J Rehabil Med 2011; 43: 145–150

ORIGINAL REPORT

GOALS OF PATIENTS WITH REHABILITATION NEEDS IN ACUTE HOSPITALS: GOAL ACHIEVEMENT IS AN INDICATOR FOR IMPROVED FUNCTIONING

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Objective: **To identify goals of patients with rehabilitation needs in the acute hospital setting using the International Classification of Functioning, Disability and Health (ICF), to examine association of goal achievement with improvement in overall functioning, and to examine whether ICF Core Sets for the acute hospital cover patients goals.**
Design: **Multi-centre cohort study.**
Patients: **A total of 397 patients (50% female, mean age 63 years) from 5 hospitals in Austria, Switzerland and Germany.**
Methods: **A semi-structured questionnaire was used to assess patient goals and goal achievement. Overall functioning from the patients' and health professionals' perspective was assessed on a numerical rating scale. Improvement in functioning was calculated using a residualized gain score. Association between goal achievement and improvement in overall functioning was assessed with logistic regression.**
Results: **A total of 397 patients reported achievement of at least 1 goal. Eighty-eight percent of the goals were translated into categories of the ICF. Logistic regression analyses revealed significant association between goal achievement and overall functioning.**
Conclusion: **The ICF might be useful to identify and structure patient's goals in acute hospital care. The association between goal achievement and improved functioning underlines that it is essential to involve the patient in the process of planning rehabilitation interventions in acute hospitals.**

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

J Rehabil Med 2011; 43: 145–150

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Submitted May 25, 2010; accepted October 21, 2010

INTRODUCTION

Patients hospitalized for an acute injury or disease who receive maximum medical or surgical care are still at risk of transitory or permanent loss of functioning. Irrespective of the underlying health condition this may be due to complications, comorbidities, or prolonged immobilization (1). It is thus increasingly recognized that appropriate and early onset of rehabilitation interventions can maintain functioning, prevent disability, and promote the recovery of patients. Specifically, this has been shown for patients in intensive care (2–3).

Goal setting to structure intervention planning and organizing a more patient-centred care is an integral part of rehabilitation medicine (4–6). Timely goal setting in close consultation with the patient is essential to rehabilitation success (7–8). Arguably, this also applies to rehabilitation interventions in the acute situation. Wade (9, p. 273) defined "goal" in the rehabilitation situation as a "future state that is desired and/or expected", goals "refer to relative changes or to an absolute attainment". In this context, a rehabilitation goal does not only comprise the patient's individual perspective, but also his environment, family, or any other persons involved.

In the acute situation, due to the brevity of admissions and the focus on medical and surgical care, there is limited time for the provision and coordination of structured rehabilitation interventions (10). Despite limited time resources, decisions regarding interventions and their priority should be determined by both the expert's view and, in accordance with the principles of evidence-based-practice, the expectations, prospects and personal goals of the individual patient (11).

In contrast to rehabilitation planning in specialized rehabilitation facilities in the post-acute setting, a formal comprehensive goal setting process in the acute hospital situation might be too ambitious. Restricted length of inpatient stay and limited personal resources necessarily narrow the focus on treatment of the acute injury or disease. Hence, rehabilitation planning and coordination in the acute situation, comprising assessment, goal setting and evaluation, should be realized using specifically tailored assessment systems including the most relevant issues of the patients, specifically the patient's goals.

From an ethical and human rights perspective it is fundamental to consider patient's individual goals in any healthcare intervention, such as early provision of rehabilitation. Since goal setting and goal achievement is hardly discussed in the context of acute patient care, but rather in rehabilitation and management of chronic conditions, little is known about the association of individual goals with established outcomes, such as improvement in functioning. In addition, there is no clear consensus on how to describe or formulate individual patient's goals. With the International Classification of Functioning, Disability and Health (ICF) we can now refer on a common framework to describe these goals. The ICF is a globally ac-

cepted language for communication about functioning, which entails consideration of body function, autonomy of the individual, and engagement in society (12). It was developed to be used and understood by all potential user groups, including patients. In order to enhance the applicability of the ICF in clinical practice and research, and to overcome practical concerns relating to the large number of categories included within the ICF, comprehensive ICF Core Sets for patients in acute hospitals were created for the assessment of problems and needs in the acute situation, as well as for the estimation of prognosis and rehabilitation potential. Likewise, they can be used to coordinate rehabilitation interventions in this setting (13–16). Since comprehensive ICF Core Sets were designed to include the total spectrum of problems in functioning commonly relevant to patients in the acute situation, arguably they can also be used to code patient's goals.

