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ORIGINAL RESEARCH

The Effect of a New Payment System on Physiotherapeutic Management of Patients With Low Back Pain in Primary Care

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Abstract

Objective: To evaluate differences regarding the number of treatment sessions, costs, and outcomes (including relapses) between a regular payment-per-session system and the recently introduced product payment system.

Design: Prospective cohort study.

Setting: Dutch physical therapy practices in primary care over a 2-year period.

Participants: 16,103 patients with low back pain (LBP).

Intervention: The new product payment system is compared with the regular payment-per-session system.

Main Outcome Measures: Pain, disability, recovery, number of physical therapy sessions, therapy duration, costs (per episode), and LBP relapse.

Results: At baseline, we found greater pain and disability scores associated with an increased risk profile in both payment systems. With regard to the payment systems, we found greater costs (€283.8 vs €210.8) and a greater percentage of relapse (4.5% vs 2.8%) for the product payment system compared with the payment-per-session system. Comparing the 2 payment systems within each risk strata, we found no significant differences, except for a decrease in pain in the medium-risk stratum. Concerning the therapy characteristics, we found that in the payment-per-session group, the therapy took 6 days longer for low-risk patients (median 27 vs 21 days) and 7 days shorter for high-risk patients (median 42 vs 49 days) compared with the product payment group. Moreover, the mean number of sessions in the payment-per-session group was greater for low-risk patients (5.4 vs 4.8 sessions) and lower for high-risk patients (7.7 vs 8.1 sessions) compared with the payment-per-session group. Finally, the costs were significantly greater in all strata of the product payment group compared with the payment-per-session group.

Conclusions: The 2 payment systems are largely comparable regarding patient outcomes, therapy duration, and treatment sessions. Both the average cost per patient per LBP episode and the number of relapses in the product payment system are statistically significantly greater than in the payment-per-session system.

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Low back pain (LBP) is one of the most frequently occurring reasons for visiting a primary care physical therapist in the Netherlands.[1,2] The recent *Lancet* series encourages better management of LBP, as managing LBP remains a challenge, often with suboptimal treatment results.[3,4] One explanation for these suboptimal treatment results might be that despite the heterogeneity in this group of patients, a "one-size-fits-all" approach still prevails.[5-8] Another explanation is that health care reimbursements of LBP treatment do not always align with best evidence.[9]

In the Netherlands, all citizens are obliged to have health care insurance consisting of a mandatory basic insurance and an optional complementary health care insurance.[10] Physical therapy

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for LBP currently is financed per session by the complementary health care insurance. Discussion is ongoing regarding whether payment per session influences the number of treatment sessions given, because more sessions generate more income for the physical therapist. In an effort to prevent supposed unnecessary services, we can see that in the last decade the Dutch health care insurance companies limit the number of sessions that they reimburse.

In 2019, a pilot started in which physical therapists are paid per LBP episode of any duration. This new system, called "product payment," is based on a classification of LBP patients into 3 strata, each with a different tariff. In the pilot, physical therapists have to report on the patient-reported outcomes (on a practice-level) to ensure the effectiveness of the treatment. The classification of these strata is based on a combination of the STarT Back Tool (SBT)[11,12] and the physical therapist's prediction of patient's prognosis. Patients are classified as being at low, medium, or high risk for persistent disability. In the Netherlands, a recent study found that most patients (86.2%), despite their SBT risk profile, receive a medium-risk treatment approach,[8] whereas low-risk patients often are overtreated (86.3%), and high-risk patients are undertreated (93.7%).[6] These findings show that there is room for improvement in the management of patients with LBP.

