

Outcome measures in physiotherapy management of patients with stroke: a survey into self-reported use, and barriers to and facilitators for use

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ABSTRACT Objective. *To investigate physiotherapists' self-reported use of outcome measures as recommended in the Dutch Clinical Practice Guideline on Physiotherapy Management of Patients with Stroke (CPGPS) and to assess perceived barriers to and facilitators for the use of outcome measures in everyday practice.* **Method.** *A 41-item survey, including the barriers and facilitators questionnaire (BFQ), was sent by post to 400 physiotherapists in each of the following settings in the Netherlands: acute care hospitals (ACH; n = 100), rehabilitation centres (RC; n = 100), nursing homes (NH; n = 100) and private physiotherapy practices (PPP; n = 100).* **Results.** *One hundred and eighty-nine physiotherapists returned the survey (47%; ACH, n = 57; RC, n = 67; NH, n = 26 and PPP, n = 39) and the surveys of 167 physiotherapists involved in stroke settings were analysed. These physiotherapists reported regularly using three (median; range 0–7) of the seven recommended outcome measures, with those working in RC or ACH reporting a significantly higher use than their colleagues in PPP (4 vs. 0 and 3 vs. 0; $p < 0.001$ and $p = 0.02$, respectively). The BFQ revealed that there were setting-specific facilitators, such as*

'a positive attitude towards outcome measures' (as mentioned by 93% of the physiotherapists) and 'acquaintance with outcome measures' (90%), and barriers such as 'changing routines' (32%), 'time investment' (29%) and 'financial compensation' (21%). **Conclusion.** Despite an almost uniformly positive attitude, physiotherapists infrequently use the outcome measures recommended in the CPGPS. Robust setting-specific tailored implementation strategies based on the reported barriers and facilitators are needed. Copyright © 2008 John Wiley & Sons, Ltd.

Key words: cerebrovascular disorders, guideline, outcome measures, physiotherapy, survey

INTRODUCTION

The judicious use of outcome measures to monitor the health status of patients is considered an aspect of good clinical practice in physiotherapy (Haigh et al., 2001; Parker-Taillon, 2002; Jette et al., 2003; Glasziou et al., 2005). Their use leads to improved patient care, because professionals have feedback on the effect of an intervention, and to improved communication, both with patients and members of an interdisciplinary team (Hammond, 2000). While physiotherapists are encouraged to use outcome measures as a part of their daily practice (Partridge, 1982; Van Peppen et al., 2007), recent surveys indicate they do not regularly do so (Chesson et al., 1996; Duckworth, 1999; Haigh et al., 2001; Glasziou et al., 2005; Maher and Williams, 2005; Abrams et al., 2006; Akinpelu and Eluchie, 2006).

In September 2004, a Clinical Practice Guideline on the Physiotherapy Management of Patients with Stroke (CPGPS) was published in the Netherlands (Van Peppen et al., 2004; Van Peppen et al., 2007). One part of the CPGPS recommends the use of a core set of seven valid, reliable and responsive outcome measures to assess the functional health status of patients who have had

a stroke (Van Peppen et al., 2007). This evidence-based core set aims to monitor specific aspects in the 'activities' domain of the International Classification of Functioning, Disability and Health (WHO, 2001; Australian Physiotherapy Association, 2003; Jette, 2003) as advocated by Geyh et al. (2004). The seven outcome measures recommended in the CPGPS are the Motricity Index (MI; Demeurisse et al., 1980), Trunk Control Test (TCT; Franchignoni et al., 1997), Berg Balance Scale (BBS; Berg et al., 1995), Functional Ambulation Categories (FAC; Holden et al., 1986), Ten-Metre Walk (TMW; Wade, 1992), Frenchay Arm Test (FAT; Heller et al., 1987) and Barthel Index (BI; Collin et al., 1988). The guideline recommends that physiotherapists assess patients' functional status at least five times at fixed time points during treatment, namely, 1) at the start; 2) at the end of a course of treatment in any location; 3) before each multidisciplinary stroke team meeting (information about patients' current status and progress); 4) at three months; and 5) at six months after the stroke (Van Peppen et al., 2007). The CPGPS also recommends that appropriate outcome data are sent to colleagues if patients are transferred from one clinical setting to another (Van Peppen

et al., 2007), e.g. from hospital to stroke unit or nursing home (Commissie CVA-Revalidatie, 2001). In the Netherlands, cooperating institutions build up regional networks in order to constantly support patients after stroke, the so-called 'stroke services'.

It is difficult to study the adherence of physiotherapists to the entire CPGPS at once. According to Grol and colleagues, the frequent use of recommended outcome measures by professionals can be seen as a useful process indicator of guideline adherence (Grol et al., 2005) as it reflects a pivotal part of preferred clinical practice, especially in patients with a chronic condition such as stroke (Glasziou et al., 2005). Consequently, in the present survey, we focused on the CPGPS recommendations concerning the use of a core set of outcome measures. A crucial element for the successful implementation of evidence-based therapy in daily practice is an initial analysis of the patients and professionals involved and their institutional context (Grol and Grimshaw, 2003).

This study analysed the current use of outcome measures by physiotherapists involved in the care of patients with stroke. Such knowledge makes it possible to tailor future implementation strategies. Contrary to international studies, to date, little is known about the use of outcome measures by physiotherapists who provide care for patients with stroke in the Netherlands.

We therefore carried out a survey among physiotherapists in different Dutch stroke settings to investigate the self-reported use of outcome measures as recommended in the CPGPS and to identify perceived barriers to and facilitators for the use of these outcome measures (Barriers and Facilitators Questionnaire, BFQ). This information may prove helpful in tailoring strategies to promote the implementation of the CPGPS recommendations.

