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Health Policy 75 (2005) 85–98
HEALTH policy
www.elsevier.com/locate/healthpol

Cost-effectiveness of an active implementation strategy for the Dutch physiotherapy guideline for low back pain

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Abstract

Background and purpose: The treatment for patients with low back pain varies considerably. The Dutch Physiotherapy Association issued an evidence-based physiotherapy guideline for non-specific low back pain. To establish changes in daily practice an active implementation strategy was developed. We evaluated the cost-effectiveness of this implementation strategy.
Subjects: 113 physiotherapists included 500 patients with low back pain.
Methods: In the intervention group the guideline was implemented actively, in the control group the standard method of dissemination was used. The patients filled in questionnaires at baseline and 6, 12, 26 and 52 weeks later. Direct medical costs, productivity costs (due to absenteeism) and quality of life (EQ-5D) were calculated.
Results: During the 1-year follow up, no differences were found in the quality of life, direct medical costs and productivity costs.
Conclusion: The active implementation strategy appears not to be cost effective as compared to the standard strategy.

Keywords: Active implementation strategy; Low back pain; Physiotherapy guideline; Cost-effectiveness

1. Introduction

Low back pain is a tremendous health and socioeconomic problem [1–3]. Life time incidences are reported to range from 60 to 90% and the prevalence rates from 12 to 35% [4–6]. For about 85% of the patients it is not possible to find a specific reason for the back pain [7]. In these patients the low back pain is called non-specific. The disease prognosis is often favourable; 50% of the patients visiting a general practitioner (GP) recovers within 6 weeks, irrespective of the type of treatment [8].

The duration of a physiotherapy treatment episode and type of treatments for low back pain provided by

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doi:10.1016/j.healthpol.2005.02.008

Dutch physiotherapists vary considerably [9] An efficient policy concerning physiotherapy requires treatment consensus and an optimal interaction with other caregivers such as GPs and medical specialists [10–12]. Therefore, the Royal Dutch Physiotherapy Association (KNGF) developed a method for the development and implementation of clinical practice guidelines, specifically for the field of physiotherapy [13,14]. An example is the evidence based guideline for non-specific low back pain [15].

Mailing guidelines is one step; successful implementation of a guideline is equally important and difficult. Most of the studies that have analysed the effects of clinical guidelines, have assessed the process of care rather than patient outcomes [16,17]. The studies that have analysed the effects of guidelines on patient outcomes show conflicting results [16,18–20].

An economic evaluation may provide important information to decision makers to decide if an active implementation strategy is worthwhile. The aim of this study is to perform an economic evaluation of the active implementation strategy as compared to the standard method of dissemination.

2. Methods

A cost-utility analysis was performed comparing the active implementation strategy with the standard method of guideline dissemination. This study used a societal perspective: in principle all costs, which are relevant for all participants, were measured, e.g. costs for patients, health care suppliers, insurers and for society as a whole [21]. However, travel costs for patients are not included. The follow up period was 1 year. The costs were expressed at prices for the year 2002. The relevant costs categories were direct medical costs, implementation costs and productivity costs.

2.1. Research population

The research population in this study involved 113 physiotherapists, working in 68 practices in a central region of the Netherlands. To contribute to this study, physiotherapists had to meet the following criteria:

- working in primary care;
- expecting to treat at least five patients with low back pain in the coming 6 months;
- being a member of the Royal Dutch Physiotherapy Association (KNGF).

The physiotherapists were randomised per practice to the intervention or control group. A blocked randomisation was performed to make sure that the same number of practices was represented in both groups. The patients, a maximum of 10 patients per physiotherapist, were recruited from May 2001 until the first of January 2002 by the physiotherapists. In total the physiotherapists included 500 patients of whom 483 participated in this study.

2.2. The intervention group

The intervention consisted of a standardized, active and more extensive strategy to implement the guideline for low back pain, *in addition to the standard dissemination method*. Two training sessions were offered by a researcher to small groups of physiotherapists (8–12). Implementation interventions that have shown to be effective, such as education, discussion, feedback, interactive sessions and reminders, were used in combination during the training sessions. [22,23] The guideline was explained to and discussed with the physiotherapists and special skills were practiced during the first session. The time after this session had to be used to practice with the guideline, and to complete registration forms on the physiotherapists' current low back pain management. The second session was 4 weeks later: the experience of the physiotherapists and the problems were discussed. They also received feedback on their current management and two reminders.

The training was standardized to a considerable extent. Each participant received a reader containing the information for the training, together with the most important recommendations of the guideline and its underlying evidence. A pilot training was given. The two trainers used the same set of transparencies as training material.

