ORIGINAL REPORT

PATIENT GOALS IN POST-ACUTE GERIATRIC REHABILITATION: GOAL ATTAINMENT IS AN INDICATOR FOR IMPROVED FUNCTIONING

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Objective: To identify goals of older patients in geriatric rehabilitation and to measure their improvement in overall functioning.

Design: A prospective multi-centre cohort study.

Methods: A semi-structured questionnaire was used to identify patient goals and to assess improvement in overall functioning from patients' and health professionals' perspectives. Patients' goals were linked to the International Classification of Functioning, Disability and Health (ICF). Using a residualized change score, we identified patients who improved more than statistically expected.

Results: A total of 209 patients gave 476 statements. Of these, 346 (72.7%) statements were linked to 58 different ICF categories. More than 90% of the ICF categories were part of the comprehensive geriatric ICF Core Set. "Walking", "getting rid of pain", "autonomy" and "returning home" were the most frequently reported goals. Multivariable analysis identified shorter length of inpatient stay and goal attainment to be significant predictors for an improvement in overall functioning from the patients' perspective.

Conclusion: The ICF can be used to identify and structure patients' goals in geriatric rehabilitation. The association between goal attainment and improved overall functioning underlines the necessity of considering the patients' perspective in the rehabilitation process.

Key words: ICF; goals; advance care planning; cohort study; rehabilitation; outcome assessment; classification; aged.

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INTRODUCTION

After an acute adverse event or an acute episode of illness, older patients need special attention due to their higher vulnerability to functional decline during hospitalization (1). This increased risk of experiencing a loss of functioning is due to comorbidities, a high prevalence of cognitive impairment (2), in addition to factors such as depression (3), frailty (4) and other pre-existing limitations in functioning (1, 5). To prevent chronic disability, early onset of rehabilitation is essential (6).

The American Geriatrics Society (AGS) (7) defines rehabilitation "as the maintenance and restoration of physical and psychological health necessary for independent living and functional independence". As such, restoration or maintenance of patients functioning is the main objective of post-acute rehabilitation. Moreover, post-acute rehabilitation also aims at preventing disability and the need for long-term care as well as at promoting patients' autonomy (6). Ideally, an interdisciplinary team of physicians, nurses and therapists specialized in rehabilitation care should cooperate to manage the demands of early post-acute rehabilitation.

Timely goal-setting in close consultation with the patient is essential to rehabilitation success (8–9). Wade (10) considers a goal as a "future state that is desired and/or expected" and that "might refer to relative changes or to an absolute achievement" (p. 273). In this context a goal comprises not only the patients' aspirations, but also his environment, family, or any other involved persons. Involving the patients' perspective by identifying his personal needs and problems is considered to be a basic principle of the goal planning process (10).

Older, frail persons, in particular those at risk for functional decline, have a large spectrum of needs, desires or goals relevant to their rehabilitation. These goals may pertain to their particular health condition or disability, return to the home environment, activities of daily living, or emotional situation. The need for involving the patients' personal perspective in the rehabilitation process had been noted previously (11–12). In this context, the relevance of goal attainment for an evaluation of outcome is of interest in clinical practice (12). Arguably, the actual attainment of patients' goals is associated with improvement in overall functioning as subjectively perceived by the patient, and objectively recorded by the health professional. However, there is no consensus on how to assess systematically the patients' perspective, nor is it obvious whether the attainment of goals really indicates improvement in measured outcomes (12–14).

The International Classification of Functioning, Disability and Health (ICF) is a globally accepted language to communicate about functioning with consideration of body function, autonomy of the individual, and engagement in society (15–16). In order to enhance the applicability of the ICF in clinical practice and research and to overcome practical concerns relating to the great number of categories afforded within the ICF, a comprehensive ICF Core Set for patients in geriat-

ric post-acute rehabilitation facilities was created to provide standards for multi-professional patient assessment. This Set was designed to include the typical spectrum of problems in functioning encountered in older patients, so as to permit the coding of patients' goals.

