to measure (RVZ, 2007; Baart & Grypdonck, 2008). Even if the total intervention of this study was ineffective, the more complete identification of the problems of the frail elderly patient, allowing more appropriate care to be given, is more compatible with the idea of offering good care, and for this reason, should be maintained. Avenues to fulfil the care needs of the individual frail elderly patient must be sought, so that the most appropriate care result for the patient can be attained.

8.5 Recommendations

To engage early diagnosis and treatment in patients to avoid decline or to slow decline already underway, the Groningen Frailty Indicator (GFI) must be taken by every incoming elderly patient in the clinical practice. The GFI quickly and simply screens the elderly patient for comprehensive frailty, and in the process, for the risk of poor outcomes of aging. It is important for nurses to know whether a patient is frail. Preventive action among this group of patients is

clearly within the working sphere of nursing personnel (Inouye et al., 1999; Inouye et al., 2000; King, 2006). Certainly in cases in which disability and/or comorbidity are observed, they must be extra alert to potentially more difficult recovery of the patient and/or faster deterioration of the patient's situation.

A number of points need to be kept in mind when administering the GFI. The GFI is taken by the patient himself, and for patients with a cognitive impairment, it is important to coordinate the patient's responses on items pertaining to mobility and health problems with the patient's proxy, who may be informed of these responses. An important part of administering the GFI is to clearly indicate that in reference to the mobility aspects, the question is whether the patient still has the capacity to perform them, not whether he or she is actually still doing them. This may be unclear on certain questions, such as the question about doing the shopping. If the GFI is taken by the proxy, it is important to indicate that the proxy should answer from the patient's perspective, that is, answer as the patient would answer (proxy-patient view). The GFI was developed to screen the patient's degree of frailty in a short space of time, so as to be an indicator for the decision-making on whether or not to apply more specific diagnostics and treatment of the problems identified. An important aspect here remains the nursing personnel's observation and assessment of the frailty of the patient. In cases of doubt on the accuracy of the responses, this should first be coordinated with the patient and/or proxy. Should there be any question of whether the GFI's assessment is too low, a further examination must always follow.

Clinical experience has shown that patients with a score of four or higher on the GFI can be classified as frail, and benefit the most from geriatric care. The group of patients with a score lower than four do not have an increased risk of poor outcomes, and for them, care as usual is sufficient, with no extra care or attention from geriatrics being required. Further research on these cut-off points is needed. Additionally, the potential reasons why the nursing diagnostics of frail

elderly patients by ward nurses is not complete in regard to the non-geriatric knowledge domain should be the subject of further study. Future setup and evaluation of an intervention study should involve more use of the RE-AIM model, because this model allows more information to be obtained on the external validity and process of generalisation of the intervention, which would allow more effective translation of the intervention into daily practice.

The inability to demonstrate an effect for the engagement of the GNS in regard to the functioning of the frail elderly must not mean the discontinuation of that branch's specific role in the care of this group. The engagement of the GNS has already resulted in better identification of the care problems of frail elderly patients. To increase the effectiveness of the performance of the GNS's recommendations, the problems identified should be the subject of follow-up. Investments must be made in the quality of care for the elderly (Milisen & Dejaeger, 2006), including investments in increasing the knowledge of geriatrics in non-geriatric wards. A basis for this is that the nursing staff have already obtained sufficient knowledge of geriatrics in the course of their studies, so in practice they are able to not only identify problems faster, but master new interventions in this area faster as well. Additionally, the GNS must also participate in the multidisciplinary patient meeting and can, in the role of case manager, be given more authority and control of the care for frail older patients. Additionally, in every ward there must be at least one nurse with extra training in geriatrics, who must stay on top of new developments and bring them to the attention of his or her ward. Further, a climate in the wards should be created in which nursing personnel can be more open to new developments in their care providing. This will benefit the quality of the care, which will reflect on their own practices and prompt searches for opportunities to improve them, for example by being in a position to utilize the results of scientific research. One precondition for this is that a certain number of nurses in the ward must maintain knowledge of scientific research and evidence-based practice.

The correlation between the high workload, quality of care and patient mortality (Rafferty et al., 2007) should be an additional reason to invest in the quantity of the nursing personnel. Along with training and retraining for ward nurses, more nurses must be appointed in wards that frequently receive frail older patients. Doing so would allow these wards to provide for the often complex and more time-consuming care demands of this group of patients (Slaets, 2006; Gezondheidsraad, 2008) and live up to the responsibility of providing high-quality care.

8.6 The study results and practice: a brief reflection

Over the course of this study, I recognised the problems of the frail older patient and nursing care among this patient group from my previous work experience. Over the years that I worked as a nurse in a ward for internal medicine and oncology in a large teaching hospital in northern Netherlands, I cared for many, many frail elderly patients. Despite consultations by one specialist after another there were older patients who developed one complication after another and who only got sicker and sicker. I did not have a name for this group of patients, but I did have the feeling that things were not going well with them and that in caring for them, I was always playing catch-up with the facts. More quickly identifying all problems and working with geriatrics in a more structured way might have been able to change the course of the illnesses of some of these patients. I also recognised the ward nurses (Chapter 5) who were primarily focused on and engaged in the daily practical care, sometimes overlooked the person behind the patient, and the social and psychological dimension (sometimes being forced to do so out of necessity). This is a far from ideal situation, for both nurse and patient.

Additionally, the consideration of developments in faster and more efficient care and made-to-measure financing such as washing without water (Jansen, 2008), clinical pathways and DBCs (diagnosis-treatment combinations) must involve a critical look at their impact on frail elderly patients and the professionals caring for and treating this patient group. The frail elderly patients often benefit more from made-

to-measure care, with the great deal of personal attention it can offer, without the nurse making a hasty and overworked impression (Chang et al., 2003). Consider presence theory, which emphasises that attention and presence are important aspects of nursing care (Baart & Grypdonk, 2008). In other approaches too, such as the strive for evidence-based practice, it must be kept in mind that time and attention may be easy things to say, but hard to live up to, and their effectiveness is difficult, if not impossible, to demonstrate (RVZ, 2007).

