Which factors are associated with the use of measurement instruments in patients with non-specific low back pain?

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"ONDERGETEKENDE

Marjon Brinkman

Bevestigt hierbij dat de onderhavige verhandeling mag worden geraadpleegd en vrij mag worden gefotokopieerd. Bij het citeren moet steeds de titel en de auteur van de verhandeling worden vermeld."

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ABSTRACT

Aim: To determine patient-related, therapist-related, and practice-related factors associated with the use of measurement instruments in patients with non-specific low back pain (LBP) visiting a primary care physical therapist.

Methods: An observational study on continuously, routinely reported data in NIVEL Primary Care Database in the Netherlands. Patients were eligible to participate if they met the inclusion criteria: 1) diagnosis of non-specific LBP, 2) treated within the timeframe January 2014–July 2016 and 3)> 18 years or older. The dependent variable was whether measurement instruments were used or not. The factors tested for association are divided in three levels: patient-level, therapist-level and organization-level. The patient factors were: age, gender, health insurance, duration of the complaint prior to treatment, recurrence of the complaint, number of treatment sessions, duration of the treatment episode and treatment result. The therapist factors were: age, gender and specialization. The organization factors were: number of locations and practice site. A 3-level logistic multilevel analysis was performed to determine which factors are associated with the use of measurement instruments in patients with non-specific LBP.

Results: None of the predictor variables are associated with the use of measurement instruments. Eighty-two per cent of the variation, in the use of measurement instruments, is located at patient-level, fifteen per cent is located at practice-level and four per cent is located at therapist-level. It was possible to explain one per cent of all variance.

Conclusion: Despite the fact that PROMs have the potential to improve quality of healthcare, other quality indicators, for example the number of treatment sessions or the therapist's specialization are not associated with the use of measurement instruments, and in some extent with the quality of care, in patients with LBP.

Clinical Relevance: Patient Related Outcome Measures (PROMs) guide clinicians in providing evidence-based treatment and have the potential to empower patients, support clinical decision making and drive forward quality improvement. The current quality indicators are not associated with quality of care. Therefore more insight in factors, on the therapist-, patient- and organization-level, associated with the use of PROM's is needed, to improve and enhance quality of care.

Keywords: Low Back Pain, Multilevel Analysis, Physical Therapy Specialty, Outcome Assessment (Health Care)

INTRODUCTION

Low Back Pain (LBP) is the number one cause of disability worldwide.[1] As the population is aging, it is likely that the global number of individuals with LBP will increase over the coming decades.[2] In 2015, 23% of the Dutch population visited a physical therapist at least once[3], approximately 8% of the patients visited the physical therapist for LBP. This makes, after complaints for the upper back and neck, LBP the second most seen complaint in primary care physical therapy.[4] Most LBP complaints (90%) are non-specific, which suggests that the complaints were not caused by a specific musculoskeletal pathology.[5]

Since LBP has major impact on both the individual and the society, the need for high quality of care is urgent. The model of the Institute of Medicine[6] shows that quality of care consists of several aspects, as shown in figure 1. This diversity of quality aspects represent the differences in perspectives among different stakeholders.[7] First the patient's perspective, in which effectiveness and patient-centered care are the most important aspects. Secondly, the healthcare professional's perspective, in which safety and effectiveness are the most important aspects. And third, the healthcare organization's and managers, who are most interested in cost-effective - and timely-care to the satisfaction of its patients.[8]

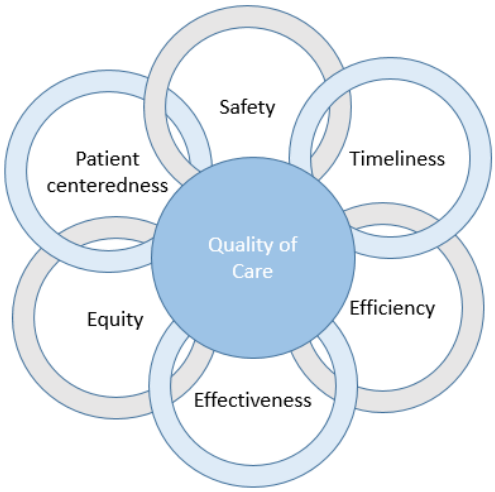

Figure 1: Model of the Institute of Medicine, explaining the different aspects of quality of care.

