

Involving caregivers in activating patients with stroke in Nursing Homes

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ENGLISH ABSTRACT

Involving caregivers in activating patients with stroke in nursing homes

Introduction: Many patients with stroke depend on help from caregivers with activities of daily living (ADL). Therefore, caregivers must be trained during inpatient rehabilitation. Also, patients with stroke in rehabilitation settings are found to be alone and inactive for more than 60% of the day. Studies have shown that involving partners in caregiving activities and training resulted in less depression, improved quality of life and better functional status.

Aim: To investigate the impact of involving caregivers in training of patients, using a caregiver training program (CTP), on therapeutic activity of patients with stroke, during clinical rehabilitation in nursing homes. Second aim was to investigate the impact of this CTP on caregiver burden.

Method: Quasi-experimental study using a pretest-posttest design, with two independent samples was conducted. Demographic and health care data were collected from patients and caregivers (instruments respectively Barthel Index (BI) and Caregiver Strain Index (CSI)). Patients' activities were observed using Behavioural Mapping (BM: including therapeutic and non-therapeutic activities) before and after implementation of the CTP.

Results: Patients in the posttest group spent 38.5 minutes a day more on therapeutic activities, than those in the pretest. Patients in the posttest spent significantly less time on non-therapeutic activities as eating and 'dressing and hygiene' and spent significantly more time at their patient room. However, they also spent more time on autonomous exercising. Positive effect was found on caregiver burden.

Conclusion: Involving caregivers in inpatient rehabilitation seems promising in activating patients with stroke, enhancing daily amount of therapeutic activities and decreasing caregiver burden.

Recommendations: Future research should investigate barriers and motivators of caregivers and patients with stroke and based on this, interventions should be tailored to the specific needs of patients and caregivers. It is important to involve nurses in supporting and facilitating caregivers in exercising with patients.

Keywords: caregiver, activating, stroke, nursing home, intervention

NEDERLANDSE SAMENVATTING

Involving caregivers in activating patients with stroke in Nursing Homes

Inleiding: Mensen die een beroerte (CVA) doormaken zijn in 25-40% van de gevallen afhankelijk van mantelzorgers om activiteiten van het dagelijks leven te kunnen uitvoeren. Uit onderzoek blijkt dat zij, bij revalidatie in een verpleeghuis, voor meer dan 60% van de dag alleen en inactief zijn. Onderzocht is ook dat betrekken van mantelzorgers in het revalidatieproces een positieve invloed heeft op het stimuleren van activiteit van patiënten, de functionele status van revalidanten en de belasting van mantelzorgers.

Doel: Onderzoeken van de impact van het betrekken van mantelzorgers bij revalidatie van CVA-patiënten, middels een mantelzorgprogramma, op de dagelijkse hoeveelheid therapeutische activiteiten van patiënten die verblijven op een revalidatieafdeling van een verpleeghuis. Onderzoeken van de impact van het mantelzorgprogramma op de ervaren belasting van mantelzorgers.

Methode: Quasi-experimenteel onderzoek met twee onafhankelijke steekproeven, waarbij demografische gegevens zijn verzameld, gegevens over de functionele status van patiënten (Barthel Index) en gegevens over belasting van mantelzorgers (Caregiver Strain Index). Dagelijkse hoeveelheid (niet-)therapeutische activiteiten van patiënten is gemeten middels Behavioral Mapping, voorafgaand aan (groep 1) en na afloop (groep 2) van het mantelzorgprogramma.

Resultaten: Patiënten uit groep 2 besteedden 38.5 minuten meer per dag aan therapeutische activiteiten, dan patiënten uit groep 1. Zij besteedden significant minder tijd aan niet-therapeutische activiteiten als eten en wassen/aankleden, verbleven significant meer op hun kamer, maar besteedden ook meer tijd aan zelfstandig oefenen. Belasting van mantelzorgers lijkt positief beïnvloedt.

Conclusie: Het betrekken van mantelzorgers tijdens intramurale revalidatie lijkt veelbelovend bij het activeren van patiënten met een CVA, het verhogen van therapeutische activiteiten en het verminderen van ervaren belasting van mantelzorgers.

Aanbevelingen: Beïnvloedende factoren bij mantelzorgers van patiënten met een CVA moeten worden onderzocht, zodat interventies aangepast kunnen worden aan de specifieke behoeften van patiënten én mantelzorgers. Men moet verpleegkundigen betrekken bij het ondersteunen/motiveren van mantelzorgers om actief te oefenen met patiënten.