In my current work in the development of an electronic nursing file for the care institution, I have already been asked whether reductions in administrative burden of the nursing personnel may lead to being able to reduce the number of working nursing personnel. Partly based on the impact that frailty can have on the elderly and the care institution and the nurse's role therein, I argue that if time saved it should in fact be spent on care activities for these elderly patients, that are now being neglected out of necessity. From another perspective, I am even more convinced that the nurse plays an important role in the recognition of the frail elderly patient and the problems of and care for these patients. As such, I find the fact that the intervention programme as set up in this dissertation has focused clear attention on the frail elderly patient in the care institution, and that this has been continued after the end of this study, a positive development. The enthusiasm of the nurses involved in the study has certainly been a positive factor here.

8.7 Conclusion

The results of this dissertation lead to the conclusion that in clinical practice, many patients with comprehensive frailty are designated as frail, and that these patients are hospitalised in many different wards in the hospital. In the face of an aging population, longer life expectancy, common incidence of frailty and risk of poor health outcomes paired with it, this is definitely a group of patients needing focused attention in general hospitals. Geriatrics, as a specialism focused on the problems of aging, and the use of that specialty in

these wards has already produced positive results among frail elderly patients, and it is important to organise the deployment of geriatrics properly for the people who it can help. Because the problems surrounding frailty often lie within the domain of nursing care, the Geriatric Nurse Specialist will be a key figure for this patient group. Early identification of frailty in a patient can lead to further investigation of the individual care needs and appropriate treatment being used to prevent, delay or improve poor outcomes. Focused application of this specific care will benefit not only the individual frail elderly patient, but the care institution as a whole.

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Summary

The process of aging, whereby the functional reserves of the body decline, is not the same for everybody. Some elderly stay fit and vital for a long time while others face chronic diseases, handicaps and frailty. Frail elderly are confronted with deterioration in various domains of functioning and therefore face a high risk of deterioration in wellbeing, hospitalisation, care dependency and death. Hospitalisation may mean (further) deterioration in functioning, care dependency, hospitalisation for a longer period of time and complications. It is important for elderly people to receive the proper care to prevent possible negative outcomes. From a healthcare perspective, it is important that health risks for elderly people with complex problems is assessed at an early stage, the right care is administered and that the care is well organized.

Geriatric interventions have shown positive results in earlier studies of frail elderly, such as reduction of time in hospital, fewer complications and a reduction of transfers to nursing homes or homes for the elderly. When frailty is used for case-finding, it can be used to identify elderly people who have an increased risk of adverse health outcomes and who can benefit from preventative intervention. In some definitions of frailty the emphasis is on the diminishing reserve capacity of physical aspects of functioning while others plead for a definition which is based on all aspects of functioning. Such a definition is more in line with the holistic vision of geriatric medicine. In this study frailty is described as an age-related state of diminished physical, cognitive, social and psychological functioning, which results in a diminished reserve capacity for dealing with stressors.

Due to deterioration of functioning and/or obtaining chronic diseases, the situation can exist where elderly people have to rely on others in their daily functioning. To assist with daily problems due to disease and/or handicaps or the prevention thereof is the domain of the nursing profession. It gives nurses a central role in the care of this frail elderly. To provide the right nursing care, a diagnosis of nursing

problems is important. It is possible that nurses who work in other departments than geriatric care, have little knowledge of recognizing the problems of frail elderly people. A specialised geriatric nurse could possibly add a positive contribution here. When a complete inventory of problems of the frail elderly is made, suitable interventions can be applied with the aim to achieve results in care which are in the best interest of the individual patient.

In this thesis the focus was on the concept of frailty in clinical practice, the establishment of it, the role of the Geriatric Nurse Specialist (GNS) and the effect of the implementation of the GNS among this group.

In Chapter 2 physical frailty based on physical aspects of functioning is compared to comprehensive frailty based on all aspects of functioning. Beside that the overlap of both concepts with disability, comorbidity and burden of disease in a group of elderly hospitalised patients was looked at. The reason for this was to come to a conclusion about the usefulness of both frailty operationalisations for case-finding in clinical practice to identify those patients for which specialized geriatric care must be applied. Age appeared to have a positive correlation to both frailty operationalisations and disability. Comprehensive frailty was often more prevalent than physical frailty. Physical frailty was prevalent in less than 25% of the elderly people and was nearly always in combination with disability and/or comorbidity. Because of this it appeared not be easily distinguishable from disability and/or comorbidity. Comprehensive frailty was prevalent in almost two-thirds of the elderly. While this operationalisation is often prevalent on its own, relatively more elderly people were identified with frailty by which also disability and/or comorbidity was seen. More than half of the respondents showed comprehensive frailty as well as disability and burden of disease which indicated that this was a group of elderly people who would clearly be needing care. By registering health problems, social and psychological functioning as well as physical functioning in

comprehensive frailty, more elderly people were found to be frail compared to physical frailty.

In Chapter 3 the prevalence and the implication was researched of frailty with elderly people admitted to five nursing wards with various medical specialisms: geriatric medicine, internal medicine, traumatology, pulmonology/ rheumatology and surgical medicine. Because there is a relation between the deterioration in physical functioning with care dependency and a medical diagnosis, frailty could prevail more or less with patients of various illnesses. Nearly all the patients on the geriatric ward were recorded as being frail, with the most prevailing problems divided into the mobility, health and psychosocial aspects of frailty. This was according to expectation of the target group of the geriatric medicine and confirmed the used definition of frailty. At surgical medicine, frailty prevailed in more than half of the number of patients, at traumatology and pulmonology/ rheumatology nearly three-fourths of the number of patients and at internal medicine even more than three quarter of the patients. Psychosocial aspects of frailty prevailed nearly as often in all the various medical specialisms and appeared to be independent of the health problems of frail older people. The scores on the mobility aspects of frailty were different in all the specialisms however. De elderly people on the geriatric ward were significantly more frail than the elderly people of the other four specialisms, among which the patients weren't much different. The conclusion could be made that from half to over three-fourths of the patients of 75 years and older admitted to these specialisms were frail.

In Chapter 4 the usefulness of information from the proxy with regard to the determination of frailty of the patient at the moment of hospitalisation is researched. The patients' proxy thought the patient more frail than the patient him/herself. Despite differences on an individual level, this difference wasn't significant for patients without cognitive impairment but was significant for patients with cognitive impairment. Besides this it was noticed that for both groups of patients, the difference between patient and spouse was smaller than

the difference between patient and child. It also showed that more agreement in answers occurred for the more observable aspects of frailty like mobility, than for the more subjective aspects like feelings of loneliness. When determining frailty, influences should be taken into account. Due to the lack of consensus about a standard definition on frailty, it cannot be determined at which score there is a mention of under or overestimation of frailty.