METHODS

A questionnaire was sent to a sample (Portney and Watkins, 2000) of randomly selected physiotherapists working in acute care hospitals ($n = 100$), in rehabilitation centres ($n = 100$), in nursing homes ($n = 100$) and in private physiotherapy practices ($n = 100$) in the Netherlands to assess the self-reported use of outcome measures as recommended in the CPGPS. Physiotherapists were also asked to provide information about apparent barriers to and facilitators for the use of the recommended outcome measures.

Questionnaire design

A 41-item questionnaire on the self-reported use of outcome measures in the physiotherapy management of patients with stroke was used. This questionnaire comprised of three sections:

- *Section I* consisted of seven multiple choice questions about relevant personal, demographic and professional characteristics of the physiotherapists, such as age, professional experience and number of stroke patients treated weekly.
- *Section II* included 14 questions concerning a) the routine use of outcome measures on a nominal scale (yes/no); b) the self-reported use of the recommended core outcome measures (e.g. BBS); and c) time points of assessment (e.g. at admission and discharge) and registration (e.g. sending discharge letters).
- *Section III* contained 20 statements concerning potential barriers to and facilitators for the use of outcome measures in everyday practice in physiotherapy stroke management, such as 'reluctance to adhere to guidelines' or 'experience with outcome measures', etc. This 'Barriers

and Facilitators Questionnaire' was based on a validated questionnaire for perceived barriers to professional change (Peters et al., 2003; Grol et al., 2005). The original 27-statement questionnaire was adapted for the purpose of this study. Eleven statements concerning 'prevention' were not applicable and therefore removed. Four statements with regard to patients' view about outcomes and physiotherapists' training and experience with outcome measures were added. The final 20 statements were tested for content validity by five experts. After in depth inspections and minor correction of text, the instrument was completed for use in this project. Physiotherapists rated each statement on a 5-point Likert scale, ranging from 'fully disagree' (1 point) to 'fully agree' (5 points).

Sample

The survey was performed in November 2004, two months after the publication of the CPGPS in the Netherlands. The survey was sent by post to a sample of physiotherapists ($n = 4 \times 100$) randomly selected from the database of the Royal Dutch Society for Physical Therapy and equally distributed over the four main settings of physiotherapy stroke management: acute care hospitals (ACH), rehabilitation centres (RC), nursing homes (NH) and private physiotherapy practices (PPP) (Commissie CVA-Revalidatie, 2001). Non-responders were sent a reminder in February 2005. The data supplied by physiotherapists who reported treating patients with stroke were analysed.

Data analysis

SPSS 12.0 statistical software was used for data analysis (SPSS Inc., Chicago, Illinois,

USA) using a significance level of $p < 0.05$. Descriptive statistics were used to describe the physiotherapists and their responses and to examine the frequency of the self-reported use of the recommended outcome measures (Field, 2005). Sum scores were calculated for all self-reported outcome measures, ranging from 0 (no use of any of the outcome measures) to 7 (regular use of all recommended outcome measures). Based on the recommendations of the CPGPS, a self-reported use of less than 7 outcome measures is stated as infrequent use. We hypothesized that the physiotherapists' case-load of patients with stroke would be linearly related to the frequency of using the recommended outcome measures. The association between sum scores of self-reported use of recommended core instruments and the number of stroke patients treated weekly was assessed using Spearman's rho. The strength of the associations was worded as recommended by Learner and Goodman, who suggested that a correlation coefficient ≥ 0.7 is indicative of a strong association (Learner and Goodman, 1996). To assess perceived barriers to and facilitators for the use of outcome measures in the four settings, cross tables and (cumulative) frequencies were used. The 5-point Likert scale was recoded into a 3-point scale (fully disagree/disagree, do not agree nor disagree and agree/fully agree) to simplify data interpretation. Rank scores were used to determine the barriers and facilitators most frequently mentioned.

A principal component analysis (PCA) with varimax rotation was used to uncover underlying dimensions of the BFQ in this specific professional area and to reduce the number of statements of the perceived barriers and facilitators statements. Only factors with an eigen value of at least 1.0 were considered for analysis and factor loadings < 0.4

were suppressed (Streiner and Norman, 2003; Field 2005). Before factor analysis, the database was screened for shortcomings such as multicollinearity, checking for an identity matrix using the Bartlett's test of sphericity ($\alpha < 0.05$ to perform factor analysis) and the Kaiser-Meyer-Olkin measure for sampling adequacy. With the outcomes of the PCA, we intended to detect different setting-specific factors (barriers of facilitators), which in the long run, may permit us to develop tailored setting-specific implementation strategies to promote the use of clinical outcome measures in the physiotherapy management of patients with stroke, a tactic formerly advocated by Grol and Grimshaw (2003).

Subsequently, the internal consistency of the total BFQ and of each of the identified factors was assessed using Cronbach's alpha. Finally, sum scores were calculated for each identified factor by adding up the individual item scores assigned to that specific factor. To assess differences between 1) self-reported (median) use in the four settings; and 2) statements regarding perceived

barriers and facilitators in the four settings, a one-way analysis of variance (ANOVA) was performed with post hoc multiple setting comparison using Bonferroni post hoc test (Field, 2005). All analyses were assessed at a significance level of $p < 0.05$.