Each training session was reported in a summary, which was also given to the trainer of the other groups. Feedback was filled in on standard forms and was checked to see to what degree the trainees adhered to the guideline.

2.3. Control group

In an economic evaluation an intervention is always compared to the best alternative: dissemination of the guideline in the usual way, by mail to the members of the KNGF, together with four implementation forms. These forms consist of a self-evaluation form to assess if the current management is consistent with the guideline, two forms facilitating discussion with other physiotherapists respectively GP's and a copy of the Quebec Back Pain Disability Scale. Furthermore, a summary of the guideline was provided and an article about the development of the guideline was published in a Dutch professional journal for physiotherapists [24,25].

2.4. Outcomes

The outcome measures of the costing research were the average costs per patient and the average intervention costs per physiotherapist. Health effects were evaluated using quality of life measurement.

To establish the costs, the patients received a structured questionnaire at their first visit at the physiotherapist. The questionnaire included some general questions, e.g. age and sex, and questions about the length of the low back pain episode, specific complaints, healthcare utilisation, absence from work, problems with unpaid work and illness specific and general quality of life questions. Four questionnaires were sent later to the patient after 6, 12, 26 and 52 weeks.

2.5. Direct costs

The direct costs consisted of costs of the dissemination of the guideline and the costs of the healthcare utilisation of the patients.

The costs of the intervention (the extensive implementations) and the control (standard dissemination) were based on the information of the institute for Research in Extramural Medicine (EMGO) from the physiotherapy researchers who had provided the implementation training and the KNGF. The dissemination costs of the control group consisted of the costs to disseminate the guideline, costs of the development of the implementation forms, costs of an article in Fysiopraxis (professional journal for physiotherapists) and the time costs of the physiotherapists for reading the new guideline and the implementation forms.

The costs for the intervention were identical to the costs of the control group *plus* the costs for producing and organising the training sessions, costs of a teacher and an actor who were involved in the training sessions, extra time costs of the physiotherapists and the mailing costs of the invitations for the training.

The costs of health care utilisation, during the one year follow up, consisted of visits to a general practitioner, medical specialist, physiotherapist, prescribed and not prescribed medicines, alternative practitioners and hospitalisation.

In the questionnaire we asked for the health care consumption in the past 6 weeks.

We calculated the annual costs of healthcare utilisation by adding up the costs per period, starting with the costs as measured at 6 weeks after randomisation. The costs for the time between the measurement periods (week 13–20 and week 27–46) were established through linear interpolation. We made a correction for patients who did not report a visit to a physiotherapist or manual therapist at 6 weeks. They must have been there at least once, otherwise they could not participate in this research project so we counted one visit for these patients ($n = 62$).

We valued the medical consumption based on resource costs and guideline costs of the Supervisory board for Health insurance (CvZ) updated to 2002 [26]. In case of treatment by alternative healthcare providers, we estimated the costs per unit by taking the mean of four or five different rates, found on Internet sites.

2.6. Productivity costs

The productivity costs were defined as the costs of absence from work due to low back pain. The respondents were asked to report the reason for absence from work and the number of absent days. For the valuation of an hour work we used the average productivity costs per hour worked in 2002, i.e. €34.26, based on the net national income per working hour [27]. The elasticity for working time versus labour productivity was established at 0.8 [28]. We used one average overall estimate for the valuation of productivity loss, in order to avoid that differences in productivity costs between treatment arms could only result from (income) differences in gender and/or age between the groups.

The friction cost method was used. This method takes into account that in a productivity process

everyone is replaceable after a certain period [28]. Productivity losses only occur in the period that one needs to replace someone. At the moment this period was estimated as being 22 weeks for the Netherlands [29].

The annual productivity costs were calculated by adding up the costs per recall period. The costs between the measurement periods were interpolated. We did not correct for missing values on productivity costs, because respondents with no missing values and respondents with minimal one missing value were not different with respect to age, sex and indirect and productivity costs on the available measurement moments.

Productivity costs can also occur when people with health complaints are still working, but at a lower productivity level. This is called efficiency loss.

The efficiency losses without absence have been established by means of the quality- and quantity-method. The respondents gave their marks for the quality and the quantity of their work on the last working day on a visual analogue scale [30]. We calculated the efficiency loss during paid work as: $(1 - (\text{quality}/10) \times (\text{quantity}/10)) \times$ working hours per day.

2.7. Hindrance at unpaid work

We also estimated hindrance and productivity losses at unpaid work. When asking for hindrance at unpaid work unpaid work was split up into housekeeping, shopping, doing odd jobs and childcare. We also asked for the number of hours housekeeping tasks that were taken over by other people, and for how many hours paid help was needed. The costs of 1 h of housekeeping tasks were set at the current price of one hour of simple professional home care [26].