In Chapter 5 the nursing problems of the frail were studied and the role of the GNS when determining the nursing problems. In total an average of 4 nursing diagnoses were registered, with ‘impaired physical mobility’, ‘nutritional deficit’ and ‘high risk for injury (falling)’ being the most frequent. Of these nursing diagnoses more than half were added by the GNS after the nursing diagnoses were registered by the ward nurses. De ward nurses mainly registered diagnoses of a physical nature and which required direct care. In addition, the GNS registered other current potential nursing problems like ‘risk for injury (falling)’ and ‘risk of acute confusion’ and problems needing attention after hospitalisation. Half the diagnoses of which the aetiology was related to hospitalisation were registered by the GNS. Three-fourths of the diagnoses which would still be relevant post-discharge were registered by the GNS. By implementing a GNS consultation with the frail and elderly group admitted to a nursing ward, many and important nursing diagnoses were registered additionally.

In Chapter 6 the effect of a newly created intervention programme was researched with a central role for the GNS consulting the frail elderly admitted to a non-geriatric nursing ward in a general hospital. In a quasi-experimental research project (non equivalent control group design), the effect of different aspects of functioning was studied: physical, psychological and social functioning, subjective well-being, care dependency, medication and days of hospitalisation. By consulting the GNS with the frail elderly in the intervention group, more problems were inventoried; mobilisation of other disciplines such as physiotherapy and dietician was necessary, compared to the control group. The final sample was smaller than required to

distinguish a significant difference. Besides this, the sample contained more young and less frail elderly people from the target group because of not including and fall-out of older and more frail patients during research. When monitoring the respondents, the intervention group appeared to do somewhat better than the control group. By implementing a GNS with frail elderly people in the hospital more individual needs of this group are inventoried but the aid for this group needs to be applied more powerfully.

In Chapter 7 the usefulness of the RE-AIM model for the purpose of evaluating the intervention study as described in Chapter 6 was studied. The model consisting of five dimensions, focuses on several aspects of an intervention which have an impact on a daily practice situation and subsequently the translation of research into practice. Reach, the percentage and the representativeness of the participants of the target group, was average in the intervention study. This was due to the fact that many people of the population couldn't be included and less frail elderly participated in the intervention. The effectiveness, the impact of the intervention on important outcome scores, including potential negative effects, quality of life and economical outcome, couldn't be demonstrated in this study. Adoption, percentage and representation of organizations and people who are prepared to work with intervention, wasn't researched in this study and therefore no statements could be made about this. The implementation, the amount of consistency and compliance of handling of all the parties concerned with regard to intervention, can be called low in this study. The final intervention wasn't executed in practice as was originally intended. Timely implementation of the GNS in case of acute confusion, the positive side effect of the study was put into the daily routine well. The maintenance, the rate at which the new intervention was institutionalized and became part of own practice and policy was low for the intervention. For the positive side effect however this could be called high. The evaluation of the intervention study with the RE-AIM model as described in Chapter 6 clearly indicated that the research design only focussed on the dimensions, reach and effectiveness. Statements about the other

dimensions are based on experience of the researcher and the GNS.

In Chapter 8 the most important results and conclusions are described, discussed and recommendations are made for practice and further research. This study shows that in contrast to the use of physical frailty in clinical practice with comprehensive frailty, many patients are marked as being frail where also disability and/or comorbidity is registered. This frail elderly group who need complex care are admitted to various nursing wards in the hospital which aren't specialized in care for this specific group of patients. Nursing problems in this group were specifically registered with regard to mobility, nutrition, risk of falling and risk of acute confusion. The consulting GNS registered more than half of the average 4 diagnoses per patient. The ward nurses mainly focussed on nursing diagnoses of physical problems and problems which required immediate care while the GNS also registered (potential) problems which would need attention during hospitalisation. The intervention study of implementing a GNS consulting frail elderly people showed that the mobilisation of other disciplines was necessary. The sample was smaller than required to show a significant difference. During the discussion of the RE-AIM model it became clear that the intervention study with this quasi-experimental research design was mostly aimed at reach and effectiveness and therefore aimed at the individual short term effect of the intervention.

Due to an aging population, longer life expectancy, common incidence of frailty and risk of poor health outcomes this is definitely a group of patients needing focused attention in general hospitals. In order to diagnose and start specific treatment at an early stage to prevent deterioration or delay further deterioration, it is recommended that, with each newly admitted patient, the Groningen Frailty Indicator (GFI) is applied. Subsequently, specific diagnose can be done to ascertain the care needs of the individual patient and fitting treatment can be applied. Because the problems going on with frailty often lie within the domain of nursing care, it is recommended that the Geriatric Nurse Specialist becomes a key figure with these patients.

Samenvatting

Veroudering, gedefinieerd als het proces waarbij de functionele reserves van het lichaam afnemen, verloopt niet voor iedereen hetzelfde. Sommigen zijn lang fit en vitaal, terwijl anderen kampen met chronische ziekten en handicaps en kwetsbaar zijn. Kwetsbare ouderen gaan achteruit in verschillende domeinen van functioneren en hebben daarom een groter risico op slechte uitkomsten, zoals verlaagd welzijn, ziekenhuisopname, zorgafhankelijkheid en overlijden. Een ziekenhuisopname kan voor een oudere een (verdere) achteruitgang in functioneren betekenen, afhankelijkheid van zorg vergroten, opnameduur in een ziekenhuis verlengen en de kans op complicaties vergroten. Om slechte uitkomsten te voorkomen is het voor de oudere van groot belang dat hij die zorg krijgt aangeboden waar hij het meeste baat bij heeft. Voor de ziekenhuizen is het van belang dat de gezondheidsrisico's bij ouderen met complexe problematiek vroegtijdig worden gesignaleerd, de juiste zorg wordt ingezet en dat deze zorg goed is georganiseerd.