The objectives of this study were:

- to identify goals of patients with rehabilitation needs in the acute hospital setting using the ICF;
- to examine the association of goal achievement with improvement in patient's overall functioning, as perceived by patients and health professionals;
- to examine whether the comprehensive ICF Core Sets for the acute hospital cover relevant patients goals.

METHODS

Study design

The current study is part of a larger multi-centre cohort study conducted for the development and validation of ICF Core Sets in the acute hospital and in early post-acute rehabilitation facilities (17). Patients were recruited consecutively between May 2005 and August 2008 from acute wards of 4 university hospitals in Austria, Germany and Switzerland and 1 Austrian general hospital. Patients were included if they were at least 18 years old and received rehabilitation interventions for treatment of any acute musculoskeletal, neurological or cardiopulmonary injury or disease coordinated by a rehabilitation physician (1). Informed consent was obtained from patients, or, if the patient was unable to make an informed decision, from the patient's caregiver. The study was approved by the institutional ethics committees of all involved hospitals prior to starting the research. Interviewers collecting data had been trained in the application and principles of the ICF, and provided with a manual. All interviewers were health professionals (physicians, medical students in clinical training, physical therapists, or nurses). During data collection interviewers obtained support and information from the ward staff in charge. Ongoing supervision of the interviewers was ensured by periodic telephone calls.

Measures

Goal achievement. Patients were asked at baseline (within 24 h after admission) to report up to 10 important aspects related to their health condition and their hospitalization. We asked for areas of body and mind, as well as for areas of daily activities and participation, or aspects related to the physical or social environment. It was indicated by the interviewers that the patients would be asked again at discharge to rate the perceived change in these aspects. At the end-point (within 36 h before discharge) we asked them to state which of the aspects mentioned at baseline they had achieved during the inpatient stay.

Overall functioning. Patients were asked to assess their overall functioning at baseline and at end-point on a numerical rating scale (where 0 = complete limitation in all aspects of functioning, and 10 = no limitation in functioning). Health professionals who collected the data were asked to assess patient's overall functioning using the same scale.

Additionally, socio-demographic (sex, age, education, living and occupation situation) and condition-specific data (underlying diagnosis, time until rehabilitation, number of co-morbidities and length of stay) were recorded.

Analysis

Linking of patient statements to the ICF. We translated the patients' statements into categories of the ICF to make data accessible for subsequent statistical analysis. The translation followed a standardized procedure: in the first step, 2 researchers independently identified all meaningful concepts with a common topic contained in the patients' statements. In case of dissent on the meaningful concept, a third independent researcher was involved in the discussion. The identified concepts were linked to categories of the ICF by 2 health professionals based on the established linking rules, which enable linking concepts to ICF categories in a systematic and standardized way (18–19). According to these linking rules, researchers trained in the ICF are advised to attribute each concept to the ICF category representing this concept most precisely. One concept can be linked to one or more ICF categorie, depending on the number of themes contained in the concept. Consensus between the 2 researchers was required to decide which ICF category should be linked to the identified concept. In case of a disagreement, a third person trained in the linking rules was consulted. In a discussion led by the third person, the 2 researchers who linked the concepts stated their pros and cons for the linking of the concept under question to a specific ICF category. Based on these statements, the third person made an informed decision. For feasibility reasons, the linking procedure was restricted to the second level of the ICF.

