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Stroke service in the Netherlands: an exploratory study on effectiveness, patient satisfaction and utilisation of healthcare

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Abstract

Objective: To assess whether shared care for stroke patients results in better patient outcome, higher patient satisfaction and different use of healthcare services.

Design: Prospective, comparative cohort study.

Setting: Two regions in the Netherlands with different healthcare models for stroke patients: a shared care model (stroke service) and a usual care setting.

Patients: Stroke patients with a survival rate of more than six months, who initially were admitted to the Stroke Service of the University Hospital Maastricht (experimental group) in the second half of 1997 and to a middle sized hospital in the western part of the Netherlands between March 1997 and March 1999 (control group).

Main outcome measures: Functional health status according to the SIP-68, EuroQol, Barthel Index and Rankin Scale, patient satisfaction and use of healthcare services.

Results: In total 103 patients were included in this study: 58 in the experimental group and 45 in the control group. Six months after stroke, 64% of the surviving patients in the experimental group had returned home, compared to 42% in the control group ($p<0.05$). This difference could not be explained by differences in health status, which was comparable at that time. Patients in the shared care model scored higher on patient satisfaction, whereas patients in the usual care group received a higher volume of home care.

Conclusions: The Stroke Service Maastricht resulted in a higher number of patients who returned home after stroke, but not in a better health status. Since patients in the usual care group received a higher volume of healthcare in the period of rehabilitation, the Stroke Service Maastricht might be more efficient.

Keywords

transmural care, shared care, stroke service, effectiveness

Introduction

Stroke is a major healthcare problem because of its devastating effects on patients' life in combination with high incidence and prevalence. In the Netherlands, the yearly incidence of stroke is estimated between 1.7 (man) and 2.0 (women)/1.000 inhabitants, its prevalence between 5.6 (man) and 5.4 (women)/1.000 inhabitants [1].

Some years ago, the Dutch Heart Foundation identified several bottlenecks in healthcare for stroke patients in the Netherlands [2]. These bottlenecks concern actual patient care and patient education as well as basic and applied research. Some examples: (a) it is still unclear what is the most adequate site of treatment in the acute phase of stroke, (b) there is lack of sufficient capacity in nursing homes and home care, and (c) there is not enough co-operation between primary and secondary healthcare providers.

On the other hand, healthcare for stroke patients is continuously in progress. New treatment modalities are emerging and the organisation of care for stroke patients is constantly being modified in order to improve the quality of care [3]. Well known are two meta-analyses on the effectiveness of stroke units [4, 5]. Although the control groups in these analyses were not comparable to the neurological wards in Dutch hospitals, it is generally believed that structured care for stroke patients will have positive effects on the quality of care [6]. This structured care usually implies a multidisciplinary approach, continuity of care, and support by protocols.

In the Netherlands, an alternative way of organising healthcare, called transmural care, has received a great deal of attention recently. Transmural care is usually defined as: '*tailor made healthcare that is delivered on the basis of co-operation and direction between primary and secondary healthcare providers, with shared responsibilities and explicit sub-responsibilities*' [7]. Transmural care encompasses many different forms of healthcare directed toward bridging the gap between general primary care and specialised hospital care. The concept of transmural care overlaps with that of 'shared care' [8]. With these definitions in mind, structured care for stroke patients in the Netherlands can be considered as an example of shared care.

In spite of the popularity of shared care in the Netherlands, there is hardly any evidence for its effectiveness or efficiency [9]. It was suggested that one of the causes for this lack of evidence could be the methodological difficulties inherent to this type of assessment. For example, the randomisation of patients to different healthcare models is difficult in case of shared care because of practical reasons.

A recent inventory of shared care projects in the Netherlands demonstrated that in total over 300 projects were initiated, of which 12 concerned care for stroke patients [10]. These 12 projects are situated in 8 hospitals and comprise many different activities in order to improve the 'care chain', varying from early diagnosis to fast transitions and adequate rehabilitation sites. Most of these projects have not yet reached maturity. To illustrate this, none of these initiatives is structurally financed and insurance companies are involved in only one of these projects. Furthermore, only 4 of these 12 projects are being evaluated, information about the quality of these assessments is lacking.

One of the few shared care projects for stroke patients in the Netherlands that have reached maturity is the Stroke Service Maastricht (SSM). The primary goals of this healthcare model are to admit all patients suspected of having a stroke to the (university) hospital for diagnosis, followed by fast transition to, preferably, home, and otherwise to a rehabilitation centre or a specialised nursing home. The basic assumption behind this stroke service is that this model will result in a more effective as well as a more efficient healthcare for patients with stroke. To assess the extent to which these goals are realised in practice, we performed an exploratory cohort study, in which the SSM as an example of shared care, is compared with usual care.

