

INSIGHTS IN THE EFFECTIVENESS OF USUAL CARE REGARDING FUNCTIONAL DECLINE IN GERIATRIC AND STROKE PATIENTS.

MASTER'S THESIS

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<i>Version</i>	Final version
<i>Date</i>	30-06-2016
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<i>Intended journal</i>	Journal of clinical nursing (3000-8000 words, no specific reference style)
<i>Words</i>	3792
<i>Reporting criteria</i>	Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) statement
<i>Words in abstract</i>	299
<i>Woorden in samenvatting</i>	297

ABSTRACT

Background: Worldwide, 30-60% of older patients develop functional decline during hospital admission, due to, among other causes, geriatric diseases or stroke. Usual care influences change in functional decline, but insights into usual care are required to optimize care in geriatric and stroke patients.

Aims: Gaining insights into the effectiveness and experiences of usual care in geriatric and stroke patients admitted to hospital regarding change in functional decline.

Design: A prospective mixed-method multicenter study with a parallel approach was performed, consisting of a quantitative observational longitudinal and a qualitative study design.

Methods: Geriatric and stroke patients (N=122) admitted to hospital participated in the quantitative study. Main quantitative study outcome was actual change of functional decline between admission and discharge, operationalized as level of independency in Activities of Daily Living (Barthel Index) and mobility (Elderly Mobility Scale). Patients' experiences with usual care regarding functional decline were qualitatively collected through semi-structured interviews (N=7).

Results: A paired t-test derived significant increase in level of independency in Activities of Daily Living and mobility in both groups. Qualitative findings suggest differences in perceived importance of recovery. Geriatric patients mentioned independency and autonomy as important, and expectations of recovery were low compared to stroke patients' expectations. Stroke patients were highly motivated to recover from functional decline and accepted the undermining of their autonomy to achieve their goal.

Conclusion and recommendations: Usual care seemed most effective in stroke patients, since their actual change in functional decline was more positive than in geriatric patients. Differences in priority of preventing and reducing functional decline during hospital admission were found as main qualitative finding. In conclusion can be stated that patients' motivational reasons influence the actual change of functional decline. To guide future improvement of care, various needs of both groups should be taken into account in developing future interventions.

Keywords: Functional decline, experiences, usual care, geriatric and stroke patients.

SAMENVATTING

Achtergrond: Wereldwijd ontwikkelen 30-60% van de oudere patiënten functionele achteruitgang tijdens ziekenhuisopname door, naast andere oorzaken, geriatrische ziekte of beroerte (CVA). De verandering in functionele achteruitgang wordt beïnvloedt door de gebruikelijke zorg, maar inzichten in de gebruikelijke zorg zijn nodig om de zorg voor geriatrische en CVA patiënten te optimaliseren.

Doelstelling: Het verkrijgen van inzichten in de effectiviteit en ervaringen met gebruikelijke zorg met betrekking tot functionele achteruitgang bij geriatrische en CVA patiënten die opgenomen zijn in het ziekenhuis.

Design: Een prospectieve mixed-methods multicenter studie met een parallelle benadering werd uitgevoerd, bestaande uit een kwantitatieve observationele longitudinaal en een kwalitatief design.

Methode: Geriatrische en CVA patiënten (N=122) opgenomen in het ziekenhuis namen deel in de kwantitatieve studie. De hoofduitkomst was verandering in functionele achteruitgang tussen opname en ontslag, geoperationaliseerd als niveau van onafhankelijkheid in dagelijkse activiteiten (Barthel Index) en mobiliteit (Elderly Mobility Scale). Ervaringen van patiënten met gebruikelijke zorg omtrent daadwerkelijke verandering in functionele achteruitgang werden daarnaast verzameld met semigestructureerde interviews (N=7)

Resultaten: Een gepaarde t-toets gaf significante verbetering aan in niveau van onafhankelijkheid in dagelijkse activiteiten en mobiliteit in beide groepen. Kwalitatieve bevindingen suggereerden verschillen in het ervaren belang van herstel. Het belang voor geriatrische patiënten lag bij onafhankelijkheid en autonomie en hun verwachtingen van herstel waren lager vergeleken met dat van CVA patiënten. Het belang van CVA patiënten lag bij herstel van functionele achteruitgang en ondermijning van hun autonomie werd geaccepteerd.