Trefwoorden: caregiver, activating, stroke, nursing home, intervention

1. INTRODUCTION

Stroke causes severe adult disability in the Western world (1). Annually, about 45.000 Dutch individuals suffer from stroke (2) and the incidence is estimated to increase by 17% from 2010-2020 (3). People with stroke are often confronted with disabilities in physical, psychological and social functioning which have a serious impact on the patient's activities of daily living (ADL) (4-6). Six months after stroke, 21% of Dutch patients with stroke live in nursing homes (7) and about 90% of Dutch institutionalized patients with stroke depend seriously in basic ADL (8).

Many patients with stroke (25-47%) depend on informal caregivers for their daily activities (1,9). Therefore, informal caregivers (further referred to as caregivers) are an essential source of support for patients with stroke in the community (10). Unfortunately, caregivers rarely are prepared to manage the complex care needs of stroke patients after discharge to home (10,11). Caregivers experience high levels of caregiver burden, poor mental and physical health, after their relative suffered from stroke (10,12-15). About 80% of Dutch caregivers reported lower quality of life and 52% reported depressive symptoms (16).

Nurses spend a limited amount of time in activating patients to do exercise in between training sessions (17-19). Patients in Dutch nursing homes are alone and inactive for more than 60% of the active part of the day (20). Therapeutic activities are described as physical therapy, occupational therapy, speech therapy, nursing care and medical care (18,19,21,22). Closer collaboration between nurses and physical therapists is needed to activate patients and to realize more therapeutic activities for patients with stroke and their caregivers (22,23). Involving family in the patient's rehabilitation is a key aspect in stimulating patients in becoming more active (24), which results in better functional status (9), less depression and improved quality of life (25).

However, to become a competent caregiver and reduce caregiver burden, caregivers need to be educated and trained under professional supervision during inpatient rehabilitation (9,26). Previous studies showed many support, education and counselling programs being developed and tested on both patient and caregiver outcomes (27-34), which resulted in improved functional outcomes for the patient (27,28,33,34) and reduced caregiver strain as well (32). Fewer studies have tested training and exercise programs, for both patients and caregivers. However, additional exercise therapy significantly influences functional recovery after stroke (9,35-37). A family-mediated training therapy which combined exercise programs with training of caregivers, additional to the 'routine' therapy, significantly improved functional status of the patient and decreased levels of caregiver burden compared to family members in a control group (38).

Nurses are important members of the interdisciplinary rehabilitation team, who provide essential information about the patient's progress. They are in an ideal position to train caregivers for their future role, as they provide continuous and coordinating care and treatment to patients with stroke (12,39). Several of the caregiver programs described in the studies above were carried out by (specialised stroke) nurses (28-30,32,40-43). Their main role was to stimulate, motivate, advice and educate caregivers, tailored to their specific needs. For example, daily amount of activities of patients with stroke in a Dutch university hospital increased after implementation of nursing interventions to stimulate activity (24). Involvement and education of the nursing staff is essential for all interventions aiming to prevent inactivity in het acute phase after stroke (24).

2. PROBLEM STATEMENT

Although many caregiver training programs (CTP) for patients with stroke and their caregivers have been developed, literature shows patients with stroke on rehabilitation wards to be alone and inactive for more than 60% of the day. Thereby, effect of interventions which involve caregivers in the rehabilitation process is unclear as well as the impact of involving caregivers on activity levels of patients and caregiver burden.

3. AIM

The primary aim of this study was to investigate the impact of involving caregivers on therapeutic activity of patients with stroke during clinical rehabilitation in nursing homes. Second aim of the study was to investigate the impact of involving caregivers during clinical rehabilitation, on experienced caregiver burden. This study will be a first step towards increasing the daily amount of therapeutic activities by actively involving caregivers during inpatient rehabilitation in nursing homes. This may contribute to a better functional recovery of patients, less caregiver burden, an improved therapeutic climate and hopefully a shorter length of stay on rehabilitation wards in nursing homes.

4. RESEARCH QUESTIONS

The research questions guiding the study were: (1) "What is the impact of involving caregivers in daily training of patients with stroke in clinical rehabilitation, on the daily amount of therapeutic activities of patients with stroke on the rehabilitation unit of a nursing home?" and (2) "What is the impact of involving caregivers of patients with stroke, in the daily training of patients in clinical rehabilitation, on caregiver burden?".

