

“Insist on recovery” as a Positive Prognostic Factor in Japanese Stroke Patients

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Short running title: Insist on recovery After Stroke

Abstract

Aim We designed two-step analyses to examine the effect of acceptance of disability or “insist on recovery” in Japanese stroke patients: firstly on their functional improvement and secondly on their psychological symptoms.

Methods We assessed disability using functional independence measurements (FIM), examined the stage of acceptance of disability by observation using Fink's theory (from shock to defensive retreat, acknowledgement, and acceptance/change stage), and quantitatively estimated “insist on recovery” (on a scale from 1 to 4) by observation. We then assessed the differences over time and the effects on the improvement in their FIM. We assessed depression using the Zung Self-rating Depression Scale (SDS); apathy using the Apathy Scale (AS), and assessed the correlation with the acceptance stage or “insist on recovery.”

Results The acceptance stage and functional improvement progressed significantly, but “insist on recovery” did not change significantly during hospitalization. Multiple regression analysis revealed that the “insist on recovery” score (but not the acceptance stage) was a good predictor of the degree of improvement in FIM (FIM gain per week) in the elderly group. Post-hoc testing showed that the SDS or AS score decreased from the 1st stage to the 4th stage (but increase at the 3rd stage) of acceptance, the score

decreasing from 1 to 3; however the score for “insist on recovery” increased from 3 to 4.

Conclusions The appropriate level of “insist on recovery” reduced depression and apathy, resulting in enhanced improvement of disability after a stroke in elderly stroke patients.

Key Words: acceptance of disability, “insist on recovery,” functional independence measurement, stroke, elderly

Introduction

Stroke has been described as a condition with a unique epidemiological profile, with high incidence and mortality rates, and where a large proportion of survivors have significant but varying degrees of residual disability.^{1,2} There are two types of improvement which occur after a stroke: neurological improvement and improvement in functional abilities or performance.¹ Neurological recovery depends upon the mechanism of the stroke and the location of the lesion. By contrast, the improvement of functional abilities, such as activities of daily living (ADL), depends upon the environment in which the stroke patient is placed and how much training and motivation there is for the patient to learn to become independent again in terms of self-care and mobility. The ability to perform ADL can improve through acceptance and training in the presence or absence of natural neurological recovery.¹⁻⁴ Stroke rehabilitation must therefore restore optimal physical, psychological, social, and vocational function to enable the patient to become a productive participant in the community.

Emotional responses to stroke have traditionally been thought to follow a natural course of evolution; initial state of significant distress or depression that, over time and as a result of some active process of “working through”, resolves to a condition of

acceptance and relative emotional harmony.^{5,6} This process was thought to be a mourning process or acceptance of disability. Disabled stroke patients who refuse to accept their impairment; eventually realizing they are “sick” but thinking that they will soon get well.^{5,6} They manifested through direct verbal report or inferred from behavior continuously and repeatedly (this attitude was something like a whining, and we termed this emotional status as “insist on recovery” in this text). “Insistent of recovery” is thought to be a sign of denial and thus regarded as an irrational belief. Denial is generally found in the psychiatric illness, however also found in the mourning process among disabled stroke patients.⁶ The patients with “insist on recovery” have traditionally been thought to think that their only goal is recovery, can be motivated to do any work perceived as aiding recovery; but are not motivated to learn to function as a disabled person, and so fail to gain the maximum benefit from rehabilitation services.⁵⁻⁸ Thus “insist on recovery” is considered maladaptive status and thought to be a target for psychotherapeutic intervention.⁵⁻⁸ However, we have experienced many stroke disabled patients, who say they will recover someday repeatedly, participate to the rehabilitation and gain independence for ADL in the rehabilitation service. Question arises whether “insist on recovery” is irrational belief or rational. Although there is much popular and professional literature attesting to the veracity of stages of acceptance to disability, the

empirical data do not support such a contention.⁵ Moreover, “insist on recovery” is regarded as counterproductive to maximising functional abilities and enhancing quality of life.⁵⁻⁸ while no previous paper has reported examining the nature of “insist on recovery.”