Conclusie en aanbevelingen: Gebruikelijke zorg leek het effectiefst bij CVA patiënten, daar de verandering in functionele achteruitgang positiever was. Prioriteitsverschillen in het voorkomen en verminderen van functionele achteruitgang tijdens ziekenhuisopname was de belangrijkste kwalitatieve bevinding. De motivatie van patiënten beïnvloedt de verandering van functionele achteruitgang. Voor het ontwikkelen van interventies in de toekomst moet rekening worden gehouden met de verschillende aard van beide groepen.

Sleutelwoorden: Functionele achteruitgang, ervaringen, gebruikelijke zorg, geriatrische en CVA patiënten.

INTRODUCTION AND RATIONALE

Successful ageing is associated with significant challenges to the provision of health care^{1,2}. Older people live longer, which is often accompanied by a decline in the activities of daily life (ADL)^{1,3-7}. In addition, they are progressively confronted with comorbidities, impaired quality of life, and hence increased dependency on care and hospital admission^{3,8}. Annually, about two million hospital admissions are registered in the Netherlands. A hospital admission is defined as admission to hospital for more than 24 hours⁹. Hospital admission is risky for elderly people and associated with an increased risk of functional decline (FD) and iatrogenic complications¹⁰⁻¹³.

FD is defined as *loss of the ability to independently perform ADL, and/or instrumental ADL, such as house cleaning or travelling*¹⁴⁻¹⁶. It is the most prevalent complication among elderly people admitted to hospital, but still an underestimated problem. It is associated with increased length of stay, hospital expenditures and mortality^{10,15-21}. During hospital admission, 30-60% of older patients (aged ≥65 years) experience FD caused by geriatric diseases or stroke²². Geriatric diseases are caused by multiple problems, such as infections, cognitive disorders or falls. Stroke is a sudden loss of neurological function²³. Both geriatric diseases and stroke causes FD, a high disease burden and increased risk for dependency^{22,24}.

Risk factors for FD are age, cognitive impairment, immobilization, isolation, restricted fluid intake, preadmission, decrease in IADL, depression and hospital admission. The probability of this risk increases with successful ageing^{16,25-27}. Therefore, in the Netherlands and other mainly Western countries with predicted ageing, preventing and reducing FD during hospital admission must be prioritized^{16,25-27}.

Multidisciplinary care, characterized by the multidisciplinary approach through which disciplines such as nurses or physiotherapists deliver care in close collaboration with each other, contributes to preventing and reducing FD among geriatric and stroke patients. This effect is more significant if specialized geriatric and rehabilitation multidisciplinary care is performed²⁸⁻³¹. Furthermore, multidisciplinary care is related to a reduction in length of admission and an increase in quality of life and experience of health^{11,28,32-34}.

Nevertheless, multidisciplinary care is primarily directed towards treating the disease and iatrogenic complications, rather than preventing and reducing FD^{11,32,33,35}. This may be caused by the culture in hospitals, in which the focus generally is on providing medical, high-technology, effective and rapid care, which does not always fit the elderly's needs in nursing^{20,36-38}.

The quality of multidisciplinary usual care influences patients' change in FD, among other factors such as disease outcome^{39,40}. Besides this, the vigor of usual care regarding prevention of FD among geriatric and stroke patients admitted to hospital is still unknown.

AIM

The aim of the study was to gain insights into the effectiveness and experiences of usual care in geriatric and stroke patients admitted to hospital, by identifying the actual change in functional decline as well as patients' experiences with usual care regarding their functional decline. Conclusions may guide the future improvement of nursing care regarding functional decline in these patient categories.

METHODS

DESIGN

A prospective mixed-method multicenter study with a parallel approach was performed; see Figure 1⁴¹. The combination of a quantitative observational longitudinal and qualitative study design was preferred, not only to quantify the actual change in FD but also to acquire a deeper understanding of patients' experiences with usual care regarding their FD. Data were equally prioritized, and overall data were interpreted to understand insights into the study objective from both perspectives⁴¹⁻⁴³.

SETTING, POPULATION AND DOMAIN

The study was performed at the geriatric and neurological wards in one general and one academic hospital in the Netherlands, from February to April 2016. Both hospitals were included to increase generalizability because of the various patient populations.

All geriatric or stroke patients with an expected duration of hospital admission of more than 48 hours were approached for inclusion in the quantitative study. Patients were excluded from participation if they were: a. too ill to participate; b. readmitted during the study period or; c. not able to speak Dutch, except for patients with cognitive or communicative disorders, such as aphasia.

Qualitative data were collected in the academic hospital from a purposive sample drawn from the quantitative sample. Maximum variation was pursued, based on baseline characteristics, such as gender, age and kind of ward. Only patients able to communicate adequately were approached for participation.