One of the aims of the product payment system is to remove the financial incentive to overtreat patients with LBP, as the therapy sessions are not reimbursed separately. In addition, physical therapists have more room for innovative care (e-health, telemonitoring) and group fitness training because, in contrast to the payment-per-session system, the product payment system does not limit care to face-to-face by a physical therapist. Group fitness training or pain explanation might be given by other health care professionals. The health care insurance company does not restrict nor direct the content of the therapy. It also aims to increase the focus on relapse prevention: when patients relapse within 6 or 12 months (depending on SBT strata), they are entitled to additional physical therapy care without additional costs. Not all Dutch health care insurance companies use this new system. Nevertheless, from a health care insurance perspective, there is increased interest in the effectiveness and patient experiences regarding this system, which may affect the willingness to upscale it. Since the COVID-19 pandemic, the payment-per-session system reimburses physical therapy but also when provided by phone or though e-health. Group fitness training is only covered at a lower tariff per session (depending on the number of patients in the group), for a maximum duration and only when following a strict protocol.

In this study, we aim to evaluate the differences between the payment-per-session system and the new product payment system regarding the number of treatment sessions, costs, and outcomes for patients with LBP in primary care physical therapy. We investigate these differences per SBT stratum in both payment systems. Finally, we evaluate the difference between patients' risk profiles and the strata used for payment.

List of abbreviations:

LBP	**low back pain**
MIC	**minimal important change**
NPRS	**Numeric Pain Rating**
QBPDS	**Quebec Back Pain Disability Scale**
SBT	**STarT Back Tool**

Methods

Design

We undertook a prospective cohort study. The study was approved by the medical ethics committee of the Erasmus University, Rotterdam, the Netherlands (medical ethics committee 2020-0760), and it was reported in line with the Strengthening the Reporting of Observational Studies in Epidemiology statement for observational studies.

Setting

We collected the data for this study within Zorg1, a health care organization consisting of 130 participating physical therapy practices. Zorg1 initiated the new product payment system in collaboration with most health care insurance companies. A physical therapy practice can join Zorg1 when they hold an average of 7 or more sessions per patient with LBP. After joining Zorg1, the physiotherapist collects data systematically but is still paid through the payment-per-session system for the first 6 months. Thereafter, the practice is paid through the product payment system for all patients from the participating insurance companies. As not all insurance companies use this system, we were able to collect and compare data on both payment systems. Data were collected from all Zorg1-affiliated practices that used Intramed as the software for their electronic patient files.

Physical therapists are expected to provide guideline-recommended care and continue until patients' goals are met.[13] In a recent qualitative study, we found that the adherence is overall better than what the interviewed physical therapists expected themselves.[14]

Measurements

Baseline

At baseline (T0), patients filled out a questionnaire consisting of demographic variables (ie, age and sex), the SBT,[12] their average pain in the past week using the 11-point Numeric Pain Rating Scale (NPRS)[15] ranging from 0 (no pain) to 10 (worst imaginable pain), and their level of disability using the Quebec Back Pain Disability Scale (QBPDS),[16] ranging from 0 (no disability) to 100 (worst disability). The QBPDS measures 20 activities of daily living affected by LBP, each measured using a 5-point Likert scale (0=no effort, 5=not able to).

Follow-up

At the end of the treatment, patients were asked to complete a repeated questionnaire to evaluate the symptoms using the NPRS for pain and the QBPDS for disability. To assess recovery, we used the general perceived effect scale ("To what degree have you improved since filling out the baseline questionnaire?").[17] The answer options range from 1="fully recovered" to 7="worse than ever" on a 7-point Likert scale. In the analysis, we categorized the answers in 3 groups: improved (scores 1 and 2), the same (scores 3, 4, and 5), and worsened (scores 6 and 7).

Physical therapists

The physical therapists were not blinded to the results of the questionnaires and provided care as they deemed fit. Within the

product payment system, physical therapists could also provide care through e-health, by phone, or in exercise groups.

Participants

We included patients with LBP between January 1, 2020, and December 31, 2021. As the information on the type of LBP is embedded in the diagnostic code, patients with specific LBP (after surgery, a fracture or a systemic disease, or with a lumbar radiculopathy) and patients <18 years of age were excluded. We only analyzed data on patients with completed SBT.