RESULTS

Of the 400 questionnaires sent, two were undeliverable and 189 were returned (of which 88 were returned within two months, the remaining were returned after a reminder was sent) representing an *overall response rate* of 47% (189/400). Twenty-two questionnaires were excluded from analysis because the physiotherapists concerned were not involved in the care of patients with stroke. Seventeen out of these 22 excluded physiotherapists worked in a PPP, four in RC and one in a nursing home. The remaining 167 questionnaires were included in the analyses representing an *effective response rate* of 42% (167/400) (Figure 1 and Table 1).

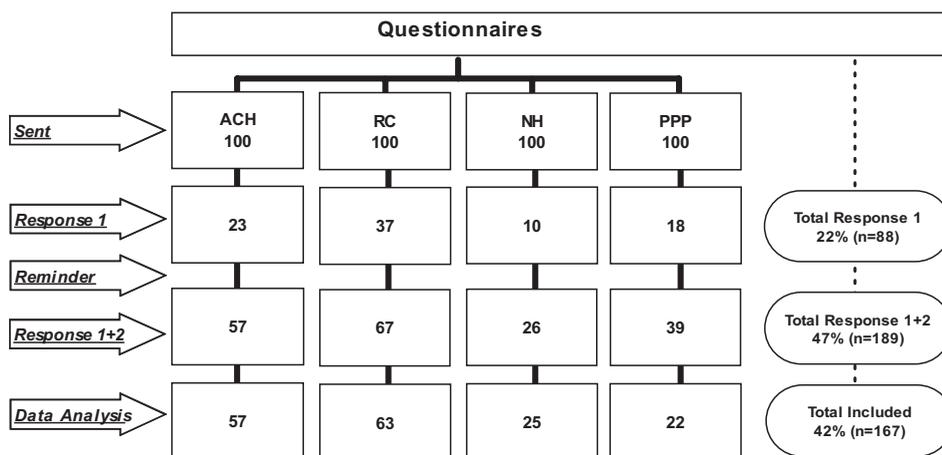


FIGURE 1: Physiotherapists (n) per setting.

ACH = acute care hospitals; NH = nursing homes; RC = rehabilitation centres; PPP = private physiotherapy practices.

TABLE 1: Characteristics of included physiotherapists

	<i>Acute care hospitals</i>	<i>Rehabilitation centres</i>	<i>Nursing homes</i>	<i>Private physiotherapy practices</i>	<i>Total %</i>
	<i>(n = 57)</i>	<i>(n = 63)</i>	<i>(n = 25)</i>	<i>(n = 22)</i>	<i>(n = 167)</i>
	<i>%</i>	<i>%</i>	<i>%</i>	<i>%</i>	<i>100%</i>
Gender					
male	35	32	20	59	35
female	65	68	80	41	65
Age					
<30 years	14	25	36	14	22
30–34 years	19	14	20	9	16
35–39 years	13	13	16	4	12
40–44 years	7	11	20	14	11
45–49 years	21	18	4	18	17
>50 years	26	19	4	41	22
Number of stroke patients treated weekly					
One	14	5	4	41	13
2–3	32	11	16	45	23
4–6	28	32	32	14	28
7–10	10	17	16	0	13
>10	16	35	32	0	23
Cooperate in stroke service?					
Yes	93	94	72	9	79
No	7	6	28	91	21
In possession of CPGPS?*					
Yes	96	94	92	91	94
No	4	6	4	5	5
Informed about content of CPGPS?*					
Yes	79	83	60	36	72
No	11	13	28	18	15
Using recommended core set of outcome measures?*					
Yes	53	73	36	9	52
No	26	16	40	32	25

* The remaining percentage in each table cell reflects missing data. CPGPS = Clinical Practice Guideline on Physiotherapy Management of patients with Stroke.

Section I: characteristics of the effective response

Of the 167 physiotherapists whose information was analysed, 63 worked in RC, 57 in ACH, 25 in NH and 22 in PPP. Most of these physiotherapists worked in an institutional

or interinstitutional stroke service ($n = 132$, 79%), had a copy of the CPGPS (94%), were knowledgeable about the content of the CPGPS (72%) and reported using at least some of the recommended outcome measures of the CPGPS (52%). Most of the physiotherapists who worked in PPP had a copy

of the CPGPS ($n = 20$, 91%) and did not work in a stroke service (91%). Overall, physiotherapists working in PPP reported they were poorly informed about the CPGPS. These colleagues also reported a relatively low frequency of use of the recommended outcome measures in the CPGPS (9%) (Table 1).

Section 2: self-reported use of recommended outcome measures

The 167 physiotherapists reported using three of the seven recommended outcome measures. The most widely used outcome measure was the FAC ($n = 82$, 49%) and the least used was the FAT ($n = 11$, 7%).

Specified per setting, the highest reported use of the seven outcome measures was among physiotherapists working in RC (median = 4, interquartile range [IQR]: 3–5/modus = 4), followed by physiotherapists working in ACH (median = 3, IQR: 1–4/modus = 3), in NH (median = 2, IQR: 0–4.5/modus = 0) and in PPP (median = 0, IQR: 0–2/modus = 0). Physiotherapists working in RC or ACH made significantly greater use of outcome measures than their colleagues working in PPP (median 4 vs. 0 and median 3 vs. 0, $p < 0.001$ and $p = 0.02$, respectively).

Physiotherapists working in PPP reported the most infrequent use of the recommended outcome measures; reported use was lower than 10% for six of the seven measures. The highest reported use of outcome measures was by physiotherapists working in RC, ranging from 79% for the BBS ($n = 50$) to 11% for the FAT and the lowest was by physiotherapists working in PPP, ranging from 23% for the TMW ($n = 5$) to 5% for the BI (Table 2).