It is not possible to add up the costs of less unpaid work done, taken over housekeeping tasks and paid taken over housekeeping tasks because double counting may take place. Less housekeeping tasks done represents the productivity costs, taken over housekeeping tasks represent the replacement costs and the paid taken over housekeeping tasks represents the paid replacement costs.

2.8. Quality of life

The quality of life was measured by means of the EQ-5D instrument [31]. The EQ-5D has five dimensions: mobility, self-care, usual activity, pain/discomfort and anxiety/depression. Each dimension has three levels, no problems, some problems and serious problems. Hence, EQ-5D has 243 possible health states. Utility values of the general public for these health states as measured with the time trade-off technique on a random sample of the adult population of the United Kingdom, the MVH-A1 tariff, were applied in this study. The scores range from −0.594 (worst situation) to 1.0 (perfect health) [32].

2.9. Statistical analysis

Analysis was performed according to the intention to treat principle. Both parametric and non-parametric tests were performed to compare both groups on costs and health effects. The level for statistical significance was set at 5%. We used SPSS Version 10.0.

3. Results

3.1. Population

In total the physiotherapists included 500 respondents in this study. At baseline 96% of the questionnaires were returned, after 6 weeks 93%, after 12 weeks 90%, after 26 weeks 88% and after 52 weeks 86%. Eighty percent of the respondents completed all questionnaires.

The general characteristics of the intervention and the control group are reported in Table 1.

The two groups were comparable at baseline with regard to most prognostic factors. There was only a small, but not significant, difference in health insurance, which can be explained by the difference in income between both groups (in the Netherlands about 65% of the population (more prevalent in the lower income groups) is compulsory enrolled with a sickness fund). The average income per hour is significantly higher in the control group. About 28% of the respondents had a missing value on income, which is quite common for income questions. The proportion of missing income data was about the same for both groups.

The length of the period with back pain, pain intensity, EQ-5D pain dimension and score on the Quebec Back Pain Disability Scale at baseline were not significantly different in both groups [33].

Table 1
General characteristics of the patients at baseline

	Intervention group ($n = 242$)	Control group ($n = 241$)
Average age	45.5 (med 45.0, S.D. 14.8)	43.65 (med 42.0, S.D. 13.3)
Sex		
Women (%)	54.1	50.6
Men (%)	45.9	49.4
Health insurance		
Private (%)	30.6	39.0
Sickness fund (%)	61.6	51.0
Sickness fund + complementary insurance (%)	7.9	10.0
Paid work (%)	69.0	76.8
Average hours of work per week	31.6 (med 36.0, S.D. 10.4)	32.3 (med 36.0, S.D. 11.4)
Average income per hour	€9.26 (med 8.47, S.D. 4.29)	€10.77 (med 9.47, S.D. 4.74)
Missing values (%)	41.3	40.0
Education		
Low (%)	23.2	29.2
Median (%)	44.0	31.7
High (%)	31.9	39.1
Prior episode of low back pain (%)	73.7	72.4
Duration of current episode		
<6 weeks (acute) (%)	51.9	49.6
6–12 weeks (sub acute) (%)	15.5	20.6
>12 weeks (chronic) (%)	32.6	29.8

med, Median; and S.D., standard deviation.

3.2. Costs of implementing the guideline

The costs of the standard dissemination of the guideline for low back pain and the additional costs of the active strategy are shown in Table 2. The guideline and the implementation forms were distributed to 18,000 physiotherapists, all KNGF members including those abroad. The average costs per physiotherapist were €4.

Additional implementation costs were made for the intervention group. The costs of developing the additional training were fixed. The costs of planning, preparing and realizing the training were variable costs. In this research project one pilot training and five training sessions were performed and 51 physiotherapists participated. Per physiotherapist it took 9.5 h for preparing and participating.

The additional variable costs of the training for one physiotherapist, assuming an average of 8.5 participants per training, were €364. In the Netherlands 12.687 physiotherapist are working in primary care [34]. We assumed that 80% of them are treating patients with low back pain. When 25% of them would participate in the training program the total costs per physiotherapist are €369. When 50% of the physiotherapists would join the training program the total additional costs are €366, hence the variable costs are dominant.