Costs

In the Netherlands, the costs per physical therapy session differ based on the type of session and the insurance company. The average cost for patients with LBP is €33.90. This cost is multiplied by the total number of sessions. For the product payment system, costs differ per health care insurance company. The average cost was €172.62 for low-risk, €307.00 for medium-risk, and €550.13 for high-risk patients.

Statistical analysis

If a patient revisited the physical therapist within 6 months (after initial onset), we marked it as a relapse. We added the number of sessions to treat the relapse to the initial number of sessions. If the time between original consult and relapse was longer than 6 months, we reported it as 2 separate episodes. No data were available on whether the patients visited another physical therapy practice. The data over the last 6 months were only used to determine the relapse.

First, we performed a descriptive analysis, comparing patients with and without a completed SBT. We performed a descriptive analysis per payment system and per risk strata on the following data: (1) sex, age, pain, and disability at baseline and (2) pain, disability, and recovery at follow-up. In addition, we reported the therapy duration, number of sessions, relapse, and costs. We used these minimal important change (MIC) values to determine whether the between-group differences were clinically relevant. The MIC is 2 points for pain using the NPRS and 20 points for disability using the QBPDS.[18,19]

Second, we compared the differences between the 2 payment systems (overall and per risk strata) using an independent sample *t* test. We employed the Mann−Whitney *U* test when data were not normally distributed. For dichotomous variables, we used the chi-square test. The data were analyzed with the Statistical Package for the Social Sciences (SPSS) software, version 26 (IBM Corp).

Third, we performed a linear regression analysis on the outcome (NPRS and QBPDS) between the 2 payment systems. We adjusted for the baseline scores (NPRS and QBPDS), age, and sex. We checked for the assumptions of linear regression (ie, linearity, residuals normal distribution, no multicollinearity, homoscedasticity).

Fourth, we used a cross-table to identify differences between the risk profiles based on the SBT and the strata used for the product payment.

Results

Participants

We collected data from 49 practices including 425 physical therapists and 56,959 LBP episodes (figure 1). In total, 4683 episodes were excluded as the result of age younger than 18 years and the presence of a specific LBP based on the diagnosis code, and 10,263 episodes could only be used to determine the relapse (last 6 months). We found 557 (3.6%) patients with a relapse of LBP

