

Use of health care services after stroke

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Abstract

Objectives—To describe the use of care before and after stroke and to evaluate equity in access to health care services after stroke.

Design—Cross sectional study.

Setting—The Netherlands.

Patients—382 patients living in the community who had been admitted to hospital with a stroke six months before.

Main measures—Sociodemographic status and functional health status according to The Barthel index, Rankin scale, and sickness impact profile, assessed during interview, and general practitioner (GP) characteristics obtained by postal questionnaire. Univariate and multivariate analyses of the relation between patient and GP related factors and use of care.

Results—Compared with the period before stroke the use of care six months after stroke increased significantly, especially use of physical therapy, home help, and aids. Multivariate analyses showed that impaired functional health increased the use of care (range in odds ratios 1.6 to 6.7). Compared with younger patients, elderly patients were more likely to have home help (odds ratio 2.9) and aids (2.4) but less likely to receive therapy (0.4), psychosocial support (0.5), and an appreciable amount of care (0.5). Being female (1.7), living alone (4.0), and whether the GP was informed about patients' discharge (2.2) increased the use of home help. Higher financial income (2.8) and having a male GP (3.2) contributed to use of therapy. Emotional distress (1.6), living protected (3.2), and living alone (1.7) accounted for psychosocial support.

Conclusions—Although older age, lower income, and poor discharge information to the GP decreased the use of some types of care, there is equity in access to care after stroke, primarily determined by needs in terms of functional health status and predisposing factors such as living arrangement and social circumstances.

Implications—Patient oriented studies focusing on care processes and care outcomes in terms of subjective needs, perceived care deficits, and satisfaction with care are still required.

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Introduction

Stroke is the third leading cause of mortality in Western countries and one of the most

disabling chronic diseases in the community. In the Netherlands the annual incidence of stroke is estimated at about 170/100 000 population, of which 145/100 000 are first cases.¹ On the basis of demographic changes incidence rates are expected to rise.² Thirty per cent of patients with stroke die in the acute phase,¹ and half of the survivors have substantially impaired functional health outcomes.³ About 80% of those admitted to hospital are discharged home,⁴ and many of them depend on long term home care facilities.⁵

Most studies of stroke have focused on diagnostics, treatment options, and assessment of functional health outcomes after stroke; few, however, have paid attention to the use of non-medical healthcare resources in the (sub)chronic period after the stroke.⁶ Studies of the use of care after stroke are meaningful for enhancing present supportive care and predicting future care patterns, and they can be used as a basis for developing long term health care policy.

In this study we investigate the use of care before and after stroke and identify patient characteristics, functional health variables, and general practitioner (GP) characteristics that explain the care at six months after stroke. The objective of the study is to evaluate empirically one of the most basic indicators for quality of health care – namely, equity in access to care. According to Andersen's "Behaviour model of health services use,"⁷ access to health care depends on three factors: predisposing factors (for example, sociodemographic variables), enabling factors (for example, financial income), and need factors (for example, functional health status and patients' perception of health). The purpose of this model is to find evidence for the (in)equity in access to care. Equity is demonstrated when care is primarily determined by needs and predisposing factors such as age and social circumstances; inequity of care is when care is merely explained by predisposing and enabling factors, such as sex and socioeconomic status or characteristics of the health care system itself.

Patients and methods

The study group consisted of 382 patients living in the community who had had a stroke six months before. Most patients (234) had had a first ever stroke, 128 had had a recurrent stroke, and in 20 patients this information was unknown. The patients were survivors of an original cohort of 760 consecutively admitted patients with stroke who participated in a multicentre study of the quality of care in 23

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hospitals in the Netherlands (258 patients died after the stroke; 17 patients refused to enter the study; 103 patients were readmitted to hospitals, stayed in rehabilitation centres, or lived in nursing homes). The study was performed from mid-1991 to mid-1992 and was approved by the ethical committees of the participating centres.