One tool that contains many of the quality aspects and thus addresses the different perspectives of quality of care are Patient Reported Outcome Measures (PROMs). PROMs provide patient-centered data on the impact and quality of the treatment from the patient's perspective and capture information regarding aspects of health problems that are important to the patient.[9,10] The use of PROMs is highly recommended in several clinical guidelines[11,12,13], as well in the clinical guidelines for LBP.[5]

In the Netherlands, the clinical practice guideline for physical therapy in patients with non-specific LBP, set by the Royal Dutch Society for Physical Therapy (KNGF)[5] recommends three measurement instruments specifically for diagnostic inquiry: 1) the Numeric Rating Scale for pain (NRS) for evaluation of functions and anatomic characteristics, 2) the Patient Specific Functional Scale (PSK) for evaluation of limitations in activities and participation problems and 3) the Quebec Back Pain Disability Scale (QBPDS) for evaluation of limitations in activities.[5] The NRS is a generic measurement instruments which can be used for all types of complaints.[14] The PSK includes patient priorities and evaluates complaints in a patient-specific way.[15] The QBPDS is a disease specific measurement instrument for back pain.[16]

Despite the proven usefulness of PROMs to enhance quality of care, only 48-52%[12,13] of the physical therapists use these outcome measures routinely in their practice. Several studies investigated factors associated with the use of outcome measures.[12,17,18] These studies mainly focused on factors related to the level of the healthcare provider. Main positive factors towards the use of outcome measures, mentioned by physical therapists, were: a positive attitude[12], being convinced of the advantages towards the use of outcome measures[17], familiarity with outcome measures[12] and the ability to make a comparative clinical assessment.[12] The most important barriers to the use of outcome measures are: changing routines[12]/changing behaviour[17], time investment[12,13], level of knowledge[18], practice organization [13,17,19] (e.g. no room or no financial compensation) and the unavailability and feasibility of measurement instruments.[17,19]

There is little known about the relationship between the use of measuring instruments and the characteristics of the patient or organization, even though quality of care is also of importance to these stakeholders.[20] Earlier research has shown key factors affecting professional's use of outcome measures exist at multiple levels like individual, managerial and organizational levels.[18] Several studies suggested patient-related factors could be an influence as well.[21,22,23] For example, the extent of care (number of treatment sessions per treatment episode) and gender of the patient did show a relation with outcome measures in previous research.[22] Based on clinical expertise, other factors which are suspected to be of influence on the professional's choice to use measurement instruments are the medical history of the patient, in terms of whether the complaint is a recurrence or not, and the duration of the complaint before treatment. Furthermore, the healthcare insurance the patient signed a contract for insurance of health care costs could be of influence because of contract agreements between patients, healthcare insurances and physical therapy practices. Because clinical expertise is one of the three dimensions of evidence-based practice[24] the specialization of the physical therapist could be of influence. The geographical location of a physical therapy practice may also effect the professional's use of outcome measures because of differences in education among physical therapy universities.

The aim of the current study is to investigate which factors on patient-level, therapist-level and organization-level, are associated with the use of measurement instruments in patients with non-specific low back pain (LBP) visiting a primary care physical therapist.

METHODS

Study design

This study is an observational cross sectional study on continuously, routinely reported data in the NIVEL Primary Care Database (NPCD), box 1. This longitudinal database contains data from several primary care health care providers, including physical therapists. For this study data were gathered from the NPCD in the timeframe January 2014 to July 2016.

Ethical considerations

Data was, according to the Personal Data Protection Act[25], anonymized by Thrusted Third Party (ZorgTTP), and translated into a pseudonym before it was send to NIVEL. No ethical approval was necessary since the patients received care as usual. This study was conducted in accordance to the principles of the Declaration of Helsinki, by the 64th World Medical Association (WMA) General Assembly, October 2013.[26]

Box 1: NIVEL Primary Care Database[37]

Nivel Primary Care Database:
NIVEL Primary Care Database (in Dutch: NIVEL Zorgregistraties eerste lijn) uses routinely recorded data from health care providers, recorded in their electronic health record system, to monitor health and utilisation of health services in a representative sample of the Dutch population. The aim of NPCD is to monitor developments in health and the use of primary health services in the Netherlands. Participants of the NPCD are: General Practitioners (GP), physical therapists, exercise therapists, dieticians, primary care psychologists, GP out-of-hours services and health centres.