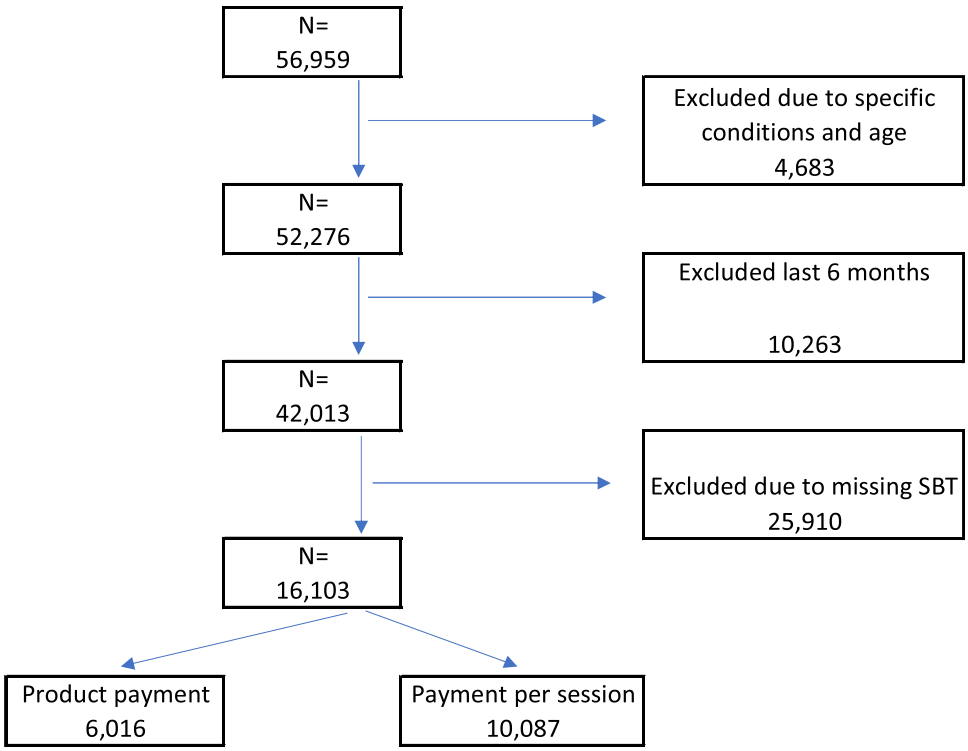

Fig 1 Flowchart. SBT, STarT Back Screening Tool.

Table 1 Comparison of missing data group

Characteristic	Valid SBT Data N = 16,103	Missing SBT Data N = 25,910
Sex (male), n (%)	7757 (48.2)	11,630 (44.9)
Mean age ± SD (y)	50.0 (17.4)	50.2 (19.0)
Baseline		
Pain: NPRS (range 0-10), mean ± SD	6.5 (1.8)	6.5 (2.0)
Disability: QBPDS (range 0-100), mean ± SD	38.2 (18.2)	38.2 (18.2)
Follow-up		
Pain: NPRS (range 0-10), mean ± SD	1.9 (2.1)	2.1 (2.2)
Disability: QBPDS (range 0-100), mean ± SD	12.2 (15.7)	12.6 (14.4)
Recovery: GPE		
Improved, n (%)	7956 (92.2)	3382 (92.2)
The same, n (%)	674 (7.8)	283 (7.7)
Worsened, n (%)	3 (0.0)	2 (0.1)
Therapy		
PT sessions, median (IQR)	5 (3-8)	4 (2-7)
Therapy duration, d, median (IQR)	30 (12-70)	28 (9-64)
Costs, €, mean ± SD	238.1 (169.2)	217.7 (204.1)
Relapse, n (%)	557 (3.5)	920 (3.6)

Abbreviations: GPE, general perceived effect; IQR, interquartile range; NPRS, Numeric Pain Rating Scale; PT, physical therapist.

within 6 months and 940 (6.2%) patients with a relapse between 6 and 24 months. After the exclusion of 25,910 episodes due to missing SBT scores, our final sample yielded 16,103 LBP episodes from 15,163 different patients (fig 1). We found no meaningful differences between the patients with and without a completed SBT when looking at patient characteristics, baseline data, and outcome data except for a much larger percentage of missing data on other questionnaires when the SBT was missing (table 1).

Differences between payment systems

Table 2 presents the findings per payment group. At baseline, we found no clear differences in pain and disability between the 2 payment systems. In the product payment group, pain decreased to an NPRS score of 1.7, somewhat lower than the NPRS score of 2.0 in the payment-per-session group. The same decrease occurred for disability (11.2 vs 13.1). Although statistically significant, these differences did not meet our thresholds for clinically relevant between-group differences. The MIC is 2 points for pain using the NPRS and 20 points for disability using the QBPDS.[18,19]

The median therapy duration was 4 days shorter in the product payment group than in the payment-per-session group, with the average cost per episode being €73 greater. The number of relapses in the payment-per-session group (n = 285 [2.8%]) was proportionally lower than in the product payment group (n = 272 [4.5%]) and was statistically significant.

