

# Physiotherapy management of low back pain: Does practice match the Dutch guidelines?

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The purpose of this study is to explore adherence by Dutch physiotherapists to the physiotherapists' guideline for non-specific low back pain. For this study data from the National Information Service for Allied Health Care were used. This is a registration network that continuously collects information about physiotherapy patients and their treatment episodes. Within this network, adherence to the low back pain guideline was assessed by three criteria based on the guideline. These criteria concerned the number of sessions, the treatment goals, and the interventions. Data from patients with 'non-specific low back pain' as the reason for referral and a completed treatment episode were selected (n = 1254); 90 therapists in 40 practices treated these patients. The criterion concerning the number of sessions applied only for patients with acute complaints and was met in 17% of these patients. In about half of the patients the criterion for the treatment goals as well as the criterion relating to the interventions was met. Treatment goals are aimed mainly at improving mobility functions and changing body position. In more than three-quarters of the treatment episodes manual interventions (massage or manual manipulation) and exercise therapy were used frequently. As considerable variation in guideline adherence was shown to exist among therapists, there is clearly room for improvement in the quality of the care. [Swinkels ICS, Ende van den CHM, van den Bosch W, Dekker J and Wimmers RH (2005): Physiotherapy management of low back pain: Does practice match the Dutch guidelines? *Australian Journal of Physiotherapy* 51: 35–41.]

Key words: Low Back Pain, Guideline Adherence, Physical Therapy (Specialty)

## Introduction

Quality of health care is an important element of public health care policy in The Netherlands. Since 1990 Dutch physiotherapists have been responsible for providing insight into the process of care and the quality of care in their practice (Sluijs et al 2003). A number of activities have been undertaken to enhance the quality of care. So far, there have only been a few activities to evaluate the quality of care provided by physiotherapists.

Quality of care can be evaluated on the basis of structure, process, and outcome (Brook et al 1996, Brook et al 2000, Lawrence et al 1997). Structural data refer to the characteristics of therapists and practices (e.g. a therapist's specialty); process data are the components of the encounter between a therapist and a patient (e.g. the interventions); while outcome data refer to the patient's subsequent health status (e.g. an improvement in mobility) (Brook et al 1996). Process data are usually the most sensitive measures of quality, because they provide information about the content of the process, are easy to measure, and vary in accordance with the behaviour of the care provider (Brook et al 1996, Lawrence et al 1997).

The process of care can be evaluated by using explicit criteria (Brook et al 1996). These criteria are used to assess the extent to which actual practice corresponds to recommendations, which may be derived from clinical guidelines (Lawrence et al 1997). In this way, guideline adherence can be used as an indicator for quality of care, on the assumption that the

guidelines are scientifically valid and secondly that they are implemented successfully (Lawrence et al 1997).

Process data to assess guideline adherence can be obtained from various sources, such as records maintained by insurance companies to reimburse therapists, clinical records maintained by health care professionals, survey data collected for quality-assessment purposes, and direct observations of the therapist-patient encounter (Brook et al 1996, Brook et al 2000). In The Netherlands a registration network continuously collects information about physiotherapy practice. This network was set up in 2001 to collect healthcare-related information. Data gathered by the network were used for the current study.

The aim of the present study is to investigate to what extent Dutch physiotherapists in private practice adhere to recommendations in clinical guidelines. Because the guideline for the treatment of patients with non-specific low back pain concerns the largest group of patients seen by physiotherapists, the paper will focus on this group of patients. The following aims will be addressed:

1. To give a description of the process of care for patients with non-specific low back pain;
2. To explore to what extent the physiotherapists' treatment of patients with non-specific low back pain adheres to the recommendations in the guideline;
3. To give insight into the variation among therapists regarding guideline adherence.