The research questions for this study were whether this example of shared care for stroke patients with a survival rate of more than 6 months, results in:

- a higher health status and functioning of patients,
- a higher patient satisfaction and in
- a different use of healthcare services after discharge from hospital.

Methods

Patients

The patients in this prospective study were recruited from all patients with a stroke who were admitted to either one of the two hospitals. Patients with a stroke who were not admitted, but stayed home, were not included in this study. The inclusion period for patients in the experimental group was the second half of 1997. Since the hospital in the control group is of a smaller size, and has a smaller referral area compared to the SSM, we extended the inclusion period in this group with another year. In this way, we were able to create equal sample-sizes. The choice of the control group was based on the fact that at the time of the study no elements of stroke service were present in this hospital. The medical treatment was comparable in both models. Both hospitals had education facilities for neurologists. The only difference between the two hospitals was the way that healthcare has been organised for patients, which is the object of our study.

The inclusion of patients and data-collection in both groups was organised in a similar, prospective way. Patients were considered to have suffered a stroke if there was a sudden focal neurological deficit with no other known cause. Patients with first ever as well as with recurrent strokes were included in this study. Whenever symptoms disappeared within 24 hours, patients were considered to have suffered a transient ischaemic attack (TIA), and were subsequently excluded from this study. Patients with a subarachnoid hemorrhage were excluded also. All other stroke-patients admitted to the neurological wards in both hospitals were informed about the study during their hospital stay and gave informed consent to use their medical records in order to collect data about socio-demographic aspects and about the care-process. About six months after the onset of stroke, all surviving patients received a letter, in which they were informed about this study and were invited to participate in an interview. Patients who were willing and able to participate, were subsequently visited and interviewed by a trained researcher. The medical-ethical committee of TNO-Prevention and Health approved the study.

Experimental group

SSM is a co-operative healthcare model of general practitioners, neurologists, care co-ordinators, nurses, the hospital rehabilitation team, liaison-nurses, home care, physical therapists, speech therapists, the regional rehabilitation centre and nursing- and residential homes. The treatment of stroke in the SSM is given under set protocol [11, 12]. The key-characteristics of this model are:

- all stroke patients are referred to the hospital accompanied by a structured referral-letter from the general practitioner. This letter also contains a first estimation of the possibilities for home support after discharge;
- patients are admitted to the stroke unit for diagnosis and treatment;
- nursing care co-ordinators are brought into action on the stroke unit as well as in primary care in order to facilitate the returning home of patients;
- patients are accompanied by a ‘transmural’ patient-record throughout the whole care-process.

In the weekly multidisciplinary meetings in the hospital, the progress of all stroke patients is assessed. Whenever prolongation of medical treatment is judged to be unnecessary, the care co-ordinators start preparing a patient’s discharge. These care co-ordinators have an important role in the collaboration between primary and secondary care and can be considered as central actors throughout the whole care process.

Control group

In contrast with the SSM, healthcare in the control group (‘usual care’) is not structurally embedded in a co-operation model of various care providers involved in the healthcare for stroke patients. To illustrate this, there is no explicit guideline to admit all patients suspected of having a stroke to the hospital. The assessment of discharge possibilities can be characterised as ad-hoc, since it is based on the progress of rehabilitation and does not happen at set times. Whenever it is expected that home care will be needed after discharge, this is organised by a liaison nurse.

Outcome measures

- Generic health status of patients was measured using the SIP-68 and the EuroQol. Both instruments are considered to measure the so-called ‘health related quality of life’. The SIP-68 contains 68 items, covering 6 dimensions of health: somatic autonomy, motor control, psychological autonomy and communication, social behaviour, emotional stability and mobility range. For each dimension the scores are straightforwardly added up, a higher score indicates a higher impact on health, implying a lower health status [13, 14]. The EuroQol is a generic instrument with 5 questions about subjective health together with a so-called ‘health thermometer’ [15]. To measure the disease specific health status we used the Barthel Index and the Modified Rankin Scale (Oxford Handicap Scale). The Barthel Index consists of 10 items concerning daily functioning and limitations of mobility [16, 17], and is considered as a standard measure of disability [18]. The Modified Rankin Scale (to be called the Rankin Scale from here) is a more global measure of disability and consists of 6 scoring options, varying from ‘no complaints’ to ‘severe limitations’, with a constant need of support [19–22]. The cognitive functioning of patients was measured using the Mini Mental State Examination [23].
- To measure patient satisfaction we used several questions that were previously used in another project on stroke, the ‘Research On Stroke Amsterdam’ [24]. In order to measure more specifically patients’ judgement about the healthcare that was delivered, we added some questions developed especially for this study about the length of hospital stay, the way patients were treated by healthcare providers and the organisation of care.
- The use of healthcare services after discharge from hospital was estimated by an inventory of the (para)medical and nursing care that patients received the first half-year after stroke.
- The place of residence and patients’ living situation were documented during an interview, six months after the onset of stroke.