Privacy:
NIVEL handles the data in accordance with the Dutch Data Protection Act. Researchers have no access to identifiable patient information, such as name, address or citizen service number. Research results cannot be traced back to individual persons, health care providers or health care organisations. Participating health care providers may withdraw from NPCD at any time, and without stating reasons.

Governance:
Steering committees with representatives from national associations of health care providers decide about the use of the data.

Study population

Patients

All patients older than 17 years of age, with non-specific LBP, who visited a physical therapist in the timeframe January 2014 to July 2016 were selected from the NPCD (n=2916). Non-specific LBP was operationalized by three codes according to the Dutch national classification system (DCSPH code, in Dutch: Diagnose Code Systeem Paramedische Hulpverlening), table 1.[27] Only patients who have received regular physical therapy were included.

Table 1: The three codes for non-specific low back pain according to the DCSPH classification[28]

DCSPH code	Explanation
3326	Surmenage degenerative diseases, dystrophy: muscle-, tendon, and fascia diseases to the thoracic-lumbar vertebral column
3426	Surmenage degenerative diseases, dystrophy: muscle-, tendon, and fascia diseases to the lumbar vertebral column
3526	Surmenage degenerative diseases, dystrophy: muscle-, tendon, and fascia diseases to the lumbar-sacral vertebral column

DCSPH= Dutch National Classification System (Diagnose Code Systeem Paramedische Hulpverlening in Dutch)

Therapists

In 2016, 182 physical therapists treated the 2916 included patients in this study. Since a considerable part of physical therapists' characteristics were missing in the NPCD, the national 'Data Management Register for the Healthcare Industry' (in Dutch: Algemeen GegevensBeheer register) was used supplementary to complete therapist characteristics.

Organizations

Participating in the NPCD as an organization is voluntary. The physical therapy organizations, physical therapists and patients affiliated with the NPCD are nested, meaning that the patients are bedded in the sample of therapists and the therapists are bedded in the sample of organizations. In 2016, 42 physical therapy organizations were registered in the NPCD.

The representativeness of the participating physical therapists and physical therapy organizations in the NPCD was determined by comparing the data from the NPCD in 2015, with the data from the 'Data Management Register for the Healthcare in 2016. The national distribution of male-female and the average age of the physical therapists were similar to the nationwide numbers. The average age of the physical therapists is 41, and the percentage of female physical therapists is 55%.[29] The global distribution of the physical therapy organizations was comparable to the national distribution of physical therapy organizations. In the current study the numbers can differ slightly because the study population was a sample of the data in the NPCD.

Data collection

Data were gathered from the physical therapy part of the NPCD database. These data consist of patient demographics and treatment characteristics which are registered in the regular electronic medical record of the patient and characteristics of the physical therapists and physical therapy practices included in the NPCD. Table 2 summarizes the collected data in this study at the level of the patient, the physical therapist and the physical therapy practice.

Outcome variable

The main outcome variable (dependent variable) in the current study was the use of measurement instruments (1=yes, 0=no) during a treatment episode of LBP. The 'use of measurement instruments' was operationalized by the use of one of the most common PROMS in patients with LBP (VAS, PSK, QBPDS).

Predictor variables

The predictor variables, summarized in table 2, are the independent variables which are used to determine potential association with the use of measurement instruments.

Table 2: Predictor variables per level with the operationalization per variable

Patient level	**Operationalization**
Age	A patient's age in years
Gender	The patient's gender: male / female
Recurrence	A complaint was considered a recurrence when the patient was treated for the same complaint after a complaint-free episode of at least four weeks and at most two years.
Duration of the complaint	The duration of the complaint before treatment. Subdivided in four categories: <7 days, 1 week – 1 month, 1 month – 3 months, >3 months
Number of treatment sessions	The total number of physical therapy sessions in one treatment episode with one DCSPH code.
Treatment result	The result of the treatment episode, which was filled in when closing a treatment episode. The result can be 1) goal achieved; 2) goal partially achieved; 3) goal not achieved. This information is entered by the attending physical therapist.
Health insurance	Top 4 health insurance companies in the current sample of patients.
Therapist level	
Age	A therapist's age in years
Gender	The therapist's gender: male / female
Specialization	The specialization, presented by name, of the therapist which can be one of the ten recognized physical therapy specializations, registered in the CKR. Recognized physical therapy specializations are: manual therapy, occupational health and ergonomics, geriatric physical therapy, oncology, pediatrics, orofacial therapy, pelvic therapy, sport physical therapy, psychosomatic therapy and edema therapy.[30]
Organization level	
Size of the organization	The number of locations of one organization
Geographical location	The region in which a practice is situated (North, East, South, West)