Table 2
The costs of releasing a new guideline for low back pain to 18,000 physiotherapists using the standard method and the additional costs of an active strategy (the intervention)

Developing implementation forms	€6092
Photographs cover guideline	€717
Designing the guideline	€5493
Printing implementation forms	€11325
Printing guideline	€22209
Sort mailing guideline	€4683
Postal charges guideline	€12582
Total	€63101
Additional costs of the intervention	
Scientific preparation of the training	€10723
Pilot training (1 evening for 8 physiotherapists)	€2002
Five trainings of 2 evenings for 43 physiotherapists	€10594
Administration costs for organising an extra training	€996

Table 3
Mean direct medical costs per patient for the previous 6 weeks per measurement moment for both the intervention and the control group

	Baseline	6 weeks	12 weeks	26 weeks	52 weeks
Intervention group					
GP costs	€26 (18)	€8 (0)	€2 (0.00)	€3 (0)	€2 (0)
Physiotherapist costs[a]	€54 (40)	€106 (101)	€51 (0.00)	€18 (0)	€15 (0)
Medication costs	€7 (1)	€4 (0)	€1 (0.00)	€3 (0)	€3 (0)
Other costs[b]	€5 (0)	€8 (0)	€5 (0.00)	€8 (0)	€7 (0)
Total	€92 (72)	€125 (111)	€58 (20)	€33 (0)	€24 (0)
S.D.	€62	€91	€91	€98	€68
25 percentile	€47	€60	€0	€0	€0
75 percentile	€114	€161	€80	€1	€3
Control group					
GP costs	€30 (18)	€8 (0)	€6 (0)	€5 (0)	€2 (0)
Physiotherapist costs[a]	€52 (40)	€125 (121)	€61 (0)	€22 (0)	€19 (0)
Medication costs	€7 (1)	€3 (0)	€3 (0)	€3 (0)	€3 (0)
Other costs[b]	€5 (0)	€10 (0)	€11 (0)	€9 (0)	€12 (0)
Total	€89 (71)	€145 (141)	€77 (25)	€35 (0)	€30 (0)
S.D.	€69	€95	€107	€99	€109
25 percentile	€44	€80	€0	€0	€0
75 percentile	€109	€201	€121	€20	€6

(Median).
[a] Physiotherapist costs include costs of physiotherapist, manual therapist and Mensendieck or Cesar therapist.
[b] Other costs include hospitalisation, medical specialist, company doctor and alternative practitioner.

3.3. Direct medical costs

The health care utilisation due to low back pain showed the same pattern in the intervention and control group over time: a rapid decrease in the first 12 weeks and after 6 months the healthcare utilisation stabilised. At baseline about 94% visited a general practitioner, at 6 weeks this was 25% and at 12 weeks about 10%. The number of visits to a physiotherapist showed an increase at 6 weeks and a decrease at 12 weeks. Only four patients were hospitalised during the 1-year follow-up for an average of 1.5 days. Prescribed drugs were provided to 40% of the respondents at baseline and decreased to about 10% at 12 weeks later. Medication available without a prescription was taken by 49% of the respondents at baseline and decreased to plus minus 23% at 12 weeks.

For both groups we observed a peak in medical consumption during the first 6 weeks and thereafter a substantial decrease. After 6 months the healthcare utilisation stabilised for both groups. Appendix A gives a detailed summary of healthcare utilisation of both groups.

A summary of the direct costs per 6 weeks is given in Table 3. The costs per unit of medical consumption are mentioned in Appendix B.

The increase in costs at 6 weeks and the decrease at 12 and 26 weeks were statistically significant within both groups (p-value for both groups <0.000).

Only at 6 weeks the medical costs were significantly lower for the intervention group than for the control group ($p = 0.026$). No significant cost differences were found at 12, 26 and 52 weeks between the groups ($p_{12} = 0.051$; $p_{26} = 0.818$; $p_{52} = 0.477$).

3.4. Productivity costs

Absenteeism, in 2 weeks, is shown in Table 4 for both groups. The number of respondents is lower, since only respondents with a paid job were included in this comparison.

For both strategies, the decrease of absenteeism at 6 weeks was substantial and statistically significant. On any measurement moment, the difference in absenteeism between the two groups is small and not statistically significant.

Table 4
Absenteeism during the previous 2 weeks and absenteeism due to low back pain during the previous 6 weeks per measurement moment

	Baseline	6 weeks	12 weeks	26 weeks	52 weeks
Intervention group (*n*)	169	161	155	150	146
Absenteeism in 2 weeks					
None (%)	51.8	78.3	87.7	83.3	84.9
Due to low back pain (%)	42.2	13.7	7.1	6.0	5.5
Due to other complaints (%)	4.2	7.2	4.5	8.0	5.5
Due to both (%)	1.8	0.7	0.6	2.7	4.1
Average hours absenteeism per 2 weeks	17.1 (24.4)	8.1 (20.4)	5.5 (17.5)	6.2 (17.9)	6.3 (19.2)
No absenteeism due to low back pain in the past 6 weeks (%)	53.7	75.5	90.3	91.4	90.2
Control group (*n*)	186	176	169	167	161
Absenteeism in 2 weeks					
None (%)	57.1	79.6	85.0	87.2	88.8
Due to low back pain (%)	37.4	13.0	6.9	6.1	2.5
Due to other complaints (%)	5.5	6.8	7.5	6.1	8.1
Due to both (%)	0.0	0.6	0.6	0.6	0.6
Average hours absenteeism per 2 weeks	16.5 (26.1)	8.3 (20.6)	5.3 (17.4)	4.5 (14.8)	4.9 (16.4)
No absenteeism due to low back pain in the past 6 weeks (%)	56.5	77.1	90.2	93.3	94.9

(For the patients with a paid job) (S.D.).