5. METHOD

5.1 Study design

This quasi-experimental study used a pretest-posttest design (44), with two independent samples. These designs examine change before and after implementation of an intervention, which was ideal to examine effect before and after implementation of our CTP (45). Because of the small sample, this study can be seen as a pilot study to test feasibility of our CTP (46). Primary outcome was daily amount of therapeutic activities and secondary outcome was caregiver burden. The study took place between December 2012 and June 2013 on a rehabilitation ward in a Dutch nursing home. The researcher, two nursing students and three nurses from an other nursing home conducted the observations. Before start of the observations, interraterreliability was measured to assure agreement among the observers. Agreement between the researcher and the others observers ranged between 89,7% and 97,4%. The study was approved by the medical ethics committee (METC) of the University Medical Center (UMC) Utrecht (12-606/C).

Study population and sample

Patients diagnosed with stroke, residing at the rehabilitation ward of a nursing home, were included. Inclusion criteria of patients were 1) diagnosed with stroke (both infarcts and haemorrhage) and 2) aged above 18 years. Criteria of caregivers were 1) partner or close relation to the patient and willing to participate in the program, 2) visiting their relative at least 2 times a week and 3) aged above 18 years. Patients were excluded when they were cognitive unable to participate in the CTP. Caregivers were excluded for participation in the posttest if they had a serious physical handicap (>3 on the Modified Rankin Scale (MRS)(47,48)). In the pretest, they had no role in training yet. Patients and caregivers were excluded if they were unable to understand or speak Dutch.

Sample size calculation, using effect size of the Barthel Index (BI) (5,49) showed 140 patients would be needed for the study. However, similar studies used samples of 17-66 patients (20,43,50). Therefore, a convenience sample was used depending on the number of patients available on the rehabilitation ward at time of measurement. An estimated 15-20 couples of patients and caregivers would be included.

The researcher individually approached all eligible participants for participation, either by telephone or on the rehabilitation ward. The next time the caregiver visited the patient, both were provided with verbal and written information, including the informed consent (IC) letter. They had one week to decide to participate, whereafter both patient and caregiver signed the IC-letter, as well as the researcher.

5.2 Variables and measures

Patient measures

Demographic, healthcare and organizational data, such as age, gender, stroke type and length of stay in nursing home, were collected at the pretest (T1) and posttest (T2).

Functional status of the patients was measured by nurses, with the BI (5,51) at T1 and T2. BI is a 10-item instrument representing the patient's ability to carry out ADL. BI shows good validity and reliability ($\alpha = 0,89 - 0,96$, Cohen's kappa (K) = 0.53 – 0.94) (5,52). Functional status was also measured by the physiotherapists, using the Berg Balance Scale (BBS) (53-56). BBS is a 14-item scale assessing balance function and risk for falls, which also shows good validity and reliability ($\alpha = 0,97-0,98$, ICC=0.95-0.98) (53-55). Both BI and BBS, are widely used to assess functional status of patients with stroke (5,49,53,55,57).

Therapeutic activities of patients were observed using Behavioural Mapping (BM) (18-22). BM is a time sampling technique providing systematic and accurate data and was chosen to systematically observe daily activities of patients (18,58). The Cohen's Kappa index of agreement is very high for all 3 categories (activity, location and social interaction): $K = 0.967$ for activities, $K = 0.986$ for locations and $K = 0.958$ for social interactions (18,19). Patients were observed on weekdays for one day, from 8.30-17.10h, similar to other studies using BM (20,21,58). At 10-minute intervals data was recorded about three categories: activity (therapeutic/non therapeutic), social interaction and location (17-20,59). Each category included predefined items (table 2). Patients were not observed when privacy was required, when they left the ward or when they were in the bathroom or toilet. Patients were informed they would be observed for one day, but the exact date remained unknown. They were instructed not to do anything different than they would normally do (Appendix 1).

Caregiver measures

Age, gender and relation to the patient, were collected from caregivers. Caregiver strain was measured with the Caregiver Strain Index (CSI) (60,61). CSI is an easy and widely used 13-item instrument to assess caregiver burden (60-63). The 13 items are yes/no statements about different domains including employment, finances, physical and emotional strain. High caregiver burden is considered by total scores of 7 yes answers or more (60). CSI shows good validity ($\alpha = 0.84-0.86$; Spearman's rho= 0.66-0.71) (61-63).

5.3 Intervention

Between observation periods a CTP was implemented (64). CTP was developed by physical and occupational therapists and the exercises were divided into different levels of complexity. These simple exercises included for example lifting the arms or stretching the legs and they could be performed in bed or in a chair. The exercises focused on functional activities and were explained by coloured pictures with a short description on how to perform the exercises.