DCSPH code= Dutch national classification system (Diagnose Code Systeem Paramedische Hulpverlening in Dutch), CKR= Dutch National Quality register for physical therapists (Centraal Kwaliteits Register in Dutch)

Statistical analysis

Descriptive statistics

Descriptive characteristics were presented at patient-level, therapist-level and organization-level, table 3. Patient characteristics were presented separately for both the clinimetrically evaluated and not-clinimetrically evaluated patients. Nominal variables were tested for normality and equal variances by using QQ-plots, the Shapiro Wilk test and Levene's tests. Categorical variables were tested for equal variances by using the Pearson Chi square test.

Between-group differences were tested by unpaired students t-tests, in case of non-normally distributed data the Wilcoxon Ranksum test was used. Significance levels were set at $P<0.05$.

Identifying factors associated with the use of measurement instruments

To determine which factors are associated with the use of measurement instruments in patients with LBP, data were analyzed by means of logistic multilevel regression analysis. Logistic multilevel analyses were applied due to the nested structure of the data: the patients (level 1) are nested in the sample of therapists (level 2), and the therapists are nested in the sample of physical therapy practices (level 3).

Before starting logistic multilevel analysis, the Variance Inflation Factors (VIFs) were calculated to check for multicollinearity between predictor variables and was set at a maximum of 10.[31] Subsequently, a random intercept-only model was composed and compared with an ordinary logistic model. Next the predictor variables were added per level, starting with variables on patient level (level 1) to build a full model. The full model (including 12 variables) was compared with the null model, to confirm multilevel analysis fits best to the data.

Logistic multilevel regression, using stepwise backward elimination, were used to identify the best fitted model. The goodness of fit of the models was tested by using a chi-square likelihood ratio test (LR X^2 test), to test for Maximum Likelihood ($p<0.05$). The least significant predictor was deleted, and from this new model the likelihood ratio was used to calculate the p-value (by calculating the -2 log delta value). Cut-off value was a mean likelihood ratio (chi2) of <0.05.

For the empty model and the final model the proportion of explained variance in the outcome was assessed by calculating the Variance Partition Coefficients (VPCs) per level. The level-1 variance error term is $\pi^2/3 = 3{,}29$,[32] The level 2 and level 3 variance error terms were calculated by using the formula: $p=\frac{\tau_{00}}{\tau_{00}+\pi^2/_3}$.[32]

Missing data were assumed to be missing at random and were presented for every variable (presented in table 3). Variables with missing values more than 50% were excluded from the analyses. Data analyses were performed by using Stata, version 14.2.

RESULTS

Study population

Table 3 shows the characteristics of the included patients (n=2916), therapists (n=182) and practices (n=42). With respect to the patients, distinction is made between patients which are clinimetrically evaluated and not-clinimetrically evaluated.

Patients were labelled as clinimetrically evaluated when one of the top three measurement instruments was used at least once, this was in 46% of the cases. The top three most frequently used instruments included the PSK (used in 42% of the cases in the clinimetically evaluated group) followed by the VAS (42%) and the QBPDS (15%). In both groups there were slightly more woman than man (54%) and the mean age of the patients was 51 (SD±18) in both groups. The duration of the complaint before treatment was significant longer in the clinimetrically evaluated group (p=0.04). The duration of the treatment episode in days (mean 52, SD±66) and the mean number of treatment sessions per treatment episode (mean 7, SD±6) were not significant different between both groups (p=0.06, p=0.9).

The therapist sample consisted also of more woman than man (52%) with an overall mean age of 41 (SD±12.7). Labor, oncology, and orofacial therapy were the most common specialization among the included therapists. However these values may differ in practice, because these data were extracted from the AGB-register and must be completed by the therapists manually.