## Method

**Registration** Since 2001 a registration network of Dutch physiotherapists working in private practices all over the country has been collecting healthcare-related data on a continuous basis. Data from this National Information Service for Allied Health Care (in Dutch called LiPZ) were used for the current study. Dutch therapists in private practice generally use a software program to register their patients and treatments. Besides providing regular information, therapists participating in the network register supplementary information on all their patients by means of special software. The participants submit their data on a monthly basis. After quality control, the data are entered in the database. Collected information includes:

- Patient characteristics (gender, age, health insurance, and education).
- Information about the referral (reason for referral and referrer). The reason for referral as given by letter by the referrer is registered by the physiotherapists. Researchers code these reasons according to the International Classification of Primary Care (ICPC) (WONCA 1998).
- Characteristics of the health problem (duration of the complaint and a prior episode of low back pain [appearing after a complaint-free episode of at least four weeks and at most two years]).
- Aspects of the treatment plan (treatment goals and interventions) and the extent of care (number of sessions and duration of episode); per patient, one treatment goal at the level of activities and one treatment goal at the level of functions can be registered. The definitions of the treatment goals are based on the International Classification of Functioning, Disability and Health (WHO 2001). At the end of a treatment episode physiotherapists register a maximum of three interventions that have been applied in at least 50% of the sessions.

**Therapists and practices** In early 2001 randomly selected physiotherapists were invited to participate in the registration network. Those physiotherapists were a sample of all private physiotherapy practices as listed in a national database (Hingstman et al 2002). We aimed at a registration network of 40 practices. On the basis of a power calculation it was estimated that 40 practices supply sufficient data to detect a difference of two treatment sessions between two different clusters of patients with a proportion of at least 3.5% of the total patient population with 90% statistical power and a 5% significance level. Therapists could participate only if they used one out of two specified software programs in their practice. Physiotherapists with a homogeneous patient population (> 50% of the treatment episodes belonging to one patient category, for instance children) were not eligible. Twenty per cent of the invited therapists were willing and eligible for participation. Frequently mentioned reasons for not participating were 'not enough time' and 'personal reasons'. In case of dropouts new physiotherapists were invited in a non-selective way. Since 2001 over 140 physiotherapists working in more than 60 practices have participated. Participants are offered a financial incentive. Furthermore on a yearly base they receive benchmark data.

For the current study, data of therapists who treated patients referred with non-specific low back pain during the period

July 2002 to September 2003 were selected. This resulted in a group of 90 therapists in 40 practices; 23% of the 40 participating were solo practices, 59% of the 90 physiotherapists were male, 35% were aged 36 to 45 years and 39% were aged 46 to 55 years. Almost half the therapists had been in practice for 15 to 24 years. In the selected period an average of 31.4 patients with low back pain were treated per practice (range = 1 to 171). From comparisons with other available data, the participating practices, therapists, and collected data appear to be representative of The Netherlands (Dekker et al 1998, Hingstman et al 2001, Verheij et al 2002).

**Patient population** All patients aged 18 years or older referred with low back pain without X-ray diagnosis (ICPC-code L03.00; ICD10-code M54.5) between July 2002 and September 2003 were selected from the database (n = 1613). Data from these patients were collected until April 2004. Of a total of 1613 patients, 1486 had completed a treatment episode (92.1%). For 15% of the patients with a completed treatment episode the interventions were unknown and consequently the data of these patients were omitted; 1254 patients remained. Data from these patients have been used for the current study.

According to the Dutch Act 'Regulations on medical research involving human subjects' ethical approval is necessary for medical research in which persons are subjected to treatment or are required to behave in a certain manner. As this was not the case for the current study, ethical approval was not required. Nevertheless, the Dutch Data Protection Authority was notified of the research. In addition, pursuant to the Personal Data Protection Act data were collected anonymously, patients were informed about the research by posters and leaflets in practice waiting rooms, and patients had the opportunity to refuse participation.