Statistical analysis. We used absolute and relative frequencies to describe patient's goals and corresponding ICF categories. Change in overall functioning was estimated with a residualized gain score. Estimating change by calculating the crude difference between scores at different time points can be biased by the effect called "regression to the mean". Individuals with a higher baseline score are more likely to score lower on re-test, whereas individuals with low baseline score are more likely to score higher on end-point (20–21). As a result of these tendencies, absolute changes may overestimate the effect of baseline differences on re-test scores (22). To avoid this effect Cronbach & Furby (23) suggest calculating a residualized gain score. We calculated the residualized gain score to estimate change in overall functioning using a linear mixed model that integrates the differing length of inpatient stays as a random effect. We used the function "lmer" of the package "lme4" of R 2.11.0 (24). A patient was rated as actually improved when his or her overall functioning improved more than predicted by the linear mixed model. Specifically, we rated the individual as "improved" when an individual experienced positive change from baseline to end-point and the improvement was greater than expected by the model, i.e. the residual was greater than zero, and as "not improved" when the residual was less than expected. This classification served as outcome variable for the subsequent multiple logistic regression analyses.

The main independent variable in multiple analysis was patient's goal achievement at discharge as classified with a dichotomous variable ("no goal achieved" vs "at least 1 goal achieved"). We took the variables "age", "sex", "length of inpatient stay", "number of comorbidities", "time from event to rehabilitation onset", "diagnosis groups" (neurological, cardiopulmonary, or musculoskeletal condition) and "need for professional nursing care prior to hospitalization" into account as potential confounders and included them in the model. In order to check for potential effect modification by sex we analysed the corresponding odds ratios. Collinearity was checked using correlation coefficients.

We calculated separate logistic regression models to estimate the effects of goal achievement on improvement in overall functioning from the patients' and the health professionals' perspectives, respec-

tively. Stepwise variable selection was carried out based on the Akaike Information Criterion (AIC).

All data analyses were carried out with R 2.11.0 (25).

RESULTS

We included 397 patients from 5 different acute hospitals in Austria, Switzerland and Germany. Patients' ages ranged from 18 to 100 years, with a median age of 65 years. Length of hospital stay ranged from 4 to 99 days (median 10 days). Fifty percent of the patients were female. Ninety-one patients (23%) presented with neurological, 109 (28%) with cardiopulmonary, and 191 (49%) with musculoskeletal conditions. Detailed diagnoses of the patients are reported in Table I. Median time from event to onset of rehabilitation interventions was 1 day (mean 7 days, range 0–180 days). Demographic characteristics and assessment of overall functioning from the patients' and health professionals' perspectives are summarized in Table II.

A total of 373 patients (94%) reported at least 1 goal, 69% (257) reported more than 1 goal (median 2 goals, mean 2.8 goals). A total of 998 goals were reported. 778 (77%) goals could be linked to the ICF, namely 95 ICF categories, 5 ICF chapters and 2 ICF components. A total of 216 goals (22%) could not be linked to any part of the ICF.

The most frequently reported goals were *Walking* (d450), *Sensation of pain* (b280), *Health services, systems and policies* (e580), *Recreation and leisure* (d920), *Washing oneself* (d510), *Caring for household objects* (d650), and *Sensations associated with cardiovascular and respiratory functions* (b460) (see also Table III).

The most frequently stated patient goals that could not be linked to the ICF were "Admission to home" (9% of all mentioned goals), "General health" (5%) and "General physical functioning" (2%). Thirty-five percent of the reported goals linked to ICF categories were not covered by the corresponding comprehensive ICF Core Sets (ICF categories named with a frequency $\geq$5% and the corresponding ICF Core Set are reported in also Table III).

Information on goal achievement was available from 327 patients (88%). A total of 260 patients (80%) had achieved at least 1 of their personal goals, whereas 114 patients (35%) claimed no achievement in any of their goals. In summary, 568 (57%) of the 998 goals were reported as achieved at discharge.