Most practices were located in the West of the Netherlands (45%). The mean number of working therapists per practice was 4 (SD±3).

Factors associated with the use of measurement tools

No multicollinearity was detected, with mean VIF of 1.57 and all VIFs were under 10. All missing values were under 50% (table 3), except for treatment result (68%) which was excluded from analyses.

Variance components in the intercept-only model

In the intercept-only model, there was no significant variation in the use of measurement instruments. The variance of the random intercept was not significant (OR 0.76, p= 0.57). However, the chi-square likelihood ratio test (LR X^2 test) comparing the ordinary logistic model to the multilevel logistic model was significant (LR X^2 =1580, p<0.01), which indicates a multilevel model was preferred. As shown in table 4, in the intercept-only model, most of the variation in the use of measurement instruments was among patients (82%); 15% of the total variation was located among practices and 4% was located among therapists.

Table 4: Explained variances per level in the intercept only model

Intercept only model		
	VPC	% of Variation
Patient level	3.29	81.5
Therapist level	0.13	4.0
Practice level	0.61	15.3
Total	4,03	100%

Likelihood (LL) of the intercept only model -1219,56
VPC= Variation Partition Coefficient

Full model:

First patient characteristics (level 1 predictor variables) were added. None of these variables were significant. The LR X^2 test was significant (LR X^2=1037, p<0.0005), which indicated the multilevel model with patient characteristics was preferred over the null model. Next therapist characteristics (level 2 predictor variables) were included, and this model was significant better than the previous model with only level 1 predictor variables, (LR X^2=655, p<0.0005). However, none of the variables (therapist characteristics) were significant. Next organization characteristics (level 3 predictor variables) were added to the model. This model showed an increase in LR, but still was significant (LR 787, p<0.0005). Again none of the included variables were significant. The conclusion to these calculations is a three level model fits the data best.

Final model:

The backward regression resulted in a final model including 4 variables: duration of the complaint prior to treatment, recurrence, practical site and number of locations. As shown in table 5, none of these variables significantly attributed to the final model. The final model was compared with the intercept-only model. Despite the fact none of the variables were significant, the final model fits the data better than the intercept-only model (p<0.0001). The backward stepwise multilevel logistic regression method, which resulted in the final model is included in appendix 1.

Table 5: The final model of the multilevel logistic regressions analysis

FINAL model					
Variables:	**OR**	**Std. Err.**	**z**	**P>z**	**[95% Conf. Int.]**
Duration complaint prior to treatment	1,07	0.09	0,80	0,42	0,90 – 1,28
Recurrence	0,80	0,16	-1,11	0,27	0,54- 1,18
Practice site	0,48	0,28	-1,28	0,20	0,15- 1,48
Number of locations	1,70	1,33	0,68	0,50	0,37- 7,90

Likelihood (LL) of the final model -515.26
OR=Odds Ratio, Std. Err.= Standard Error, z= z-score, P=p-value, Conf. Int.=Confidence Interval

Explained variance in the final model

Compared to the intercept-only model, the final model explained 1% of the variance with a total Variance Partition Coefficients (VPC) of 4.07. 19% Was explained at therapist level, where the least variance was located (VPC 0.16). The variance on patient level did not change, because of the already fixed variance level-1 error term (VPC 3.29).[32] On practice level, 1.6% of the variation was explained (VPC 0.62).