SAMPLE SIZE

In the quantitative study a sample size of N=129 was required to minimize the risk of type I- and II-errors, based on an estimated effect size of 0.35 on the main study outcomes and power of 80% for paired t-tests⁴¹. A number of eight interviews was pursued and data-collection stopped if theoretical data saturation was achieved.

DATA COLLECTION

MAIN STUDY OUTCOME

The main quantitative study outcome was the actual change in FD in geriatric and stroke patients admitted to hospital. The change in FD was operationalized as level of independency in ADL measured with the Barthel Index (BI), and level of mobility measured with the Elderly Mobility Scale (EMS); see Table 1. Measurements were performed at T₀: within 36 hours after admission and T₁: within 36 hours before discharge. Differences between these measurements determined actual change in FD.

BASELINE DATA

Baseline data were collected from all patients, including demographic characteristics: Age; gender, marital status categorized as single, married/cohabiting, widowed/divorced and other, and educational level categorized as low, medium and high. Besides this, the following health parameters were collected: Length of admission in days, reason for hospital admission categorized as geriatric or stroke, presence of cognitive competence measured with the Mini Mental State Examination (MMSE), presence of aphasia measured with the short version of the Frenchay Aphasia Screening Test (FAST); number of comorbidities, number of medications used and risk of malnutrition measured with the Malnutrition Universal Screening Tool (MUST); see Table 1.

Semi-structured interviews were performed after at least 72 hours of hospital admission to acquire a deeper understanding of patients' experiences with usual care. The questionnaire consisted of the following topics: Expectations of usual care; experiences of usual care; satisfaction with usual care; patients' role during hospitalization; good points and points for improvement.

PROCEDURES

Nurses working on the geriatric or neurological wards to the potential participants presented the opportunity for potential participants to participate in the study. A member of the research team verified eligibility by approaching the interested patients. Communicative and cognitive competence was measured with the FAST and MMSE. Participants with communicative

and/or cognitive disorders were considered communicatively incompetent, but eligible. All eligible patients were asked to sign informed consent and, in case of communicatively incompetent patients, their legal representative was approached to sign informed consent.

After their inclusion, baseline characteristics were collected from the Electronic Patient Record (EPR). Measurements were performed face-to-face with the communicative competent participants, as only observational data were collected in interviews with the nursing staff and/or legal representative in the case that a participant was communicatively incompetent.

Only communicatively competent participants were also approached for participation in the interviews. Setting and planning of the interview was determined in collaboration with the participant.

ETHICAL CONSIDERATIONS

Ethical approval was obtained from the Medical Research Ethics Committee of the academic hospital (reference number: 15-157/C) and the hospital authority of the general hospital (reference number: 1512-657). The study was performed in accordance with principles of the Declaration of Helsinki (version 19-10-2013)⁴⁴, Medical Research Involving Human Subjects Act⁴⁵ (WMO) and Personal Data Protection Act⁴⁶ (WPDA).

All eligible patients received verbal and written information and a member of the research team answered all questions. Informed consent was obtained. Patients' data were made anonymous by assigning a code to each participant, and only the research team had access to source codes.

DATA ANALYSIS

Statistical analysis was performed using IBM SPSS version 22.0 (IBM Corp., Armonk, NY, USA)⁴⁷. Missing values were replaced using multiple imputations for either geriatric or stroke patients to increase the statistical power and decrease bias. Demographics were compared between geriatric and stroke patients using percentages and Chi-square tests for dichotomous variables, and either means with standard deviation (SD) and student's t-test for continuous variables⁴¹.

A student's t-test was performed to compare variability in results of BI and EMS at T₀ between the two groups⁴¹. A paired t-test was performed to assess the actual change in FD during hospitalization within groups⁴¹.

All audiotaped interviews were transcribed verbatim, and a qualitative content analysis was performed using NVivo 10 (QSR International)⁴⁸. The first interview was considered a pilot

interview, but included in data-analysis. The audiotape of the pilot interview was listened to and discussed within the research team, and adjustments were performed on the questionnaire and interview process. Alternating data-collection and analysis lead to adjustments to the questionnaire based on a discussion within the research team (JdM) and new insights derived in the first four interviews^{41,42}. Transcripts of the first six interviews were read and coded by two members of the research team (EK and SvE) and one peer reviewer (JV) and final coding was performed after researcher triangulation. Researcher triangulation was applied to base data collection, coding and analytic decisions on convergent validation with two independent researchers, and within the research team. Themes were constructed by combining codes with categories. Ultimate themes were drafted after discussion within the research team (EK, JdM, CV, SvE).