The mean overall functioning score from the patients' perspective was 4.54 (median 5) on admission and 6.63 (median 7) on discharge. The mean overall functioning score from the health professionals' perspective was 4.59 (median 5) on admission and 6.68 (median 7) on discharge.

Sixty percent of patients (n=190), were judged as improved, from both patients' and health professionals' perspectives.

In bivariate analyses, sex acted as an effect modifier of the association between goal achievement and improvement in functioning (odds ratio (OR) 3.9, 95% confidence interval (CI) [1.72–8.93] in women vs 1.8, 95% CI [0.88–3.70] in men). Therefore, the interaction term of sex and goal achievement was included in the multiple analyses.

After stepwise variable selection the final model (patients' perspective) contained the variables "Goal achievement", "Indication" and "Need for professional nursing care prior to hospitalization". A patient who achieved at least 1 goal was 2.7 times as likely to improve in overall functioning (OR=2.7). The interaction term of goal achievement and sex did not improve the explanatory power of the model and was removed.

After stepwise variable selection, the final model (health professionals' perspective) contained the variables "goal achievement", "time from event to rehabilitation onset", "number of comorbidities" and "need for professional nursing care prior to hospitalization". A patient who achieved at least 1 goal was almost 1.8 times as likely to improve in overall functioning (OR=1.8). Again, the interaction term was not included in the final model.

Tables IV and V summarize the results of both multivariable logistic regression models.

Table I. *Diagnoses responsible for inpatient stay (International Classification of Diseases-10*

Diagnosis	*n* (%)[a]
Diseases of the musculoskeletal system and connective tissue (M00-M99)	88 (22.5)
Injury, poisoning and certain other consequences of external causes (S00-T98)	80 (20.5)
Diseases of the circulatory system other than cerebrovascular diseases (I00-I52 and I70-I99)	69 (17.6)
Cerebrovascular diseases (I60-I69)	46 (11.8)
Neoplasms (C00-D48)	38 (9.7)
Diseases of the respiratory system (J00-J99)	29 (7.4)
Other diagnoses	23 (5.9)
Diseases of the nervous system (G00-G99)	18 (4.6)

[a]Percentage based on 391 patients.

Table II. *Characteristics of participants*

Variable: Category	*n* (%)
Gender	
Female	198 (49.9)
Male	199 (50.1)
Personal informed consent (vs consent by caregiver)	371 (93.5)
	Mean (median) [95% CI]
Age, years	63 (65) [61.2–64.8]
Duration of inpatient rehabilitation, days	15.6 (10) [14.1–17]
Time from event to rehabilitation onset, days[a]	7.5 (1) [5.5–9.4]
Number of comorbidities	2.7 (2) [2.5–2.9]
Overall functioning – health professionals' perspective[b]	
Admission, n=394	4.5 (4) [4.3–4.7]
Discharge, n=366	6.6 (7) [6.4–6.8]
Overall functioning – patients' perspective[c]	
Admission, n=376	4.5 (5) [4.3–4.7]
Discharge, n=349	6.6 (7) [6.4–6.8]

[a]n=391.

[b]For analysing change in overall functioning, n=364 due to missing values for admission or discharge data.

[c]For analysing change in overall functioning, n=345 due to missing values for admission or discharge data.

Table III. *Patient goals linked to International Classification of Functioning, Disability and Health (ICF) categories*