Overall, outcome monitoring of the patient's health status at fixed time points as

recommended by the CPGPS varied from 69% ($n = 115$) in the week of admission to 16% at six months after stroke (Table 3). Compared with physiotherapists working in the other settings, physiotherapists working in PPP followed the guideline recommendations the least in this respect, ranging from 18% ($n = 4$) at six months after stroke to 5% at discharge or at the end of a treatment period. The number of missing values for these physiotherapists was relatively high ($\geq 45\%$).

Most physiotherapists (93%) reported sending a discharge letter to the professional responsible for the further treatment of the patient (proportion of physiotherapists by setting: ACH = 96%, RC = 93%, NH = 83% and PPP = 100%), whereas only 42% of them stated receiving such discharge letters (RC = 60%, NH = 54%, PPP = 42% and ACH = 12%).

The association between the sum scores of self-reported use of core outcome measures and the number of stroke patients treated weekly was only significant (though weak) for physiotherapists working in ACH ($\rho = 0.35$, $p = 0.009$). For the other settings, no significant relation was found (RC, $\rho = 0.18$, $p = 0.17$; NH, $\rho = -0.16$, $p = 0.46$; and PPP, $\rho = 0.15$, $p = 0.64$).

Section 3: BFQ

Psychometrics of BFQ

All data of the BFQ were normally distributed. The internal consistency of the complete BFQ was good (Cronbach's $\alpha = 0.86$). Factor analysis identified six factors that together explained 65% of the variance in the use of outcome measures (Table 4). These were: 1) 'personal environment' (explained 15.4% of variance, $\alpha = 0.86$); 2) 'practitioner' (12.1%, $\alpha = 0.77$); 3) 'patient'

TABLE 2: Self-reported use of recommended core outcome measures by physiotherapists

	<i>Acute care hospitals</i>	<i>Rehabilitation centres</i>	<i>Nursing homes</i>	<i>Private physiotherapy practices</i>	<i>Total %</i>
	<i>(n = 57)</i>	<i>(n = 63)</i>	<i>(n = 25)</i>	<i>(n = 22)</i>	<i>(n = 167)</i>
	<i>%</i>	<i>%</i>	<i>%</i>	<i>%</i>	<i>%</i>
	<i>100%</i>				
Motricity Index*					
Yes	47	49	28	5	40
No	42	44	64	55	48
Trunk Control Test*					
Yes	60	40	40	9	43
No	32	52	52	50	45
Berg Balance Scale*					
Yes	33	79	40	5	48
No	49	17	52	55	38
Functional Ambulation Categories*					
Yes	49	67	44	5	49
No	39	24	48	55	37
Ten-Metre Walk*					
Yes	19	73	40	23	44
No	65	22	52	36	44
Frenchay Arm Test*					
Yes	4	11	4	5	7
No	79	79	88	55	79
Barthel Index*					
Yes	39	19	36	5	26
No	47	76	60	50	62

*The remaining percentage in each table cell reflects missing data.

(10.5%, $\alpha = 0.61$); 4) 'professional attitude' (9.6%, $\alpha = 0.58$); 5) 'economic environment' (9.5%, $\alpha = 0.62$); and 6) 'administrative environment' (7.0%, $\alpha = 0.34$).

Outcomes of BFQ

Four major facilitators and three barriers to the use of outcome measures were identified (Table 4). Facilitators were 'a positive attitude towards outcome measures' (mentioned by 156 physiotherapists, 93%), 'familiarity with outcome measures' (90%), 'ability to make a comparative clinical assessment' (90%) and 'cooperation of colleagues in

applying outcome measures' (83%). The barriers that were mentioned the most were 'changing routines' ($n = 52$, 32%), 'time investment' (29%) and 'financial compensation' (21%). Physiotherapists working in different settings mentioned different barriers and facilitators (see Table 4). The most marked differences concerned the factors 'personal environment' (PPP-RC, $p = 0.02$ and PPP-ACH, $p = 0.02$), 'practitioner' (PPP-RC, $p < 0.001$; PPP-ACH, $p < 0.001$; PPP-NH, $p = 0.014$; and RC-NH, $p = 0.02$) and 'economic environment' (PPP-RC, $p = 0.03$). The other three factors were not significantly different between settings.

TABLE 3: Self-reported use of assessment time points by physiotherapists

<i>According to recommendations in CPGPS (Van Peppen et al., 2007)</i>	<i>Acute care hospitals</i>	<i>Rehabilitation centres</i>	<i>Nursing homes</i>	<i>Private physiotherapy practices</i>	<i>Total %</i>
	<i>(n = 57)</i> %	<i>(n = 63)</i> %	<i>(n = 25)</i> %	<i>(n = 22)</i> %	<i>(n = 167)</i> %
	100%				
In week of admission*					
Yes	84	81	56	9	69
No	11	14	40	32	19
In week of discharge*					
Yes	77	60	48	5	57
No	16	29	40	41	28
In week of multidisciplinary meeting*					
Yes	33	67	36	5	43
No	49	22	52	36	38
Three months after onset of stroke*					
Yes	4	21	44	14	17
No	70	65	48	41	61
Six months after onset of stroke*					
Yes	4	14	44	18	16
No	70	70	48	32	62

*The remaining percentage in each table cell reflects missing data.