Two physical therapists involved in this study, determined the level of exercises safe for the patient to practice with their caregiver. Patients and caregivers were instructed about the exercises by the researcher and/or physical therapist. They were instructed to practice the exercises at least 2 to 3 times a week, for about 10 minutes each time and more when possible, depending on which exercise(s) they practiced. To ensure caregivers actually practiced with the patient, they were asked to fill in a diary concerning when and which exercise they practiced with their relative and for how long. Nurses of the ward were involved and were informed about the CTP. Similar to other studies (24,50), they had an important role to stimulate and motivate caregivers to practice the exercises with the patient.

5.4 Statistical analysis

For comparison of baseline data, descriptive statistics were used. Means and medians were calculated for continuous data and percentages were calculated for dichotomous data. The percentage of the total observed time that a patient spent doing a certain activity, with other people in a certain location, was also analyzed by descriptive statistics. The Chi-Square (χ^2) test and Mann Whitney U test were used to test between-group differences and to compare pretest and posttest meanscores for independent samples (65,66). Each outcome was tested with a 2-tailed analysis and 0.05 significance level, reported using SPSS version 20 (67).

6. RESULTS

Sample

A total of 36 patient-caregiver couples (36 patients/36 caregivers) were approached for participation (figure 1). Sixteen couples consented for participating in the study. Two couples were lost to follow-up, due to a family conflict and a sudden discharge from the ward, before both patients were observed. Of the other 20 couples not participating, 3 patients were too ill to participate, 5 patients were transferred to another ward or discharged from the nursing home during the study and 12 patients and/or caregivers did not give their informed consent for other reasons. No patients were excluded because of their cognitive abilities and no caregivers were excluded because of serious physical handicap.

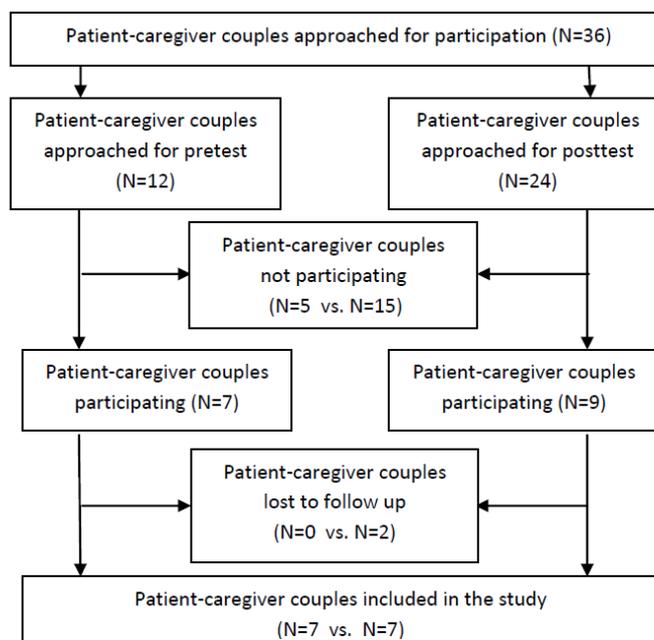


Figure 1. Flowchart of participants included in the study

Patient and caregiver characteristics

Table 1 presents the baseline characteristics of the patients and caregivers included. The pretest-posttest groups showed no statistical difference in patient characteristics. Mean age of patients in the pretest was 71.9 years and in the posttest 76.8 years. Majority of the patients was female (71.4%) and in 50% of the caregivers this concerned a daughter of the patient. Regarding type of stroke, majority of the patients (92.9%) had an infarction. Mean BI score in the pretest was 10.7 and in the posttest 9.0. Mean BBS score of the patients in the pretest was 25.3 and of the patients in the posttest 25.8.

Mean age of participating caregivers in the pretest was 50.3 years and in the posttest 50.7 years. The majority of the caregivers was female in both pretest and posttest group.

Daily amount of therapeutic activities

Table 2 shows the observed time spent on therapeutic activities, non-therapeutic activities, location and interaction with others during the day. Total therapy time observed was 7280 minutes. In the pretest, 52.9 minutes (10.2%) a day were spent on therapeutic activities, compared to 91.4 minutes (17.6%) a day in the posttest. This showed a nonsignificant increase of 38.5 minutes a day ($Z = -1.162$; $p = 0.245$).