The aim of the present study was to evaluate the effect of the stage of acceptance of disability or “insist on recovery” on functional independence in stroke patients. Aging is associated with a high incidence of physical impairment, functional disability and depression.^{9,10} Therefore, we divided stroke in-patients into two age groups: middle-aged and elderly. Moreover, depression and apathy are common neuropsychiatric consequences of a stroke, and can be examined by self-reported tests: the Zung Self-rating Depression Scale (SDS) and the Apathy Scale (AS). To clarify the psychopathological aspects of “insist on recovery” after a stroke, we also examined the correlation between the “insist on recovery” score and the SDS or AS score.

Subjects and Methods

Study design

This study consisted of two parts: first, the changes in “acceptance of disability” and “insist on recovery” over time were estimated, and we examined the effect of these

factors on functional recovery after a stroke. Secondly, we examined the psychopathological symptoms (depression and apathy) using self-reporting scales, and estimate the association between depression and “acceptance of disability” or “insist on recovery” after a stroke.

Patients

The approval of institutional ethics committees was obtained for this prospective study. Informed consent for functional or psychological measurements, including acceptance of disability, was obtained on admission from all patients or from those authorised to give consent on their behalf. The subjects for the first study were 231 patients with haemorrhagic and occlusive stroke without subarachnoid haemorrhage, diagnosed by computed tomography (CT) and/or magnetic resonance imaging (MRI), who were admitted to the Nishi-Hiroshima Rehabilitation Hospital less than 3 months after suffering a stroke (range, 10-109 days; mean, 44 ± 21 days), and who were hospitalized for more than one month. The patients were divided into two age groups at admission: the middle-aged group (95 patients aged 40 to 65 years); and the elderly group (136 patients aged ≥ 66 years).

For the second study, the subjects, who completed the SDS and AS scales, included

237 patients after excluding patients with 1) a history of major psychiatric illness, such as major depression, bipolar disorder, schizophrenia, or schizoaffective disorder; 2) subarachnoid hemorrhage; 3) emergency discharge because of medical illness; 4) medications, medical illness, physical disability, or cognitive dysfunction (MMSE score < 15) affecting their ability to perform the self-reporting test or to provide consent.

Data were gathered from a subset of the subjects of a previous study, which was a research project on depression and lesion location, or depression/apathy and functional outcome, or sitting balance among stroke rehabilitation patients.¹¹⁻¹³ Patients were not selected on the basis of the results of the previous study.

Treatment

This unit provides intensive multidisciplinary goal-oriented inpatient rehabilitation. Every one or two weeks, the staff, including medical doctors, nurses, care workers (CW), physical therapists (PT), occupational therapists (OT), speech therapists (ST), medical social counselors (MSW) and clinical psychologist (CP), assemble in the conference room and make arrangements regarding the physical, psychological, or social problems of each in-patient, and review patients' rehabilitation programs.

CT findings

CT scanning was carried out in all patients on admission; a follow-up CT scan was performed every 1-3 months after admission to measure the infarction/haemorrhage site and volume (cubic centimeters) according to the formula $0.5 \times A \times B \times C$, where A and B represent the largest perpendicular diameters through the hypodense area on the CT scan, and C is the thickness of the infarction area.¹¹⁻¹³

Functional measures

The functional independence measurement (FIM) (version 3.0) is an observer-rated multi-item summed rating scale used to evaluate disability in terms of dependency, and is widely used as a measure of disability in stroke patients.¹²⁻¹⁵ The maximum total FIM score is 126; the lower the score, the greater the disability. All patients were examined for disability using the FIM (the Japanese version) within one week after admission and at 1-2 week intervals during hospitalisation.

The improvement in FIM score per week during hospitalisation was calculated as follows: $[(\text{FIM score on discharge}) - (\text{FIM score on admission})] / [\text{period of hospitalisation (weeks)}]$.

Motor impairment in hemiplegic stroke patients was measured by the stage on the

Brunnstrom Recovery Scale (BRS), in which movement patterns are evaluated and motor function is rated according to stages of motor recovery.^{12,13,16} The BRS scale defines recovery only in broad categories; these categories correlate with progressive functional recovery.