Table 2 Findings per payment group

Characteristic	Product Payment Group N=6016	Payment Per Session Group N=10,087
Sex (male), n (%)	2921 (48.6)	4836 (47.9)
Mean age ± SD (y)	50.1 (16.4)	49.9 (18.0)
Baseline		
Pain: NPRS (range 0-10), mean ± SD	6.4 (1.8)	6.5 (1.8)
Disability: QBPDS (range 0-100), mean ± SD	37.5 (17.9)	38.7 (18.4)
Follow-up		
Pain: NPRS (range 0-10), mean ± SD	1.7 (2.0)	2.0 (2.2)
Disability: QBPDS (range 0-100), mean ± SD	11.2 (14.8)	13.1 (16.6)
Recovery: GPE		
Improved, n (%)	3799 (92.7)	4157 (91.7)
The same, n (%)	297 (7.2)	377 (8.3)
Worsened, n (%)	2 (0.0)	1 (0.0)
Therapy		
PT sessions, median (IQR)	5 (3-7)	5 (3-8)
Therapy duration in days, median (IQR)	28 (14-62)	32 (11-77)
Costs, €, mean ± SD	283.8 (106.1)	210.8 (192.3)
Relapse, n (%)	272 (4.5)	285 (2.8)

Abbreviations: GPE, general perceived effect; IQR, interquartile range; PT, physical therapist.

Table 3 Findings per risk profile

	Product Payment Group			Payment Per Session Group		
	N=6016			N=10,087		
SBT Risk Profile	Low	Medium	High	Low	Medium	High
n (%)	2548 (42.4)	2910 (48.4)	558 (9.3)	4715 (46.7)	4267 (42.3)	1105 (11.0)
Male, n (%)	1369 (53.7)	1328 (45.6)	224 (40.1)	2520 (53.4)	1911 (44.8)	405 (36.7)
Mean age ± SD (y)	47.6 (16.4)	51.8 (16.2)	52.2 (16.2)	47.8 (18.3)	51.6 (17.5)	52.6 (17.7)
Baseline						
Pain: NPRS (range 0-10), mean ± SD	5.9 (1.9)	6.7 (1.6)	7.5 (1.5)	6.0 (1.9)	6.8 (1.6)	7.6 (1.6)
Disability: QBPRD (range 0-100), mean ± SD	29.1 (15.2)	41.9 (16.8)	53.0 (16.8)	29.7 (15.6)	43.9 (16.3)	56.3 (16.9)
Follow-up						
Pain: NPRS (range 0-10), mean ± SD	1.3 (1.6)	1.8 (2.0)	2.8 (2.4)	1.5 (1.8)	2.3 (2.2)	3.5 (2.7)
Decrease on pain: NPRS, mean ± SD	4.6 (2.3)	4.9 (2.4)	4.6 (2.5)	4.5 (2.4)	4.5 (2.5)	4.0 (2.8)
Disability: QBPRD (range 0-100), mean ± SD	6.7 (11.3)	13.1 (15.1)	23.3 (19.0)	7.8 (11.9)	16.1 (17.5)	27.2 (21.6)
Decrease on disability: QBPDS, mean ± SD	23.0 (17.1)	29.8 (19.1)	29.1 (21.0)	23.6 (17.7)	28.7 (19.8)	29.8 (22.1)
Recovery: GPE						
Improved, n (%)	1.701 (94.6)	1.828 (91.7)	270 (88.2)	2.080 (94.2)	1.735 (90.3)	342 (84.7)
The same, n (%)	96 (5.3)	165 (8.3)	36 (11.8)	128 (5.8)	187 (9.7)	62 (15.3)
Worsened, n (%)	2 (0.1)	0 (0.0)	0 (0.0)	1 (0.0)	0 (0.0)	0 (0.0)
Therapy						
PT sessions, median (IQR)	4 (2-6)	5 (3-8)	6 (4-11)	4 (2-7)	5 (3-9)	6 (3-10)
Therapy duration (d), median (IQR)	21 (7-49)	35 (16-65)	49 (21-102.3)	27 (7-67)	35 (14-83)	42 (14-94.5)
Costs, €, mean ± SD	213.1 (73.9)	305.8 (53.1)	492.5 (113.6)	182.3 (171.8)	229.4 (198.1)	260.5 (230.3)
Relapse, n (%)	120 (4.9)	112 (4.0)	31 (5.8)	119 (2.6)	122 (2.9)	39 (3.6)

Abbreviations: GPE, general perceived effect; IQR, interquartile range; PT, physical therapist.