**Dutch physiotherapy guideline for the assessment and treatment of patients with low back pain** In 2001 the physiotherapy guideline for the assessment and treatment of patients with non-specific low back pain was published in The Netherlands. The recommendations in this guideline were based on scientific evidence where available; otherwise they were based on consensus. The guideline recommends that the diagnostic process should focus on disability and participation problems resulting from back pain. The treatment should consist of an active approach, in which patients learn to take control of their back pain. The main treatment interventions are systematic patient education and exercise therapy aimed at improvement of functioning (Bekkering et al 2003). For patients with a normal course (in whom activities and participation gradually increase) reassurance, adequate information, and advice to stay active are the most important recommendations. One treatment session should be sufficient; if necessary a second appointment may be made. For patients with an abnormal course, in whom activities and participation do not improve, exercise therapy should be provided, with a behavioural approach if necessary. The guideline does not include a recommendation about the number of sessions in patients with an abnormal course (Bekkering et al 2003).

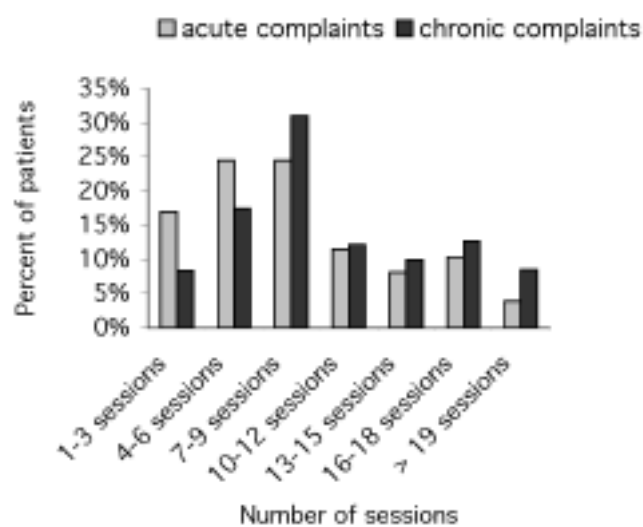
The implementation of the guideline consisted of dissemination to all members of the Royal Dutch Society for Physiotherapy, publication in Dutch journals, presentations at congresses and symposia, and education (Bekkering 2004).

**Process criteria** In a study aimed at evaluating the effects of

**Table 1.** Characteristics of patients with non-specific low back pain in physiotherapy practice.

	< 1 month (n = 616)	> 1 month (n = 638)	Total (n = 1254)	<i>p</i>
Age in years (mean (SD))	48 (16)	48 (16)	48 (16)	0.88 <sup>a</sup>
Men (%)	53	39	46	< 0.001 <sup>b*</sup>
Educated at lower level (%)	40	46	43	0.02 <sup>b*</sup>
Referral by GP (%)	98	96	97	0.02 <sup>b*</sup>
Recurrent complaint (%)	43	45	44	0.50 <sup>b</sup>

<sup>a</sup>*t*-test of differences between patients with complaints of less than one month and patients with complaints of more than one month's duration; <sup>b</sup>Chi square test to test differences between patients with complaints of less than one month and patients with complaints of more than one month's duration; \*difference is statistically significant ( $p < 0.05$ ).



**Figure 1.** Number of physiotherapy treatment sessions in patients with non-specific low back pain by the duration of complaint (acute < 1 month, n = 616; chronic > 1 month, n = 638).

a multifaceted implementation strategy for the Dutch physiotherapy guideline for low back pain on the process of care, four process criteria were developed (Bekkering 2004). For the current study three of those four criteria were adapted to be used in the registration network. The fourth criterion concerns the content of the advice provided by physiotherapists to their patients. The registration network does not record this kind of information. The criteria were divided in two parts: one part related to the amount of care and the other related to the content of care.

With regard to the *amount of the care* if patients had acute complaints (less than one month) the maximum number of treatment sessions was three. For patients with chronic complaints (greater than one month) no criterion concerning the amount of care was formulated. For the purpose of this study patients with acute complaints were seen as having a normal course, while patients with chronic complaints were seen as having an abnormal course.

