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ORIGINAL ARTICLE

Assessing discrepancies in outcomes of pain rehabilitation: “these questionnaires don’t measure results that are relevant to me”

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ABSTRACT

Background: Pain rehabilitation programs are recommended interventions for patients with chronic pain. Average effect sizes are moderate. Physiatrists, based on clinical experience, argue that the present outcome measures underestimate the outcome of pain rehabilitation programs.

Objective: (1) To explore discrepancies and relationships in outcomes of pain rehabilitation. (2) To explore causes of discrepancies from the perspective of patients.

Method: A mixed-method, prospective cohort study of patients who participated in pain rehabilitation programs. Outcome measures: Canadian Occupational Performance Measure, Pain Disability Index, a discharge assessment by the physiatrist. Differences and relations were tested. Semi-structured interviews about patients’ explanations for discrepancy were performed via telephone.

Results: Outcomes of 45/80 patients (56%) were discrepant. When discrepant, effect sizes of the Canadian Occupational Performance Measure and the Pain Disability Index were substantially lower, but the physiatrist-rated outcomes did not differ between discrepant and non-discrepant patients. Common patient-reported explanations for discrepancy were improvement of coping skills and irrelevant (items of) questionnaires.

Conclusion: Discrepancies occurred often. When discrepant, physiatrist-rated outcome reflects a more positive outcome compared to the other outcome measures. The results of the interviews suggest that the present outcome measures may not fully capture life domains that are relevant for patients, and may thus underestimate meaningful outcomes.

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outcome measures

► IMPLICATIONS FOR REHABILITATION

- Present standardized outcome measures may not fully capture and may underestimate meaningful outcomes of pain rehabilitation.
- Outcome measures of pain rehabilitation programs should include a meaningful patient-centered measure.
- Development of a patient-centered instrument to capture meaningful outcomes of pain rehabilitation is needed.

Introduction

Chronic musculoskeletal pain is associated with disability, a reduced quality of life and a reduction of participation in daily life [1]. Interdisciplinary pain rehabilitation programs (IPRP), based on the biopsychosocial model, are recommended as a treatment for selected cases of chronic musculoskeletal pain because they effectively improve physical activities, participation and general well-being [2–4]. The overarching goal of this program is to optimize functioning in daily life despite the pain. The patients determine their specific, individual goals within this overarching goal. The average effect sizes of functional outcomes of IPRP, however, are small to moderate (range 0.21–2.38) [3,5,6]. Outcomes of IPRP can be assessed with questionnaires and clinician rated [1,7]. Questionnaires are often reliable, responsive and valid self-reported outcomes.

Among the validated outcome measures of IPRP are the Canadian Occupational Performance Measure (COPM) and the Pain Disability Index (PDI) [8,9]. The COPM is a structured

interview-based instrument to identify individual treatment goals and satisfaction with execution of activities. When reassessed at discharge, it also provides a patient-specific outcome measure [10–12]. The PDI is a widely used, short, (7-item) specific instrument for measuring and evaluating self-reported disability associated with pain [1,13]. While standardized and thus comparable between patients, items in questionnaires, such as the PDI, may not always be relevant because of patient heterogeneity. Differences between COPM and PDI change scores are reflected in a weak to moderate correlation ($r = -0.380$), indicating that different but somewhat related constructs are measured [9].

Based on the clinical experience of physiatrists, it is hypothesized that the PDI underestimates meaningful outcomes of IPRP [14,15]. Explanations for underestimation of the results of the PDI may be that outcome measures are probably incomplete in terms of patient’s perspective and preferences [14–17, Reneman et al., accepted] questionnaires may be difficult to interpret [14]

and older patients and patients with a lower level of education might have difficulties with a right interpretation of the questions [18,19]. Because the COPM is a semi-structured interview-based instrument, it was hypothesized that it captures more relevant outcomes of IPRP compared to the PDI. A more open discharge-assessment by the physiatrist will probably reveal even more relevant items for outcomes of IPRP in addition to the present self-report outcome measures [20]. On the other hand, a response bias toward socially desirable answers is more likely to occur in interviews compared to self-reported questionnaires [21].