Psychological assessments: the process of acceptance of disability and “insist on recovery”

Inpatient psychological status (acceptance stage and “insist on recovery”) was assessed by observation of the behavior of patients under the guidance of clinical psychologist. Information relating to patients’ psychological complaints varies among staff members, because the patient usually does not convey his or her real feelings equally to all staff. The acceptance stage and “insist on recovery” were therefore estimated on the basis of statements by every doctor, nurse, CW, PT, OT, ST, MSW and CP.

The stage of acceptance of disability in each inpatient was estimated using Fink's theory of the acceptance process (1st stage: shock, 2nd stage: defensive retreat, 3rd stage: acknowledgement, 4th stage: acceptance and change) as described previously.⁷ In scoring the acceptance stage, a value of 1, 2, 3 and 4 was assigned to an observation

depending upon whether the patient's acceptance stage progressed or not; shock, defensive retreat, acknowledgement, or acceptance and change would be scored 1, 2, 3, and 4, respectively.

“Insist on recovery” was defined in this study as the patient’s direct verbal report and behavior: eventually the person realizes they are “sick,” but thinks they will soon get well.⁸ The assumption of a normal body is implicit in any discussion of future plans. The person is preoccupied with their physical condition and is apt to overestimate the meaning of any small improvement. They say, “I know it’s taken a long time, but I still haven’t given up hope. “Insist on recovery” was estimated by observation of patient behavior in quantitative terms: the “insist on recovery” score is constructed on a scale where complaints that are noted a little of the time, some of the time, much of the time, or most of the time, would be scored 1, 2, 3, and 4, respectively.

Self-rating Depression Scale (SDS)

We used the Japanese version of the SDS to examine the subjective severity of depression.^{11-13,17} SDS was performed within one month after admission. We classified the patients into two groups according to their score: a non-depressed group (SDS score < 45 points) and a depressed group (SDS score \geq 45 points). The cut-off point was determined on the basis of a previous report on Japanese stroke patients.¹⁷

Apathy scale (AS)

To quantify the apathetic state, we used a Japanese version of the apathy scale.^{11-13,18-20}

The apathy scale was performed within one month after admission. The apathy scale consists of 14 questions concerning spontaneity, initiation, emotionality, activity level, and interest in hobbies. This scale was self-assessed. The answers to each question were scored against 4 grades (0 to 3) and the total score was used for the analysis. We classified the patients into two groups according to their score: a non-apathetic group (apathy score < 16 points) and an apathetic group (apathy score \geq 16 points).

Statistical analyses

Statistical analyses were based on the assumption that the data were not normally distributed, analysis being performed with nonparametric tests for paired (Spearman rank test) and unpaired (Mann-Whitney U test) groups.

Differences in time course (at admission, at 3 months and at 5 months) of acceptance of disability or FIM score were assessed by Kruskal-Wallis 1-Way ANOVA. Post hoc testing was performed using the Scheffé test.

Multiple regression analysis was used to estimate the independent effects of predictor variables (highest attained acceptance stage, "insist on recovery" score, age, sex, the presence of a history of stroke, BRS, FIM score on admission, period of hospitalisation)

on improvement in FIM (FIM gain/week).

Different degrees of the acceptance stage or “insist on recovery” stage were compared with the SDS or AS score by a one-way analysis of variance (ANOVA) followed by a post-hoc Fisher protected least significant difference test (Fisher PLSD test).

Values were considered to be significant at $P < 0.05$. The Stat View 5.0 (SAS Institute, Inc., Cary, NC) statistical package was used for all analyses.

Results

Baseline data for patients

Table 1 shows the baseline data for all patients in the two age groups (middle-aged or elderly). There were no differences in the presence of stroke history, laterality of the stroke, size of CT findings, FIM gain/week, acceptance stage, or “insist on recovery” score at admission between the two age groups at baseline. The two age groups were not matched for sex, type of stroke, FIM score, or “insist on recovery” score at discharge. The FIM score, “insist on recovery” score at discharge, male gender and rate of hemorrhage were much higher in the middle-aged group than in the elderly group.