ICF category		Reported as patient goal *n*[a]	Reported as achieved goal *n* (%)	ICF category reported as patient goal but not in the corresponding ICF Core Set[b]
d450	Walking	104	58 (56)	neuro
b280	Sensation of pain	97	46 (47)	
e580	Health services, systems and policies	53	41 (77)	
d920	Recreation and leisure	33	9 (27)	neuro, cardio
d510	Washing oneself	24	19 (79)	
d650	Caring for household objects	22	7 (32)	neuro, msk, cardio
b460	Sensations associated with cardiovascular and respiratory functions	20	15 (75)	
d410	Changing basic body position	16	14 (88)	
d640	Doing housework	16	2 (12)	msk
d760	Family relationships	16	11 (69)	
d845	Acquiring, keeping and terminating a job	16	3 (19)	msk
b730	Muscle power functions	14	7 (50)	
d415	Maintaining a body position	14	9 (64)	
e450	Individual attitudes of health professionals	13	10 (77)	
d445	Hand and arm use	12	11 (92)	
d475	Driving	12	0 (0)	msk
d460	Moving around in different locations	11	9 (82)	cardio
b240	Sensations associated with hearing and vestibular function	10	6 (60)	
d330	Speaking	10	8 (80)	
d530	Toileting	10	5 (50)	
d660	Assisting others	10	1 (10)	
d850	Remunerative employment	10	5 (50)	
b265	Touch function	9	6 (67)	
d455	Moving around	9	4 (44)	
b134	Sleep functions	8	6 (75)	
b126	Temperament and personality functions	7	3 (43)	
b440	Respiration functions	7	7 (100)	
d550	Eating	6	2 (33)	
d166	Reading	5	0 (0)	
d440	Fine hand use	5	1 (20)	
d465	Moving around using equipment	5	2 (40)	
d540	Dressing	5	3 (60)	
d770	Intimate relationships	5	1 (20)	
e110	Products or substances for personal consumption	5	2 (40)	
e310	Immediate family	5	4 (80)	

[a]Only frequencies ≥5 reported.
[b]Only frequencies ≥5% reported.
neuro: neurological conditions; cardio: cardiopulmonary conditions; msk: musculoskeletal conditions.

DISCUSSION

To the best of our knowledge this is the first study in the acute hospital to investigate patient's functioning goals systematically. We found that patients attached great importance to basic abilities such as walking and self-care, but also to be free of pain and to obtain appropriate care. As in other settings it could be demonstrated that categories of the ICF are useful to describe patients' attitudes and views on their functioning and health (26). In addition, this is the first study to show that the

Table IV. *Results of the multivariable logistic regression model: patients' perspective*

Patients' perspective (*n*=316)	OR	95% confidence interval
(Intercept)	0.36	0.16–0.8
At least 1 goal achieved	2.66	1.54–4.63
Indication[a]: Cardiopulmonary conditions	1.55	0.87–2.84
Neurological conditions	0.6	0.34–1.06
Need for professional nursing care prior to hospitalization: No	2.26	1.17–4.46

[a]Reference category is musculoskeletal conditions.
OR: odds ratio.

Table V. *Results of the multivariable logistic regression model: health professionals' perspective*

Health professionals' perspective (*n*=316)	OR	95% confidence interval
(Intercept)	0.9	0.39–2.11
At least 1 goal achieved	1.75	1.02–2.98
Time from event to rehabilitation onset	0.98	0.96–1
Number of comorbidities	0.91	0.81–1.02
Need for professional nursing care prior to hospitalization: No	1.69	0.86–3.32

OR: odds ratio.

achievement of individual goals is associated with improvement in patient's overall functioning even in the acute hospital situation, as rated both from the patients' and the health professionals' perspective. It could also been shown that a majority of categories of the respective comprehensive ICF Core Sets corresponds with patient goals.

Since, so far, there are no comparable studies on patient goals and goal achievement in the acute situation, the study results have to be viewed in relation to studies on those topics carried out in the post-acute situation. Current research on patient goals indicates that mobility, especially independent walking, is one of the most prominent goals in rehabilitation (27). Independent self-care is a main prerequisite of independent living and is therefore highly plausible as a primary patient goal. The high number of patients who reported housework as an important goal might be surprising at the first glance. It shows, however, that patients even when suffering from severe acute conditions plan and care for their living situation after discharge from hospital. It is plausible that patients also wanted to be free of sensations related to cardiovascular and respiratory functions, such as dyspnoea and palpitations. Dyspnoea is among the first symptoms treated in an emergency situation and heavily impairs functioning and quality of life (28–29).

In addition to some very general aspects, such as maintaining general health or independent living, a very high proportion stated appropriate health service, empathic and qualified doctors and nurses as a major goal.