The objectives of this study were to identify the rehabilitation goals of patients in early post-acute geriatric rehabilitation by using the ICF, and to examine the association of goal attainment with measures of improvement in overall functioning, as perceived by the patients and according to health professionals.

METHODS

Study design

The study design was a prospective multi-centre cohort study conducted from May 2005 to August 2008. The study population was recruited from geriatric wards and units in 3 German hospitals, and 2 Austrian hospitals; approximately 62% of the patients were recruited from the German centres. Patients were eligible for inclusion if they were over 65 years of age, and fulfilled the criteria for post-acute geriatric rehabilitation, according to their need for ongoing medical and nursing care in addition to rehabilitation. Informed consent was obtained prior to the study. For patients who were incapable of providing written, informed consent, the principal carer signed the informed consent form for participation. The study was approved by the institutional ethics committees.

Measures

The case record form comprised socio-demographic data and main diagnoses. Furthermore, it included a semi-structured questionnaire for patient and health professional to identify patient goals and assess overall functioning from the patients' and health professional's perspectives. The data were collected by interview about 24 h after admission (baseline), and within 36 h before discharge (end-point).

Patients were asked at baseline to report up to 10 important aspects related to their health condition and their hospitalization. These aspects were expectations, desires, hopes, goals as well as fears, doubts or problems due to the underlying health condition, the hospitalization or associated with the physical and social environment. In addition, patients were asked at end-point to decide which of the aspects or goals mentioned at baseline they had attained during the inpatient stay. Patients were also asked to assess their overall functioning at admission and at discharge on a numerical rating scale (where 0 = complete limitation in all aspects of functioning and 10 = no limitation in functioning). To gain information from the expert's perspective as well, health professionals were independently asked to assess patients' overall functioning using the same numerical scale.

Linking process

Patients' statements were translated into the ICF terminology following a standardized linking procedure, which is based on established linking rules (17–18). We used the framework of the ICF to specify and group the information derived from the patients, and by these means enable further statistical analysis.

In the first step of the linking procedure, two researchers independently identified all meaningful concepts contained in the patients' statements. A meaningful concept can be described as a specific component of text, consisting either of a few words or a few sentences having a common motif (19). In a second step, the two versions of the concepts identified as being meaningful were compared. Structured discussion and informed decision of a third expert were used to resolve disagreements between the two versions. Then the final version of meaningful concepts was linked to the most closely corresponding ICF categories by the two independent researchers according to the defined linking rules. The results of the two experts were again compared; in the event

of disagreement, structured discussion and consultation with a third expert was used to arrive at a decision. In cases when a patients' goal could not be linked to the ICF, e.g. because the statement was too general for linking, or if the contents were not covered by the ICF, we summarized and grouped the data so as not to lose that information and to enable subsequent analysis.

Data analysis

We used absolute and relative frequencies to describe patients' goals. Based on the statements on goal attainment at discharge, we made a binary classification of the individuals (0 = no goal attained, 1 = at least one goal attained). In general, estimating change by calculating the difference between admission score and discharge score can be biased by an effect called "regression to the mean", wherein those individuals who scored higher at baseline are likely to score lower on re-test, whereas those who scored low at baseline are likely to score higher on re-test (20–21). As a result of these tendencies, difference scores (absolute changes) can overestimate the effect of baseline differences on re-test scores (22). To avoid this effect in assessing change between two measurements, Cronbach & Furby (23) suggest calculating a residualized gain score, which we used to determine change in functioning from the patients' and health professional's perspectives.