FINDINGS

QUANTITATIVE SAMPLE

In the period of inclusion, 254 patients were found to be eligible for the quantitative study and 206 patients were approached for participation. A sample of 122 (48%) patients was included in the study. The most common reasons for exclusion were 'declined for participation' (N=32; 38.1%), 'too ill or in terminal phase' (N=19; 22.6%) and 'duration of hospital admission <48 hours' (N=19; 22.6%); see Figure 2. Missing values in level of independency in ADL and Mobility (LIAM) were found, respectively 18% on BI and 18.9% on EMS.

DEMOGRAPHIC AND HEALTH PARAMETERS

The mean age of the 122 patients was 77 years old (SD=13.1), and 50 of these patients were male. Sixty patients (49.2%) were diagnosed with a stroke and 66 patients (54.1%) with a geriatric disease. Of the geriatric patients, the mean age was 82.3 years old (SD=7) and 28 were male; in the stroke patients the mean age was 70.8 (SD=15.6) and 22 were male. Based on the criteria for cognitive and/or communicative function, 63 patients were considered as communicatively incompetent; see Table 2.

ACTUAL CHANGE IN FD

On average, there was no significant difference at T₀ between geriatric and stroke patients in the level of independency in ADL, with means respectively of 8.87 (SD:5.6) and 9.20 (SD:6.07), and level of mobility with means respectively of 8.09 (SD:5.94) and 8.26 (SD:5.89).

The LIAM increased significantly in both geriatric and stroke patients during hospital admission. The level of independency in ADL increased by 1.55 points (SD: 4.66; p<0.01)

and in stroke patients by 4.73 points (SD: 5.98; $p>0.01$) points. The levels of independency in mobility in geriatric patients increased by 1.91 points (SD: 5.87; $p=0.01$) and in stroke patients by 3.83 points (SD: 6.92; $p<0.01$); see Table 3.

QUALITATIVE SAMPLE

Seven patients were selected from the quantitative sample; three geriatric and four stroke patients. Three participants were male and ranged in age between 41 and 87 years. Interviews occurred after four but not longer than nine days after admission, and lasted for geriatric and stroke participants between 25-35 minutes. Finally, geriatric and stroke participants were admitted to hospital for 7.3 and 11.5 days respectively; see Table 5.

MAIN QUALITATIVE FINDINGS

Geriatric and stroke patients appear to have differences in perceiving the importance of recovery, and experiences of usual care regarding FD are different. Geriatric patients mentioned independency and autonomy as being very important and expectations of recovery were relatively low. They appeared keen for discharge. Stroke patients were highly motivated to recover their pursued LIAM and willing to accept, temporarily or not, that their autonomy was undermined. Stroke patients were only keen for discharge if their clinical treatment was completed. See Table 6 for the supporting quotes of the following topics.

BEING SATISFIED WITH TREATMENT

Geriatric patients were also satisfied with the treatment they received, but had other goals to pursue, especially the prevention of FD and being discharged as soon as possible. Stroke patients mentioned being highly satisfied with the treatment they received in order to restore the desired recovery. The variety of interventions performed by the multidisciplinary team was experienced as positive for achieving the desired recovery.

MAINTAINING AUTONOMY IS IMPORTANT

Particularly geriatric patients mentioned maintaining their autonomy was important, as they had been independent during their whole life and wanted to maintain independent during admission. A difference in perspective was found in stroke patients, as receiving optimal treatment to prevent and reduce FD was the main priority and they accepted their autonomy was undermined to achieve these objectives.

NURSES' IMPORTANT ROLE IN FD

Geriatric patients indicated they asked nurses for help only if it was really necessary. They stated a relatively large part of patients being admitted to the geriatric ward was mentally and/or physically incompetent and, therefore, needed nursing care more than they did.

Nurses did not always make additional efforts regarding prevent and reduce FD. Stroke patients indicated that instead of nurses' pitying their situation; they immediately started up the optimal treatment focused on prevent and reduce FD that was experienced as highly valuable both physically and mentally.