The part concerning the *content of the care* consisted of two criteria which applied for patients with acute complaints as

well as for patients with chronic complaints. The first criterion concerned the treatment goals: at least one treatment goal had to be set at the level of activities (i.e. walking or lifting). The second criterion concerned the interventions: 'exercise therapy' or 'advice' had to be one of the interventions.

**Data analysis** Descriptive statistics were calculated for all variables. The units of analysis were both the patients and the therapists. Analysis on the patient level describes whether patients receive treatment according to the guideline. Chi-square tests with a significance level of 0.05 were used to test differences in categorical data between patients with acute complaints and patients with chronic complaints; two-sample *t*-tests were used to test differences between both groups in continuous data (significance level 0.05). For the analysis on the therapist level we used aggregated data to describe guideline adherence per therapist and to establish variation between therapists. Per therapist the percentage of patients treated according to the separate criteria was calculated. Furthermore, per therapist the percentage of patients treated according to both the criteria 'treatment goals' and 'interventions' was calculated. In the results section per criterion first a general description is given, next the guideline adherence at the patient level is described, and third the guideline adherence at the therapist level is described.

## Results

**Patient characteristics** Table 1 shows the characteristics of the patients. Almost half the patients (49.1%) had acute complaints. Characteristics of patients with acute complaints and of those with chronic complaints were similar. The greatest differences were in gender and level of education: patients with chronic complaints were more often female and were more often educated at a lower level.

**Number of treatment sessions** The median number of treatment sessions in patients with acute complaints was 8.0 (inter-quartile range = 4.5 to 12) while 17% of these patients underwent one to three treatment sessions (Fig. 1). In patients with complaints of longer duration the median number of treatment sessions was 9.0 (inter-quartile range = 6 to 14).

**Adherence to the criterion 'number of treatment sessions'** The first criterion—number of treatment sessions—was met in only 17% of the patients with acute complaints (Table 2). Treatment of the majority of the patients with acute

**Table 2.** Physiotherapy treatment goals and interventions for patients with non-specific low back pain by duration of the complaint (in percentages of patients).

	< 1 month (n = 616)	> 1 month (n = 638)	Total (n = 1254)	Chi-square (p) <sup>a</sup>
<b>Treatment goals</b>				
<i>Mobility related activities</i>				
Maintaining body position	16.6	19.1	17.9	0.24
Changing body position	25.3	19.1	22.2	0.008*
Walking	5.5	6.7	6.1	0.37
Other activities	13.7	10.8	12.3	
<i>Body functions</i>				
Mobility functions	35.2	48.7	42.1	< 0.001*
Muscle functions	18.0	12.7	15.3	0.09
Sensation of pain	11.0	8.3	9.6	0.10
Other functions	9.1	11.8	10.5	
<b>Interventions</b>				
<i>Exercise therapy</i>				
Functions – individual	77.4	83.5	80.5	0.06
Activities – individual	64.1	69.6	66.9	
Others	21.6	21.8	21.7	
Others	2.4	3.4	2.9	
<i>Manual interventions</i>				
Manual manipulation	78.1	74.6	76.3	0.15
Massage	46.6	42.9	44.7	
Not specified	41.4	38.4	39.9	
Not specified	2.6	4.4	3.5	
Information/ advice	34.1	30.4	32.2	0.16
<i>Physical modalities</i>				
Electrotherapy	14.1	12.5	13.3	0.41
Others	9.4	7.5	8.5	
Others	4.8	5.2	5.0	
Other interventions	0.2	0.8	0.6	

<sup>a</sup>to test differences between patients with complaints of less than one-month and patients with complaints of more than one-month's duration; \*difference is statistically significant ( $p < 0.05$ ).

complaints was completed in more than three sessions (83%). The maximum reported number of treatment sessions in patients with acute complaints was 67.