We calculated the residuals using a mixed regression model. This allows the integration into the model of differing length of inpatient stay as a random effect. With the mixed model, the statistically predicted discharge values were calculated for the whole study population. Subtracting the values predicted by the regression model from the observed values then gives the residualized score, which is the proportion of change not predicted from the baseline score, and controlled for length of inpatient stay. For subsequent regression analyses we defined a binary outcome variable according to the values of the residualized gain score. A gain score of 0 or less signified an improvement in overall functioning as less than or equal to the statistically expected change (0), whereas a gain score above 0 signified an improvement in overall functioning exceeding that which is statistically expected (1).

To analyse the predictors for an improvement in functioning, we used logistic regression models with improvement in overall functioning as the dichotomous dependent variable (0 = improvement in overall functioning as or less than expected; 1 = improvement in overall functioning more than expected). Independent variables examined were "age", "sex", "length of inpatient stay", "time from event to rehabilitation onset", "number of comorbidities", "living situation prior to hospitalization", "years of education" and "goal attainment". To decide which variables should enter the model, the relationship of each independent variable with the dichotomous outcome was assessed using bivariate χ^2 tests. Fisher's exact test was used when necessary. We stratified by sex in the bivariate analyses in order to test for potential gender interactions. A variable was considered to be a potential predictor if it had a p-value of < 0.20 in the bivariate test, or was of clinical relevance. To avoid collinearity, variables would only be selected for the multiple logistic regression model if the Spearman's correlation coefficient was < 0.5.

Two logistic regression models were then used to select the final set of predictors based on backward elimination ($p < 0.05$ to remove), 1 for overall functioning from the patients' perspective and 1 for overall functioning from the health professional's perspective. The potential predictors "age", "length of inpatient stay", "time from event to rehabilitation onset" and "number of comorbidities" entered the model as continuous variables. The variable "living situation prior to hospitalization" was coded as nominal (0 = living in a home for older people/nursing home, 1 = living alone or with another person, being in need of care, 2 = living alone or with another person, not being in need of care).

To determine the predictive ability of the final models we considered the c-value, which gives an estimate of the area under the receiver operating characteristic (ROC) curve (area under the curve; AUC) (24). The AUC can attain values between 0.0 and 1.0, with a practical lower bound value 0.5, and 1.0 indicating perfect predictive ability of a model.

RESULTS

A total of 209 patients from 5 different rehabilitation facilities were included in the study. Patients ranged in age from 57 to 101 years, with a median age of 80 years (mean 80 years (95% confidence interval (CI) (79; 81)). Sixty-seven percent of the patients were female. The most common reasons for admission were injuries and fractures, principally femur fractures, in addition to diseases of the circulatory system, principally cerebrovascular diseases. Median length of stay was 21 days (mean 23 days, 95% CI (21; 25)). Median time from event to rehabilitation onset was 13 days (mean = 15 days, 95% CI (13; 18)). Eighty-nine percent of the individuals were admitted from home, and 75% were discharged to home. Mini-Mental State Examination yielded a median of 26 points (mean 24.2 points). Demographic characteristics and assessment of overall functioning from patients' and health professional's perspective are summarized in Table I. Most frequent diagnoses responsible for inpatient stay are reported in Table II.

Table I. *Demographic characteristics and overall functioning of the study population (*n = 209)

Characteristics	
Gender, female, *n* (%)	140 (67.0)
Age, years, mean (95% CI) [median]	79.9 (78.9–80.9) [80]
Duration of inpatient rehabilitation, days, mean (95% CI) [median]	23.1 (21.3–24.9) [21]
Time from event to rehabilitation onset, days[a], mean (95% CI) [median]	15.4 (13.0–17.8) [12.5]
Number of comorbidities, mean (95% CI) [median]	6.6 (6.3–7.0) [7.0]
Overall functioning – Health Professional[b], mean (95% CI) [median]	
Baseline (*n* = 190)	5.3 (5.1–5.6) [5.0]
Discharge (*n* = 190)	6.8 (6.5–7.1) [7.0]
Overall functioning – Patient[c], mean (95% CI) [median]	
Baseline (*n* = 202)	5.0 (4.8–5.3) [5.0]
Discharge (*n* = 172)	6.8 (6.5–7.0) [7.0]
Living Situation prior to hospitalization, *n* (%)	
Living alone	71 (34.0)
Living alone with need for care	21 (10.2)
Living with another person	61 (29.2)
Living with another person with need for care	29 (13.9)
Living with another person and cares for this person	3 (1.4)
Home for older people/nursing home	24 (11.5)
Living Situation after discharge, *n* (%)	
Home	156 (74.6)
Back to acute medical care	13 (6.2)
Change into home for older people/nursing home	33 (15.8)
Death	3 (1.4)
Not specified	4 (1.9)