Table 3: Descriptive statistics for patients, therapists and organizations

Patient characteristics	Study Population (N= 2916)	Clinimetrically evaluated (n=1328)	Non clinimetrically evaluated (n=1588)	P-value	Missing values (%)
Age, mean (SD)	51 ±17	51 ±17	51 ±18	0,57	-
Gender					-
Female	1568 54%	716 54%	852 54%	0,89	
Recurrence of complaint , n (%)					1337 46%
Yes	756 26%	359 46%	397 50%	0,06	
Duration of the complaint prior treatment, n (%)				0,04*	1028 35%
< 7 days	423 15%	217 22%	206 13%		
1 week – 1 month	709 24%	348 34%	361 23%		
1 month – 3 months	326 11%	180 18%	146 9%		
> 3 months	430 15%	246 24%	184 12%		
Duration treatment episode, mean (SD)	52 ±66	53 ±67	51 ±66	0,06	11 0%
Number of treatment sessions, mean (SD)	6,8 ±6,4	6,7 ±5,5	7 ±6,4	0,9	11 0%
Treatment result / Goal achieved, n (%)				0,008*	1974 68%
Goal not achieved	30 1%	26 5%	4 1%		
Goal partially achieved	46 2%	32 6%	14 4%		
Goal totally achieved	866 30%	523 90%	343 95%		
Health insurance, n(%)				0,06	28 1%
Concern 1	745 26%	346 26%	399 25%		
Concern 2	670 23%	294 22%	376 24%		
Concern 3	602 21%	247 19%	355 22%		
Concern 4	489 17%	242 18%	246 16%		
Measurement instrument top three**					
VAS		871 42%			
PSK		879 42%			
QBPDS		323 15%			

Therapist characteristics	Study Population (n=182)				Missing values (%)
Gender, n (%)					-
Female	94 52%				
Age, mean (SD)	41 ±13				-
Specialization, n (%)					18 10%
General physical therapy	15 8%				
Manual	6 3%				
Pediatrics	5 3%				
Sports					
Pelvic	5 3%				
Psychosomatic	1 1%				
Oncology	29 16%				
Geriatric	3 2%				
Orofacial	41 23%				
Occupational health and ergonomics	57 31%				
Edema	2 1%				
Practice characteristics	Study population (n=42)				
Organization size, mean (SD)	4 ±3				-
Practice site, n (%)					-
North	6 14%				
South	8 19%				
West	19 45%				
East	9 21%				
Number of locations, mean (SD)	1.5 ±0,9				-

%= percentage, n= number of subjects, SD= standard deviation, yrs= years, NRS= Numeric Rating Scale, PSK= Patient Specific Complaints, QBPDS= Quebec Back Pain Disability Scale. * p≤ 0.05, ** this is the frequency the measurement instrument is used in the clinimetrically evaluated group.

DISCUSSION

The objective of the current study was to determine associated factors with the use of measurement instruments in patients with non-specific LBP. In the current study, no associated factors were found. A combination of four variables in the final model, explains 1% of the variance in the use of measurement instruments. The most variation is located among patient characteristics.

Several studies previously investigated the barriers and facilitators regarding the use of measurement instruments.[33,13,12,34,9] In agreement with previous work by Swinkels et al [33] we did not indicate a relation between the use of measurement outcomes and therapists' age. One of the most obvious differences with previous studies is the factor of knowledge. Copeland et all[23] reported a strong association between the use of outcome measures and a master's degree qualification. This is in contradiction with the current study, since we found no association between specialization and the use of measurement instruments. However, the contradiction with Copeland et all could be partly explained by the differences in titles of qualification and education level between different countries. Duncan et all[18] reported that the level of knowledge is a major barrier in the use of measurement instruments. However, knowledge about using measurement outcomes in daily practice and knowledge as a form of specialization is not comparable.

Quality indicators used by policy makers, for example health insurances, like the number of treatment sessions and the duration of treatment episode were expected to be associated with the use of measurement instruments. However, these quality indicators did not show a more frequent use of measurement instruments among therapists. This could be due to the relative low average number of treatment sessions and short treatment episodes in comparison with the literature. Previous research in the Netherlands shows an average number of treatment sessions of ten. [4,21] The mean number of treatment sessions in the current study is 7. The average duration of a treatment episode for a not-chronic disease is 63 days, in the current study the average duration is 55. Based on clinical expertise of the authors, there is a possibility therapists will be triggered to evaluate their intervention by the use of measurement instruments when the number of treatment sessions or the duration of the treatment episode increases to higher than the average numbers. In the current study this was not the case.

The health insurance showed no association with the use of measurement instruments. In the current study only the contractual agreements between patient and health insurance could be included. However, contractual agreements between health insurances and physiotherapy practices could be a major predictor since the use of measurement instruments is a part of the contractual requirements from health insurances to physical therapy practices.[35] The use of measurement instruments is one of the requirements set by health insurances to obtain a higher quality status as physical therapy practice.[35]

The geographical location of the practice and the number of locations did not show any association with the use of measurement instruments. It may be that the subdivision in geographic location was not adequate. Perhaps a subdivision in countryside and city side is more evident than the current subdivision in north, east, south and west.