Data collection and statistical analyses

Patients’ records served as the main source for socio-demographic characteristics, clinical data and information about the proceedings of the treatment-process. All other data were collected during an

Table 1. Some baseline characteristics of stroke patients in both groups

Patient characteristics	SSM group (n=287)	Usual care (n=130)	p-value
– mean age ± sd	72 ± 12	76 ± 12	ns*
– % male/female	48/52	43/57	ns**
– % haemorrhage/infarction	21/79	15/85	ns**
Co-morbidity/risk factors:			
– % previous stroke	30	20	<0.05**
– % previous TIA	19	14	ns**

* *t*-test.
** Chi-square test.

interview, six months after stroke. Since there was no prior relevant research on which our estimations of the expected effects could be based we used standardised effect sizes ($\gamma=(\mu_1-\mu_2)/\sigma$) [25] to estimate the necessary sample sizes. With an α value of 0.05 and power of 0.70, the total sample size (number of subjects in both groups) for this study, with expected medium ($\gamma=0.50$) effects would 98. Baseline clinical and socio-demographic characteristics and outcome measures were analysed using chi-square or Fisher Exact test and unpaired T- or Mann-Whitney tests when appropriate. A p-value equal to or less than 0.05 was considered statistically significant. The test-hypothesis for all the analyses performed was that there would be no difference between the two settings. Data were processed and analysed using SPSSWIN.

Results

Patients

During the period of inclusion, in total 417 patients were admitted to the hospital: 287 in the SSM group and 130 in the control group. Some baseline characteristics of these patients [26] are represented in Table 1.

Of these patients, 31% in the SSM group, and 25% in the control group had died six months after stroke. From the remaining cohorts, we managed to include 58 patients in the SSM group and 45 in the control group. All other patients, who in fact can be considered as lost to follow up, were not able or willing to participate in this interview. They represent a high number of patients, which, considering the severity of this disease and its many complications (for example aphasia) is not too surprising.

The baseline characteristics of all patients who were included in our study are summarised in Table 2. It appears that both groups did not differ concerning these characteristics with the exception of the higher number of patients in the SSM group that had previously suffered a TIA. We also tested whether or not the interviewed patients differed from the original, larger cohorts (see Table 1). On neither aspect were any statistically significant differences found, implying that our study group can be considered as representative for all patients with a stroke in both hospitals.

Living situation

The living situation of patients during the interview, six months after the stroke, is given in Table 3.

The results show that, six months after stroke, relatively more patients in the SSM group lived in their own homes again.

Health status

The generic and disease specific health status of patients at the time of the interview is summarised in Table 4.

Concerning health status, both groups appear to be quite comparable six months after stroke. Some differences were detected in favour of the SSM group on three sub-scores of the Barthel Index: personal care, transport and walking stairs. This, however, was not reflected in the total score.

Patient satisfaction

The length of hospital stay of patients in the SSM group was 27 ± 19 days compared to 37 ± 37 in the control group (ns). We asked patients how they judged this length of stay: 26% of the patients in the SSM group judged this as ‘too long’, compared to 53% of the patients in the control group ($p<0.05$). Patients in the SSM group graded the quality of hospital care with 7.7 ± 0.9, patients in the control group with 7.1 ± 1.8. After dichotomising these

Table 2. Patient characteristics of the study population at the time of admission to the hospital in both groups

Patient characteristics	SSM group (n=58)	Usual care (n=45)	p-value
– mean age ± sd	72 ± 13	72 ± 12	ns*
– % male/female	48/52	43/57	ns**
– % haemorrhage/infarction	17/83	18/82	ns**
Severity of stroke, affected side			
– arm (%):			ns**
no problem	22	27	
paresis	47	58	
paralysis	26	16	
missing data	5	–	
– leg (%):			ns**
no problem	21	24	
paresis	66	60	
paralysis	7	16	
missing data	7	-	
Co-morbidity/risk factors:			
– % previous stroke	32	22	ns**
– % previous TIA	33	13	<0.05**
– % high blood pressure	47	38	ns**
– % angina pectoris	26	11	ns**
– % myocard infarction	19	7	ns**
– % cabg/ptca	14	7	ns**
– % high cholesterol	11	7	ns**
– % diabetes mellitus	19	27	ns**
– % copd	9	4	ns**
– % smoking	42	49	ns**
– % alcohol (10 glass/week)	16	22	ns**

* *t*-test.
** Chi-square test.

gradings in 'sufficient' (>6) versus 'not sufficient' (<6), significantly more patients in the SSM group graded the hospital care as 'sufficient'. Furthermore, patients were asked to judge healthcare and information, as delivered by several in-hospital care providers, see Table 5.