[a]*n* = 208.

[b]For analysing change in overall functioning, *n* = 186 due to missing values for admission or discharge data.

[c]For analysing change in overall functioning, *n* = 167 due to missing values for admission or discharge data.

CI: confidence interval.

Table II. M*ost frequent diagnoses responsible for inpatient stay (International Classification of Diseases 10) (*n = 209)

Diagnosis	*n* (%)
Injuries (S00–T14)	54 (25.8)
Injuries of hip and thigh (S70–S79)	35 (16.7)
Diseases of the circulatory system (I00–I99)	45 (21.5)
Cerebrovascular disease (I60–I69)	19 (9.1)
Symptoms, signs and abnormal clinical and laboratory findings (R00–R99)	28 (13.4)
Diseases of the musculoskeletal system and connective tissue (M00–M99)	16 (7.7)
Diseases of the nervous system (G00–G99)	13 (6.2)
Certain infectious and parasitic diseases (A00–B99)	12 (5.7)

Only diagnoses with a prevalence of at least 5% are reported.

A total of 202 patients (97%) reported at least one goal, whereas 87% reported up to 3 goals (mean = 2, median = 2). A total of 476 goals were reported. A total of 346 (73%) goals could be linked to 58 different ICF categories and 5 different chapters of the ICF. A total of 130 goals (27%) were not specific enough to be linked to single ICF categories.

Table III shows the most frequent goals coded with ICF categories. Fifty-eight different second-level ICF-categories were used for coding. "Autonomy", "returning home" and improvement of the "general condition" were the most frequently stated among those goals which could not be coded with the ICF. Forty-two (9%) of the reported goals were linked to ICF categories not presently included in the comprehensive ICF Core Set for older patients. Among them "domestic life" (d6) and "recreation and leisure" (d920) were the most frequent coded ICF categories not comprised in the ICF Core Set for older patients (Table IV).

A total of 170 patients (81%) gave information on goal attainment. Two hundred and forty-three (51%) of the 476 goals were reported as attained at discharge. One hundred and thirty-six patients (80%) had attained at least one of their personal goals, but 34 patients (20%) claimed no attainment in any of their goals.

Mean overall functioning score from the patients' perspective was 5 (median = 5) on admission and 7 (median = 7) on discharge. Mean overall functioning score from the health professional's perspective was 5 (median = 5) on admission and 7 (median = 7) on discharge.

From the patients' perspective 59% (*n* = 167), and from the health professional's perspective 63% (*n* = 186) of the patients improved in overall functioning more than would be statistically expected.

Seven variables met the inclusion criteria for the multivariable logistic models and were consequently selected as potential predictors: "age", "sex", "length of inpatient stay", "time from event to rehabilitation onset", "number of comorbidities", "living situation prior to hospitalization" and "goal attainment". Given that the bivariate analyses gave differing effects in men and women, an interaction term of sex and goal attainment was included.