Time course of the acceptance stage, “insist on recovery” score and FIM score

Changes in the FIM score, acceptance stage, and “insist on recovery” score over time are shown in Table 2. In both age groups, the acceptance stage progressed and the FIM score increased significantly each month ($p < 0.0001$, Kruskal-Wallis test). Post hoc testing (Scheffé) showed a difference between the acceptance stage at admission and at 3 or 5 months. However, we found no significant differences between acceptance stage or FIM score at 3 months or at 5 months (Scheffé). We found no differences in the “insist on recovery” score on admission, at 3 months or at 5 months (Kruskal-Wallis test

and Scheffé test). Therefore, progression of acceptance stage and functional improvement were evident, especially during the first 3 months after admission, but the “insist on recovery” score did not change during hospitalisation in either age group.

The effects of the acceptance stage or “insist on recovery” score on improvement in FIM after a stroke

To identify predictors of improvement in FIM after a stroke, we performed multiple regression analysis with sex, age, presence of history of stroke, period of hospitalisation, FIM at admission, BRS (upper limb, finger, lower limb), acceptance stage and “insist on recovery” score as independent variables, with improvement in FIM as the dependent variable (Table 3). In the middle-aged group, no predictors were found. However, in the elderly group, the FIM score on admission, the period of hospitalisation, and the “insist on recovery” score were correlated significantly with FIM gain/week. It was noteworthy that the “insist on recovery” score (but not the acceptance stage) correlated positively with improvement in FIM in the elderly group.

The effects of the acceptance stage or “insist on recovery” score on depression or apathy after a stroke

To examine the effects of the acceptance stage on depression or apathy, we examined the ANOVA and post-hoc test (Fig. 1). The SDS score (Fig. 1A) and AS score (Fig. 1C) changed significantly from “shock (1st) stage” to “acceptance and change (4th) stage”. Post-hoc testing showed a difference between 1st and 4th, 2nd and 3rd, and 3rd and 4th for the SDS score and between 1st and 4th, and 3rd and 4th for the AS score. Both SDS and AS scores showed the highest score in the 3rd stage but significantly decreased in the 4th stage.

The effects of the “insist on recovery” showed that the SDS score (Fig. 1B) and AS score (Fig. 1D) changed significantly from 1 to 4. Post-hoc testing showed significant differences between scores 1 and 3, and scores 3 and 4 on the SDS score and showed significant differences between scores 1 and 2, and scores 1 and 3 on the AS score. It is noteworthy that both the SDS and AS scores decreased from 1 to 3, while the score for “insist on recovery” increased from 3 to 4.

Discussion

The present results demonstrate that many stroke patients improved in functional disability, proportional to progress in stage of acceptance to disability in the rehabilitation hospital. It is surprising that the presence of “insist on recovery” enhanced functional improvement. To our knowledge, this is the first stroke study that addresses the influence of “insist on recovery” on functional improvement after a stroke.

Stage of acceptance of disability correlated with FIM improvement

The stage theory of acceptance of disability states that people undergoing a life crisis follow a predictable, orderly path of emotional response. In this study, we examined the effect of acceptance on functional improvement in Japanese stroke patients. Our data demonstrated that acceptance stage progress and FIM scores increased significantly each month, particularly in the first 3 months after hospital admission (Table 2). At the onset of physical disability after a stroke, the individual cannot tolerate the overwhelming chaos accompanying the shock.^{7,8} In this shock phase, the person feels emotionally numb and experiences a sense of depersonalization. Physical recovery from the acute phase is interpreted as a sign that everything is returning to its former state.^{7,8} At that time, the acceptance stage progresses from the shock phase to defensive retreat.

When the disabled patient gradually begins to experience a physical plateau, the acknowledgement phase occurs.^{7,8,21,22} The patient no longer finds it possible to escape reality and experiences the loss of his valued self-image. The feeling-state, which accompanies these changes, is one of deep depression as in mourning. Therefore, patients in this acknowledgement stage suffered higher levels of depression and apathy than those in the other acceptance stages (Figure 1). The patient who has accepted his permanent physical impairment considers the disability to be merely one of his many characteristics.^{7,8,21,22} Therefore, it was suggested that many stroke patients functionally improved in parallel with progression of the acceptance stage.