These results show that relatively more patients in the control group judged the information they received about their disease as well as the information about self care as 'insufficient' ($p<0.05$).

Also, we documented the type and volume of healthcare that patients received after discharge from hospital. It was also asked whether or not patients judged this as sufficient, see Table 6.

Table 3. Living situation of patients in both groups, six months after stroke

Living situation (%):	SSM group	Usual care	p-value**
Home	64	42	<0.05
Sheltered living*	12	7	ns
Nursing home	22	38	ns
Rehabilitation centre	2	13	<0.05

* Sheltered living: residential home, living in with their children or with other family.
** Chi-square test.

Compared to the SSM group, more patients in the usual care group received physical- and occupational therapy, day care and social care six months after stroke. The experimental group, on the other hand, received a higher volume of speech therapy and primary nursing care. It is striking that patients in the usual care group, despite the fact that they received a higher volume of healthcare, more often judged this as 'not enough', compared to patients in the SSM group. The patients in the SSM group, on the other hand, more often judged the volume of home help and primary nursing care as 'not enough'.

Finally, an inventory was made of the extent to which patients considered improvements desirable on various aspects of the healthcare they received after discharge from hospital. The results are depicted in Table 7.

It appears that patients from the control group more often felt that various aspects could be improved, specifically, the provision of information about stroke and its consequences and the co-ordination and organisation of healthcare.

Table 4. Health status of patients in both groups, six months after stroke

Measure:	SSM group	Usual care	p-value
– SIP-68			
Mean total score (±sd)	34±30	30±20	ns*
– EUROQOL (% without problems)			
Walking	52	31	ns*
Bathing	43	44	ns*
Daily activities	27	41	ns*
Pain/other complaints	43	42	ns*
Fear or depression	47	51	ns*
Health thermometer (±sd)	65±18	63±17	ns*
– BARTHEL Index			
Mean total score (±sd)	15±6	14±5	ns*
– RANKIN-scale (%)			ns**
0	4	2	
1	14	16	
2	37	37	
3	11	20	
4	18	14	
5	18	10	
– Mini Mental State Examination			
Mean total score (±sd)	24±4.5	25±5.2	ns*

* *t*-test.
** Chi-square test.

Discussion

On the basis of the results of this exploratory study, we conclude that changing the organisation of healthcare towards a stroke service can probably result in a higher number of patients who return home after stroke. We could, however, not detect any effect on the health status of patients. Together with the finding that the patients in the stroke service model consumed less healthcare after discharge from hospital, we conclude that this stroke service is more efficient compared to usual care.

Our results, however, need cautious interpretation and should be considered as tentative. To begin with, despite the fact that patients in both groups were comparable concerning most relevant characteristics at baseline, selection bias cannot be completely ruled out, as randomising patients to either one of the two models involved was not feasible. Assessing the organisation of care is complicated because the intervention to be evaluated is a complex change in the delivery of healthcare, with many different actors involved. This made randomisation very difficult because of practical reasons. Randomisation of patients within one setting was not possible since two different ways of organisation within one setting is not workable in daily practice. The randomisation of patients between both hospitals in different cities was not feasible, since this would imply long travels for patients and their relatives during the hospital stay, as well as for providers of home care after discharge. Another option would have been a pretest-posttest design, which was not possible because the shared care model had already been implemented when it was decided to do an evaluation study. For these reasons, we designed a prospective observational comparative study to assess the effects of shared care by comparing the outcomes of usual care with the outcomes of this new shared care model for

Table 5. Patient satisfaction: healthcare providers and information in the hospital

Patient judgement (%):	SSM group			Usual care		
	Good*	Not good/ Not bad	Bad*	Good*	Not good/ Not bad	Bad*
– Nurses	82	16	2	71	16	13
– Physicians	75	22	2	74	15	12
– Information about disease/treatment	37	46	17	42	10	48
– Information about self case	49	49	0	27	30	42

* In this table the answering modalities ‘excellent’ and ‘good’, as well as ‘bad’ and ‘very bad’ were put together in ‘good’, respectively, ‘bad’.