From the patients' perspective, "length of inpatient stay" and "goal attainment" remained in the final model after backward elimination. A person who attained at least one personal goal was more than 5 times as likely to improve in overall

Table III. *Goals (*n = 476) in early post-acute geriatric rehabilitation for 209 patients*

Category	Total goals (*n*=476) *n* (%)	Attained goals in category *n* (%)	Patients with at least 1 goal in category (*n*=209) *n* (%)
Goals coded[a]			
b1 Mental functions	18 (3.8)	7 (41.2)	17 (8.6)
b152 Emotional functions	7 (1.5)	3 (42,9)	7 (3.3)
b2 Sensory function and pain	36 (7.6)	21 (58.3)	36 (17.2)
b280 Pain	31 (6.5)	20 (64.5)	31 (14.8)
b4 Functions of the cardiovascular, haematological, immunological and respiratory systems	10 (2.1)	5 (50.0)	8 (3.8)
b440 Respiration functions	6 (1.3)	3 (50.0)	6 (2.9)
b7 Neuromusculoskeletal and movement related functions	27 (5.7)	15 (55.5)	23 (11.0)
b710 Mobility of joint functions	7 (1.5)	5 (71.4)	5 (2.4)
b770 Gait pattern functions	6 (1.3)	5 (83.3)	6 (2.9)
d4 Mobility	174 (36.6)	86 (49.4)	140 (67.0)
d450 Walking	99 (20.8)	53 (53.5)	92 (44.0)
d465 Moving around using equipment	16 (3.4)	9 (56.3)	16 (7.7)
d410 Changing basic position	7 (1.5)	2 (28.6)	7 (3.3)
d440 Fine hand use	8 (1.7)	4 (50.0)	7 (3.3)
d5 Self-care	18 (3.8)	11 (61.1)	16 (7.7)
d6 Domestic life	16 (3.4)	8 (50.0)	12 (5.7)
d920 Recreation and leisure	8 (1.7)	4 (50.0)	6 (2.9)
e1 Products and technology	9 (1.9)	0 (0.0)	7 (3.3)
e3 Support and relationship	14 (2.9)	11 (78.6)	14 (6.7)
e355 Health professionals	13 (2.7)	10 (76.9)	13 (6.2)
Goals not coded[b]			
Autonomy	32 (6.7)	16 (50.0)	32 (15.3)
Returning home/staying home	33 (6.9)	23 (69.7)	33 (15.8)
General condition/health	28 (5.9)	13 (46.4)	28 (13.4)
Others	23 (4.8)	10 (43.5)	20 (9.6)

Only frequencies > 5 reported.
[a]346 of all goals were coded as International Classification of Functioning, Disability and Health (ICF) categories.
[b]130 of all goals could not be coded as ICF categories.

functioning (odds ratio = 5.5). From the health professional's perspective "length of inpatient stay" "goal attainment" and additionally "number of comorbidities" remained in the final model. A person who attained at least one personal goal was 3 times as likely to improve in overall functioning. Length of stay was inversely associated with improvement in overall functioning. The interaction term of sex and global attainment was not significant. Table V summarizes the results of both multivariable logistic regression models. Predictive ability of both models was adequate as rated by the c-value.

Table IV. *Patient goals in early post-acute geriatric rehabilitation not covered in the International Classification of Functioning, Disability and Health (ICF) Core Set for geriatric patients (*n = 209)[a]

Category	Total goals (*n*=42) *n* (%)	Patients with at least 1 goal in category (*n*=209) *n* (%
Goals coded		
d455 Moving around	4 (0.8)	4 (1.9)
d470 Using transportation	3 (0.6)	2 (1.0)
d6 Domestic life	16 (3.4)	12 (5.7)
d920 Recreation and leisure	8 (1.7)	6 (2.9)

Only frequencies > 2 reported.
[a]Patients reported 42 goals not covered in the ICF Core Set for geriatric patients.