Analyses at the level of the therapists revealed that adherence to the criterion 'number of sessions' varied among therapists. Overall, 16 therapists did not treat any patient with acute complaints; of the remaining therapists 42% completed treatment of all their patients with acute complaints in more than three sessions. This means that they did not treat any patient according to the guideline for this criterion.

**Treatment goals** A treatment goal at the level of activities was registered in 58% of the patients. In a small majority of these patients (36% of the sample) a treatment goal at the level of functions was also cited (not in table). Scarcely any differences existed between the treatment goals for patients with acute complaints and patients with chronic complaints (Table 2). Exceptions were 'changing body position', which was mentioned less frequently for patients with chronic complaints ( $p = 0.008$ ), and 'mobility functions', which were mentioned more often for these patients ( $p < 0.001$ ).

**Adherence to the criterion 'treatment goals'** The second

criterion states that one treatment goal has to be set at the level of activities. This criterion was met in 58% of all treatment episodes (Table 3). Differences between patients with acute complaints and patients with chronic complaints were not statistically significant.

With regard to the analyses at the level of the therapists, as was the case for adherence to the first criterion, adherence to this second criterion varied among therapists. Of the therapists 24% did not set a treatment goal at the level of activities for any of the patients.

**Interventions** For 81% of the patients, exercise therapy was one of the main interventions. Manual interventions (massage, manual manipulation) had been used frequently for 76% of all patients and information or advice for 32% of the patients. There were no differences between patients with acute complaints and patients with chronic complaints.

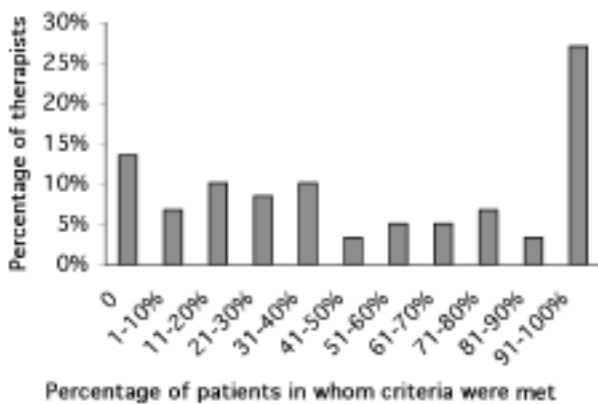
For 67% of the patients the treatment episode consisted of both active and passive interventions. For 12% only passive interventions, such as manual interventions and physical modalities, were applied. Again, no statistically significant differences were found between patients with acute



**Table 3.** Adherence at patient level to the criteria 'treatment goals' and 'interventions' specified for the duration of the complaint in patients with low back pain (in percentages of patients).

	< 1 month (n = 616)	> 1 month (n = 638)	Total (n = 1254)	Chi-square (p) <sup>a</sup>
Treatment goals	61.0	55.8	58.4	0.06
Interventions	87.7	87.5	87.6	0.91
Adherence to both criteria	55.4	50.0	52.6	0.06
Adherence to one of the criteria	93.3	93.3	93.3	0.95
Adherence to none of the criteria	6.7	6.7	6.7	0.95

<sup>a</sup>Chi-square test of differences between patients with complaints of less than one-month and patients with complaints of more than one-month's duration; \*difference is statistically significant ( $p < 0.05$ ).

**Figure 2.** Adherence at the therapist level to both the criteria 'treatment goals' and 'interventions' for therapists who treated at least five patients (n = 59).

complaints and patients with chronic complaints ( $p = 0.062$ ).

*Adherence to the criterion 'interventions'* The third criterion states that exercise therapy or advice has to be one of the interventions. This criterion was met in 88% of all treatment episodes (Table 3). As shown in Table 2, exercise therapy was used more frequently than information or advice.