Strengths and limitations of this study

Previous research on this topic reveals other factors associated with the use of measurement instruments than the factors included in the current study. However, the strength of this study are the included predictor variables based on the dimensions of the IOM model[7], which is unique in this type of research. For future research it would be interesting to examine other possible related factors with the use of measurement instruments, for example the contractual agreements between physical therapy practices and health insurances, and the quality-status of the physical therapy practices.

A limitation of the current study is the way of selecting patients and dividing the patients in two groups. This could have resulted in selection bias. Patients with non-specific LBP were selected from the NPCD by using three DCSPH-codes[28]. Since we were only able to use variables from the electronic medical record we were unable to verify if the patient was truly suffering from non-specific LBP. LBP is a very broad and unspecified complaint, however, there is no evidence the use of measurement instruments is related to the type of complaint. Therefore it is expected, this limitation has no effect on the conclusion of the research.

The patients were subdivided by using the three most frequently used measurement instruments. This means, when a therapist used a measurement instrument which not belonged to the top three, or the therapist did not register the measurement instrument in the personal medical record but just added it in the treatment journal itself, the patient was labelled as not-clinimetrically evaluated. This may have caused a blend of groups. Since most variation was located on patient-level, for future research it is recommended to be more accurate in the subdivision of the patient-groups.

Implications for future research

As described in the IOM model, in addition to the therapist's perspective, factors from the patient's perspective and policymakers' perspective are important for quality of care as well.[20] Since, outcome measures have the potential to improve and measure quality of care[36], research on associated factors, based on the different perspectives, is urgent to enhance and improve quality of care. For the patient's perspective, effectiveness and patient-centered care are the most important aspects of quality of care.[8] The effectiveness of the treatment should be investigated in future research and should aim to include treatment results and whether treatment goals are achieved. Due to the fact there were many missing values, this variable could not be included in this current study.

From the healthcare organization's perspective, the most important domains are cost-effective and timely-care.[8] In the NPCD, no distinction has been made between practices which meet the quality system requirements and general practices. In future research it would be interesting to see if there is a difference between these two types of practices, because health insurances set different requirements in the use of measurement instruments for these different types of practices.[35]

CONCLUSION

In conclusion, this study shows there is no association between any of the included predictor variables and the use of measurement instruments in patients with non-specific LBP. Despite the fact PROMs have the potential to measure and improve quality of healthcare, other quality indicators, for example a lower amount of treatment sessions or specialized education, does not correlate with the use of measurement instruments. For future research it would be interesting to examine whether there is a difference between practices which meet the quality system requirements, and practices which do not meet the requirements. And to examine whether contractual agreements between health insurances and physical therapy organizations are associated with the use of measurement instruments and in a certain way to quality of care.

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Appendix 1

Backwards stepwise logistic multilevel regression analysis of predictors of clinimetric-evaluation in patients with non- specific low back pain

	Model 1 (null) OR (95% CI)	Model 2 (full) OR (95% CI)	Model 2a OR (95% CI)	Model 2b OR (95% CI)	Model 2c OR (95% CI)
Variables included	0	12	11	10	9
Least significant variable (p value)		Therapist age (0,82)	Duration treatment episode (0,70)	Number treatment sessions (0,80)	Health Insurance (0,69)
Intercept	0,76 (0,29 - 1,96)	8,38 (0,03 – 2094)	8.38 (0,03-2094)	8,25 (0,03-2054)	8,24 (0,03-2055)
Log likelihood	-1220	-504,41	-504,44	-504,51	-504,65
Delta LL			0,03	0,07	0,14
P value Likelihood ratio χ^2			0,82	0,70	0,60
Patient level					
Gender					
Age					
Recurrence of complaint					
Duration of the complaint prior treatment					
Number of treatment sessions				1,00 (0,98-1,03)	
Duration treatment episode			0,999 (0,995-1,00)		
Health Insurance					1,02 (0,94-1,10)
Therapist level					
Gender					
Age		1,00 (0,96-1,05)			
Specialization					
Practice level					
Number of locations					
Practice site					