Table V. *Results of the multivariable logistic regression model*

Parameter	*p*-value	Point estimate (OR)	95% confidence interval
Patient perspective[b]			
Length of inpatient stay	<0.0001	0.93	0.90–0.96
Goal attainment	0.0004	5.52	2.16–14.12
c-value (final model)=0.77			
Age	0.3498*		
Number of comorbidities	0.2725*		
Living situation prior to hospitalization	0.1382*		
Sex	0.3816*		
Sex[a] goal attainment	0.1094*		
Health professional perspective[c]			
Length of inpatient stay	<0.0001	0.93	0.90–0.96
Number of comorbidities	0.0142	0.81	0.68–0.96
Goal attainment	0.0348	2.68	1.07–6.71
c-value (final model)=0.72			
Age	0.2376*		
Living situation prior to hospitalization	0.3674*		
Sex	0.1042*		
Sex[a] goal attainment	0.3733*		

Final model describing variables associated with the outcome "improvement in overall functioning", with a *p* < 0.05 on the Wald test.
[a]Not significant; [b]*n* = 158 due to missing values for the response or explanatory variables; [c]*n* = 155 due to missing values for the response or explanatory variables. OR: odds ratio.

DISCUSSION

In this study, older patients undergoing early post-acute rehabilitation reported regaining mobility/walking ability and autonomy, getting rid of pain, returning home and improving their general health condition as their main goals of the rehabilitation process. Goals could be standardized and analysed in a meaningful way by using the ICF. Goal attainment as a result of the rehabilitation process was independently associated with improvement in patients' overall functioning, both from the patients' perspective, and that of health professionals.

Current research on patient goals confirms that mobility is the main issue for older patients, e.g. after stroke (25). Being able to walk is strongly associated with independent living, as recently shown in a similar sample of older individuals undergoing early post-acute rehabilitation (26). Equally, independence in self-care and domestic life contribute to the general goal of autonomy. The central importance of autonomy for patients in early post-acute geriatric rehabilitation reflects in practice a fundamental human need (27). Based on this theoretical background, it is obvious that the patients' perspective must be part of the goal-setting process in modern rehabilitation (9).

Interestingly, patients had quite concrete ideas regarding their goals. Apart from some more general aspects, such as improvement of their general health condition or autonomy, the goals reflect a prototypical spectrum of impairments, limitations and restrictions as described by the comprehensive ICF Core Set for older patients (28). This replication in an independent group of patients again confirms the face validity of the comprehensive ICF Core Set, which consistently provided a useful framework to categorize and standardize patients' goals.

The concurrence is a potentially important result of this study, since a common and accepted way to involve the patient perspective in goal-setting has been lacking (13, 29). While some authors favour a structured tool to integrate the patient perspective (8, 30), others prefer or recommend unstructured, open methods to record patients' needs (11, 14, 31). Since communication with older persons is sometimes difficult, we used an open-ended questionnaire for evaluating the patients' perspective. In answering the questions, patients were assisted by trained interviewers. We found this method in practice to be the simplest strategy for consistently obtaining authentic statements from the individual patients.

In older persons, health conditions are characterized by their complexity and gravity (5). By translating the patients' goals into a standardized language it becomes obvious that patients express their notions of goals in very general terms. For instance, individuals make statement such as "I want to handle all activities on my own", "I want to regain my strength", or "I want to care for myself again" rather than making specific statements such as "I want to be able to open a bottle with my right hand" or "I want to strengthen the muscles of my affected leg". It is up to the health professional to clarify the general goals in a more detailed way and to deconstruct them into the components that can be addressed by therapy (25). Based on our experience the ICF can be seen as a tool that offers a helpful terminology to translate unstructured information into a structured form, which can be analysed and reported in a standardized way, and can guide the rehabilitation process.

Unsurprisingly, goal attainment was associated with improvement in overall functioning, independent of the perspective taken. In an earlier study of neurological rehabilitation, goal attainment was likewise shown to be associated with improvements in functioning (14). In another study, this association was shown to be independent of patients' characteristics such as main diagnosis and age (12).