In the pretest 84,1% of the day was spent on non-therapeutic activities, compared with 82.4% in the posttest. Patients in the pretest were alone for 45,4% of the day compared to 51.4% in the posttest. Patients in the posttest spent significantly less time on eating ($p=0.011$) and 'dressing and hygiene' ($p=0.038$) and spent significantly more time at their patient room ($p=0.015$).

Of the therapeutic time, most time in the pretest was spent on physiotherapy (25.7 minutes) and nursing care (22.9 minutes) followed by speech therapy (16.3%) (table 3). In the posttest physiotherapy and nursing care decreased to respectively 17.1 minutes and 15.7 minutes, while autonomous exercising and occupational therapy both increased to 15.7 minutes as well.

The majority of diaries, distributed among patients and caregivers to record amount of and time spent on exercises they practiced, was not filled in accurately or was not filled in at all.

Caregiver Burden

Mean CSI score for caregivers in the pretest was 8 and in the posttest 6.7. This showed a nonsignificant decrease of 1.3 ($p=0.44$).

7. DISCUSSION

The findings of the study showed that activity levels of the patients increased considerably after implementation of the CTP, whereas caregivers experienced less caregiver strain after following the CTP.

Participant recruitment for the pretest showed a response rate of 58.3%, while for the posttest it was 37.5%. Of the 24 pairs of patients and caregivers approached in the posttest, only 9 pairs consented. Main reasons for caregivers not to participate were, already living a stressful life themselves, living too far away to come visit their relative at least 2 times a week and preferring to use their visits for talking, instead of exercising. This lower response rate is in contrast with a recent Taiwanese study which reported only one caregiver refused to participate in their CTP (68). However, other studies investigating similar CTP's do not specifically describe why patients or caregivers refused to participate (9,24,38,42). This made it difficult to explore what caused the differences in response rate in our study.

Previous studies (24,50) already showed a significant increase in activities by implementing nursing interventions, based on the Clinical Nursing Rehabilitation Stroke Guidelines (CNRS-Guidelines) (69,70). However, mean time spent on therapeutic activities at baseline was already twice as much as in our study (103.5 minutes vs. 52.9 minutes) (50). The increase of therapeutic activities by 38.5 minutes a day in our study may not be significant, but it may still be a positive influence of the CTP. Time spent on therapeutic activities increased from 6.2 hours a week to 10.7 hours a week, which is an important step towards the recommended dose of 16 hours rehabilitation a week within the first six months after stroke, as described by Huijben-Schoenmakers and colleagues (71) as well.

Functional status of the patients in our pretest and posttest was relatively low, with a mean BI score of respectively 10.7 and 9.0. Comparable studies showed similar scores ranging between 8.8 and 12 (24,50,72). On the other hand, lower BI scores in our posttest, indicate a higher level of dependence. This may have caused the increase of activities not being significant, because functional status is positively related to time spent on therapeutic activities (50,72). Mean time spent on non-therapeutic activities was only a little less in the posttest compared to the pretest, probably caused by 210 minutes of activities, unable to detect in the pretest.

Nursing care was the second most frequently observed therapeutic activity in the pretest. However, in the posttest it accounted for only 17.2% of the therapeutic activities, while many of the activities nurses do with patients can be seen as therapeutic moments in which patients can be more actively involved (24). Task-oriented activities from the CNRS-Guidelines should be implemented in every nursing home to enhance patient activity facilitated by nurses (50).

In our study patients in the posttest spent significantly more time in their room. This is in contrast with the study of v.d. Port and colleagues (2012), while they implemented a comparable CTP to stimulate activity levels of patients. However, this significant result may be caused by patients in our posttest spending more time on autonomous exercises, similar to the study of Huijben-Schoenmakers and colleagues (2013) (50).

Our findings showed that caregivers who followed the CTP experienced less caregiver strain than those who did not. Caregivers in the pretest experienced high caregiver burden, with a mean score of 8 on the CSI, which is somewhat higher than the cut-off point of ≥ 7 for caregiver strain on the CSI. Interestingly, after implementing our CTP, caregiver burden decreased with a mean score of 6.7 in the posttest. This nonsignificant decrease supports findings from another study in which caregiver burden also decreased after implementing a family-mediated exercise intervention (FAME) (38).

Some limitations of the study have to be addressed. This study only included a small sample of patients and caregivers and therefore, one needs to be careful when interpreting the findings. All observational studies have a potential risk of bias. We would expect activity to increase in response to observation, which may have caused overestimated activity levels.