Geriatrische interventies hebben in eerdere studies bij kwetsbare ouderen positieve resultaten laten zien, zoals kortere ziekenhuisopname, minder complicaties en minder opnamen in verpleeghuizen. Het begrip kwetsbaarheid wordt als casefinding gebruikt om die ouderen te identificeren met een hoger risico op slechte uitkomsten en baat kunnen hebben bij preventief handelen. In sommige definities van kwetsbaarheid wordt de nadruk gelegd op de afnemende reservecapaciteit in de fysieke aspecten van het functioneren terwijl andere definities zijn gebaseerd op alle aspecten van functioneren. De laatste definitie sluit meer aan bij het beeld in de klinische praktijk van de kwetsbare oudere en de holistische visie van de geriatrie. In dit proefschrift is kwetsbaarheid omschreven als een op leeftijdsgerelateerde toestand van verminderd lichamelijk, cognitief, sociaal en psychisch functioneren, wat resulteert in een verminderde reservecapaciteit voor het omgaan met stressors.

Door een achteruitgang in functioneren en/of een chronisch ziekte kunnen ouderen aangewezen zijn op hulp van anderen bij hun dagelijks functioneren. Het ondersteunen bij dagelijkse problemen door ziekte en/of handicaps, of het voorkomen daarvan, ligt in het domein van de verpleegkundige beroepsgroep. Daarmee heeft de verpleegkundige een duidelijke rol in de zorg voor deze groep kwetsbare ouderen. Om de juiste verpleegkundige zorg in te kunnen zetten is een goede diagnostiek van verpleegproblemen van belang. De mogelijkheid bestaat dat verpleegkundigen zonder het specialisme geriatrie, te weinig kennis hebben om alle problemen bij kwetsbare ouderen te herkennen. Een Geriatric Nurse Specialist (GNS: geriatrisch verpleegkundig specialist) zou hier wellicht een positieve bijdrage in kunnen leveren. Wanneer de volledige inventarisatie van problemen bij de individuele kwetsbare oudere is gedaan, kan een passende interventie worden ingezet. Hierbij moet gestreefd worden naar uitkomsten van zorg die voor de patiënt wenselijk en haalbaar zijn.

In dit proefschrift is gekeken naar het begrip frailty in de klinische praktijk, het vaststellen ervan, de rol van de GNS en het effect van het inzetten van de GNS bij de groep kwetsbare ouderen.

In hoofdstuk 2 is physical frailty gebaseerd op fysieke aspecten van functioneren vergeleken met comprehensive frailty gebaseerd op alle aspecten van functioneren. Gekeken is naar de overlap van beide begrippen met disability, co-morbiditeit en ziektelast in een groep oudere ziekenhuispatiënten. Dit, om een uitspraak te kunnen doen over de bruikbaarheid van beide frailty operationalisaties voor casefinding in de klinische praktijk. Leeftijd bleek een positieve relatie te hebben met beide frailty operationalisaties en met disability. En comprehensive frailty werd vaker gezien dan physical frailty. Physical frailty werd bij minder dan een kwart van de ouderen gezien en nagenoeg altijd in combinatie met disability en/of co-morbiditeit. Het leek zich hierdoor niet goed te onderscheiden van disability en/of co-morbiditeit. Comprehensive frailty werd bij bijna tweederde van de ouderen gezien. Het kwam vaker alleen voor, maar met deze

operationalisatie identificeerden we relatief meer ouderen bij wie naast kwetsbaarheid ook nog disability en/of co-morbiditeit werd gezien. Bij meer dan de helft van de respondenten kwam comprehensive frailty voor samen met disability en ziektelast, wat erop duidde dat het hier ging om een groep ouderen die duidelijk zorg nodig zou hebben. In vergelijking met physical frailty zijn met comprehensive frailty dus meer kwetsbare ouderen gevonden waarbij zo specifieke zorg zou kunnen worden ingezet. Dit, door het opnemen van gezondheidsproblemen, sociaal en psychisch functioneren naast fysiek functioneren.

In hoofdstuk 3 is gekeken naar het vóórkomen en de implicatie van frailty bij ouderen opgenomen op vijf verpleegafdelingen met verschillende medische specialismen; geriatrie, inwendige geneeskunde, traumatologie, longziekten/reumatologie en chirurgie. Doordat de afname in lichamelijke aspecten van functioneren samenhangt met de aanwezigheid van zorgafhankelijkheid en een medische diagnose, zou kwetsbaarheid in meer of mindere mate kunnen vóórkomen bij patiënten met verschillende ziektebeelden. Nagenoeg alle patiënten op de afdeling geriatrie werden als kwetsbaar aangemerkt, met de meest voorkomende problemen verdeeld over de mobiliteits-, gezondheids- en psychosociale aspecten van kwetsbaarheid. Dit was conform de verwachting bij de doelgroep van de geriatrie en bevestigde ook de gehanteerde definitie van frailty. Bij chirurgie werd kwetsbaarheid gezien bij zeker de helft van de patiënten, bij traumatologie en longziekten/reumatologie bij bijna driekwart en bij de inwendige geneeskunde zelfs bij meer dan driekwart van de patiënten. Psychosociale aspecten van kwetsbaarheid kwamen bij de verschillende medische specialismen nagenoeg even vaak voor en leken daarmee onafhankelijk van de aandoening van de kwetsbare ouderen. De scores op de mobiliteitsaspecten van kwetsbaarheid verschilden echter wel voor alle specialismen. De ouderen van de afdeling geriatrie waren significant meer kwetsbaar dan de ouderen van de andere vier specialismen, welke onderling niet significant van elkaar verschilden. Geconcludeerd kon worden dat de helft tot meer

dan driekwart van de bij deze specialismen opgenomen patiënten van 75 jaar en ouder kwetsbaar was.

In hoofdstuk 4 is de bruikbaarheid van informatie van naasten onderzocht ten aanzien van het vaststellen van frailty van de patiënt op het moment van ziekenhuisopname. Gevonden is dat de naasten de patiënt meer kwetsbaar beoordeelden dan de patiënt zelf deed. Ondanks verschillen op individueel niveau was dit verschil niet significant voor patiënten zonder cognitieve beperkingen, maar wel significant voor patiënten met cognitieve beperkingen. Daarnaast is voor beide groepen patiënten gevonden dat het verschil tussen patiënt en partner kleiner was, dan het verschil tussen patiënt en een kind. Ook is aangetoond dat voor beide groepen patiënten meer overeenstemming in antwoorden bestond voor de meer observeerbare aspecten van kwetsbaarheid zoals mobiliteit, dan voor de meer subjectieve aspecten zoals gevoelens van eenzaamheid. Bij het vaststellen van frailty moet bij de patiënt en bij de naaste rekening worden gehouden met beïnvloeding. Door het ontbreken van consensus over een definitie van kwetsbaarheid en daarmee een gouden standaard, kan niet worden aan gegeven bij welke score sprake is van onder- of overschatting van de kwetsbaarheid.