All in all, the stated goals reflect a prototypical spectrum of impairments and limitations as described by the comprehensive ICF Core Sets for acute hospital (13–14, 16). This study in a new sample of patients confirms the face validity of the comprehensive acute ICF Core Sets, which consistently provided a useful framework to categorize and standardize patient goals. This concurrence is a potentially important result of this study, since a common and accepted way to involve the patients' perspective in goal-setting has been lacking (30–31).

The linking of stated goals of patients in the acute hospital to categories of the ICF highlights that patients tend to express their view in very general phrases. It is up to the health professionals to clarify the general goals in a more detailed way and to deconstruct them into the components that can be addressed by therapy (27). Based on our experience the ICF can be seen as a tool that offers helpful terminology to translate unstructured information into a structured form, which can be analysed and reported in a standardized way, and can guide the treatment process.

As expected, goal achievement was associated with improvement in overall functioning, independent of the perspective taken. Studies could show that goal achievement was associated with patient progress (32). Likewise, in an earlier study of neurological rehabilitation, goal achievement was associated with improvements in functioning (33). In another study, this association was shown to be independent of patient's characteristics such as main diagnosis and age (34).

A rather surprising finding of our study is that several frequently reported patient goals are not covered by the corresponding comprehensive ICF Core Set, such as *Walking* (d450), *Recreation and leisure* (d920), or *Caring for household objects* (d650) (see also Table III). It has to be kept in mind that the acute ICF Core Sets were developed by acute care health professionals who focus on patients' survival, prevention of secondary conditions and complications and immediate basic activities, such as self-care. Goals such as housekeeping, remunerative work and leisure are important because the patient wants to return to his or her own life and autonomy, whether this is realistic or not. Although those goals might not be the immediate priority for acute rehabilitation interventions, they have to be regarded as relevant. The fact that *Walking* (d450) was not included into the first version of the comprehensive ICF Core Set for neurological patients followed a extensive discussion with the result that walking is not an immediate goal of treatment and rehabilitation in the acute situation, but one of the major goals in the post-acute situation (14).

Our study has some potential limitations. Patients were asked to report the 10 most relevant aspects of functioning pertaining to their disease and hospitalization rather than to report measurable, realistic goals. Nevertheless, these 10 aspects can be interpreted as significant for patients' personal desires and expectations concerning their disease and hospitalization. Therefore, we feel justified in considering these aspects to be synonymous with "goals" (9). The time from acute event to rehabilitation onset ranged up to 180 days for a minority of patients. This could be attributed to several transfers from one hospital or clinic to another due to exacerbation of the condition. We decided not to exclude the outliers, since we are confident that those patients are typical for our target population. A further aspect to bear in mind is the prevalence of impairment in cognitive or consciousness functions in patients in acute hospital care. It is not clear to what extent those patients are able to participate adequately in the formulation of goals. In our study, part of the sample had problems with mental functions (35). This might have led to selection bias towards the fitter patients.

In conclusion, the ICF proved to be a useful framework to identify and structure statements about goals of patients with rehabilitation needs in the acute hospital. Goals set by patients should be taken into account as a valuable outcome in the acute situation. Thus, translating these goals into categories of the ICF enables linking patient goals to standardized assessment instruments to measure goal achievement in a valid manner.

In addition, positive association between goal achievement and improved functioning underlines that it is essential to involve the patient in the process of planning rehabilitation interventions even in the acute situation to ensure a maximum of effectiveness of those interventions and to prevent complications and promote early rehabilitation.

ACKNOWLEDGEMENTS

We wish to thank the patients participating in the study and the teams at the Kaiser-Franz-Josef-Hospital, Vienna (Austria), University Hospital Vienna, Vienna (Austria), University Hospital, Zurich (Switzerland), University Hospital, Heidelberg (Germany), and Hannover Medical School, Hannover (Germany). The project was supported by the German Ministry of Health and Social Security (BMGS) grant no. 124-43164-1/501.

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