In the Netherlands, the PDI is recommended as main outcome measure by clinicians and health insurances [22]. For patients, the PDI is used as a feedback instrument about functioning before and after IPRP. In research the PDI is often used as an outcome measure. If, however, the outcome by the PDI is an underestimation of 'true' effects, the treatment results may probably be interpreted as suboptimal. It is conceivable that a combination of standardized outcome measures and a supplementary clinical assessment is desirable for a comprehensive interpretation of the results of IPRP. The purpose of our study was to explore discrepancies in outcomes of IPRP according to the COPM and the PDI on the one hand, and the assessment by the physiatrist on the other hand. The second aim was to explore causes of discrepancies from the patient's perspective.

Materials and methods

Study design

A mixed-method study was conducted: a prospective cohort study among a 1-year consecutive sample of patients who participated in IPRP, and a semi-structured interview among participants with discrepant outcomes. COPM and PDI are regularly assessed at baseline and at discharge. Next to these outcome measures, a clinical assessment with a physiatrist or resident is part of the regular discharge procedure.

Data was derived from the care as usual during baseline and discharge. All patients signed informed consent for the use of care as usual data for scientific purposes. Additionally, patients signed informed consent for the interview. A waiver was granted by the medical ethics committee (M15.168205), which means that with the Dutch system formal ethical approval for this study was not needed.

Patients

All patients following the outpatient pain rehabilitation program in the University Medical Center Groningen, The Netherlands, from May 2015 to August 2016 were eligible for inclusion in this study. Inclusion criteria for the program: chronic musculoskeletal pain longer than 6 weeks, age older than 18 years, and patient's agreement to participate in the multidisciplinary outpatient pain rehabilitation program. Exclusion criteria for the program: comorbidity with negative consequences for physical and/or mental functioning, ongoing treatment elsewhere for chronic musculoskeletal pain. Additional exclusion criteria for the study: COPM not completed at baseline or at discharge, results of the pain rehabilitation program not correctly reported by the physiatrist. The length of the program is 12 weeks. In exceptional circumstances the physiatrist and patient can decide to shorten or extend the duration.

Outcome measures

Three outcome measures were used: COPM, PDI and the clinical assessment performed by the rehabilitation physiatrist.

The Dutch COPM is used by the occupational therapist to identify patients' five most important patient-reported problems in self-care, productivity and leisure. The COPM was assessed by a 30–45 min semi-structured interview at baseline and discharge. The patient rates the performance and satisfaction with performance in each problem area, identified by the patient, using a Likert scale from 1 (not able to do/not satisfied at all) to 10 (able to do extremely well/extremely satisfied). An average score, between 0 and 10, is provided for two scales: performance (COPM-p) and satisfaction (COPM-s). At discharge, patients are blinded and therapists are not blinded for baseline scores. An increase of two points or more is considered clinically relevant [9,23,24]. Test-retest reliability and validity of the COPM performance and COPM satisfaction level are good (COPM performance: intraclass correlation coefficient 0.63; COPM satisfaction: intraclass correlation coefficient 0.84) [9,24,25].

The Dutch PDI measures self-reported disability in seven activities: family/home responsibilities, recreation, social activity, occupation, sexual behavior, self-care and life-support activities. The answers can vary from 0 to 10, anchored as no disability and maximum disability [8] (Tait et al., 1990). The test-retest reliability is good (intraclass correlation coefficient 0.76) [26]. In patients with chronic back pain, the minimal clinically important change is 8.5–9.5 points [13]. A decrease of nine points or more was considered as clinically relevant.

The standardized question, asked verbally by the physiatrist was: are you satisfied with reaching your previously stated goals? The answer was documented by the physiatrist at a 7-point Likert scale (0: fully satisfied; 1: very satisfied, 2: somewhat satisfied, 3: approximately equal satisfaction and dissatisfaction, 4: somewhat dissatisfied, 5: very dissatisfied, 6: extremely dissatisfied). The physiatrist assessment scores 0, 1 and 2 were interpreted as positive satisfaction with the pain rehabilitation program, the scores 3 to 6 were interpreted as neutral or negative satisfaction. Reliability and validity of the physician assessment is unknown.