In hoofdstuk 5 is gekeken naar de verpleegproblemen van de kwetsbare oudere en de rol van de GNS bij het vaststellen ervan. In totaal zijn gemiddeld vier verpleegkundige diagnoses gesignaleerd bij de kwetsbare oudere. Waarbij ´beperkte lichamelijke mobiliteit`, ´voedingstekort` en ´risico op vallen` het meest zijn geregistreerd. Van deze diagnoses werd meer dan de helft aangevuld door de GNS bovenop de diagnoses die al waren vastgelegd door de afdelingsverpleegkundigen. De afdelingsverpleegkundigen registreerden daarbij vooral diagnoses van lichamelijke aard en die direct zorg behoefden. Daarnaast registreerde de GNS ook nog actuele verpleegproblemen, potentiële problemen zoals ´risico op vallen` en ´risico op acute verwardheid` en problemen die na de opname nog zorg nodig hadden. De diagnoses waarvan de etiologie samenhing met de ziekenhuisopname werden voor bijna de helft door

de GNS geregistreerd. Dit gebeurde ook bij driekwart van de diagnoses die na ontslag uit het ziekenhuis nog een rol zouden spelen. Conclusie is dat door de consultatie van de GNS bij kwetsbare ouderen die werden opgenomen op een verpleegafdeling, veel en belangrijke verpleegkundige diagnoses extra werden vastgelegd.

In hoofdstuk 6 is het onderzoek beschreven naar het effect van een nieuw opgezet interventieprogramma met een centrale rol voor de GNS bij kwetsbare ouderen die werden opgenomen op een niet-geriatrische verpleegafdeling in een algemeen ziekenhuis. In een quasi-experimenteel onderzoek (non-equivalent controle-group design) werd op verschillende aspecten van functioneren naar effect gekeken; lichamelijk, psychisch en sociaal functioneren, subjectief welzijn, zorgafhankelijkheid, medicatie en opnamedagen. Door consultatie van de GNS bij kwetsbare ouderen in de interventiegroep werden meer problemen geïnventariseerd dan bij de controlegroep, waarbij de inzet van andere disciplines zoals fysiotherapie en diëtetiek nodig was, De uiteindelijke steekproef was onvoldoende groot om een significant verschil aan te kunnen tonen. Daarnaast bevatte de steekproef de meer jongere en minder kwetsbare ouderen van de doelgroep, doordat vooral oudere en de meer kwetsbare patiënten uitvielen gedurende het onderzoek. Wanneer naar het beloop van respondenten werd gekeken leek de interventiegroep het op enkele uitkomstmaten enigszins beter te doen dan de controlegroep. Met het inzetten van de GNS bij kwetsbare ouderen in het ziekenhuis werden meer individuele behoeften van de kwetsbare ouderen geïnventariseerd, maar de hulp hierop lijkt krachtiger te moeten worden ingezet.

Hoofdstuk 7 beschrijft het onderzoek naar de bruikbaarheid van het RE-AIM-model bij het evalueren van de effectstudie zoals beschreven in hoofdstuk 6. Het model richt zich met vijf dimensies op de onderwerpen van een interventie die impact hebben op situatie in de dagelijkse praktijk en daarmee op de vertaling van onderzoek naar de praktijk. Reach, het percentage en de representativiteit van

participanten uit de doelgroep, was in de effectstudie matig. Dit, omdat veel mensen van de populatie niet konden worden geïncludeerd en minder kwetsbare ouderen de interventie hebben ondergaan. De effectiveness, de impact van de interventie op belangrijke uitkomstmaten, inclusief potentiële negatieve effecten, kwaliteit van leven en economische uitkomsten, is in deze studie niet aangetoond. Naar adoption, het percentage en representativiteit van organisaties en betrokkenen die bereid zijn om met de interventie te werken, is in deze studie niet gekeken en hierover konden dus geen uitspraken gedaan worden. De implementation, de mate van trouw en consistentie van handelen van de betrokkenen tijdens de interventie, was in deze studie laag te noemen. De uiteindelijke interventie werd in de praktijk niet uitgevoerd zoals was bedoeld. Sneller inschakelen van de GNS bij acute verwardheid, het positieve neveneffect van de studie, werd goed opgenomen in de dagelijkse routine. De maintenance, de mate waarin de nieuwe interventie wordt geïnstitutionaliseerd en onderdeel wordt van de eigen praktijk en beleid, was in deze studie laag. Ten aanzien van het positieve neveneffect was de maintenance hoog te noemen. Deze evaluatie van de in hoofdstuk 6 beschreven effectstudie met het RE-AIM model heeft duidelijk gemaakt dat de gehanteerde onderzoeksopzet zich alleen richtte op de dimensies reach en effectiveness. Uitspraken over de andere dimensies zijn gebaseerd op de evaring van de onderzoeker en de GNS.

In hoofdstuk 8 zijn de belangrijkste resultaten en conclusies beschreven en bediscussieerd. Ook zijn aanbevelingen gedaan voor de praktijk en verder onderzoek.
Uit het onderzoek voor dit proefschrift wordt geconstateerd dat in tegenstelling tot het gebruik van physical frailty in de klinische praktijk met comprehensive frailty veel patiënten als kwetsbaar zijn aangemerkt bij wie tevens disability, en co-morbiditeit is gezien. Deze kwetsbare ouderen, die complexe zorg nodig hebben, worden echter op veel verschillende verpleegafdelingen in het ziekenhuis opgenomen die niet specifiek zijn gericht op de zorg voor deze groep patiënten. Bij hen worden vooral verpleegproblemen gezien bij

mobiliteit, voeding, risico op vallen en risico op acute verwardheid. De ingeschakelde GNS heeft meer dan de helft van de gemiddeld vier verpleegkundige diagnoses per patiënt geregistreerd. De afdelingsverpleegkundigen waren vooral gericht op verpleegkundige diagnoses over lichamelijke problemen en problemen die direct zorg nodig hadden. Terwijl de GNS ook nog veel (potentiële) problemen registreerde waarvoor gedurende de opname aandacht nodig was. De effectstudie naar de inzet van de GNS bij deze kwetsbare ouderen liet zien dat er tevens inzet van andere disciplines nodig was. De steekproef is echter te klein geweest om significant verschil aan te kunnen tonen. In het bespreken van het RE-AIM model werd duidelijk dat deze effectstudie zich met het quasi-experimenteel onderzoeksdesign vooral heeft gericht op reach en effectiveness, en daarmee op individueel effect op korte termijn van de interventie.