Appropriate level of “insist on recovery” reduced depression and apathy, resulting in an improvement in the FIM

According to the stage theory of acceptance, “insist on recovery” is a sign of denial, and an indicator of poor prognosis in rehabilitation.⁵⁻⁸ However, our data contradicted this; the appropriate level of “insist on recovery” reduced depression and apathy, resulting in an improvement in the FIM. The question arises as to the nature of “insist on recovery” in this study.

Changes in physical functioning or appearance must be incorporated into a revised

self-image, which can necessitate a change in personal values and lifestyle.²³⁻²⁵ The individual must then prepare for an uncertain future with the threat of permanent physical disabilities, which results in a deep depression, similar to mourning. To cope with this identity crisis, individuals must maintain hope that restoration of function is possible.²⁴ Even when the prognosis is certain, the future is still uncertain; patients think about their physical disability and hope for improvement every day (the so-called “insist on recovery” in this study). The disabled stroke patients experience these positive (restoration of function, maintain hope) and negative (disability would continue permanently) feeling toward their disabilities by turns. The coexistence with both positive and negative feeling is commonly understood as ambivalence,²⁶ and representation of "insist on recovery" was thought to be a sign of post-stroke ambivalent state during the mourning process. In the traditional belief, ambivalence has been viewed as particularly important to the development of complicated grief, however Piper et al reported the opposite result; the more ambivalent the behavior of the patient, the less severe was the grief.²⁶ Defining their disability is a painful process for the stroke patient. However, “insist on recovery” (ambivalence) may minimize the seriousness of the crisis (permanent physical disability, identity crisis) and reduce the pain during the process of defining the disability. Therefore, many stroke

patients can be confronted with this painful mourning process (defining their disability) little by little to keep the depressive or apathetic symptoms to a minimum, making the pain easier with the help of more optimistic idea (“insist on recovery” or ambivalent feeling). Thus “insist on recovery” may be considered as part of the "fighting-spirit" in which patients seek to conquer several diseases (such as cancer) based on a glimmer of hope, and indicates a good prognosis.²⁷⁻²⁹ Judging from these observations, it is possible that “insist on recovery” in this study may be a favorable prognostic factor for disabled stroke patients.

Severe level of “insist on recovery” associated with both depression and apathy

Disabled stroke patients with a severe level of “insist on recovery” form only a minority of stroke patients, but they suffered severe depression and apathy as in our present data. “Insist on recovery” is thought to be a sign of denial. Denial is generally found in cognitive psychological research of psychopathology, while sometime that of normal, non-depressed individuals. Mildly depressed individuals are more balanced in self-perceptions and evince more accurate predictions of control and future outcomes.⁶ More severe depression often yields quite negative appraisal tendencies.⁶ The patients with severe “insist on recovery” is thought to be a severe denial state and to simply wait

for recovery and often state that they do not understand the purpose of rehabilitation exercises, resulting in poor participation in rehabilitation therapy.³⁰⁻³² _

In a rehabilitation unit, many staff feel that these patients are troublesome. Although patients with severe levels of “insist on recovery” are only in a minority, their characteristics are conspicuous, and all staff tend to think empirically that every “insist on recovery” prevents an improvement in functional disability, irrespective of the degree of severity. This staff tendency was thought to be a counter-transference reaction, which is thought to engage in more negative interactions with patients, leading to worse outcome.³³ _In practice, the majority of patients show an appropriately low level of “insist on recovery,” which helps disabled patients to confront the painful acceptance process (reduce depression and apathy), while the easygoing approach to reducing the “insist on recovery” might also reduce the protection that stroke patients have from depression or apathy, resulting in preventing stroke patients from improving their functioning.

The disparity in functional and psychological states between middle-aged and elderly patients

In this study, “insist on recovery” enhanced functional improvement after a stroke:

this trend was statistically significant in the elderly group, but not in the middle-aged group. A question arises regarding the difference between the middle-aged and elderly groups. Once an individual reaches old age, the body starts to lose its autonomy.^{9,10} As independence and control are challenged, self-esteem and confidence weaken. Most elderly people seem to find themselves, almost involuntarily, thinking about dying and about feeling ill, depressed, and somehow let down.^{10,34,35} To some extent, these thoughts reflect a desperation that confronts all older people. However, most people struggle to counterbalance these associations with thoughts of more optimistic, life-affirming involvement.^{34,35} These observations suggested that elderly stroke patients hope for recovery from their physical disability, and try to counterbalance desperation with thoughts of more optimistic, life-affirming involvement. Therefore “insist on recovery” may encourage elderly stroke patients to participate in a rehabilitation program and gain functional improvement during hospitalisation.