Patients are observed for one weekday from 8.30-17.10h. This may have caused some bias, when patients and caregivers practiced during weekends or evenings. Also, the BM-classification of therapeutic and non-therapeutic activities is questionable. Some non-therapeutic activities may actually be therapeutic, which may have caused some bias. Future research using BM should consider observing in evenings and weekends as well, combined with an adjusted classification, like Vermeulen and colleagues (2013) already did in their recent study (72).

The diaries, distributed to record amount of exercises practiced by patients and caregivers, were not filled in accurately or were not filled in at all. Therefore, we were unable to check whether patients and caregivers practiced as much as the CTP prescribed.

The findings of this study implicate that involving caregivers in inpatient rehabilitation may have a positive influence on amount of therapeutic activities of patients and reduces the experienced caregiver burden. However, many factors have to be taken into account when developing and implementing CTPs like ours. Therefore, interventions with an active role for caregivers should be developed carefully and tailored to barriers and motivators for caregivers to participate in intervention programs. Nevertheless, involving caregivers during inpatient rehabilitation seems promising (22,68). Outcomes as neglect, ADL and balance can be improved by caregivers supervising and guiding relatives during rehabilitation (68). Amount of time family was present significantly associated with treatment intensity.

Having more family present throughout the day, patients had longer treatment sessions (22). Further, the effects of the CTP's like ours need to be investigated in carefully executed trials prior to implementation in daily care.

8. CONCLUSION

Involving caregivers in inpatient rehabilitation seems promising in activating patients with stroke, enhancing daily amount of therapeutic activities and decreasing caregiver burden. This study investigated the impact of a CTP, which showed increased activity levels of patients after practicing exercises with their caregivers and experienced caregiver strain decreased. On the other hand, several issues have to be addressed to make sure patients and caregivers are motivated to optimize the patient's rehabilitation process.

9. RECOMMENDATIONS

Future research should study barriers and motivators of caregivers of patients with stroke. When these are clear, interventions which involve caregivers during inpatient rehabilitation can be adjusted to these factors. It is also considerable to develop an intervention, which combines interventions for nurses with interventions for caregivers. Nursing interventions which activate patients with stroke significantly increased daily amount of therapeutic activities. Combined with the promising results of our study, this may result in a positive influence. Not only on daily amount of therapeutic activities and experienced caregiver burden, but on feasibility and effectiveness of caregiver interventions as well.

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TABLES

Table 1. Baseline characteristics of patients and caregivers

	Pretest (N=7)	Posttest (N=7)	Total (N=14)
Patients			
<i>Sociodemographic characteristics</i>			
Mean age (years) (\pm SD)	71,9 (\pm 12,3)	76,8 (\pm 7,5)	74,4 (\pm 10,2)
Gender (n, %)			
Men	2 (28,6%)	2 (28,6%)	4 (28,6%)
Women	5 (71,4%)	5 (71,4%)	10 (71,4%)
Living situation in nursing home (n, %)			
Private room	7 (100 %)	7 (100%)	14 (100%)
Living situation at home (n, %)			
Alone	4 (57,1%)	5 (71,4%)	9 (64,3%)
Living together	3 (42,9%)	2 (28,6%)	5 (35,7%)
Relation participating caregiver (n, %)			
Male partner	1 (14,3%)	0 (0%)	1 (7,1%)
Female partner	1 (14,3%)	2 (28,6%)	3 (21,4%)
Son	0 (0%)	1 (14,3%)	1 (7,1%)
Daughter	4 (57,1%)	3 (42,9%)	7 (50%)
Sister	0 (0%)	1 (14,3%)	1 (7,1%)
Niece	1 (14,3%)	0 (0%)	1 (7,1%)
<i>Illness related variables</i>			
Stroke type (n, %)			
Infarction	7 (100%)	6 (85,7%)	13 (92,9)
Haemorrhage	0 (0%)	1 (14,3%)	1 (7,1%)
History of stroke (n, %)	1 (14,3%)	2 (28,6%)	3 (21,4%)
Co-morbidity (n, %)			
Several chronic diseases	6 (85,7%)	7 (100%)	13 (92,9%)
No comorbidity	1 (14,3%)	0 (0%)	1 (7,1%)
Strength arm (n, %)			
Paralysed	1 (14,3%)	2 (28,6%)	3 (21,4%)
Partly paralysed	6 (85,7%)	3 (42,9%)	9 (64,3%)
No paralysis	0 (0%)	2 (28,6%)	2 (14,3%)
Strength leg (n, %)			
Paralysed	0 (0%)	1 (14,3%)	1 (7,1%)
Partly paralysed	5 (71,4%)	4 (57,2%)	9 (64,3%)
No paralysis	2 (28,6%)	2 (28,6%)	4 (28,6%)
Speech problem (Aphasia) (n, %)	3 (42,9%)	1 (14,3%)	4 (28,6%)
Functional Status			
Mean BI score, range 0-20 (n, \pm SD)	10,7 (\pm 4,9)	9,0 (\pm 6,8)	9,9 (\pm 5,7)
Mean BBS score, range 0-56 (n, \pm SD)	25,3 (\pm 24,5)	25,8 (\pm 21,0)	25,6 (\pm 22,0)