OTHER BARRIERS IN PREVENTING AND REDUCING FD

Both geriatric and stroke patients mentioned their feeling of being busy during admission, due to a variety of disciplines contributing to treatment and many visitors. Due to this busy schedule, they experienced fatigue, stress and confusion as a barrier to recovery. Geriatric patients indicated they sometimes had to wait for over ten minutes for the nurses. Stroke patients mentioned they observed the nurses' busyness and understood the long waiting time. However, when they had to wait even longer, they insecure and more dependent. Mostly geriatric patients did not like the multidisciplinary interventions regarding FD being offered; they referred to them as boring and not suiting their needs. Therefore, they did not participate.

OVERALL ANALYSIS

Both geriatric and stroke patients showed significant increase in LIAM during admission, although differences between both groups ensured they cannot be seen as the same.

Geriatric patients showed less improvement in LIAM and mentioned that independency and autonomy was important; their expectations of recovery of LIAM were relatively low and thus focused more on preventing FD than recovery, and were keen for discharge. Considering all these factors, it can be said that a lack of prioritizing the recovery of LIAM during hospital admission was found, which influenced the actual change in functional decline positively.

Stroke patients showed a greater improvement in LIAM and thereby mentioned they were highly motivated to recover their LIAM. In order to achieve that goal, stroke patients were willing to accept that their autonomy was sometimes undermined, and were only keen for discharge after completion of their clinical treatment. For stroke patients it can be said that prioritizing the recovery of LIAM has a positive influence on the actual change in functional decline.

DISCUSSION

The overall results provide insights into the effectiveness and experiences of usual care in geriatric and stroke patients admitted to hospital. The actual change in functional decline was both positive in geriatric and stroke patients. The perceived importance of this recovery of LIAM influenced the effectiveness of usual care in both groups. Besides this, a relationship

was found between the priority placed on recovering LIAM by the patients and the actual change in functional status. This influence appeared stronger and more positive in stroke patients than geriatric patients.

However, geriatric patients were found to be different from stroke patients, in both effectiveness and experiences with usual care regarding FD. Health issues are common in a geriatric population and a relation between chronically unsolved health and daily living needs is associated with lower expectations among recovery. Stroke patients are less dependent in ADL and mobility at discharge, likely since stroke is an acute disorder and motivation to prevent and reduce FD is relatively high. These differences explain the differences in motivation to prevent and reduce FD.

In line with other studies, level of independence in ADL increased in geriatric patients during hospital admission, whereby length of admission was comparable^{11,49-51}. Current study confirms that geriatric patients improved their level of independence in ADL during hospital admission. Geriatric patients perceived their independency and autonomy as very important in this study. This is consistent with other study results on older peoples' perspectives of clinical care where strong desire for independence in ADL was found⁵². Differences with other studies were found as well. Chang et al. found older people (aged >80 years) perceived that physical aspects of nursing care were more important and were more satisfied with physical care⁵³. Literature regarding geriatric patients' experiences of usual care is scarce, possibly caused by the fact that conducting qualitative research with geriatric patients is barriered by their complexity of illness; fatigue; frequent ward transfer; and delirium or dementia⁵⁴.

Stroke patients' increase in level of independency in ADL during hospital admission in this study was comparable with other studies^{55,56}, as was the measured increase in level of independency in mobility⁵⁷, however, more scientific literature involving the EMS measuring level of independency in mobility during hospital admission is scarce. Stroke patients were particularly found to state recovering from FD as main priority, even if this undermined their autonomy. This is consistent with findings from other studies to stroke patients' clinical experiences: Patients relied on the health care workers in making the best decisions towards their desired recovery^{58,59}, and in line with Macduff's findings where received usual care was characterized by having all the necessary therapy done, valuing therapy, to achieve their goals with their desired recovery⁶⁰.

This study confirms that patients with geriatric disease are more dependent in ADL at discharge than patients with a stroke, possible because a stroke is an acute disorder and a geriatric disease has a gradual onset.