Six months after their stroke the patients were interviewed by trained research assistants using a semistructured questionnaire. Informed consent was given by all patients. In case patients suffered from serious communication impairments patients' proxies were interviewed. Data were collected on socio-demographic characteristics (age, sex, financial income, living arrangements, and regional level of urbanisation), functional health status (dementia, disability, handicap, emotional distress, and perception of health), and use of various types of formal care before stroke (at time of onset) and after stroke. For brevity we aggregated formal care into three broad categories: (a) therapy (physical therapy, occupational therapy, and speech therapy); (b) psychosocial support (social care, mental care (for example from psychologist and priest or vicar)), sociocultural care (for example, organised social activities with other elderly people, group travels), and support from fellow patients; (c) aids (= adaptation of home, non-body-adapted aids (for example, crutch, cane), body-adapted aids (for example, body-adapted shoes, body-adapted wheelchair), and aids to promote outdoor mobility (for example, financial compensation for taxi rides, electric wheelchair)). Other types of care (day care, nursing care, and home help) were not aggregated.

During the interview the patient's use of care before stroke was registered retrospectively. Dementia was assessed with the mini mental state examination⁸ and disability with the Barthel index.⁹ Handicap, defined as any limitations in the patient's social role, was measured with the modified Rankin scale,¹⁰ emotional distress with the emotional behaviour subscale of the sickness impact profile,¹¹ and global level of perceived health with a single item ("How would you rate your present health?").

At six months after the stroke data on GP characteristics were collected by postal questionnaire. The questionnaire contained questions about sociodemographic characteristics (age, sex), type of practice (solo versus group), and whether the GP was informed in due time about the patient's discharge from the hospital or rehabilitation centre.

χ^2 tests were performed to analyse the univariate relations between patient and GP characteristics and use of care at six months after stroke. Since it was expected that both patient and GP factors were mutually related (for example, interrelations between age, functional health, emotional distress, and information about patient's discharge or interdependency between sex, age, and financial income) the effects of patient and GP characteristics on use of care were additionally analysed with multivariate logistic regression. All need factors, age, and the significant ($p \leq 0.10$) predisposing, enabling, and GP related factors identified from univariate analysis were forced into the models. The effect sizes were expressed as odds ratios (calculated as the antilogarithm of the regression coefficients of the logistic regression model) with 95% confidence intervals. The odds ratio approximates how much more likely (or unlikely) use of care is among patients with the characteristic of interest than among patients without that characteristic.

Table 1 Sociodemographic factors and functional health factors at six months after stroke in 382 patients living in community

Patient factors	Differentiation of factor	Score	No (%) of patients
Need factors:			
Handicap	Absent/mild	<3 Rankin scale	195 (51)
	Severe	≥ 3 Rankin scale	181 (47)
	Unknown		6 (2)
Activity of daily living disability	Absent/mild	≥ 15 Barthel index	344 (90)
	Severe	<15 Barthel index	35 (9)
	Unknown		3 (1)
Emotional behaviour*	Normal	≤ 0.10 SIP subscale	168 (44)
	Distressed	> 0.10 SIP subscale	172 (45)
	Unknown		42 (11)
Cognitive functioning	Normal	≥ 24 MMSE	264 (69)
	Dementia	<24 MMSE	49 (13)
	Unknown		69 (18)
Health perception	(Moderately) healthy		176 (46)
	Unhealthy		140 (37)
	Unknown		66 (17)
Predisposing factors:			
Age	Younger	≤ 69	186 (49)
	Older	> 69	196 (51)
Sex	Male		217 (57)
	Female		165 (43)
Living arrangements	Independent		328 (86)
	Partner		236 (72)
	Alone		92 (28)
	Protected†		54 (14)
Regional level of urbanisation	Rural		172 (45)
	Urban		207 (54)
	Unknown		3 (1)
Enabling factor:			
Income	Lower income	$\leq \text{€}6700$ nett yearly	124 (33)
	Higher income	$> \text{€}6700$ nett yearly	158 (41)
	Unknown		100 (26)

*Emotional behaviour and age of patient were dichotomised according to the median.