The average number of hours absenteeism *per absentee* in 2 weeks was stable over time and about 42 h, this is about 5.5 days, in 2 weeks for both groups.

The costs of absenteeism, due to low back pain, per 2 weeks differed not significantly within both groups over time. There was a significant decrease of the costs in the first 6 weeks, from €476 to €220 in the intervention group and from €452 to €236 in the control group. After 6 weeks there is only a slight further decrease in costs, see Fig. 1.

3.5. Efficiency loss

At baseline, about half of the patients reported efficiency loss due to low back pain for almost 2 h on average per day. The efficiency losses per working day, without absenteeism, due to low back pain showed a significant decrease after 6 and 12 weeks for the intervention and the control group. After 12 weeks the pattern remained stable. The differences between the two groups were not statistically significant at any measurement moment. Table 5 shows the results at baseline, 6 and 12 weeks.

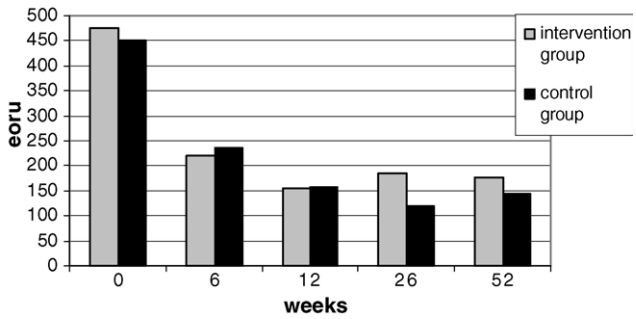

Fig. 1. Costs of absence from work due to low back pain per 6 weeks.

Table 5
Efficiency loss (el) on the previous workday of the intervention (ig) and the control group (cg)

	Baseline		6 weeks		12 weeks	
	ig (n = 168)	cg (n = 186)	ig (n = 161)	cg (n = 176)	ig (n = 155)	cg (n = 169)
No loss of quality or quantity (%)	39.3	43.2	55.8	64.2	71.4	71.1
el due to low back pain (%)	54.0	50.6	31.4	22.8	17.5	16.4
el other reasons (%)	6.7	6.2	12.8	13.0	11.1	12.5
Average hours efficiency loss due to low back pain	1.95 (2.38)	1.91 (2.46)	1.87 (7.53)	0.83 (1.80)	0.40 (1.08)	0.40 (1.09)

(S.D.).

Table 6
Hindrance during unpaid work, in the previous 2 weeks, as a result of low back pain in the intervention (ig) and control (cg) group at baseline and 6 and 12 weeks

	Baseline		6 weeks		12 weeks	
	ig (n = 242)	cg (n = 241)	ig (n = 235)	cg (n = 229)	ig (n = 224)	cg (n = 222)
% With hindrance	50	47.5	26.1	24.8	15.6	13.8
% Housekeeping tasks taken over	38.2	34.9	18.1	16.7	14.1	9.2

3.6. Hindrance during unpaid work

Hindrance during unpaid work in the previous 2 weeks, due to low back pain, was experienced equally in the intervention and the control group. At baseline almost 50% of the patients experienced hindrance. After 12 weeks (about 15%) there is no further significant decrease in experienced hinder.

At baseline, about one third of the patients had housekeeping tasks taken over. This fraction decreased to 10–15% at 12 weeks and remained stable thereafter (Table 6).

The average costs of less housekeeping at baseline were in the intervention group €24 and in the control group €22 per week per patient. These costs decreased to €7 in the intervention group and €7 in the control group per week after 12 weeks. Fig. 2 shows the costs over time of less housekeeping done in the previous week.

The costs of taking over housekeeping tasks *per 2 weeks* were at baseline €27 in the intervention group and €24 in the control group. After 12 weeks these costs decreased to €8 in the intervention group and to €5 in the control group. The cost differences between the two groups were not significant.