DISCUSSION

The outcome measures, recommended by the CPGPS, appear to be used modestly in physiotherapy practice, leaving ample room for improvement in this respect among physiotherapists working in stroke management in the Netherlands. While most physiotherapists were positive about using such clinical outcome measures, only half of them actually claimed to use these instruments, with the highest use being reported by physiotherapists who either reported to be familiar with the content of the guideline or were involved in institutional stroke management with a relatively high caseload or both. Almost half of the therapists reported using outcome measures for mobility-related activities (MI, TCT and BBS) and walking (TMW and FAC). Instruments broadly

quantifying activities of daily living (BI) and hand and arm use (FAT) were reported to be used far less by the physiotherapists. The frequency with which therapists claim to assess patients decreased if patients were situated in (or perhaps transferred to) ACH, the long stay in RC and NH, or were treated in PPP. Physiotherapists working in PPP in particular, reported poor adherence to the CPGPS recommendations. This might be attributable more to the phase of rehabilitation of the patients than to the setting per se, as these data are in-line with those of Lennon (2% of senior physiotherapists in UK stroke care reassess patients at six months after stroke; Lennon, 2003). Alternatively, this might be a consequence of the relatively low caseload and barriers such as physiotherapists' opinions about financial compensations and competencies

TABLE 4: Barriers to and facilitators for the use of the recommended outcome measures, as reported by physiotherapists

<i>Factors</i>	<i>% Fully disagree or disagree*</i>					<i>% Agree or fully agree*</i>				
	ACH	RC	NH	PPP	Total	ACH	RC	NH	PPP	Total
<i>'Personal environment'</i>										
Familiarity with outcome measures	0.0	1.9	7.1	16.7	2.5	88.9	92.4	85.8	83.3	89.8
Experience with outcome measures	11.1	5.7	28.6	66.7	13.5	77.8	88.6	57.1	16.7	77.1
Knowing much about outcome measures	6.7	7.5	14.3	14.3	8.4	73.3	75.5	64.3	57.1	72.2
Trained to use outcome measures correctly	4.4	5.8	7.1	14.3	5.9	64.5	75.0	64.3	57.1	68.7
<i>'Practitioner'</i>										
Cooperation of fellow physiotherapists in applying outcome measures	0.0	1.9	7.1	33.3	3.4	88.9	92.4	64.3	33.4	83.1
Cooperation of managers in applying outcome measures	11.6	5.7	7.7	50.0	9.0	57.5	81.1	53.8	0.0	71.2
No need for extra accommodation to apply outcome measures [†]	6.8	2.0	7.1	0.0	4.3	65.9	92.1	64.3	50.0	76.6
Outcome measures fit in with my daily practice routine	8.8	3.8	7.1	14.3	6.7	73.3	83.0	64.3	57.1	75.6
<i>'Patient'</i>										
Outcome measures give patients insight into their physical functioning	20.0	5.7	0.0	14.3	10.9	37.8	66.0	78.6	28.6	54.6
Outcome measures leave enough room for individual patients' preferences	6.7	7.7	7.1	16.7	7.7	53.3	63.5	50.0	83.3	59.9
Layout of measurement part of CPGPS makes it easy to use	13.3	11.5	0.0	0.0	10.2	35.6	61.6	66.7	16.7	50.0
<i>'Professional attitude'</i>										
No general reluctance to adhere to guidelines [†]	4.4	7.5	0.0	0.0	5.1	82.2	73.6	92.9	42.9	77.3
Positive attitude towards the use of outcome measures	0.0	0.0	0.0	0.0	0.0	95.5	94.3	92.9	71.4	93.3
Outcome measures allow me to make a balanced clinical assessment	0.0	2.0	6.7	0.0	1.7	88.6	90.2	86.7	100	89.7
No problems with changing routines [†]	22.2	37.7	50.0	14.3	31.8	51.1	34.0	35.7	57.1	42.1
<i>'Economic environment'</i>										
Use of outcome measures does not require financial compensation [†]	31.8	7.5	20.0	66.7	21.1	27.3	66.1	66.6	0.0	48.3
Patients do not find the use of outcome measures too time-consuming [†]	6.6	5.7	0.0	0.0	5.1	62.2	60.3	35.7	33.3	56.8
Use of outcome measures is not too time-consuming [†]	26.6	26.4	28.5	57.1	28.6	31.1	56.6	42.8	28.6	43.7

TABLE 4: *Continued*

'Administrative environment'										
No risk that use of outcome measures will be abused for disciplinary action against PT [†]	6.8	4.1	0.0	16.7	5.3	38.6	38.8	40.0	33.3	38.6
Description of outcome measures is mainly correct	15.9	17.7	20.0	33.3	18.1	47.7	35.3	40.0	16.7	39.7

*The remaining percentages correspond to 'do not agree nor disagree' answers.

[†]The original statements of the BFQ were reformulated for the purpose of data analysis.

ACH = acute care hospitals; NH = nursing homes; RC = rehabilitation centres; PPP = private physiotherapy practices; CPGPS = Clinical Practice Guideline on the Physiotherapy Management of Patients with Stroke.

in PPP. While we expected that physiotherapists who regularly treated stroke patients would make most use of outcome measures, there was only a weak correlation between the number of patients treated and the self-reported use of outcome measures, and only for physiotherapists working in ACH. This weak correlation also means that physiotherapists who saw few patients (i.e. those working in PPP) did not use the guideline to monitor patients' functional status either.