Analyses at the level of the therapists revealed that adherence to the third criterion also varied among the therapists. Two therapists did not adhere to the guideline concerning this criterion for any of their patients. Sixty-one therapists treated the majority of their patients (> 90%) according to this criterion.

#### Overall adherence to the guideline

In 53% of all treatment episodes both the criterion 'treatment goals' and the criterion 'interventions' were met (Table 3), whereas in almost all treatment episodes at least one of the two criteria was met (93%). There were no differences of statistical significance between patients with acute complaints and patients with chronic complaints.

With regard to patients with acute complaints, a criterion for the number of treatment sessions was also defined. As stated before, this criterion was met for 17% of the patients. For

only 4% of patients with acute complaints were all three criteria met.

There was substantial variation in guideline adherence among therapists. Figure 2 displays the percentage of patients per therapist for whom the criteria 'interventions' and 'treatment goals' were met. Only therapists who treated at least five patients are shown (59 out of 90). We found that 16 therapists (27.1%) treated at least 91% of their patients according to the guideline regarding both criteria. On the other hand, eight therapists (13.6%) treated none of their patients according to the guideline for those criteria.

## Discussion

The results of the current study show that in a small majority of the treatment episodes of patients with non-specific low back pain the treatment goals and the interventions are in complete accordance with the recommendations in the guideline for the treatment of these patients. Conversely, for only a few patients the treatment episode did not adhere at all to the guideline. However, the variation in guideline adherence among physiotherapists was considerable.

To our knowledge, this is the first study in which a national registration network has been used for the assessment of guideline adherence by physiotherapists. Advantages of this method are the relatively simple assessment and a decrease in bias towards socially desirable answers. Guideline adherence is an important topic in The Netherlands, which could result in socially desirable answers. The primary goal of the national registration network is to collect general data about physiotherapy care. Therapists are not reminded of the guideline by participating in the registration network. Therefore, it is not likely that socially desirable behaviour affected the registration.

Besides these advantages, some limitations of the study should be borne in mind when interpreting the results. Because the network collected information completely electronically it is possible that the participating therapists form a subgroup of the Dutch therapists, namely those working in more computerised practices. However, the basic characteristics of the participants, such as gender, age, and years since graduation, are representative of all Dutch therapists. A second limitation of the study is the reliance on therapists to record relevant data accurately. We assume only minimal inaccuracies for two reasons. First, the participants declare their treatment sessions to health insurers electronically and

in the current study a part of the data was filtered from these reimbursement data. Second, standardised quality control mechanisms are used to correct missing or wrong data. A third limitation of the study is that it was necessary to adapt validated criteria (Bekkering 2004). Since the criteria we used are related to the validated criteria we feel that current results are a good estimation of guideline adherence in patients with low back pain.

Comparisons between physiotherapy practice and evidence-based care (or clinical guidelines) have been made in several studies (Armstrong et al 2003, Foster et al 1999, Gracey et al 2002). The results from those comparisons show a gap between clinical practice and evidence-based care. However, those studies evaluated guideline adherence at the level of the grouped patient population and not at the level of individual patients. Therefore, the distribution of guideline adherence across patients remained unclear: were some patients treated entirely according to the guideline, while others were not at all, or were all patients treated only partly according to the guideline? To our knowledge only one study with a design comparable to the current study has been conducted in physiotherapy. Bekkering (2004) showed an adherence to the physiotherapy low back pain guideline for Dutch physiotherapists in 30% of the patients. When physiotherapists had undergone an active implementation strategy adherence increased by 12%. However, the participating therapists in that study were expected to have a more positive attitude towards guidelines (Bekkering 2004). Consequently, the results could not be generalised to all Dutch physiotherapists.