3.7. The quality of life

The quality of life scores on the EQ-5D were at baseline significantly different between the intervention

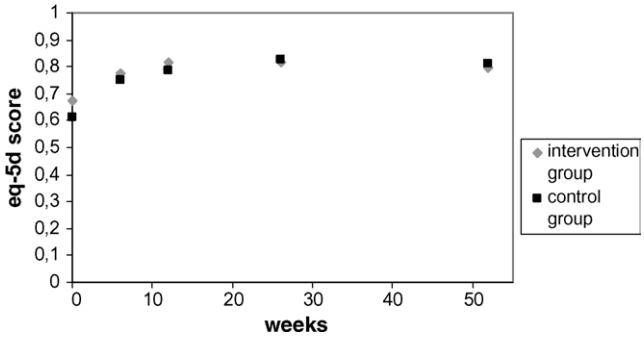

Fig. 2. Quality of life as measured by the EQ-5D.

and the control group. The intervention group had a higher quality of life score, 0.6730 (S.D. = 0.2042), compared to the control group, 0.6134 (S.D. = 0.2661) (p-value = 0.006). Inspecting each EQ-5D dimension shows a significant lower score on self-care for the control group at baseline. After 6 weeks the quality of life has improved in both arms and the difference between the arms has almost disappeared. The scores on the EQ-5D after 6 weeks were 0.7778 (S.D. = 0.1978) in the intervention group and 0.7497 (S.D. = 0.2316) in the control group. At 12 weeks the scores were respectively 0.8141 (S.D. = 0.1988) and 0.7873 (S.D. = 0.2210). From 6 weeks onwards, quality of life was not significantly different between the groups.

Fig. 2 shows the scores on the EQ-5D over time for the intervention and the control group.

3.8. The annual costs

The costs per patient per year are summarised in Table 7. There were no significant differences in the annual costs per item between the intervention and the control group. The 95% confidence interval for the difference in medical costs between the two groups = [−180, +30], for the difference in productivity costs = [−1559, +3166] and for the difference in total costs = [−1685, +1750]. The medical cost only differ significant at 6 weeks after randomisation, but aggregating all measurement moments attaches more weight to the measurement moments at 26 and 52 weeks, as these encompass a larger time interval. See Section 4 for more details on this issue.

Table 7
The mean annual costs per patient in the intervention and the control group

	Intervention group	Control group
Direct costs		
Average	€374	€449
S.D.	€427	€572
25 percentile	€102	€121
50 percentile	€224	€248
75 percentile	€447	€575
Productivity costs		
Average	€4838	€4035
S.D.	€9572	€8962
25 percentile	€0	€0
50 percentile	€192	€282
75 percentile	€4398	€2193
Less housekeeping done	€434	€293
Taken over housekeeping tasks	€256	€199
Paid taken over housekeeping tasks	€15	€49

3.9. Cost-effectiveness

We did not calculate a cost-effectiveness ratio in this study, since far from significant differences between the intervention and control group were found in both costs and health effects. Given the p-values and the wide confidence intervals (including zero differences) for differences between the groups, there is a very low probability of health gains and/or cost savings. Moreover, since the costs of the extended implementation strategy are with certainty additional costs, it is very likely that the extended implementation strategy incurs extra costs without producing health gains, hence it is very likely to be not cost-effective.

4. Discussion

In most cost-effectiveness research on guidelines no attention is paid to the costs of guideline implementation, which may be substantial and therefore may influence decision-making on the method of implementing a new guideline.

The results of this study showed no significant differences in the direct and productivity costs and the quality of life during one year follow up between the intervention group and the control group.

It should be noted that only at 6 weeks after randomisation, we observed lower therapists costs (€19 per patient, that is about the cost for one visit) in the intervention group. Hence, one could state that the €368 additional costs per training for a physiotherapist may be earned back when this physiotherapist has treated 20 new patients with low back pain because of the lower physiotherapist costs, €19 at 6 weeks.

However, aggregating all costs at all five measurement moments does not show significant cost differences, because this aggregation attaches more weight to the measurement moments at 26 and 52 weeks, as these encompass a larger time interval. Furthermore, the lower costs of the intervention group at 6 weeks may be related to the higher quality of life score of

the intervention group at baseline, since the costs at 6 weeks represent the medical consumption during the 6 weeks between baseline and 6 weeks.

In this study, randomisation was made by practice, but costs and quality of life were measured in individual patients. It is possible that the effect of practice may affect individual variance. Multilevel regression analysis was performed to analyse the patient outcomes for this clustering of data. As reported by Bekkering [33] in this patient sample the variation between practices on physical functioning was zero: 97–99% of the variation in physical functioning and pain was due to variation on the level of the patients and the measurement moments within each patient. Hence, the impact of practice on individual variance appears to be absent. Because physical functioning and pain are the main elements of quality of life as measured here, we did not perform an additional multilevel analysis on quality of life. With respect to the costs, patient costs are dominated by productivity costs. Practices may affect the utilisation of physical therapy to a certain extent, but practices are not likely to affect absence from work and therefore productivity costs.