†For example, service flat, home for elderly people.

SIP = sickness impact profile; MMSE = mini mental state examination

Results

In all, 46 patients (12%) were not communicative because of cognitive, speech, or language disorders, and their proxies (mostly their partners) were interviewed. To avoid an unacceptably high patient burden (especially tiredness) we did not measure emotional distress in 42 (11%) of the patients. In 69 patients (18%) cognitive function could not be assessed because of serious aphasia. Almost a fifth of patients (66, 17%) were unable to score the one item question on perceived health. More than a quarter (100, 26%) refused to give information about their financial income (table 1).

Of the 382 GPs, 350 (92%) returned the postal questionnaire, 11% of whom reported that they were not sure whether they had been informed in due time about the patient's discharge (table 2).

In the period before stroke 191 patients (50%) had already received a substantial amount of care, particularly physical therapy (57, 15%), home help (72, 19%), socio-cultural care (49, 13%), and non-body-

Table 2 Characteristics of 350 GPs responding to postal questionnaire

Characteristic	Differentiation	No (%) of GPs
Age*	Younger	<45 years 165 (47)
	Older	≥45 years 169 (48)
	Unknown	16 (5)
Sex	Male	315 (90)
	Female	34 (10)
	Unknown	1 (0)
Organisation of practice	Group	86 (25)
	Solo	259 (74)
	Unknown	5 (1)
Informed about patient's discharge	Informed	85 (24)
	Not informed	226 (65)
	Unknown	39 (11)

*Age of general practitioner was dichotomised according to the median.

adapted aids (52, 14%) (figure). Except for non-body-adapted aids, these types of care were unrelated to whether the patient had or had not had a previous stroke (use of non-body-adapted aids in patients with recurrent or first ever stroke was 21% (26/125) and 10% (24/230) respectively; 95% confidence interval of difference 2% to 19%).

In the period between discharge from hospital and six months after stroke 219 patients (57%) temporarily made use of various types of care, specifically physical therapy (118, 31%), occupational therapy (69, 18%), speech therapy (56, 15%), nursing care (41, 11%), and social care (50, 13%) (figure). Of the total 1348 care modalities given in the first half year after the stroke, 445 (33%) were stopped within this period.

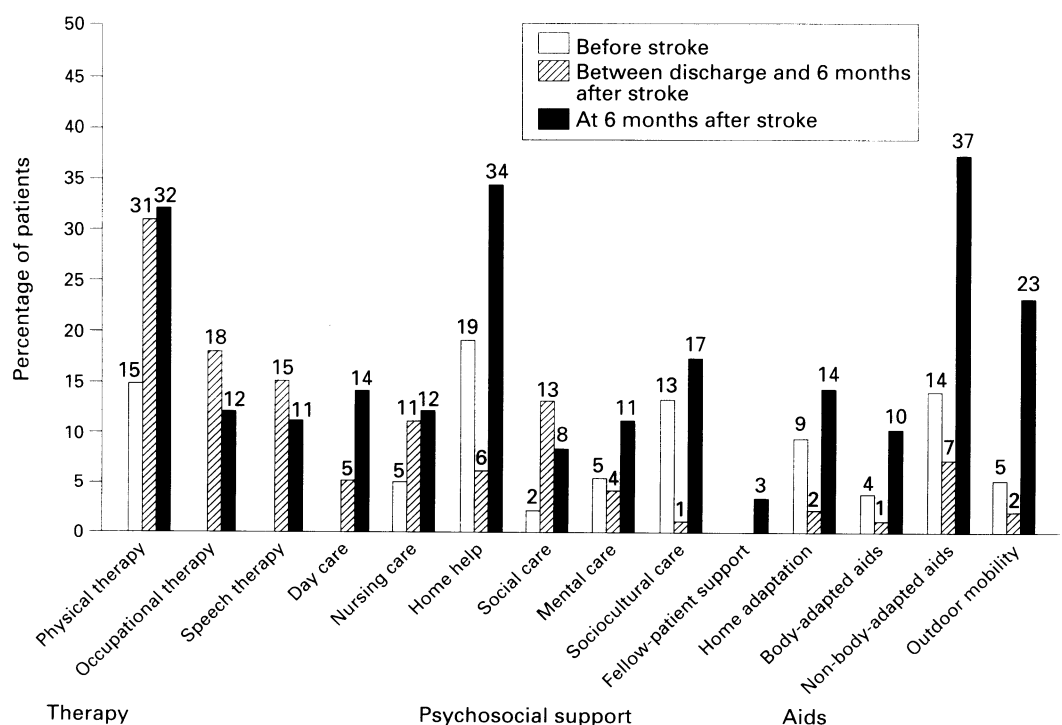
Compared with use of care before stroke, care used six months after stroke increased significantly, especially for physical therapy (by 17% (64 patients); 95% confidence interval 11% to 23%), home help (15% (56); 9% to 21%), non-body-adapted aids (23% (89); 17%