When comparing the baseline data per SBT risk profile, we found, as expected, greater pain and disability scores with an increase in the risk profile in both payment systems. The follow-up data revealed that patients in all 3 risk profiles improved, but not to the same extent (table 3). Except for a decrease in pain in the medium-risk stratum ($P<.001$), we found no significant difference per risk strata between the 2 payment systems. The average decrease in pain (NPRS) and activity limitations (QBPDS) across all strata were clinically relevant, as the (within-group) change was more than the MIC.

Concerning the therapy characteristics, we found several differences between the 2 payment systems. In the payment-per-session group, the therapy took 6 days longer for low-risk patients (median 27 vs 21 days; $P<.001$) and 7 days less for high-risk patients (median 42 vs 49 days; $P=.008$) than in the product payment group. For the number of sessions for low-risk and high-risk patients in the product payment group, the median was comparable, but the mean number of sessions was greater for low-risk patients (5.4 vs 4.8, $P<.001$) and lower for high-risk patients (7.7 vs 8.1, $P=.005$) compared with the payment-per-session group. More importantly, the costs were significantly greater ($P<.001$) in all strata of the product payment group compared with the payment-per-session group. The percentage of patients with a relapse in the payment-per-session group was lower for all strata but only significant for the low-risk group.

We performed a regression analysis for the 2 payment systems and adjusted for baseline pain or disability, age, and sex. We found, for pain (NPRS) a regression coefficient of 0.138 (95% confidence interval, 0.069-0.207, $P<.001$) and for disability (QBPRD) a regression coefficient of −1.178 (95% confidence interval, − 1.742 to −0.614).

As mentioned, the physical therapist could "overrule" the SBT when their own prognostication differed from that of the SBT. Table 4 shows an overview of the number of patients along with their outcome and the risk profile as a basis for the product payment. We found that 4950 patients (82%) were financed in the stratum corresponding to the SBT, whereas 768 (13%) were financed in a greater and 298 (5%) in a lower stratum.

Discussion

Main findings

We found slightly better pain and disability outcomes in favor of the product payment system compared with the payment-per-session system. However, the statistically significant differences are not clinically relevant. In addition, costs and the number of relapses were greater in the product payment group, and the average

Table 4 Patients per risk profile

		Stratum for Product Payment		
	n	Low	Medium	High
SBT outcome	Low	1864	638	46
	Medium	179	2647	84
	High	24	95	439

duration of the therapy was somewhat longer in the payment-per-session group but at lower costs and lower relapse rates on average.

Interpretation of findings

Independent of the payment system, patients scored pain and disability on baseline proportional to each stratum. As expected, we also found that the greater the stratum, the more physical therapy treatments patients received and over a longer time. Patients in each stratum recovered, but the greater the stratum, the greater the remaining pain and disability. This was confirmed by the general perceived effect, where a larger percentage of patients in the high-risk group stated that they did not improve compared with the low-risk group. These findings also align with those in earlier studies.[11,12]

One purpose of the product payment system is to allow patients to return to their previous physical therapist without additional costs if their back pain recurs. This measure aims, among other things, to encourage physical therapists to focus on the prevention of relapse. However, we found that the percentage of relapse was greater in the product payment system compared with the payment-per-session system. This could be because patients were aware that they were entitled to additional physical therapy without additional costs in the product payment system, thus returning with milder pain than they would in the payment-per-session system. In addition, physical therapists in the product payment group were obliged to register a relapse, whereas those in the payment-per-session group were not.