Study limitations

The findings of our study do not suggest that “insist on recovery” cause depression and apathy; rather they indicate that “insist on recovery” are frequently associated with depression and apathy, and likely interact with the recovery process. Our findings

should be seen in light of certain methodological limitations. First, the sample size was modest and the patients suffering of severe level of “insist on recovery” were very few. Therefore, the results require replication with a larger sample. Second, no structured personality scale was used; hence personality data might have been influenced by recall bias. Third, there is a possibility that social factors, such as working and economical problems, might be more strongly influenced than psychological problems in our present study, and thus “insist on recovery” might not influence ADL improvement in the middle-aged group. Forth, the findings of this study refer to national characteristics of Japanese, and thus are not typical of the generality of other countries. Fifth, the psychological findings of our present report could examine only within 6-9 months after the onset of stroke. However, the process of acceptance or mourning against disability was thought to continue during many years after the onset of stroke. Therefore, further longitudinal study should be required to clarify the effect of acceptance or “insist on recovery” on the improvement of activity of daily living and social function for many years after the onset of stroke.

Conclusions

Progression of acceptance stages kept pace with improvement in functional disability

after a stroke during rehabilitation. Mild level of “insist on recovery” is a kind of “fighting spirit,” rational belief, which is minimising the seriousness of the integration of self-image, and accelerating functional improvement. However, severe level of “insist on recovery” is irrational belief, and leads the patients to be more severe depressive state. “Insist on recovery” was previously believed to be a negative indicator for functional improvement of disabled stroke patients, while our data contradicts this, especially among elderly patients. Thus, “insist on recovery” needs be present alert the clinician to the potential for improvement of ADL especially among elderly stroke patients. When caring for patients, especially elderly patients, we should judiciously inform them of their prognosis, so that they do not give up hope.

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Figure legends

Figure 1. Differences in SDS (A, B) and AS score (C, D) between patients with acceptance stage (A, C: 1st, 2nd, 3rd, and 4th) and score of “insist on recovery” (B, D: 1, 2, 3, and 4) were shown. The mid point, top and bottom of each vertical line represent the mean, upper, and lower 95% CI values, respectively. The Fisher PLSD test also indicates that these parameters can distinguish between some of these psychological subgroups, with the p-values given.