Met het ouder worden van de bevolking, de langere levensverwachting, het veel voorkomen van kwetsbaarheid en daarmee het risico op slechte gezondheidsuitkomsten, zijn kwetsbare ouderen in de algemene ziekenhuizen zeker een groep patiënten waar gericht aandacht voor moet zijn. Om vroegtijdige diagnostiek en behandeling gericht in te zetten bij risicopatiënten en achteruitgang te voorkomen of te vertragen, is het aan te bevelen om in de klinische praktijk de Groningen Frailty Indicator (GFI) bij iedere nieuw opgenomen oudere patiënt af te nemen. Zo kan gericht onderzoek worden gedaan naar de zorgbehoeften van de individuele patiënt en kan aansluitende de voor die patiënt adekwate behandeling worden ingezet. Omdat de problemen rond frailty meestal binnen het domein van de verpleegkundige zorg liggen, wordt een centrale rol voor de GNS bij deze risicopatiënten aanbevolen.

Gearfetting

Ferâldering as it proses wêrby't de funksjonele reserves fan it lichem ôfnimme, ferrint net by elk itselde. Guon binne lang fit en linich, oaren ha kroanyske sykten en oandwaningen en binne kwetsber. Dy âlderen ha te krijen mei efterútgong yn ferskate domeinen fan funksjonearjen en ha dêrmei in gruttere kâns op minne útkomsten bygelyks leger wolwêzen, sikehûsopname, soarchôfhinklikens en stjerre. In sikehûsopname kin foar in âldere ek in fierdere efterútgong yn it funksjonearjen betsjutte, ôfhinklik fan soarch wurde, langer opnommen wêze en komplikaasjes krije. Foar de âldere is it wichtich dat dy soarch oanbean wurdt dy't it meast fertuten docht, sadat it tal minne útkomsten beheind bliuwd. Foar de sûnenssoarch is it wichtich dat de sûnensrisiko's by âlderen mei in komplekse problematyk betiid sinjalearre wurde, de krekte soarch ynset wurdt en dat dy goed organisearre is.

Yn eardere stúdzjes by kwetsbere âlderen ha geriatryske yntervinsjes positive resultaten sjen litten, bygelyks, koartere sikehûsopname, minder komplikaasjes en minder opnamen yn ferpleechhuzen. It begryp kwetsberheid kin as case-finding brûkt wurde om âlderen te identifisearjen mei in heger risiko op minne útkomsten en dy't baat ha kinne by previntyf hanneljen. Yn guon definysjes fan kwetsberheid wurdt de klam lein op de tanende reserve kapasiteit yn de fysike aspekten fan it funksjonearjen, oaren pleitsje foar in definysje dy't basearre is op alle aspekten fan funksjonearjen. Sa'n omskriuwing passet better by it byld yn de klinyske praktyk fan de kwetsbere âldere en de holistyske fysje fan de geriatry. Yn dit proefskrift is kwetsberheid omskreaun as in oan leeftyd relatearre tastân fan fermindere lichamelik, kognityf, sosjaal en psychysk funksjonearjen wat resultearret yn in fermindere reserve kapasiteit foar it omgean mei stressors.

Troch efterútgong yn funksjonearjen en/of krijen fan kroanyske sykten kinne âlderen ferlet ha fan help fan oaren by har deistich libben. It stypjen by deistige problemen of om dy problemen foar te kommen

leit yn it domein fan de ferpleechkundige, dy hat dermei in dúdlike rol yn de soarch foar de kwetsbere âlderen. Om de krekte ferpleechkundige soarch yn sette te kinnen is diagnostyk fan it ferpleechprobleem tige wichtich. It is mooglik dat ferpleechkundigen wurkjend yn in oar spesjalisme as de geriatry, te min saakkundich binne om alle problemen fan de kwetsbere âldere te werkennen. In spesjalisearre geriatryske ferpleechkundige soe grif in positive bydrage leverje kinne. As der in folsleine ynventarisaasje fan de problemen fan de yndividuele kwetsbere âldere dien is kin in krekte yntervinsje ynset wurde, wêrby't stribbe wurde moat nei útkomsten fan de soarch dy't foar de pasjint gaadlik en helber binne.

Yn it proefskrift is sjoen nei it begryp frailty yn 'e klinyske praktyk, it fêststellen derfan, de rol fan de Geriatric Nurse Specialist (GNS: geriatryske ferpleechkundich spesjalist) en it effekt fan it ynsetten de GNS by kwetsbere âlderen.

Yn Haadstik 2 wurdt physical frailty basearre op fysike aspekten fan funksjonearjen ferlike mei comprehensive frailty basearre op alle aspekten fan funksjonearjen. Boppedat is sjoen nei oerlape fan de begripen mei disability, co-morbiditeit en syktelêst binnen in groep âldere sikehûspasjinten, om ta in útspraak te kommen oer de brûkberens fan beide frailty operasjonalisaasjes foar case-finding yn de klinyske praktyk. Leeftyd bliek in positive relaasje te hawwen mei beide frailty operasjonalisaasjes en mei disability en dat comprehensive frailty faker sjoen waard as physical frailty. Physical frailty waard by minder dan in kwart fan de âlderen sjoen en hast altyd yn kombinaasje mei disability en/of co-morbiditeit. Hjirtroch koe it net goed ûnderskieden wurde fan disability en/of co-morbiditeit. Comprehensive frailty kaam by hast twatredde foar. It kaam faker allinne foar, mar by dy operasjonalisaasje wiene relatyf mear âlderen identifisearre by wa't neist kwetsberheid ek noch disability en/of co-morbiditeit konstatearre waard. By mear as de helte fan de respondinten kaam comprehensive frailty tagelyk foar mei disability en syktelêst, wat betsjutte dat it hjir gong om in groep âlderen dy't dúdlik soarch nêdich ha soe. Neffens physical frailty binne mei

comprehensive frailty troch it opnimmen fan sûnensswierrichheden, sosjaal en psychysk funksjonearjen neist fysyk funksjonearjen, dus mear kwetsbere âlderen sjoen dy't ferlet ha fan spesifike soarch.