Organizational variables

Time in nursing home (n, %)			
Mean (n, \pm SD)	7,1 (\pm 5,5)	5,7 (\pm 4,1)	6,4 (\pm 4,7)
0-4 weeks	4 (57,1%)	4 (57,1%)	8 (57,1%)
5-8 weeks	0 (0%)	2 (28,6%)	2 (14,3%)
9-12 weeks	2 (28,6%)	0 (0%)	2 (14,3%)
13 weeks or more	1 (14,3%)	1 (14,3%)	2 (14,3%)
Number of planned therapeutic activities (per week)			
Mean physical therapy (n, \pm SD)	4,4 (\pm 2,2)	3,9 (\pm 2,0)	4,1 (\pm 2,1)
Mean occupational therapy (n, \pm SD)	1 (\pm 1)	1,4 (\pm 1,3)	1,2 (\pm 1,1)
Mean speech language therapy (n, \pm SD)	2,1 (\pm 2,4)	1,4 (\pm 1,3)	1,8 (\pm 1,9)
Total number of rehabilitation beds	20	20	20
Total number of the nursing staff of the ward*	12	12	12
Number of nurses on rehabilitation ward*			
Registered nurses	2	2	2
Nursing assistants	10	10	10

Caregivers

Mean age (years) (\pm SD)	50,3 (\pm 11,8)	50,7 (\pm 9,0)	50,5 (\pm 10,7)
Gender (n, %)			
Men	1 (14,3%)	1 (14,3%)	2 (14,3%)
Women	6 (85,7%)	6 (85,7%)	12 (85,7%)
Mean CSI score (number of 'yes' answers) (SD)	8 (\pm 2,3)	6,7 (\pm 3,0)	7,4 (\pm 2,7)

BI: Barthel Index; BBS: Berg Balance Scale; CSI: Caregiver Strain Index

* Total number of nursing staff and number of nurses was the same during both observation periods

Table 2. Mean time per activity, location and social interaction

Activities	Mean time in minutes per day (% of day)	
	Pretest	Posttest
Total time therapeutic activities		
Mean (SD) (% of day)	52,9 (\pm 38,2) (10,2%)	91,4 (\pm 56,7) (17,6%)
Therapeutic activities		
Physiotherapy	25,7(4,9%)	22,9 (4,4%)
Nursing care	17,1 (3,3%)	15,7 (3,0%)
Autonomous exercising	1,4 (0,3%)	15,7 (3,0%)
Occupational therapy	0 (0%)	15,7 (3,0%)
Other activities	0 (0%)	11,4 (2,3%)
Speech therapy	8,6 (1,7%)	7,1 (1,4%)
Neuropsychological training	0 (0%)	2,9 (1%)

Total time non-therapeutic activities

Mean (SD) (% of day)	437,1 (± 63,7) (84,1%)	428,6 (± 57,5) (82,4%)
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Non-therapeutic activities

Sitting	111,4 (21,4%)	150 (28,9%)
Eating	52,9 (10,2%)	20,0 (3,8%)*
Transport	31,4 (6,0%)	31,4 (6,0%)
Lying and/or sleeping	21,4 (4,1%)	55,7 (10,7%)
Communication	85,7 (16,5%)	101,4 (19,5%)
Dressing and hygiene	35,7 (6,9%)	12,9 (2,5%)*
Active leisure	41,4 (8,0%)	10,0 (1,9%)**
Passive leisure	30,0 (5,8%)	38,6 (7,4%)
Other activities	27,1 (5,2%)	8,6 (1,7%)

Total time 'not detected' (minutes, % of therapy time observed in T1 and T2)***

Activities	210 (5,8%)	0 (0%)
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Total time spent on location