As limitation of this study, not all eligible patients were approached for inclusion due to practical reasons, such as lack of time and manpower of the research team. However, based on the baseline characteristics, the sample was similar to the patients not approached for inclusion and therefore limited influence on the findings was expected. Secondly, relatively many missing values were caused due to the abovementioned practical reasons in measuring level of independency in ADL (18%) and mobility (18.9%). Multiple imputations were applied to prevent bias and increase reliability as this is the optimal method to cope with missing values⁶¹. Despite the use of the optimal method, it could have caused smaller standard estimates and therefore implicated a small effect modification on the outcome measurements. Thirdly, data saturation was not achieved in the qualitative study, due to a relative small number of participants included and practical reasons such as a lack of time to expand the qualitative study in terms of size. Thereby, the pilot interview was included in the analysis and therefore may have contributed to the level of saturation, due to the researcher's lack of experience with interviewing. Since the level of saturation cannot be excluded, information about qualitative outcome measure has been missed. Furthermore, communicative competence was necessary for inclusion in the qualitative study. This caused selection bias especially in geriatric patients, as the majority in this group was measured communicatively incompetent (59.1%) and qualitative results can be generalized only to communicative competent patients. Moreover, bias could have occurred by the course of recovery after stroke, which mostly increases in the acute phase and then the rising curve of recovery flattens out. If the interviews were performed during the period of acute post-stroke recovery with therefore, an optimistic patients, this could have resulted in selection bias⁶². Additionally, the qualitative interviews were performed in the academic hospital and results can only be generalized to all patients with stroke admitted to academic hospitals, since patients cannot be considered the same in general and academic hospitals due to the function of academic hospitals to grant specialized care for complex patients⁶³. Finally, during data-collection, there was an infection outbreak on the geriatric ward of the academic hospital, which resulted in eligible patients were missed to approach for inclusion. However, the geriatric sample was similar to samples in other studies^{15,64}.

This mixed methods study adds new evidence to the subject of interest. A study's strength is the evidence gained from two perspectives that can uncover novel causal factors and can result in holistic thinking about health care. Additionally, application of mixed methods research can enhance the ability to understand and address issues in clinical care⁶⁵. This is relevant not only to evaluate current state of health care but also to recognize variables to optimize care. A second strength is quantitative data were collected using widely used measurements by a team of trained researchers and discussion within the research team

took place whenever this was indicated. The researcher only collected qualitative data, but discussion between researchers was scheduled regularly. A member check was performed verbally in paraphrasing and summarizing answers before discussing the next topic and to build 'rapport', and the participant was free to choose the interview setting.⁴¹

In accordance with the main study findings, usual care should focus more on patients' motivational reasons to prevent and reduce FD. For example, nurses could encourage patients to perform easy tasks themselves, such as bathing or dressing. Thereby, more and different interventions should be available to meet more variable desires of the patients. To stimulate particularly geriatric patients to prevent and reduce FD, daily therapeutic activities should be tailored to patients' desires. Other study findings imply practical adjustments that could easily be performed, such as set rest hours for patients and a safe environment. More research should be performed in the future focusing on the experiences of particularly geriatric patients to uncover their experience with usual care more deeply. Also more research on the level of independency in mobility measured with EMS in stroke patients should be performed to validate the EMS in stroke patients.

CONCLUSION

Differences between geriatric and stroke patients in the effectiveness and experiences of usual care regarding the actual change in FD were found. Usual care seemed most effective in stroke patients, since their actual change in FD was more positive than in geriatric patients. Geriatric and stroke patients experienced the perceived importance with usual care regarding FD differently. Main difference was found in the priority of preventing and reducing FD during hospital admission, which was found in geriatric patients in maintaining their autonomy as much as can be, receiving their treatment, recovering, and being discharged; and in stroke patients in receiving the treatment, if necessary undermining their autonomy, recovering for as long as necessary, and then being discharged. In conclusion can be stated that patients' motivational reasons influence the actual change of FD.