When assessing change of functioning there frequently arises the problem of how to interpret and analyse the change score (32). We made the decision to use a mixed effects regression to model the average change in overall functioning. Only individuals who showed at least this average amount of change were considered as improved. The use of this strict criterion is a very conservative approach, which has been recommended to eliminate potential regression-to-the-mean effects (22–23). Since rehabilitation effectiveness is change by length of stay, it is important to include length of stay in any model of change. The mixed effects regression model is also a method to adjust for length of inpatient stay. Typically, in Germany and Austria as in many other health systems, length of stay in a rehabilitation facility is not primarily determined by goal achievement but also by reimbursement situation.

Some limitations of the study merit comment. First, patients were interviewed by health professionals in a face-to-face situation, such that the patients could potentially have been influenced by the interviewer's expectations. To avoid this, the interviewers had been trained in structured training meetings, and were provided with a manual and a list of standardized questions (5). Secondly, patients were not asked about measurable, realistic goals, but rather were asked to report the 10 most relevant aspects of functioning pertaining to their disease and hospitalization. Nevertheless, these 10 aspects were generally reflective of patients' personal desires and expectations concerning their disease and hospitalization, such that we feel justified in considering these aspects to be synonymous with "goals" (10). An additional point of concern is the prevalence of cognitive impairment in older rehabilitation patients. It is not clear to what extent older patients with cognitive impairment are able to participate in realistic goal setting. In our study, a part of the population had a least first signs of mild cognitive impairment, as measured by the Mini-Mental State Exam; however, this might have been a positive selection towards the mentally fit persons. Studies on goal setting in severely cognitively impaired persons are difficult to conceive.

In conclusion, we found the ICF to be a useful framework to identify and structure patients' statements about their goals in geriatric early post-acute rehabilitation. "Walking", "alleviation of pain", regaining "autonomy", "returning home" and improvement of the "general condition" could be identified as the most important and most frequent aspects from the patient perspective. The positive association between goal attainment and improved functioning emphasizes that it is essential to involve the patient in the rehabilitation planning process, with the aim of obtaining an optimal outcome.