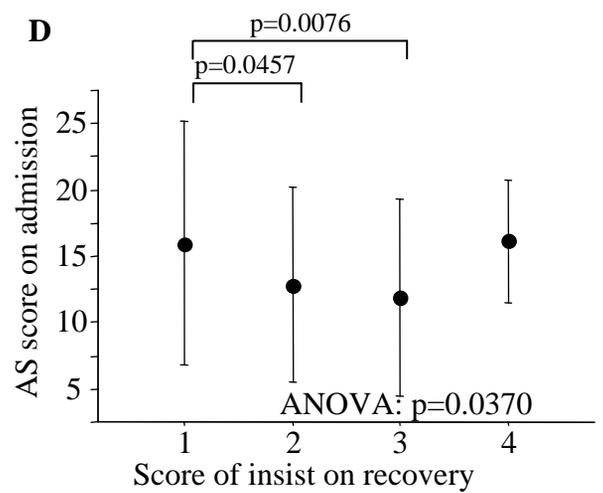
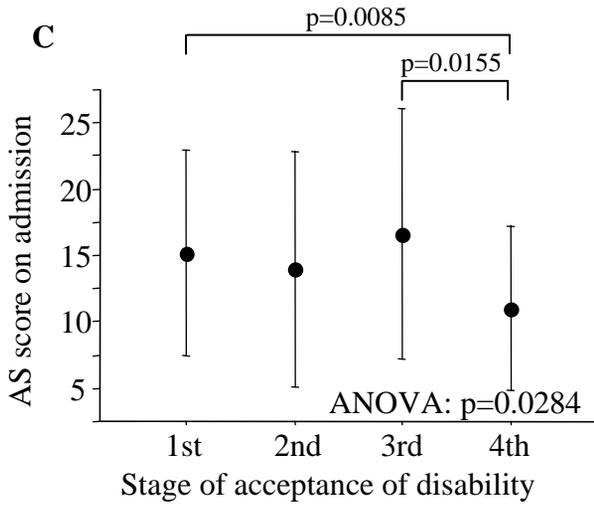
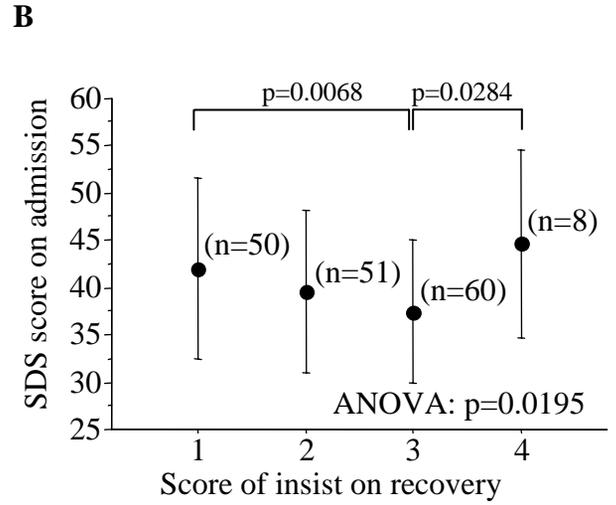
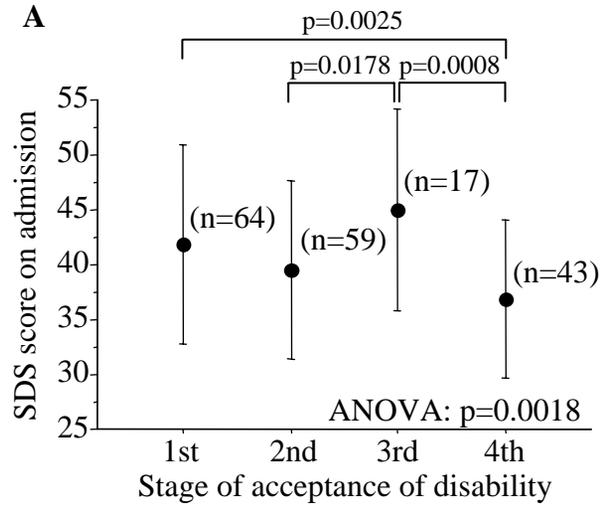


Fig. 1

Table 1. Baseline data for stroke inpatients by age group (middle-aged or elderly)

	Total (n=231)	Middle-aged (n=95)	Elderly (n=136)	p
Age, years	66.3±10.2	56.2±6.1	73.4±5.4	<0.0001
Gender, male; female, n	162;69	77;18	85;51	0.0033
Type of stroke, hemorrhage; infarction, n	95;136	47;48	48;88	0.0413
Presence of history of stroke, (%)	38 (16.5)	11 (11.6)	27 (19.9)	0.1069
Period of hospitalisation, days	152.5±51.2	146.8±60.4	160.4±49.7	0.0806
Side of stroke, right; left; bilateral, n	101;109;21	40;47;8	61;62;13	0.8373
Size of CT finding, cm ³	37.9±55.6	38.2±59.0	37.6±53.4	0.9614
FIM score on admission	64.1±25.0	69.7±25.1	61.1±24.5	0.0003
FIM score on discharge	84.5±25.5	90.9±22.5	81.1±26.4	0.0002
FIM gain/week	0.86±0.56	0.87±0.56	0.84±0.56	0.4963
Stage of acceptance at admission	1.9±1.0	1.9±1.0	1.8±1.1	0.3548
Stage of acceptance at discharge	3.0±1.1	3.1±1.1	3.0±1.2	0.4822
"Insist on recovery" score at admission	2.0±0.9	2.2±1.0	1.9±0.9	0.093
"Insist on recovery" score at discharge	2.1±0.9	2.3±0.9	2.0±0.8	0.0019

Continuous values are mean±standard deviation; categorical values are number of patients (percentage).