In the product payment group, we analyzed the difference between the SBT findings and the physical therapist's determined strata. We found that physical therapists more often "overruled" to a greater stratum (13%) than to a lower stratum (5%). Therefore, the real costs in the product payment system are greater than the calculated average costs presented in tables 2 and 3. The product payment system therefore does not fulfill the aim of removing the financial incentive to overtreat patients in the payment-per-session system.

The data used in the analysis of both payment systems were collected from Zorg1 practices. Although it is unclear whether we can generalize the payment-per-session results to other practices in the Netherlands, we found a large overlap in a recently published report that focused on the minimal data set for patients with LBP.[20] We observed comparable baseline scores on pain and disability. The mean decreases in pain and disability on each SBT stratum also were comparable, with a difference in pain score ranging from +0.7 points for low-risk patients to no difference for high-risk patients. The difference for disability ranged from +2.5 points for low-risk patients to −2.3 points for high-risk patients. Differences also were found in the mean number of sessions: the previous mentioned study had more sessions (1.0 for low-risk patients and 1.4 for high-risk patients) compared with our study.

Findings in the context of other literature

A Dutch validation study found an SBT risk distribution of 52.8% for low-risk, 38% for medium-risk, and 9.3% for high-risk patients undergoing physical therapy.[15] We found a distribution of 45.1%, 44.6%, and 10.3% for low-, medium-, and high-risk patients, respectively, indicating a shift from low- to medium- and high-risk subgroups. The percentage of high-risk patients is still lower than in the original validation study, which presented a 15% high-risk sample, and a slightly lower percentage of patients in the low-risk category (45% vs 47%).[11]

Study strengths and limitations

Our study used a large data set, with data collected over a2-year period. Data collection was incorporated into daily practice, meaning that physical therapists did not have to use additional questionnaires, and their therapy was not altered, thus making the data a true reflection of "real- world" therapy. The downside of this type of data collection is a high amount of missing data; however, we found no indications that the missing data were selective (see table 1).

When the product payment system was introduced, the physical therapist had the option to use e-health to support conventional physical therapy, as the coverage was not limited to face-to-face consultation. One of our original subaims was to analyze the content of the therapy and whether the physical therapist used technology to support conventional physical therapy. At the beginning of the study, when the coronavirus disease 2019 pandemic started, health care insurance companies swiftly changed their policy, making it possible for all physical therapists to receive reimbursements for such technological support. Analyzing the difference in e-health use between the 2 payment systems was hence not possible, because it could not be extracted from the electronic patient file. Because of the study design, it was not possible to control for all potential confounders but no differences in baseline characteristics were apparent between the 2 groups.

Clinical and research implications

The product payment system aims to reduce physical therapists' financial incentive to overtreat patients and to encourage innovative care. We found that despite this system, patients' outcomes remained the same, whereas the average cost per patient per LBP episode increased. More focus is needed by physical therapists on reducing patients' relapses.

The investigated product payment system currently does not lead to better patient outcomes or lower costs. The findings of the original study suggested that adding targeted treatment to the patient stratification leads to better health at lower costs than at present.[21] However, the effectiveness of the SBT approach has been debated in other studies and has not been studied in a Dutch health care setting.[22-24] It should be studied in the Netherlands in a randomized controlled trial to determine whether the SBT approach also will lead to better outcome for patients with LBP in the Netherlands.

Conclusions

No differences were found between the 2 payment systems with regard to patient outcomes, therapy duration, and treatment sessions. A difference was, however, found in the costs: the average cost per patient per LBP episode and the number of relapses were statistically significantly greater in the product payment system than in the payment-per-session system. Differences per SBT stratum were as expected: greater baseline scores on pain and disability, a longer therapy duration, more treatment sessions and greater costs with a greater stratum.

Keywords

Health insurance; Low back pain; Prospective payment system; Rehabilitation; Physical therapists

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