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REFERENCES

1. Weber DC, Fleming KC, Evans JM. Rehabilitation of geriatric patients. Mayo Clin Proc 1995; 70: 1198–1204.
2. Landi F, Bernabei R, Russo A, Zuccala G, Onder G, Carosella L, et al. Predictors of rehabilitation outcomes in frail patients treated in a geriatric hospital. J Am Geriatr Soc 2002; 50: 679–684.
3. Wells JL, Seabrook JA, Stolee P, Borrie MJ, Knoefel F. State of the art in geriatric rehabilitation. Part I: review of frailty and comprehensive geriatric assessment. Arch Phys Med Rehabil 2003; 84: 890–897.
4. Carlson JE, Zocchi KA, Bettencourt DM, Gambrel ML, Freeman JL, Zhang D, et al. Measuring frailty in the hospitalized elderly: concept of functional homeostasis. Am J Phys Med Rehabil 1998; 77: 252–257.
5. Grill E, Stucki G, Boldt C, Joisten S, Swoboda W. Identification of relevant ICF categories by geriatric patients in an early post-acute rehabilitation facility. Disabil Rehabil 2005; 27: 467–473.
6. Stucki G, Stier-Jarmer M, Grill E, Melvin J. Rationale and principles of early rehabilitation care after an acute injury or illness. Disabil Rehabil 2005; 27: 353–359.
7. The-American-Geriatrics-Society TAGS. Geriatric rehabilitation. J Am Geriat Soc 1990; 38: 1049–1050.
8. Wressle E, Eeg-Olofsson AM, Marcusson J, Henriksson C. Improved client participation in the rehabilitation process using a client-centred goal formulation structure. J Rehabil Med 2002; 34: 5–11.
9. Siegert RJ, Taylor WJ. Theoretical aspects of goal-setting and motivation in rehabilitation. Disabil Rehabil 2004; 26: 1–8.
10. Wade DT. Evidence relating to goal planning in rehabilitation. Clin Rehabil 1998; 12: 273–275.
11. McPherson KM, Brander P, Taylor WJ, McNaughton HK. Living with arthritis – what is important? Disabil Rehabil 2001; 23: 706–721.
12. Liu KP, Chan CC, Chan F. Would discussion on patients' needs add value to the rehabilitation process? Int J Rehabil Res 2005; 28: 1–7.
13. Hurn J, Kneebone I, Cropley M. Goal setting as an outcome measure: a systematic review. Clin Rehabil 2006; 20: 756–772.
14. McMillan TM, Sparkes C. Goal planning and neurorehabilitation: the Wolfson Neurorehabilitation Centre Approach. Neuropsychol Rehabil 1999; 9: 241–251.
15. Stucki G, Ustun TB, Melvin J. Applying the ICF for the acute hospital and early post-acute rehabilitation facilities. Disabil Rehabil 2005; 27: 349–352.
16. World Health Organization. International Classification of Functioning, Disability and Health. Geneva: WHO; 2001.
17. Cieza A, Geyh S, Chatterji S, Kostanjsek N, Ustun B, Stucki G. ICF linking rules: an update based on lessons learned. J Rehabil Med 2005; 37: 212–218.
18. Cieza A, Brockow T, Ewert T, Amman E, Kollerits B, Chatterji S, et al. Linking health-status measurements to the international classification of functioning, disability and health. J Rehabil Med 2002; 34: 205–210.
19. Karlsson G. Psychological qualitative research from a phenomenological perspective. Stockholm: Almquist & Wiksell International; 1995.
20. Bland JM, Altman DG. Regression towards the mean. Br Med J 1994; 308: 1499.
21. Bland JM, Altman, D.G. Some examples of regression towards the mean. Br Med J 1994; 309: 780.
22. Streiner DL, Norman GR. Health measurement scales: a practical guide to their development and use. New York: Oxford University Press; 2003.
23. Cronbach LJ, Furby L. How should we measure "change" – or should we? Psychol Bull 1970; 74: 68–80.
24. Hanley JA, McNeil BJ. A method comparing the areas under receiver operating characteristic curves derived from the same cases. Radiology 1983; 148: 839–843.
25. Wressle E, Oberg B, Henriksson C. The rehabilitation process for the geriatric stroke patient – an exploratory study of goal setting and interventions. Disabil Rehabil 1999; 21: 80–87.
26. Grill E, Joisten S, Swoboda W, Stucki G. Early-stage impairments and limitations of functioning from the Geriatric ICF Core Set as determinants of independent living in older patients after discharge from post-acute rehabilitation. J Rehabil Med 2007; 39: 591–597.
27. Deci E, Ryan R. Intrinsic motivation and self-determination in human behavior. New York: Plenum; 1985.
28. Grill E, Hermes R, Swoboda W, Uzarewicz C, Kostanjsek N, Stucki G. ICF Core Set for geriatric patients in early post-acute rehabilitation facilities. Disabil Rehabil 2005; 27: 411–417.
29. Levack WM, Taylor K, Siegert RJ, Dean SG, McPherson KM, Weatherall M. Is goal planning in rehabilitation effective? A systematic review. Clin Rehabil 2006; 20: 739–755.
30. Duff J, Evans MJ, Kennedy P. Goal planning: a retrospective audit of rehabilitation process and outcome. Clin Rehabil 2004; 18: 275–286.
31. Playford ED, Dawson L, Limbert V, Smith M, Ward CD, Wells R. Goal-setting in rehabilitation: report of a workshop to explore professionals' perceptions of goal-setting. Clin Rehabil 2000; 14: 491–496.
32. Stucki G, Daltroy L, Katz JN, Johannesson M, Liang MH. Interpretation of change scores in ordinal clinical scales and health status measures: the whole may not equal the sum of the parts. J Clin Epidemiol 1996; 49: 711–717.