Fisher's exact test was used to compare categorical variables; the Mann-Whitney U test was used to compare continuous variables, and to test correlation between the middle-aged and elderly groups.

FIM=functional independence measurement

Table 2. Time course of FIM, stage of acceptance and expectancy of recovery score during 5M after admission in both age groups.

		Middle-aged group			Elderly group				
		Admission (n=95)	3M (n=76)	5M (n=52)	Kruskal- Wallis	Admission (n=136)	3M (n= 118)	5M (n=95)	Kruskal- Wallis
FIM	Score	78.2±25.9	86.4±23.0	89.5±20.5	p<0.0001	65.0±26.4	76.0±27.1	78.2±24.6	p<0.0001
	Scheffé	Admission vs 3M	p=0.0007			p=0.0002			
		Admission vs 5M	p<0.0001			p<0.0001			
		3M vs 5M	p=0.1667			p=0.4095			
Acceptance of disability	1 Shock, n (%)	40 (42.1)	12 (15.8)	5 (9.6)	p<0.0001	71 (52.2)	31 (26.3)	18 (18.9)	p<0.0001
	2 Defensive retreat, n (%)	34 (35.8)	15 (19.7)	6 (11.5)		34 (25.0)	19 (16.1)	11 (11.6)	
	3 Acknowledgment, n (%)	9 (9.5)	16 (21.1)	9 (17.3)		10 (7.4)	22 (18.6)	14 (14.7)	
	4 Acceptance and change, n(%)	10 (10.5)	33 (43.4)	32 (61.5)		19 (14.0)	46 (39.0)	52 (54.7)	
	N.D., n (%)	2 (2.1)	0	0		2 (1.5)	0	0	
	Scheffé	Admission vs 3M	p<0.0001			p<0.0001			
Admission vs 5M		p<0.0001			p<0.0001				
3M vs 5M		p=0.0690			p=0.0905				
"Insist on recovery"	1, n (%)	24 (25.3)	17 (22.4)	11 (21.2)	p=0.5259	44 (32.4)	42 (35.6)	27 (28.4)	p=0.7386
	2, n (%)	16 (16.8)	26 (34.2)	20 (38.5)		30 (22.1)	40 (33.9)	38 (40.0)	
	3, n (%)	27 (28.4)	26 (34.2)	15 (28.8)		34 (25.0)	28 (23.7)	23 (24.2)	
	4, n (%)	5 (5.3)	4 (5.3)	4 (7.7)		1 (0.7)	2 (1.7)	3 (3.2)	
	N.D., n (%)	23 (24.2)	3 (3.9)	2 (3.8)		27 (19.9)	6 (5.1)	4 (4.2)	
	Scheffé	Admission vs 3M	p=0.6334			p=0.9393			
Admission vs 5M		p=0.5732			p=0.7451				
3M vs 5M		p=0.9939			p=0.9098				

Categorical values (stage of acceptance) are number of patients (percentage); continuous values (FIM score) are mean±standard deviation.

Differences in time course (e.g., at admission, 3 months and 5 months) of acceptance of disability, FIM score, or "Insist on recovery" were assessed by Kruskal-Wallis 1-way ANOVA. Post hoc tests were performed using the Scheffé test.

FIM=functional independence measurement

Table 3. Multiple regression analysis of FIM gain/w with predictable variables

	FIM gain/w			
	Middle-aged		Elderly	
	SC	P	SC	P
Acceptance stage	-0.078	0.5213	0.091	0.381
"Insist on recovery" score	-0.07	0.5551	0.218	0.0348
BRS upper limb	-0.083	0.7871	-0.314	0.1487
BRS finger	-0.236	0.3957	0.215	0.3025
BRS lower limb	0.193	0.3284	0.258	0.0833
CT size	0.034	0.7877	-0.122	0.2084
Presence of a history of stroke	0.049	0.6734	-0.084	0.3743
Period of hospitalisation	-0.113	0.4671	-0.222	0.0309
Age	0.127	0.287	-0.151	0.098
Sex	-0.045	0.692	-0.055	0.545
FIM score on admission	-0.288	0.1123	-0.341	0.0073

SC indicates standardised coefficient

BRS = Brunnstrom Recovery Scale , FIM = functional independence measure