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TABLES AND FIGURES

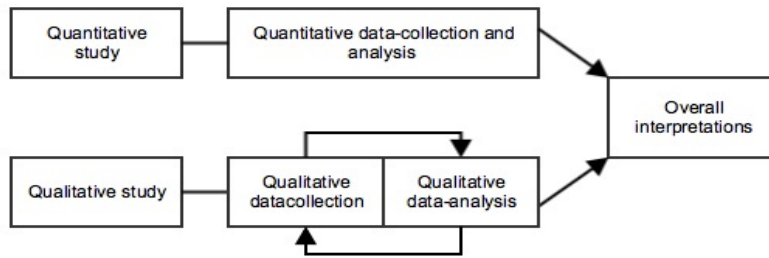


Figure 1 Design prospective mixed method study

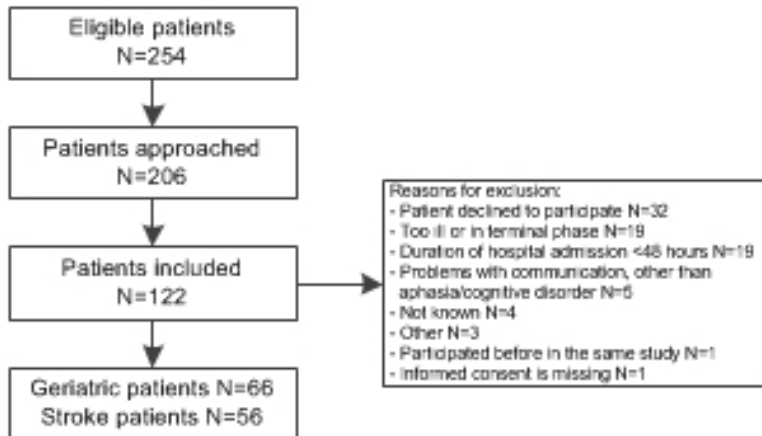


Figure 2 Flowchart of inclusion of participants

Table 1 Description of main outcomes and health parameters

Health parameter	Description
Level of independency in ADL (BI)	Ten items considering independency in ADL can be quantified using the BI. The score ranged from 0-20, as a lower score indicates lower level of independency in ADL ⁶⁶⁻⁶⁸ . Reliability: The BI is homogeneous (Cronbach's alpha 0.96), has an excellent inter-rater reliability (ICC 0.94-0.99) and an excellent agreement of total scores (mean kappa 0.88) ^{69,70} .
Level of independency in mobility (EMS)	Seven items considering mobility can be quantified using the EMS on a score ranged from 0-20, as a lower score indicates a lower level of mobility. The EMS has an excellent inter-rater reliability (ICC 0.88, p<0.0001) and a good construct validity ⁷¹ .
Reason for hospital admission	Such as stroke, pneumonia of urinary tract infection but categorized and analyzed with only geriatric disease and stroke.
Presence of cognitive competence (MMSE)*	A Dutch translation of the MMSE ⁷² was measured in an interview between researcher and patients. MMSE consists of 11 items, focusing on five aspects of cognitive function. Scores ranged between 0-30. A score <24 indicated cognitive incompetence ⁷³ . Reliability: alpha: 0.83-0.96 for internal consistency in patients admitted to hospital and an alpha: 0.80-0.95 for test-retest reliability. Validity: sensitivity: 87% in patients with dementia. Sensitivity 21-76% in patients with neurologic and psychiatric diseases. Specificity: moderate to high level ⁷⁴
Presence of aphasia (FAST)*	A Dutch short version of the FAST was measured in an interview between researcher and patients. The short version of the FAST consists of seven items, focusing on comprehension of language. A score <17, <16 and < 15 indicated communicative incompetence for respectively patients aged ≤60, ≥61 and ≥71 years ⁷⁵ . Reliability: kappa of 1.00 for test-retest reliability and inter-observer agreement: 93%. Validity: sensitivity: 87% and specificity 80% ⁷⁶ .
Number of comorbidities	Comorbidities, chronic diseases diagnosed prior to admission, were extracted from the EPR.
Number of medications used	Number of medications used was measured using the absolute number of medications used by the patient prior to admission.
Risk of malnutrition (MUST)	Measured with MUST based on anamnesis, consisting of BMI, weight loss and the expected food consumption. Scores ranged 0.6. A score of 0 indicates a low risk of malnutrition, a score of 1 a medium risk, and a score of ≥2 indicates a high risk ⁷⁷ . Reliability: kappa: 0.8-1.0 for inter-rater agreement ⁷⁸ . Validity: good content validity and an excellent concurrent validity with other measurement ⁷⁷ .
Abbreviations:	
ADL: Activities of Daily Living; BI: Barthel Index; EMS: Elderly Mobility Scale; ICC: Intraclass Correlation Coefficient; MMSE: Mini Mental State Examination; FAST: Frenchay Aphasia Screening Tool; EPR: Electronic Patient Record; MUST: Malnutrition Universal Screening Tool.	
* Communicative incompetent was categorized if scores on MMSE<24 and FAST<17, <16 or <16 (dependent of age). In all other cases, the patients was considered communicative competent.	