to 29%), and aids to promote outdoor mobility (18% (68); 13% to 23%) (figure). Again no relation could be shown between types of care after stroke and whether the patient had had a first or recurrent stroke except for non-body-adapted aids: use in patients with recurrent or first ever stroke was 46% (59/128) and 32% (74/234) respectively; 95% confidence interval of difference 4% to 25%.

Of all 382 patients, 94 (25%) did not use any care at all. Among the remaining 288 (75%) who did receive care, 181 (47%) were "low" users, consuming between one and three types of care and 107 (28%) were "high" users, receiving four or more types of care. Of the total 903 care modalities given at six months after stroke, 570 (63%) were consumed by these high users.

To show the differences between patients who were or were not users of care, as well as the differences between high and low users of care at six months after stroke, we focused on the main types of care used and aggregated some specific care types into three broad categories (see patients and methods section). Need factors, especially in terms of handicap, disability, and emotional distress, were positively related both to types of care and amount of care used (tables 3 and 4). With regard to the predisposing factors types of care were related to age, sex, living arrangements, and regional level of urbanisation. Patients with higher financial income received more therapy but made less use of aids. Furthermore, care used was positively related to the GP being male and to whether the GP was informed about the patient's discharge (table 3).

When all need factors, age, and the univariately identified significant factors were



Percentage of patients with stroke ($n = 382$) using care before and after stroke, according to type of care (figures above each bar are percentage values)

Table 3 Relative frequencies of patient and GP related factors: differences between users of care and non-users among 382 patients with stroke. † Figures are number (percentage) of patients