Guideline development is still new for Dutch physiotherapy and the guideline for the treatment of patients with low back pain was published in 2001. Our results show that one to two years later, in a small majority of the patients with low back pain, the content of the treatment episode corresponds to the recommendations in the guideline. Furthermore the results indicate that about a quarter of the therapists were very consistent in working according to the guideline: they treated almost all their patients according to the guideline. However, a substantial variation is found in guideline adherence among the other therapists. Further, as the criteria about the treatment goals and the interventions were not very difficult to meet, the percentage of adherence was expected to be higher. In view of the variation and the relatively low percentage, it is clear that the quality of the care can be improved.

The most striking finding in our study concerns the high proportion of patients with acute complaints and the high number of treatment sessions given to them. In the guideline one or two sessions are recommended for patients whose back pain follows a normal course. For the purpose of this study we assumed that patients with acute complaints in general have a normal course. In The Netherlands, physiotherapy is only accessible after a referral from a general practitioner (GP). As Dutch GPs are advised against a referral to physiotherapy for patients with acute complaints of low back pain (Faas et al 1996), it is not likely that a large number of those patients would receive physiotherapy. Nevertheless almost half the patients in the physiotherapy practice have acute complaints. It may be possible that GPs and physiotherapists do not define complaints lasting for about three weeks as 'acute complaints'. Furthermore, research has shown that Dutch GPs had sound reasons for their referral to a physiotherapist (e.g. 'advice on posture considered necessary') (Schers et al 2000). It is not clear why

physiotherapists treat these patients (much) more often than the recommended number of sessions. An explanation might be that the restriction in the number of treatment sessions is not compatible with existing routines; this can cause lower compliance (Burgers et al 2003, Grol et al 1998). On the other hand, the finding of a high proportion of patients with acute complaints and the high number of treatment sessions could indicate a misfitting of the guideline on practice: patients with acute complaints might have severe problems which cannot be solved in one or two sessions. Furthermore, the restriction on the number of sessions is a typically Dutch element of the guideline: it is, to our knowledge, not included in physiotherapists' guidelines for low back pain in other countries.

The guideline for the treatment of patients with non-specific low back pain underlines the importance of an active approach. Although an activity-related approach was adopted for the majority of the patients, in many cases passive interventions were also part of the treatment. In 76% of the patients manual interventions (massage or manual manipulation) were applied in at least half of the sessions. This is contrary to the guideline which states that traction is not useful and massage should be used reservedly (Bekkering et al 2003). A recent review showed that massage might be beneficial for patients with subacute and chronic non-specific low back pain, especially when combined with exercises and education (Furlan et al 2003). Furthermore, a review by Ferreira et al (2003) showed positive results for spinal manipulative therapy (Ferreira et al 2003). Positive clinical experience by physiotherapists might be keeping them from adhering to the guideline.

## Conclusion

For a small majority of patients, practice matches the Dutch physiotherapy guideline for low back pain. As a substantial variation in guideline adherence was also found, the quality of Dutch physiotherapy care shows distinct room for improvement. Our results might be of value in improving guideline adherence. We suggest discussion of our results in Dutch consultation platforms when reflecting on guideline adherence. Furthermore, our data might be useful in benchmarking.

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## References

- Armstrong MP, McDonough SM and Baxter GD (2003): Clinical guidelines versus clinical practice in the management of low back pain. *International Journal of Clinical Practice* 57: 9–13.
- Bekkering GE (2004): Physiotherapy guidelines for low back pain. Development, implementation, and evaluation [Thesis]. Amsterdam: Vrije Universiteit.
- Bekkering GE, Hendriks HJM, Koes BW, Oostendorp RAB, Ostelo RWJG, Thomassen JMC and Tulder van MW (2003): Dutch physiotherapy guidelines for low back pain. *Physiotherapy* 89: 82–96.
- Brook RH, McGlynn EA and Cleary PD (1996): Quality of health care. Part 2: Measuring quality of care. *New England Journal of Medicine* 335: 966–970.
- Brook RH, McGlynn EA and Shekelle PG (2000): Defining and