The increase in quality of life over time in both groups corresponds remarkably well with the decrease in medical and productivity costs.

The costs of the intervention, fixed costs per training programme €12,725 and variable costs per physiotherapist €363 are an additional investment. Since there were no clear health effects on quality of life the extra costs of this implementation strategy is not opportune from an economic perspective.

The correction of one visit we made for the patients that did not report a visit to a physiotherapist and manual therapist at baseline and 6 weeks are not expected to have an influence on the direct costs because they were distributed equally between both treatment groups.

We valued the costs of alternative practitioners by taking an average of five cost estimates we found on Internet. It is recommendable to ask patients what price they paid for the alternative practitioner, as it is mostly paid out of pocket in the Netherlands. The substantial cost variation between alternative practitioners and treatments makes it difficult to find a reliable estimate for the average cost per visit.

Table 7 shows that the distribution of productivity costs is skewed to the right, especially for the intervention group. This explains why the mean productivity costs in the intervention group are higher, but not statistically significant.

It is remarkable that the productivity costs at baseline were not higher for the control group, since quality of life at baseline was slightly worse and direct costs were higher at 6 weeks. Presumably, the persons have limited disabilities and they are often capable to work despite of their low back pain.

The higher productivity costs of the intervention group at 26 and 52 weeks cannot be explained on basis of the intervention. At these measurement moments the percentage of patients with absenteeism due to a combination of low back pain and other problems is higher in the intervention group and the higher rate of absenteeism might be the result of the other health problems. The probability that this difference is a result of the intervention is low because there are no differences found in quality of life scores, healthcare utilisation, efficiency losses and hindrance at unpaid work. At these measurement moments respectively about 14 and 8% of the patients have contact with physiotherapists, so their influence seems to be limited.

The intervention might have an effect on the knowledge of physiotherapists of the guideline recommendations regarding diagnosis and treatments. These items are not enquired in this study. It might take more time than the study duration before physiotherapists are convinced of the usefulness of the new guideline and incorporate it in their “daily routine”.

Bekkering et al. [35] concluded that active intervention improves guideline adherence but more attention for implementation of this guideline is necessary to sufficiently close the gap between scientific evidence and current physiotherapy care for patients with low back pain.

Another possible reason why the intervention sorts no effect could be that a lot of attention in the literature was paid to the treatment of low back pain. Physiotherapists may already use part of the recommendations of the guideline in practice [36]. The new insights from the training may have been not sufficient to change their way of treatment.

The degree of implementation of the guidelines could affect the costs and the health effects of the patients and the cost-effectiveness of the intervention. On a scale of 0–100% (four criteria, each criterium counted as 25%), the average implementation rate per practice was 72% as reported by Bekkering et

al. [35]; practices with one physical therapist (73%) and practices with more than one therapist (71%) showed equivalent results. In the intervention group the guideline was fully implemented for 42% of the patients, in the control group for 30% of the patients. Still for 30% of the patients the guideline was implemented for less than 50% [35]. We performed regression analyses to see if the implementation rate could explain variation in costs and quality of life of the patients. All the results were not significant, so it appears that variation in the rate of implementation is not likely to affect the cost-effectiveness of this intervention.

Further research on cost-effectiveness or cost-utility of implementation of new guidelines should measure the effects on the knowledge of the healthcare provider as an intermediate outcome variable. Also baseline measures, that give insight in the treatment physiotherapists provide, should be investigated.

In summary, this economic evaluation did not show clear differences in costs and effects between a new implementation strategy and usual dissemination of the Dutch Physiotherapy Guideline for Low Back Pain. From an economic perspective, there does not seem to be a rationale to prefer the new implementation strategy.

Acknowledgement

This study was granted by the Dutch Ministry of Health, Welfare and Sports

Appendix A

Table A.1
Healthcare utilisation in 6 week for the intervention group (median)