Yn haadstik 3 wurdt beskreaun hoe't frailty foar it ljocht komt by âlderen dy't opnommen binne op de fiif ferpleech ôfdielingen: geriatryske genêskunde, ynwindige genêskunde, traumatology,longsykten/reumatology en sirurgyske genêskunde. Omdat it ôfnimmen fan lichamelik funksjonearjen gearhinget mei de oanwêzigens fan soarchôfhinklikheid en in medyske diagnoaze, soe kwetsberheid by ferskate syktebylden mear as minder te sjen wêze. Hast alle pasjinten op de ôfdieling geriatry wiene kwetsber, mei de measte problemen ferdield oer mobiliteit-, sûnens-, en psychososjale aspekten fan kwetsberheid. Dit wie neffens ferwachting oangeande de doelgroep fan de geriatry en befêstige de brûkte definysje fan frailty. By sirurgyske genêskunde waard kwetsberheid by rom de helte fan de pasjinten konstatearre, by traumatology en longsykte/reumatology by hast trijekwart en by de ynwindige genêskunde sels by mear as trijekwart fan de pasjinten. Psychososjale aspekten fan kwetsberheid kamen by de ferskate medyske spesjalismen in stik hinne like faak foar en like dêrmei ûnôfhinklik fan de oandwaning. De skoare op de mobiliteit aspekten fan kwetsberheid wienen wol oars by alle spesjalismen. De âlderen op de ôfdieling geriatry wienen opfallend mear kwetsber as de âlderen fan de oare fjouwer spesjalismen, dy't sels net opfallende ferskille sjen lieten. In konklúzje is dat mear as de helte oant trijekwart fan de opnommen pasjinten by dy spesjalismen, fan 75 jier en âlder, kwetsber is.

Yn haadstik 4 is de brûkberens fan de ynformaasje fan neisten, ûndersocht oangeande it fêststellen fan frailty fan de pasjint op it momint fan sikehûsopname. De neisten rekkenje de pasjent mear kwetsber as de pasjint sels docht. Nettsjinsteande ferskillen op yndividueel nivo wie dit ferskil net opfallend foar pasjinten sûnder kognitive beheiningen mar wol opfallend foar pasjinten mei kognitive beheiningen. Wol is foar beide groepen pasjinten op te merken dat it

ferskil tusken pasjint en partner lytser wie as it ferskil tusken pasjint en bern. Ek is oantoand dat foar beide groepen pasjinten mear oerienstimming yn anderten bestie foar de mear sichtbere kwetsberheid lyk as mobiliteit, dan foar de mear subjektive aspekten lyk as gefoelens fan iensumheid. By it fêststellen fan frailty moat by de pasjint en by de neiste, wol degelik rekken hâlden wurde mei beynfloeding. Om't der gjin konsensus is oer de definysje fan kwetsberheid en dêrmei in gouden standert, kin net oanjûn wurde by hokker skoare der in ûnder- of oerskatting is fan kwetsberheid.

Yn haadstik 5 is it ferpleechprobleem fan de kwetsbere âldere beskreaun en de rol fan de GNS. Yn totaal binne gemiddeld 4 ferpleechkundige diagnoazen sinjalearre by de kwetsbere âldere, it meast registrearre binne: 'beheinde lichamelike mobiliteit', 'tekoarten yn it iten', 'kâns op fallen'. Fan dy ferpleechkundige diagnoazen waarden mear dan de helte oanfolle troch de GNS op de diagnoazen dy't al fêstlein wienen troch de ôfdielingsferpleechkundigen. Dy registrearren dêrby benammen diagnoazen fan lichamelike aard en dy't daliks soarch nedich hienen. De GNS registrearre benammen ek noch aktuele ferpleechproblemen en potinsjele problemen, sa as 'kâns op fallen' en 'kâns op akute betizing' en problemen dy't nei de opname ek noch omtinken freegje. De diagnoazen dêr't de etiology gearhong mei de sikehûsopname waarden hast foar de helte registrearre troch de GNS. Fan de diagnoazen dy't nei ûntslach út it sikehûs noch wichtich wêze soenen, waarden foar trijekwart fêstlein troch de GNS. Mei de konsultaasje fan de GNS by de kwetsbere âlderen op in ferpleechôfdieling waarden dus in protte en wichtige ferpleechkundige diagnoazen ekstra fêstlein.

Yn haadstik 6 is it ûndersyk beskreaun nei it effekt fan in nij opset yntervinsjeprogramma mei dêryn opnaam in sintrale rol foar de GNS by de kwetsbere âlderen dy't opnommen binne op net-geriatryske ferpleechôfdielingen yn in algemien sikehûs. Yn in kwasi-eksperimenteel ûndersyk (non-equivalent controle-group design) waard sjoen nei ferskate aspekten fan funksjonearen, subjektyf wolwêzen, soarchôfhinklikheid, medikaasje en opnamedagen. Troch

de konsultaasje fan de GNS by de kwetsbere âlderen yn de yntervinsjegroep, koenen mear problemen ynventarisearre wurde sadat de ynset fan oare dissiplines lyk as fysioterapy en dietyk nedich wie, as by de kontrôlegroep. Uteinlik wie de stekproef net foldwaande om in opfallend ferskil sjen te litten. Dêrnjonken befette de stekproef de jongere en minder kwetsbere âldere fan de doelgroep, omdat benammen âldere en mear kwetsbere pasjinten net ynkludearre wurde koene as útfoelen yn de tiid fan it ûndersyk. As nei it berin fan de respondinten sjoen waard, like de yntervinsjegroep it op inkelde útkomstmaten better te dwaan as de kontrôlegroep. Mei it ynsetten fan de GNS by kwetsbere âldere yn it sikehûs wurdt it mear yndividuele ferlet fan de kwetsbere âldere ynventarisearre.