We randomly sampled 100 physiotherapists per setting whose age and gender were comparable to those of the general Dutch physiotherapist population (Kenens and Hingstman, 2006). An adequate sample of physiotherapists, according to Field, completed the questionnaire (Field, 2005) leading to an acceptable response rate (Jette et al., 2003) comparable to that in other similar studies (Haigh et al., 2001; Lennon, 2003; Abrams et al., 2006). Although physiotherapists working in PPP were probably under-represented because two-thirds of practicing physiotherapists in the Netherlands (about 12 000 of 18 650) work in a PPP (Kenens and Hingstman, 2006; Vugts et al., 2003), it should be remembered that few patients with stroke consult such physiotherapists (Vugts et al., 2003). An alternative sampling method could be a weighted proportion of the Dutch

physiotherapists working in each stroke setting, but these data were not available. However, a larger study should investigate not only the reported use but also the actual use and performance of outcome measures. Such an investigation should be combined with a study of the origin of explicit barriers to and facilitators for guideline implementation.

We are aware that the reduction of the Likert scale to simplify data analysis probably lost the nuances of the responders. However comparable to other studies in which responders showed a reluctance to give extreme scores (Albaum, 1997), in our study, responders scored 17 out of 21 BFQ statements with a modus of two or four on the 5-point Likert scale, which sufficiently justified the analysis.

Those physiotherapists who have a special interest in guidelines were more likely to respond in the present survey resulting in selection bias, and in combination with socially preferable answers, this may mean that the use of outcome measures was over-estimated. The use of outcome measures appears to be governed by the physiotherapists' *personal environment*, the role of *practitioner* and the *economic environment*. Almost a third of the physiotherapists reported reluctance to change routines as a

barrier to the use of outcome measures in parallel with some of the *economic environment*. These distinct barriers have been mentioned by other authors (Turner-Stokes and Turner-Stokes, 1997; Pollock et al., 2000). In this respect, one should bear in mind the differences in the responses between settings, which may at the same time, reflect the progress of rehabilitation in consecutive settings. This especially holds true for physiotherapists working in a PPP. The therapists in PPP differed significantly more than their colleagues ($p < 0.05$) on items such as reported experience with outcome measures, cooperation of managers in applying outcome measures, financial compensation and time investment. The present response supports the tailoring of implementation strategies to physiotherapists in general to the different Dutch stroke settings they are working in. Although Cronbach's alpha for the overall BFQ was adequate, not all factors reached the generally accepted standard of 0.7. Three factors showed a moderate internal consistency and only the '*administrative environment*' factor did not reach an acceptable level. All in all, Dutch physiotherapists reported a positive attitude and a moderate use of outcome measures, with those working in PPP adhering poorly to the CPGPS recommendations related to outcomes.

Nevertheless, physiotherapists claimed to use the recommended outcome measures, with the exception of the FAT, which was introduced only recently with the publication of the CPGPS in the Netherlands and was thus relatively unknown at the time of the survey. Alternatively, the FAT (Nakayama et al., 1994) may be used less frequently by physiotherapists as they may especially focus on lower limb and mobility outcomes, while occupational therapists focus on the recovery and assessment of the paretic arm. Such a multidisciplinary approach has

become common practice in a lot of institutions. The low reported use of the BI by the physiotherapists can be explained in agreement with the data by Lennon (2003) from the fact that in intramural settings (ACH, RC and NH), usually other members of a multidisciplinary team (e.g. nurses) monitor patients' daily activities with the help of ADL outcome measures such as the BI. Future research therefore needs to ask for both the use of the measure itself and the use of the data produced by an instrument.

With the exception of the FAT, the self-reported use of the other outcome measures by the Dutch physiotherapists in our sample was between 26% and 49%, which is comparable with the baseline measures in other studies investigating the (self-reported) use of outcome measures (Maher and Williams, 2005; Abrams et al., 2006; Akinpelu and Eluchie, 2006). The assessment frequency was low; lower than that reported by others (Australian Physiotherapy Association 2003; Rothstein et al., 2003). An explanation for the decreasing frequency of use of outcome measures throughout the rehabilitation process is that physiotherapists in ACH were unable to use outcome measures at for instance six months after stroke, because their patients had moved on from the ACH by then.

In conclusion, Dutch physiotherapists do not routinely use the recommended clinical assessment instruments of the guideline in management of patients with stroke at two months after the publication of the clinical practice guideline. The time point of this survey may be considered too early, but for a subsequent implementation study, the survey provides good insight in the baseline characteristics of the population under study.

Physiotherapists need to be aware that treating patients with stroke should be

accompanied by monitoring of changes in patients' health status. Outcome measures are therefore essential tools in daily physiotherapy routine. When integrating advice about the use of outcome measures in clinical practice guidelines (e.g. CPGPS), physiotherapists were guided to use the recommended clinical outcome measures during different phases of the condition for diagnosis, prognosis and therapy evaluation. Thereby, outcome measures can help physiotherapists to specify relevant and attainable treatment goals, to get feedback on the success during the intervention and to optimize the communication with patients and/or members of an interdisciplinary team (Haigh et al., 2001; Parker-Taillon, 2002; Jette et al., 2003). Teaching physiotherapists how to use outcome measures must be integrated in clinical reasoning processes in the management of patients with stroke. Based on the differences in self-reported use of recommended outcome measures in the CPGPS and the barriers to and facilitators for use by physiotherapists in their specific working setting, tailored strategies are needed. We suggest the development of setting-specific education strategies to promote the implementation of the recommended clinical outcome measures in physiotherapy management of patients with stroke (Grol and Grimshaw, 2003).