	Home help		Therapy		Psychosocial support		Aids	
	Users (n = 128)	Non-users (n = 254)	Users (n = 145)	Non-users (n = 237)	Users (n = 122)	Non-users (n = 260)	Users (n = 197)	Non-users (n = 185)
<i>Patient factors</i>								
Needs factors:								
Severe handicap	80/126 (63)	97/243 (40)***	100/143 (70)	81/233 (35)***	66/121 (55)	115/255 (45)*	139/194 (72)	42/182 (23)***
Severe disability	15/128 (12)	20/245 (8)	24/143 (17)	11/236 (5)***	9/122 (7)	26/257 (10)	33/196 (17)	2/183 (1)***
Emotional distress	67/117 (57)	103/217 (47)	71/125 (57)	101/215 (47)*	67/111 (60)	105/229 (46)**	98/174 (56)	74/166 (45)**
Dementia	26/106 (25)	22/201 (11)***	20/114 (18)	29/199 (15)	20/103 (19)	29/210 (14)	31/156 (20)	18/157 (11)*
Feeling unhealthy	51/106 (48)	87/205 (42)	49/112 (44)	91/204 (45)	48/106 (45)	92/210 (44)	73/157 (46)	67/159 (42)
Predisposing factors:								
Older age	89/128 (70)	102/246 (41)***	65/145 (45)	131/237 (55)*	56/122 (46)	140/260 (54)	126/197 (64)	70/185 (38)***
Male	51/128 (40)	160/246 (65)***	79/145 (54)	138/237 (58)	63/122 (52)	154/260 (59)	99/197 (50)	118/185 (64)***
Living independently	107/128 (84)	215/246 (87)	121/145 (83)	207/237 (87)	97/122 (80)	231/260 (89)**	155/197 (79)	173/185 (94)***
Living alone	53/107 (50)	39/215 (18)***	30/121 (25)	62/207 (30)	34/97 (35)	58/231 (25)*	50/155 (32)	42/173 (24)
Urban environment	64/127 (50)	138/244 (57)	72/144 (50)	135/235 (57)	62/121 (51)	145/258 (56)	98/196 (50)	109/183 (60)*
Enabling factor:								
Higher income	46/91 (51)	109/187 (58)	70/111 (63)	88/171 (51)*	46/90 (51)	112/192 (58)	72/144 (50)	86/138 (62)**
<i>GP factors</i>								
Older age	57/113 (50)	109/213 (51)	68/130 (52)	101/204 (50)	52/109 (48)	117/225 (52)	91/173 (53)	78/161 (48)
Male	105/118 (89)	203/223 (91)	129/135 (96)	186/214 (87)**	107/116 (92)	208/233 (89)	164/181 (91)	151/168 (90)
Solo practice	83/117 (71)	171/220 (78)	101/131 (77)	158/214 (74)	88/113 (78)	171/232 (74)	137/176 (78)	122/169 (72)
Informed about discharge	41/106 (39)	44/201 (22)***	40/117 (34)	45/194 (23)**	27/103 (26)	58/208 (28)	54/165 (33)	31/146 (21)**

†Continuous variables were dichotomised according to the median. Differences between frequencies were analysed with χ^2 tests: *p \leq 0.10, **p < 0.05, ***p < 0.01. Missing values were omitted from this analysis.

forced into multivariate logistic regression models the results showed that severity of handicap increased the types and amount of care used. Compared with younger patients, elderly patients were more likely to have home help and aids but less likely to receive therapy, psychosocial support, and an appreciable amount of care. Using home help was additionally explained by being female, living alone, and whether the GP was informed about the patient's discharge. Patients' higher financial income and male sex of the GP contributed significantly to use of therapy whereas emotional distress and living arrangements (living protected and living alone) accounted for use of psychosocial support services (table 5).

Table 4 Relative frequencies of patient and general practitioner related factors: differences between low users of care (between one and three types of care) and high users of care (four or more types of care)†. Figures are number (percentage) of patients

	Low users (n = 181)	High users (n = 107)
<i>Patient factors</i>		
Need factors:		
Severe handicap	87/177 (49)	83/106 (78)***
Severe disability	11/179 (6)	24/107 (22)***
Emotional distress	81/163 (50)	60/94 (64)**
Dementia	22/147 (15)	20/85 (24)
Feeling unhealthy	71/149 (48)	39/85 (46)
Predisposing factors:		
Older age	108/181 (60)	54/107 (50)
Male	95/181 (52)	55/107 (51)
Living independently	151/181 (83)	85/107 (79)
Living alone	50/151 (33)	26/85 (31)
Urban environment	98/178 (55)	52/107 (49)
Enabling factor:		
Higher income	70/138 (51)	43/79 (54)
<i>GP factors</i>		
Older age	85/163 (52)	47/93 (51)
Male	153/167 (92)	91/99 (92)
Solo practice	122/164 (74)	74/97 (76)
Informed about discharge	41/143 (29)	33/91 (36)

†Continuous variables were dichotomised. Differences between frequencies were analysed with χ^2 tests: *p \leq 0.10, **p < 0.05, ***p < 0.01. Missing values were omitted from this analysis.

Discussion

In this study we described the types and amount of care services used after discharge from hospital by patients with stroke, and we identified the factors that explain these care patterns.