Yn haadstik 7 is de brûkberheid ûndersocht fan it RE-AIM model by it evaluearen fan de yntervinsje stúdzje lyk as beskreaun yn haadstik 6. Mei fiif diminsjes rjochtet it model him op dy ûnderweren fan in yntervinsje dy't ympakt ha op de sitewaasjes yn 'e deistige praktyk en dêrmei op de oersetting fan ûndersyk nei de praktyk. Reach, it persintaazje en represintativiteit fan de partisipanten út de doelgroep wie yn de yntervinsje stúdzje matich. Dit wie sa om't in protte lju fan de populaasje net ynkludearre wurde koenen en de minder kwetsbere âlderen de yntervinsje ûndergien ha. De effectiveness, de ympakt fan de yntervinsje op wichtige útkomstmaten, ynklusyf potinsjele negative effekten, kwaliteit fan libben en ekonomyske útkomsten, is yn de stúdzje net oantoand. Nei adoption, it persintaasje en representativiteit fan organisaasjes en belutsenen dy't reewillich binne om mei de yntervinsjes te wurkjen, is yn de stúdzje net sjoen en kinne sa ek gjin útspraken oer dien wurde. De ynplemintaasje, de mate fan trou en konsistinsje fan hanneljen fan de belutsenen oangeande de yntervinsje, wie yn de tiid fan de stúdzje leech. De úteinlike yntervinsje wurdt yn de praktyk net sa brûkt as bedoeld wie. It earder ynsetten fan de geriatry by akute betizing, de positive bykomstichheid fan de stúdzje, waard wol goed opnommen yn 'e deistige rûtine. De maintenance, hoe bot de nije yntervinsje ynstitusjonalisearre wurdt en ûnderdiel wurdt fan de eigen praktyk, wie yn de tiid fan de stúdzje leech. Foar de positive bykomstichheid, al earder neamd, wie dit

heech. De evaluaasje fan de yn haadstik 6 beskreaune yntervinsje stúdzje mei it RE-AIM model hat sa dúdlik makke dat de hantearre opset fan it ûndersyk har allinne rjochte op de diminsjes reach en effectiveness. Utspraken oer de oare diminsjes binne basearre op de ûnderfining fan de ûndersiker en GNS.

Yn haadstik 8 steane de meast wichtige resultaten en konklúzjes beskreaun. Dy binne bepraat en der binne oanbefellingen dien foar de praktyk en fierder ûndersyk. Yn it proefskrift is beskreaun dat yn stjinstelling ta it gebrûk fan physical frailty yn de klinyske praktyk mei comprehensive frailty mear kwetsbere pasjinten sjoen wurde by wa't ek noch disability en/of co-morbiditeit konstatearre waard. Dy kwetsbare âlderen dy't komplekse soarch nedich ha, wurde lykwols op ferskate ferpleech-ôfdielingen yn it sikehûs opnommen dy't net altyd goed ynspylje kinne op de krekte soarch foar dy groep pasjinten. Ferpleechproblemen binne by harren benammen oangeande mobiliteit, iten, kâns op fallen en kâns op akute betizing. De GNS hat mear dan de helte fan de gemiddelde 4 ferpleechkundige diagnoazen per pasjint registrearre. De ôfdielingsferpleechkundigen wienen benammen rjochte op ferpleechkundige diagnoazen oer lichamelike problemen en problemen dy't daliks ferlet fan soarch hienen. De GNS registrearre ek noch in protte (potinsjele) oare problemen dy't yn de hiele tiid fan de opname oandacht nedich hienen. De yntervinsje stúdzje nei it ynsetten fan de GNS by de kwetsbere âlderen liet sjen dat oare dissiplines ynsetten wurde moasten. De stekproef wie lykwols te lyts om in grut ferskil sjen te litten. Doe't it RE-AIM model wiidweidich besprutsen is, waard dúdlik, dat de yntervinsje stúdzje har mei it kwasi-eksperimenteel ûndersykdesign benammen rjochte op reach en effectiveness en dêrmei op yndividueel effekt op koarte termyn fan de yntervinsje.

Mei it âlder wurden fan de befolking, de langere libbensferwachting, it tanimmen fan de kwetsberheid en dermei de kâns op mindere sûnensútkomsten, binne kwetsbere âlderen yn algemiene sikehuzen grif in groep pasjinten dêr't spesjaal omtinken foar wêze moat. Om de diagnostyk op 'e tiid en de behanneling daliks goed yn te setten by

risikopasjinten om efterútgong foar te kommen of al ynsette efterútgong stadiger ferrinne te litten is it oan te befeljen om yn de klinyske praktyk de Groninger Frailty Indicator (GFI) by elke nije opnommen âldere pasjint ôf te immen. Dan kin ôfstimd ûndersyk dien wurde nei de soarchneed fan de yndividuele pasjint en kin in pasjende behanneling ynset wurde. Om't de problemen om frailty hinne benammen binnen it domein fan de ferpleechkundige soarch lizze, wurdt de sintrale rol foar de GNS by dy pasjinten oanrikkemandearre. Mei it gebrûk fan de skrining op kwetsberheid, it ynventarisearjen fan de spesifike soarch kin de krekte soarch ôfstimd wurde op de pasjint.

Appendix: The Groningen Frailty Indicator

All questions refer to the last few weeks, unless the question is explicitly phrased otherwise.

Mobility
Are you able to carry out these tasks single-handed without any help? (The use of help resources such as walking stick, walking frame, wheelchair, is considered independent)

- shopping
- walking around outside (around the house or to the neighbours)
- dressing and undressing
- going to the toilet

Physical fitness
What mark do you give yourself for physical fitness? (scale 0 to 10)

Vision
Do you experience problems in daily life due to poor vision?

Hearing
Do you experience problems in daily life due to being hard of hearing?

Nourishment
During the last 6 months have you lost a lot of weight unwillingly? (3 kg in 1 month or 6 kg in 2 months)

Morbidity
Do you take 4 or more different types of medicine?

Cognition (perception)
Do you have any complaints about his/her memory or it the patient known to have a dementia syndrome?

Psychosocial

Do you sometimes experience emptiness around him/her?
Do you sometimes miss people around him/her?
Do you sometimes feel abandoned?
Have you recently felt downhearted or sad?
Have you recently felt nervous or anxious?

Scoring:

Question 1 – 4: independent = 0; dependent = 1
Question 5: 0 – 6 = 1; 7 – 10 = 0
Question 6 – 9: no = 0; yes = 1
Question 10: no and sometimes = 0; yes = 1
Question 11 – 15: no = 0; sometimes and yes = 1

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