Patient's room	125,7 (24,1%)	327,1 (62,9%)*
Therapy room	35,7 (6,9%)	34,3 (6,7%)
Corridor	42,9 (8,3%)	35,7 (6,9%)
Dining room	67,1 (12,9%)	52,9 (10,2%)
Dayroom	78,6 (15,1%)	32,9 (6,3%)
Toilet or bathroom	25,7 (4,9%)	12,9 (2,5%)
Cafeteria/restaurant	67,1 (12,9%)	5,7 (1,2%)
Outside	45,7 (8,8%)	12,9 (2,5%)
Other location	31,4 (6,0%)	5,7 (1,2%)

Total time social interaction with others

Mean (% of day)	284,3 (54,6%)	252,9 (48,6%)
Doctors	0 (0%)	2,9 (1%)
Therapists	37,1 (7,1%)	55,7 (10,7%)
Nurses	38,6 (7,4%)	25,7 (4,9%)
Other patients	90,0 (17,3%)	77,1 (14,8%)
Visitors	94,3 (18,1%)	64,3 (12,4%)
Other persons	24,3 (4,7%)	25,7 (4,9%)
Alone	235,7 (± 64,0) (45,4%)	267,1 (± 105,3) (51,4%)

Total time 'not detected' (minutes, % of therapy time observed in T1 and T2)***

Social Interaction	0 (0%)	10 (0,3%)
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Observed time: 8.00 am - 5.10 pm; SD = standard deviation

* significant differences ($p < 0,05$)

** almost significant differences ($0,05 > p < 0,1$)

*** total therapy time observed = 7280 minutes (T1: 3640, T2: 3640)

Table 3. Minutes therapy per patient and percentage of therapeutic time

Therapeutic activities	Minutes per patient and % of therapeutic time	
	<i>Pretest</i>	<i>Posttest</i>
Physiotherapy	25,7 (48,6%)	22,9 (25,1%)
Nursing care	17,1 (32,2%)	15,7 (17,2%)
Autonomous exercising	1,4 (2,6%)	15,7 (17,2%)
Occupational therapy	0,0 (0%)	15,7 (17,2%)
Other activities	0,0 (0%)	11,4 (12,5%)
Speech therapy	8,6 (16,3%)	7,1 (7,8%)
Neuropsychological training	0,0 (0%)	2,9 (3,2%)
Total time spent on therapeutic activities	52,9 (100%)	91,4 (100%)

APPENDIX 1

Patient code number:

Date and Day of the week:

Code	<u>ACTIVITY</u>	<u>LOCATION</u>
	<u>Therapeutic activities</u>	
	physiotherapy	31 patient's room
111	<i>individual with physiotherapist</i>	32 therapy room
112	<i>group therapy</i>	33 corridor
	occupational therapy	34 dining room
121	<i>individual with occupational therapist</i>	35 day room
122	<i>group therapy</i>	36 toilet or bathroom
	speech therapy	37 cafeteria
	neuropsychological training	38 outside
	nursing care	39 any other location
	medical care	
	sports activities	
171	<i>swimming</i>	
172	<i>fitness</i>	
173	<i>other (e.g. horse riding, etc.)</i>	
	autonomous exercising and/or training	
	other activities	
	<u>Non- therapeutic activities</u>	
21	sitting	
22	eating	
23	transport (covering distances)	
24	lying or sleeping	
25	communication	
26	dressing and hygiene	
27	active leisure (reading a book, walking in garden etc.)	
28	passive leisure (watching TV, listening to music, etc.)	
29	other activities	
		<u>SOCIAL INTERACTION</u>
		41 doctors and/or specialists
		42 therapists
		43 nurses
		44 other patients
		45 visitors
		46 other persons (e.g. cleaning personnel, etc.)
		47 no-one
		999 not detectable

Scoringstabel

	Activity	Location	Interaction		Activity	Location	Interaction
8.30				12.50			
8.40				13.00			
8.50				13.10			
9.00				13.20			
9.10				13.30			
9.20				13.40			
9.30				13.50			
9.40				14.00			
9.50				14.10			
10.00				14.20			
10.10				14.30			
10.20				14.40			
10.30				14.50			
10.40				15.00			
10.50				15.10			
11.00				15.20			
11.10				15.30			
11.20				15.40			
11.30				15.50			
11.40				16.00			
11.50				16.10			
12.00				16.20			
12.10				16.30			
12.20				16.40			
12.30				16.50			
12.40				17.00			

Totaal aan minuten geobserveerd:

52 x 10 minuten = 520 minuten per dag