Although in this sample the amount of care before stroke was already substantial, the use of home health care services by patients in the (sub)chronic period after their stroke increased significantly. Physical therapy, occupational therapy, and speech therapy were the primary rehabilitative interventions in the period between discharge and six months after stroke. Of all care used in the first half year after stroke, 33% was stopped within six months. With the exception of physical therapy, the focus of health care services at six months after stroke seemed to switch from temporary rehabilitative "cure" to more permanent "care," particularly in terms of home help, sociocultural care, home adaptation, and aids.

There were strong relations between medical need factors in terms of functional health and use of care six months after stroke. Home help was one of the main (non-aggregated) types of care used and, not surprisingly, was consumed primarily by elderly patients, patients who lived alone, and female patients. As expected, emotionally unstable patients, those who lived protected, and patients who lived alone tended to receive more psychosocial support than patients with opposite characteristics. Older patients, however, received psychosocial support less commonly. This finding may reflect a "cohort effect" rather than an effect of chronological age. Members of older birth cohorts may be more averse to demanding formal psychological help than younger adults.

The results indicate that higher financial income increased the use of rehabilitative therapy. This finding supports an earlier study on use of physical therapy among patients with

Table 5 Logistic regression models to explain (aggregated) types of care (382 patients) and amount of care (288 patients) used at six months after stroke

	Home help (n = 128)			Therapy (n = 145)			Psychosocial (n = 122)*			Aids (n = 197)			High users (n = 107)		
	Odds ratios	95% Confidence interval	p Value†	Odds ratios	95% Confidence interval	p Value†	Odds ratios	95% Confidence interval	p Value†	Odds ratios	95% Confidence interval	p Value†	Odds ratios	95% Confidence interval	p Value†
Need factors:															
Severe handicap	2.6	(1.5 to 4.6)	p < 0.01	5.4	(3.1 to 9.7)	p < 0.01	1.6	(1.0 to 2.6)	p ≤ 0.10	6.7	(3.9 to 11.6)	p < 0.01	3.3	(1.8 to 6.1)	p < 0.01
Severe disability	1.0	(0.4 to 2.3)		2.2	(0.9 to 5.3)	p ≤ 0.10	0.5	(0.2 to 1.3)		4.6	(1.0 to 21.3)	p ≤ 0.10	3.6	(1.5 to 8.6)	p < 0.01
Emotional distress:															
Present	1.3	(0.8 to 2.3)		1.2	(0.7 to 2.0)		1.6	(1.0 to 2.7)	p < 0.05	1.0	(0.6 to 1.7)		1.4	(0.8 to 2.6)	
Unknown‡	0.7	(0.3 to 1.8)		2.7	(1.0 to 7.2)		1.3	(0.5 to 3.2)		1.1	(0.4 to 3.1)		1.1	(0.4 to 3.1)	
Dementia:															
Present	1.6	(0.8 to 3.3)		0.9	(0.4 to 1.9)		1.3	(0.7 to 2.7)		1.0	(0.5 to 2.2)		1.5	(0.7 to 3.2)	
Unknown	0.7	(0.2 to 2.2)		0.7	(0.2 to 2.2)		1.5	(0.5 to 4.5)		1.0	(0.3 to 3.7)		1.0	(0.3 to 3.3)	
Feeling unhealthy:															
Present	1.2	(0.7 to 2.2)		0.8	(0.4 to 1.3)		0.9	(0.6 to 1.5)		1.1	(0.7 to 2.0)		0.8	(0.5 to 1.5)	
Unknown	1.4	(0.4 to 4.8)		1.1	(0.3 to 3.7)		0.5	(0.1 to 1.5)		0.8	(0.2 to 2.9)		0.7	(0.2 to 2.4)	
Predisposing factors:															
Older age	2.9	(1.7 to 4.9)	p < 0.01	0.4	(0.3 to 0.7)	p < 0.01	0.5	(0.3 to 0.8)	p < 0.01	2.4	(1.4 to 4.0)	p < 0.01	0.5	(0.3 to 0.9)	p < 0.05
Female	1.7	(1.0 to 2.9)	p < 0.05							1.2	(0.7 to 2.1)				
Living protected							3.2	(1.6 to 6.4)	p < 0.01	1.8	(0.8 to 4.3)				
Living alone:															
Present	4.0	(2.1 to 7.3)	p < 0.01				1.7	(1.0 to 2.9)	p < 0.01						
Unknown	1.0	(0.5 to 2.2)					#								
Urban environment										0.7	(0.4 to 1.2)				
Enabling factor:															
Higher income:															
Present				2.8	(1.5 to 5.1)	p < 0.01				1.0	(0.6 to 1.9)				
Unknown				1.4	(0.7 to 2.6)					1.1	(0.5 to 2.1)				
Male															
Present				3.2	(1.2 to 8.5)	p < 0.05									
Unknown				1.4	(0.3 to 6.0)										
Informed about discharge															
Present	2.2	(1.2 to 4.1)	p < 0.05	1.4	(0.8 to 2.6)					1.6	(0.8 to 2.9)				
Unknown	1.1	(0.6 to 2.2)		1.5	(0.7 to 3.4)					0.7	(0.4 to 1.4)				