	Model 2d OR (95% CI)	Model 2e OR (95% CI)	Model 2f OR (95% CI)	Model 2g OR (95% CI)	Model 2h OR (95% CI)
Variables included	8	7	6	5	4
Least significant variable (p value)	Patient age (0.60)	Gender therapist (0.59)	Gender patient (0.61)	Specialization (0.58)	
Intercept	8.82 (0.04-2205)	10,55 (0.04-2536)	8,32 (0.04-1875)	9.65 (0.04-2100)	
Log likelihood	-504.73	-504.88	-505,03	-505.16	-515.26
Delta LL	0.08	0.15	0.15	0.13	10.11
P value Likelihood ratio χ^2	0.68	0.59	0.59	0.61	0.01*
Patient level					
Gender			1.10 (0.76-1.59)		
Age	1.00 (0.99-1.01)				
Recurrence of complaint					
Duration of the complaint prior treatment					
Number of treatment sessions					
Duration treatment episode					
Health Insurance					
Therapist level					
Gender		0.74 (0.26-2.15)			
Age					
Specialization				0.96 (0.82-1.12)	
Practice level					
Number of locations					
Practice site					

** p≤0.05, delta = difference LL (log likelihood previous model – new model), X^2= chi-square likelihood ratio, OR= Odds Ratio, CI=Confidence Interval*

SAMENVATTING

*Doelstelling: O*nderzoeken van mogelijk geassocieerde factoren met het gebruik van meetinstrumenten in de fysiotherapeutische behandeling van patiënten met aspecifieke lage rugklachten.

Methode: Er is een observationele studie uitgevoerd, gebaseerd op continue verzamelde data van NIVEL Zorgregistraties. Een logistische multilevel analyse is uitgevoerd om de mogelijk geassocieerde factoren te kunnen bepalen. De analytische sample bevatte 2916 patiënten, genest in de sample van 182 fysiotherapeuten, genest in de sample van 42 fysiotherapiepraktijken. Patiënten moesten aan de volgende inclusiecriteria voldoen: 1) diagnose van aspecifieke lage rugklachten, gebaseerd op de DCSPH-code, 2) de behandelepisode is gestart en geëindigd in de periode januari 2014-julie 2016, 3) 18 jaar of ouder. Patiënten werden geëxcludeerd wanneer hun behandeling kon worden toegeschreven aan een fysiotherapeutische specialisatie. De factoren die meegenomen zijn in de analyse zijn: leeftijd en geslacht van patiënt en fysiotherapeut, duur van de klacht voorafgaand aan behandeling, recidief, aantal fysiotherapiebehandelingen, duur van de behandelepisode, behandelresultaat, specialisatie van de therapeut, aantal vestigingen van de fysiotherapie praktijk en de locatie van de praktijk.

Resultaten: 82% van de variatie, in het gebruik van meetinstrumenten, is gelokaliseerd op patiënt niveau, 15% is gelokaliseerd op praktijk niveau en 4% is gelokaliseerd op therapeut niveau. Van de totale variantie is 1% verklaard. Uit de resultaten blijkt dat geen van de factoren geassocieerd is met het gebruik van meetinstrumenten.

Conclusie: De resultaten van deze studie laten zien dat het gebruik van meetinstrumenten bij patiënten met aspecifieke lage rugklachten, niet verklaard kan worden met de geïncludeerde variabelen. Ondanks dat meetinstrumenten (PROMs) de kwaliteit van zorg kunnen verbeteren, zijn andere kwaliteitsindicatoren, zoals behandelomvang en specialisatie van de therapeut, niet voorspellend voor het gebruik van meetinstrumenten en in zekere mate kwaliteit van zorg.

Klinische relevantie: Om de kwaliteit van de gezondheidszorg hoog te houden en te verbeteren wordt het gebruik van meetinstrumenten door verschillende belanghebbenden aangemoedigd. Echter hebben verschillende belanghebbenden zoals zorgverzekeraars, beleidsmakers en kwaliteitsorganisaties allen een andere definitie van kwaliteit van zorg. Ondanks dat is bewezen dat meetinstrumenten kwaliteit van zorg kunnen verbeteren, gebruikt slechts 50% van de fysiotherapeuten meetinstrumenten. Het is daarom belangrijk om te achterhalen welke factoren geassocieerd zijn met het meetinstrumentengebruik.