	Baseline $n = 242$	6 weeks $n = 234$	12 weeks $n = 223$	26 weeks $n = 217$	52 weeks $n = 214$
GP					
Contact (%)	93.8	23.6[a]	7.2[b]	10.2	7.5
Mean	1.4 (1)	0.42[a] (0)	0.13[c] (0)	0.17 (0.0)	0.13 (0.0)
Physiotherapist					
Contact (%)	89.5	75.3[a]	40.8[c]	11.2[b]	7.5
Mean	2.0 (1)	4.17[a] (4)	2.01[c] (0)	0.62[b] (0.0)	0.42 (0.0)
Physical therapist[d]					
Contact (%)	2.9	3.0	3.6	1.4	4.2
Mean	0.1 (0)	0.1 (0)	0.14 (0)	0.12 (0.0)	0.22 (0.0)
Manual therapist					
Contact (%)	20.9	15.3[a]	7.6[c]	2.8[b]	3.7
Mean	0.52 (0)	0.67[a] (0)	0.25[c] (0)	0.11[b] (0.0)	0.08 (0.0)
Medical specialist					
Contact (%)	5.4	3.0	3.6	4.2	4.2
Hospitalisation (%)	0.0	0.0	0.5	0.5	0.0
Company doctor					
Contact (%)	6.3	10.7[a]	9.0[c]	3.7[b]	5.1
Mean	0.09(0)	0.17 (0)	0.14 (0)	0.06[b] (0.0)	0.08 (0.0)
Alternative practitioner					
Contact (%)	4.6	3.3[a]	1.4	3.3	3.3
Medicines prescribed by a doctor					
Yes (%)	41.5	21.4[a]	10.4[c]	8.8	11.7
Cost	€5.73 (0)	€3.42[a] (0)	€1.19[c] (0)	€2.67 (0.0)	€2.20 (0.0)

Table A.1 (*Continued*)

	Baseline $n = 242$	6 weeks $n = 234$	12 weeks $n = 223$	26 weeks $n = 217$	52 weeks $n = 214$
Not prescribed medicines					
Yes (%)	49.0	30.8[a]	23.5[c]	20.5	23.4
Cost	€1.63 (0)	€0.77[a] (0)	€0.46 (0)	€0.24 (0.0)	€0.78 (0.0)

[a] Significant difference with baseline.
[b] Significant difference with 12 weeks.
[c] Significant difference with 6 weeks.
[d] Physical therapist contains Cesar or Mensendieck therapist.

Table A.2
The health care utilisation in 6 weeks of the control group (median)

	Baseline $n = 241$	6 weeks $n = 234$	12 weeks $n = 223$	26 weeks $n = 220$	52 weeks $n = 213$
GP					
Contact (%)	94.6	25.7[a]	14.5[b]	11.5	5.6[c]
Mean	1.6 (1.0)	0.45[a] (0.0)	0.32[b] (0.0)	0.27 (0.0)	0.085 (0.0)
Physiotherapist					
Contact (%)	86.3	80.7	48.2[b]	16.1[d]	8.0[c]
Mean	2.1 (2.0)	5.43[a] (5.5)	2.74[b] (0.0)	0.90[d] (0.0)	0.56 (0.0)
Physical therapist[e]					
Contact (%)	2.1	3.1	0.5[b]	1.4	4.2[c]
Mean	0.058 (0.0)	0.16 (0.0)	0.09 (0.0)	0.07 (0.0)	0.19 (0.0)
Manual therapist					
Contact (%)	12.4	9.2[a]	6.3[b]	1.8[d]	4.2
Mean	0.27 (0.0)	0.41[a] (0.0)	0.18[b] (0.0)	0.07[d] (0.0)	0.073 (0.0)
Medical specialist					
Contact (%)	4.1	3.3	3.6	6.9	4.2
Hospitalisation (%)	0.0	0.0	0.5	0.0	0.5
Company doctor					
Contact (%)	7.1	8.8	5.4	4.1	2.3
Mean	0.12 (0)	0.15 (0.0)	0.11 (0.0)	0.05 (0)	0.03 (0.0)
Alternative practitioner					
Contact (%)	7.5	7.1	6.3	5.0	5.6
Medicines prescribed by a doctor					
Yes (%)	37.8	20.8[a]	10.8[b]	8.7	9.9
Cost	€5.29 (0.0)	€2.31[a] (0.0)	€1.90 (0.0)	€1.87 (0)	€2.19 (0)
Not prescribed medicines					
Yes (%)	49.0	38.5[a]	22.1[b]	18.3	20.3
Cost	€1.88 (0.0)	€1.16 (0.0)	€0.79 (0.0)	€0.61 (0)	€0.59 (0)

[a] Significant difference with baseline.
[b] Significant difference with 6 weeks.
[c] Significant difference with 26 weeks.
[d] Significant difference with 12 weeks.
[e] Physical therapist contains a Cesar or Mensendieck therapist.

Appendix B

Table B.1
The costs per unit for health care utilisation (Level 2002)

General practitioner (one visit)	€18,37
Company doctor (one visit)	€18,37
Medical specialist (one visit)	€45,22
Physiotherapist (one visit)	€20,10
Physical therapist (one visit)	€19,70
Manual therapist	€30,80
1 day in hospital	€261,23
Alpha help per hour	€9,44
Physiotherapist per hour	€26,42

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