*Psychosocial, psychosocial support.

†Calculated with Wald statistics.

‡Unknown: missing values were treated as independent factors. Effect of missing values was compared with reference category "absence of concerning characteristic."

#Omitted because of redundancy; variables without odds ratios were not entered into the models.

chronic diseases in relation to their social and economic status.¹² The fact that both older patients and those with a female GP were less likely to receive therapy cannot be clearly explained.

To date various studies have identified consistently high and low users of health care services.^{13 14} Our study disclosed that at six months after stroke 28% of the younger and functionally impaired patients made use of 63% of the total amount of given care. The finding that high users were younger than the low users contradicts the frequently stated general assumption that elderly patients are very high users of all types of health care services.¹⁵

The availability of information about the patient's discharge from the hospital (or rehabilitation centre) was a relevant factor in explaining the use of home help afterwards: if the GP was informed of discharge the patient was more likely to use home help. This may indicate that a well informed GP is more likely to initiate help. Alternatively if a hospital team considers home help to be necessary, the GP may be more likely to be contacted. The results suggest that the present system of organisation of care may be improved by creating more effective communication between care givers. In any new care programme ("stroke service") that aims at adapting treatment and circumstances to the patient's needs, enhancing supportive care, and evaluating efficacy of both care and rehabilitative interventions the lines of communication should be well developed and formalised.

Our study has four limitations. Firstly, we focused only on formal use of health care. Since informal care givers are probably common providers of care in the community, additional care was probably given by the patient's proxy. For example, analysing the use of formal and informal home care by disabled elderly people, Kemper found that the availability of a proxy reduced the probability of receiving formal care, by about 7–10% from that when no proxy was available.¹⁶ Secondly, we assessed only the frequency of use of care after stroke and therefore knew little of the patterns of intensity of care. Thirdly, we studied solely the period up to six months after stroke and can speculate only on how care patterns after stroke ultimately will develop over time. Finally, although on an aggregate level "equity" is a significant basic indicator for quality of care, on an individual level this concept tells us nothing about the care processes. For example, despite the substantial amount of care given to patients with stroke they may still perceive needs for additional care. Naturally, it is doubtful whether all unmet care demands of patients are synonymous with objective clinical needs; from a patient's viewpoint,

however, unmet demands are needs, and consequently they may reflect inefficacy of care.

We conclude that use of health care services after stroke was mostly explained by needs and predisposing factors such as age, living arrangement, and social circumstances. This finding supports the principle of equity on which the health care system in the Netherlands is based. However, some inequitable care cannot be ruled out; while adjusting for the impact of need factors, older age and lower financial income decreased the use of rehabilitative therapy. The GP being informed about a patient's discharge also explained the allocation of care. Besides evaluations of the allocation of health care resources, studies are needed of alternative indicators of quality of care. These studies, on an individual patient level, should be focused on care processes and care outcomes in terms of subjective needs, perceived care deficits, and satisfaction with care.

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