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REFERENCES

- Abrams D, Davidson M, Harrick J, Harcourt P, Zylinski M, Clancy J. Monitoring the change: current trends in outcome measure usage in physiotherapy. *Manual Therapy* 2006; 11 (1): 46–53.
- Akinpelu AO, Eluchie NC. Familiarity with, knowledge, and utilization of standardized outcome measures among physiotherapists in Nigeria. *Physiotherapy Theory and Practice* 2006; 22 (2): 61–72.
- Albaum G. The likert scale revisited: an alternate version. *Journal of Market Research Society* 1997; 39 (2): 331–342.
- Australian Physiotherapy Association. APA position statement — clinical justification and outcome measures (Available at https://apa.advsol.com.au/staticcontent/staticpages/position_statements/public/ClinicalJustification&Outcome%20Measures.pdf) (Accessed December 27, 2007).
- Berg K, Wood-Dauphinee S, Williams JI. The balance scale: reliability assessment with elderly residents and patients with an acute stroke. *Scandinavian Journal of Rehabilitation Medicine* 1995; 27 (1): 27–36.
- Chesson R, Macleod M, Massie S. Outcome measures used in therapy departments in Scotland. *Physiotherapy* 1996; 82 (12): 673–679.
- Collin C, Wade DT, Davies S, Horne V. The barthel ADL index: a reliability study. *International Disability Studies* 1988; 10 (2): 61–63.
- Commissie CVA-Revalidatie. *Rehabilitation After a Stroke, Guidelines and Recommendations for Health Care Professionals* (in Dutch: Revalidatie na een beroerte: richtlijnen en aanbevelingen voor zorgverleners). Den Haag: Dutch Heart Foundation (in Dutch: Nederlandse Hartstichting), 2001.
- Demeurisse G, Demol O, Robaye E. Motor evaluation in vascular hemiplegia. *European Neurology* 1980; 19 (6): 382–389.
- Duckworth M. Outcome measurement selection and typology. *Physiotherapy* 1999; 85 (1): 21–27.
- Field AP. *Discovering Statistics using SPSS, Second Edition*. London: SAGE Publications Ltd., 2005.
- Franchignoni FP, Tesio L, Ricupero C, Martino MT. Trunk control test as an early predictor of stroke rehabilitation outcome. *Stroke* 1997; 28 (7): 1382–1385.
- Geyh S, Cieza A, Schouten J, Dickson H, Frommelt P, Omar Z, Kostanjsek N, Ring H, Stucki G. ICF

- core sets for stroke. *Journal of Rehabilitation Medicine* 2004; 44 Suppl: 135–141.
- Glaziou P, Irwig L, Mant D. Monitoring in chronic disease: a rational approach. *British Medical Journal* 2005; 330 (7492): 644–648.
- Grol R, Grimshaw J. From best evidence to best practice: effective implementation of change in patients' care. *Lancet* 2003; 362 (9391): 1225–1230.
- Grol R, Wensing M, Eccles M. *Improving Patient Care. The Implementation of Change in Clinical Practice*. London: Elsevier Butterworth Heinemann, 2005.
- Haigh R, Tennant A, Biering-Sorensen F, Grimby G, Marincek C, Phillips S, Ring H, Tesio L, Thonnard JL. The use of outcome measures in physical medicine and rehabilitation within Europe. *Journal of Rehabilitation Medicine* 2001; 33 (6): 273–278.
- Hammond R. Evaluation of physiotherapy by measuring outcome. *Physiotherapy* 2000; 86 (4): 170–172.
- Heller A, Wade DT, Wood VA, Sunderland A, Hewer RL, Ward E. Arm function after stroke: measurement and recovery over the first three months. *Journal of Neurology, Neurosurgery, and Psychiatry* 1987; 50 (6): 714–719.
- Holden MK, Gill KM, Magliozzi MR. Gait assessment for neurologically impaired patients. Standards for outcome assessment. *Physical Therapy* 1986; 66: 1530–1539.
- Jette AM. Assessing disability in studies on physical activity. *American Journal of Preventive Medicine* 2003; 25 (3) Suppl 2: 122–128.
- Jette DU, Bacon K, Batty C, Carlson M, Ferland A, Hemingway RD, Hill JC, Ogilvie L, Volk D. Evidence-based practice: beliefs, attitudes, knowledge, and behaviors of physical therapists. *Physical Therapy* 2003; 83 (9): 786–805.
- Kenens RJ, Hingstman L. *Cijfers uit de registratie van fysiotherapeuten, peiling 1 Januari 2005*. Utrecht: NIVEL, 2006.
- Learner J, Goodman NW. Descriptions of correlation. *Lancet* 1996; 348 (9021): 199–200.
- Lennon S. Physiotherapy practice in stroke rehabilitation: a survey. *Disability and Rehabilitation* 2003; 25 (9): 455–461.
- Maher C, Williams M. Factors influencing the use of outcome measures in physiotherapy management of lung transplant patients in Australia and New Zealand. *Physiotherapy Theory and Practice* 2005; 21 (4): 201–217.
- Nakayama H, Jorgensen HS, Raaschou HO, Olsen TS. Recovery of upper extremity function in stroke patients: the Copenhagen stroke study. *Archives of Physical Medicine and Rehabilitation* 1994; 75 (4): 394–398.
- Parker-Taillon D. CPA initiatives put the spotlight on evidence-based practice in physiotherapy. *Physiotherapy Canada* 2002; 24: 12–15.
- Partridge CJ. The outcome of physiotherapy and its measurement. *Physiotherapy* 1982; 68 (11): 362–363.
- Peters MAJ, Harmsen M, Laurant MGH, Wensing M. Room for Improvement? Barriers to and Opportunities for Improvement of Patient Care (in Dutch: Ruimte voor verandering? Knelpunten en mogelijkheden voor verbeteringen in de patiëntenzorg). Nijmegen, The Netherlands: Radboud University Medical Centre, 2003.
- Pollock AS, Legg L, Langhorne P, Sellars C. Barriers to achieving evidence-based stroke rehabilitation. *Clinical Rehabilitation* 2000; 14 (6): 611–617.
- Portney LG, Watkins MP. *Foundations of Clinical Research: Applications to Practice*, 2nd Edition. New Jersey: Prentice-Hall, 2000.
- Rothstein JM, Echternach JL, Riddle DL. The Hypothesis-Oriented Algorithm for Clinicians II (HOAC II): a guide for patient management. *Physical Therapy* 2003; 83 (5): 455–470.
- Streiner DL, Norman GR. *Health Measurement Scales: A Practical Guide to Their Development and Use*, Second Edition. New York: Oxford University Press, 2003.
- Turner-Stokes L, Turner-Stokes T. The use of standardized outcome measures in rehabilitation centres in the UK. *Clinical Rehabilitation* 1997; 11 (4): 306–313.
- Van Peppen RPS, Hendriks HJM, Van Meeteren NLU, Helders PJM, Kwakkel G. The development of a clinical practice stroke guideline for physiotherapists in The Netherlands: a systematic review of available evidence. *Disability and Rehabilitation* 2007; 29 (10): 767–783.
- Van Peppen RPS, Kwakkel G, Harmeling BC, Kollen BJ, Hobbelen JSM, Buurke JH, Halfens JHC, Wagenborg L, Vogel MJ, Berns M, Van Klaveren R, Hendriks HJM, Dekker J. *KNGF Clinical Practice Guideline for Physical Therapy in patients with Stroke* (in Dutch: KNGF-richtlijn Beroerte). Supplement to the Dutch Journal of Physical Therapy 2004; 114 (5): 3–248. September 2004, English version: April 2008.