Table 6. Use of health services after discharge from hospital

Patients (%) Having received healthcare from:	SSM group			Usual care		
	Received care in the past*	Still receiving care	Wants more care	Received care in the past*	Still receiving care	Wants more care
Physical therapy	35	38	6	26	62	56
Occupational therapy	48	9	4	45	29	27
Speech therapy	35	28	0	42	15	27
Day care	14	14	4	15	54	50
Primary nursing care	14	23	19	0	25	6
Home help	9	36	23	5	37	0
Social care	22	6	4	24	44	12

* 'The past' refers to the first six months after the onset of stroke.

patients with stroke. Another limitation of this study is the relatively small number of patients that could be included in this study. Because of these sample sizes, we were not able to detect smaller differences ($\gamma < 0.50$) between the two groups should they exist.

Furthermore, it should also be kept in mind that, because patients were recruited from two different regions, it couldn't be ruled out that there were more differences besides the healthcare model only. For example, social characteristics or common, regional types of housing could have had an impact on the results also.

Despite these considerations, it can be argued that our study population was representative for all Dutch stroke patients. We compared our study population with patients from a recent, large study on stroke in the Netherlands, which included 738 patients [27]. It appeared that, concerning the main baseline patient characteristics, our study population was quite similar. Therefore, we think that this study has produced some results that are relevant for the organisation of healthcare for stroke patients.

One of the results of this study was that six months after stroke more patients in the SSM group lived in their own houses again. This difference is in accordance with the discharge destinations in both healthcare models [26]. Recently, another study in the Netherlands, including 760 patients with stroke, showed that almost 50% of all patients was living at home again, six month after stroke [28], which is 'just in between' the two models in our study.

A striking finding is that this difference in living situations is not reflected in differences in health status. Apparently, health status and patients' functioning are not the only criteria in determining the discharge destination. Earlier we found that the severity of stroke was not decisive in determining the discharge destination [26], now we conclude that patients' health status and functioning is not either. This could very well be one of the effects of the SSM, which was not initiated to provide more rehabilitation as recommend earlier [2], but to discharge as many patients home as possible. In general, our study indicates that changing the organisation of care can have an effect on

Table 7. Patients' judgements on aspects of healthcare that need improvement

Number of patients (%) that consider improvement desirable on:	SSM group	Usual care	p-value*
Information about whom to ask for information	65	71	ns
Information about stroke	57	89	$p < 0.05$
Information about things to happen	45	72	$p < 0.05$
Listening to patients	71	68	ns
Taking patients' wishes into account	70	64	ns
Deliberation between healthcare providers	27	55	$p < 0.05$
Organising healthcare	24	60	$p < 0.05$
Organising adaptations in their houses	65	73	ns
Healthcare as a whole	73	71	ns

* Chi-square test.

patients' living situations, while not improving their health status.

Another important result concerns the difference between the two groups in use of healthcare after discharge from hospital, indicating that the SSM is more efficient compared to usual care. Moreover, this difference can't be explained by differences in health status or the functioning of patients. In order to gain more insight into the real differences in costs, a thorough cost analysis would be needed, in which the costs associated with the maintenance of a stroke unit, and the personnel costs of care co-ordinators should be included. Nonetheless, one could question whether the (para)medical care after discharge from hospital, at least in the control group, was correctly brought into action. Also, striking is the finding that patients in the usual care group wanted more healthcare services, despite the fact that they had already received more healthcare compared to the SSM group. Notwithstanding these differences between the two groups, our study shows that an impressive number of patients feel the need for more healthcare service. As there is some evidence that patients who perceive an unmet care demand do appear genuinely to have an unmet need for care [29], it can be tentatively concluded that healthcare for stroke patients still needs to be improved in the Netherlands.

Compared to patients in the usual care group, the patients in the SSM group scored higher on patient satisfaction. This could be explained by the fact that healthcare providers in the SSM have reached a higher degree of attunement and co-ordination of their actions, with explicit feedback moments, allowing them to improve their performance. Although our results with respect to patient satisfaction are coherent with other findings [30], it can't be ruled out that cultural differences between the two groups could also have played a role here. Nonetheless, our results show that patient satisfaction in both groups can still be significantly improved.

Finally, the study reported on here should be seen as merely a study of just one single case of shared care. In order to formulate a general conclusion about shared care for this group of patients, more cases of shared care should be evaluated. Our study has produced some first tentative results, which can be considered as a first step. Since randomisation in case of shared care is difficult, we believe that the most feasible path will be replications of our study. We demonstrated that for this purpose, this design is feasible. To aggregate the results in a databank or knowledge-centre could be very helpful as a next step. In this way, evaluation could become part of the ongoing development of shared care in the Netherlands.

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