Table 2 Patients' demographic and health parameters (N=122)

	Geriatrics N=66	Stroke N=56
Age (in years)		
Mean (SD)	82.3 (7)	70.8 (15.6)
Gender (%)		
Male	28 (42.4)	22 (39.3)
Female	38 (57.6)	34 (60.7)
Marital Status (%)		
Single	3 (4.5)	4 (7.1)
Married/Cohabiting	29 (43.9)	35 (62.5)
Widowed/Divorced	31 (47)	14 (25)
Other	3 (4.5)	2 (3.6)
Educational level* (%)		
Low	24 (36.4)	10 (17.9)
Medium	14 (21.2)	22 (39.3)
High	14 (21.2)	14 (25)
Length of admission (days)		
Mean (SD)	10.1 (5.5)	8.6 (6.2)
Reason for admission [‡] (%)		
Stroke	4 (6.1)	56 (100)
Infection	36 (54.5)	8 (14.3)
Delirium	24 (36.4)	3 (5.4)
Gastrointestinal	15 (22.7)	
Cardiovascular	10 (15.2)	3 (5.4)
Psychiatric, other than delirium	10 (15.2)	
Electrolyte disorder	8 (12.1)	
Urological/nephrological	8 (12.1)	
Other	35 (53)	2 (3.6)
Communicative competent (%)	25 (37.9)	33 (58.9)
Comorbidity		
Mean (SD)	3.3 (1.5)	1.9 (1.2)
Medication [†]		
Mean (SD)	9.5 (4.2)	4.2 (4.2)
Risk on malnutrition (%)		
Low	39 (59.1)	51 (91.1)
Medium	9 (13.6)	2 (3.6)
High	17 (25.8)	1 (1.8)

Abbreviations:

All values are n except otherwise specified.

*Low: no or elementary education, Medium: high school or middle-level applied education, High: higher professional or academic education

‡Per patient there was more than one reason for admission possible.

†Number of medications used.

‡Falls were registered in the academic hospital and general hospital respectively three and six months prior to admission.

Table 3 Actual change in functional decline

	Geriatrics (N=66)	Stroke (N=56)	P-value
	Mean (SD)		
Independency in ADL T ₀	8.87 (5.60)	9.20 (6.07)	0.755
Independency in ADL T ₁ (BI)	10.43 (5.08)	13.94 (6.33)	0.001
Independency in mobility T ₀ (BI)	8.09 (5.94)	8.26 (5.89)	0.877
Independency in mobility T ₁ (EMS)	10.00 (5.17)	12.09 (6.38)	0.048
	Mean (SD)		P-value
Difference in ADL T ₁ -T ₀ (BI)	1.55 (4.66; <0.01)	4.73 (5.98)	<0.01
Difference in mobility T ₁ -T ₀ (EMS)	1.91 (5.87; 0.01)	3.83 (6.92)	<0.01

Table 5 Patients' demographic and health parameters qualitative study (n=7)

Patient	Reason for hospital admission	Age (years)	Gender	Comorbidity (n)	Length of admission (days)
1	Stroke	41	Female	0	7
2	Stroke	70	Male	3	11
3	Stroke	47	Female	0	11
4	Stroke	74	Male	2	17
5	Geriatrics: psychiatric and other reason	85	Female	4	7
6	Geriatrics: infection	87	Female	4	8
7	Geriatrics: infection	71	Male	4	7

Table 6: Quotes of patients

BEING SATISFIED WITH TREATMENT
Patient 3: <i>"I did not had the feeling of things were not going well. Not at all. They took everything really serious I think."</i>
Patient 3: <i>"The physiotherapists, really great ... I practiced with them with standing on one or two legs, catching things, yes, I think he's doing a really good job to see what I can and cannot do."</i>
BUSY SCHEDULE RELATED TO FATIGUE, STRESS AND LIMITATION TO FREEDOM
Patient 1: <i>"The care is quite good... I just don't know what I have to do with eh...what is the one doing and what is the other doing? That's just sometimes a bit too much, I'd say."</i>
Patient 2: <i>"You just need moments to think about your own life, to have your own moments and relax your mind."</i>
NURSES' IMPORTANT ROLE IN PREVENTION OF FD
Patient 4: <i>"The nurses don't approach you with pettiness, and sometimes that is also annoying as I think: 'Can you not lend a hand?' but then they say: 'I just help you if you particularly ask for it' and I think that's a good way...you don't stay dependent that much."</i>
BARRIERS IN PREVENTION OF FD
Patient 2: <i>"Usually information is eh, just quite good, however, some casualties, just write it down and if someone comes to visit me, eh, I may have read it to someone. Yes, that's it."</i>
Patient 4: <i>"I think 15 minutes to wait for a nurse to respond my call is quite long ... it has sometimes taken longer, but then it wasn't ... yes, I think I should have screamed if it was really necessary. So that was definitely something I had to exercise some patience for."</i>
Patient 6: <i>"I think I feel a little weird, just throwing around a ball: 'who catches the ball? Oh, amazing!' No, I have been through that throwing, no, that's not for me."</i>