- Vuigts CJ, Van der Velden LFJ, Hingstman L, Van der Velde F, Van der Windt W. *Behoefteringing Fysiotherapeuten 2002–2015*. Utrecht: NIVEL/Prismant, 2003.
- Wade DT. *Measurements in Neurological Rehabilitation*. Oxford: Oxford University Press, 1992.
- WHO. *International Classification of Functioning Disability and Health*. Geneva: ICF-introduction, 2001.
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APPENDIX: A 41-item questionnaire on the self-reported use of outcome measures in the physiotherapy management of patients with stroke

Section I (Table 1)

1. What is your gender (male, female)?
2. What is your age (<30 years, 30–34 years, 35–39 years, 40–44 years, 45–49 years, >50 years)?
3. What is the number of patients with stroke treated weekly (1, 2–3, 4–6, 7–10, >10)?
4. Do you cooperate in a stroke service (yes, no)?
5. Are you in possession of the Clinical Practice Guideline on Physiotherapy Management of Patients with Stroke (yes, no)?
6. Are you informed about the content of the Clinical Practice Guideline on Physiotherapy Management of Patients with Stroke (yes, no)?
7. Do you use the core set of outcome measures as recommended in the Clinical Practice Guideline on Physiotherapy Management of Patients with Stroke (yes, no)?

Section IIa (Table 2)

8. In the treatment of patients with stroke I use the Motricity Index (yes, no)
9. In the treatment of patients with stroke I use the Trunk Control Test (yes, no)
10. In the treatment of patients with stroke I use the Berg Balance Scale (yes, no)
11. In the treatment of patients with stroke I use the Functional Ambulation Categories (yes, no)
12. In the treatment of patients with stroke I use the Ten-Metre Walk (yes, no)
13. In the treatment of patients with stroke I use the Frenchay Arm Test (yes, no)
14. In the treatment of patients with stroke I use the Barthel Index (yes, no)

Section IIb (Table 3)

15. In the treatment of patients with stroke I use the recommended outcome measures in the week of admission (yes, no)
16. In the treatment of patients with stroke I use the recommended outcome measures in the week of discharge (yes, no)
17. In the treatment of patients with stroke I use the recommended outcome measures in the week of the multidisciplinary meeting (yes, no)
18. In the treatment of patients with stroke I use the recommended outcome measures three months after stroke (yes, no)
19. In the treatment of patients with stroke I use the recommended outcome measures six months after stroke (yes, no)

Section IIc (No table)

20. I always send a discharge letter to the professional responsible for further treatment of the patient with stroke (yes, no)
21. I always receive a discharge letter from the professional responsible for earlier treatment of the patient with stroke (yes, no)

Section III (Table 4) (fully disagree, disagree, agree, do not agree nor disagree, agree, fully agree)

22. I am familiar with outcome measures
23. I know much about outcome measures
24. I have problems with changing routines
25. I have a general reluctance to adhere to guidelines
26. I have a positive attitude towards the use of outcome measures
27. Outcome measures leave enough room for individual patients' preferences
28. The use of outcome measures is too time-consuming
29. I am trained to use outcome measures correctly
30. Outcome measures give patients' insight into their physical functioning
31. My fellow physiotherapists cooperate in applying outcome measures
32. My manager(s) cooperate(s) in applying outcome measures
33. Outcome measures fit in with my daily practice routine
34. There is a need for extra accommodation to apply outcome measures
35. There is a risk that the use of outcome measures will be abused for disciplinary action against physiotherapists
36. I have experience with outcome measures
37. The use of outcome measures requires financial compensation
38. Outcome measures allow me to make a balanced clinical assessment
39. The description of the outcome measures is mainly correct
40. Patients find the use of outcome measures too time-consuming
41. The layout of measurement part of clinical practice guideline (CPGPS) makes it easy to use