- measuring quality of care: A perspective from US researchers. *International Journal for Quality in Health Care* 12: 281–295.
- Burgers JS, Grol RPTM, Zaat JOM, Spies TH, Bij van der AK and Mokkink HGA (2003): Characteristics of effective clinical guidelines for general practice. *British Journal of General Practice* 53: 15–19.
- Dekker J, Ravensberg van D, Ende van den E and Oostendorp R (1998): De beperkende maatregel fysiotherapie, oefen therapie Cesar en oefen therapie-Mensendieck en het Amsterdams Dienstenmodel: samenvatting van het evaluatie-onderzoek. Deelrapport 4. [*The restrictive measure for physiotherapy, remedial therapy (Cesar and Mensendieck) and the Amsterdam 'services model': Summary of the evaluation research. Section 4*] Utrecht: NIVEL/NPI.
- Faas AAW, Koes BW, Hoogen van den JMM, Mens JMA, Smeele LJM, Romeijnders ACM and Laan JRvd (1996): NHG-standaard M54 Lage-rugpijn. [*National College of GPs Standard M54 on low back pain.*] *Huisarts en wetenschap* 39: 18–31.
- Ferreira ML, Ferreira PH, Latimer J, Herbert R and Maher CG (2003): Efficacy of spinal manipulative therapy for low back pain of less than three months' duration. *Journal of Manipulative and Physiological Therapeutics* 16: 593–601.
- Foster NF, Thompson KA, Baxter GD and Allen JM (1999): Management of nonspecific low back pain by physiotherapists in Britain and Ireland. A descriptive questionnaire of current clinical practice. *Spine* 24: 1332–1342.
- Furlan AD, Brosseau L, Imamura M and Irvin E (2003): Massage for low back pain (Cochrane Review). The Cochrane Library, Issue 4. Chichester: John Wiley.
- Gracey JH, McDonough SM and Baxter GD (2002): Physiotherapy management of low back pain. A survey of current practice in Northern Ireland. *Spine* 27: 406–411.
- Grol R, Dalhuijsen J, Thomas S, Veld C, Rutten G and Mokking H (1998): Attributes of clinical guidelines that influence use of guidelines in general practice: observational study. *BMJ* 317: 858–861.
- Hingstman L and Kenens R (2002): Cijfers over fysiotherapeuten in de eerste lijn 2001. [*Data on physiotherapists working in primary care 2001.*] Utrecht: NIVEL.
- Hingstman L, Kenens R, Windt Wvd, Talma HF, Meihuizen HE and Voogd-Hamelink AMd (2001): Rapportage arbeidsmarkt zorg en welzijn 2001. Hoofdrapport. [*Report on the labour market for healthcare and welfare. Main report.*] Tilburg: OSA publicatie ZW 21.
- Lawrence M and Olesene F (1997): Indicators of quality in health care. *European Journal of General Practice* 3: 103–108.
- Schers H, Braspenning J, Drijver R, Wensing M and Grol R (2000): Low back pain in general practice: Reported management and reasons for not adhering to the guidelines in the Netherlands. *British Journal of General Practice* 50: 640–644.
- Sluijs EM and Wagner C (2003): Progress in the implementation of Quality Management in Dutch health care:1995–2000. *International Journal for Quality in Health Care* 15: 223–234.
- Verheij R, Jabaaij L, Bakker de D, Abrahamse H, Hoogen van den H, Braspenning J et al. (2002): LINH jaarrapport 2001 cijfers uit het Landelijk Informatie Netwerk Huisartsenzorg: contacten, verwijzingen en voorschrijven in de huisartsenpraktijk. [*LINH 2001 annual report: Encounters, referrals and prescribing in general practice.*] Utrecht: NIVEL.
- WHO (2001): *International Classification of Functioning, Disability and Health: ICF*. Geneva: WHO.
- WONCA (1998): *ICPC-2: International Classification of Primary Care*. Oxford: Oxford University Press.