Interview

Semi-structured interviews of approximately 15 min were performed by a researcher who was not involved in patient care. All patients with discrepant outcomes were interviewed if permission was granted. A discrepancy was defined as an improvement according to at least one of the currently used outcome measures (COPM performance, COPM satisfaction, PDI), but not according to the physiatrist, or vice versa. The interview consisted of three main semi-structured questions (Box 1), aimed at explaining the cause of the discrepancy, the patient's opinion of the applicability of the COPM, PDI and the discharge assessment by the physiatrist, and the applicability of each item of the PDI. Patients were also given the opportunity to share their ideas for improvement of the outcome measures of the pain rehabilitation program. The sample size of the qualitative study was determined by saturation. Saturation was assumed when results of two successive interviews did not reveal new themes. A pilot interview in patients without discrepancy was performed to verify if there were no discrepancies.

Box 1. The semi-structured interview

1.a. What is your own explanation for the discrepancy found?
 1.b. Is one of the given explanations a possible cause of the discrepancy?

- good relationship between patient and doctor
- (items of) outcome measure not relevant
- questions were difficult to score
- fluctuation of complaints

2. Which outcome measure was the most relevant one for your situation? The COPM or the PDI?

3. About the PDI: how relevant was each item according to your situation? (family/home responsibilities, recreation, social activity, occupation, sexual behavior, self-care, life-support activities).

4. Do you have other comments about the outcome measures or IPRP in general?

COPM: Canadian Occupational Performance Measure; PDI: Pain Disability Index; IPRP: Interdisciplinary pain rehabilitation programs.

Analyses

Operational definition of improvement, i.e. score discharge minus score baseline, was based on the minimal clinically important change: COPM increase of two points or more [23]; PDI decrease of nine points or more [13]; discharge assessment 0, 1 or 2 points. Missing values on the PDI were handled according to imputation on basis of item mean. Imputation was used when one value was missing. With more values missing, the case was excluded.

Distributions of all variables were assessed for normality. An independent t-test or Chi-square test was used for independent samples with a normal distribution. For ordinal variables, the Mann-Whitney-U test was used. A paired t-test was used for dependent samples with a normal distribution. A p values of $p < .05$ was considered statistical significant. Effect sizes within groups were calculated using Cohen's d . Interpretation of effect sizes: 0.20–0.49 small; 0.50–0.79 medium; >0.80 large effect [27]. Nonparametric tests, Pearson correlation (normal distribution), and Spearman correlation (non-normal distribution) were used in analyses of correlations. Correlations were interpreted as weak (r 0.10–0.29), moderate (r 0.30–0.49), or strong (r 0.50–1.0) [27]. All statistical analysis were performed using IBM SPSS Statistics 23.

Results**Study sample**

Out of the 166 patients who participated in the pain rehabilitation program, 80 patients were enrolled in the study. Reasons for exclusion or non-inclusion: $n=65$ because the PDI at discharge was not completed; $n=9$ because the PDI was not completed at baseline; $n=8$ because the PDI was not completed at baseline and discharge; $n=4$ because two or more PDI items were missing. Age, gender and level of education of the 86 excluded patients were not statistically different from the characteristics of the included patients.

Discrepancies

In 45 out of the 80 patients (56%) there was a discrepancy between COPM and PDI on the one hand, and the physiatrist rating on the other hand. Patient characteristics gender, age, pain at baseline, and level of education were not statistically different between patients with or without discrepancy (gender $p=.35$, age $p=.13$, pain at baseline $p=.44$, level of education $p=.45$) (Table 1). Pain at

discharge was significantly different ($p=.02$) for the group with discrepancy compared to the group without discrepancy.

Results of the outcome measures

Figure 1 presents the discrepancies between outcome measures in both directions. PDI was more often discrepant with the physiatrist than COPM (Figure 1 and Table 2). Results of the outcome measures are provided in Table 1. Effect sizes of COPM performance, COPM satisfaction and PDI were substantially lower in the group with discrepancy compared to the group without discrepancy. The baseline COPM performance and baseline PDI indicated lower disability in the discrepancy group. According to the physiatrist, 77 out of 80 patients were satisfied about reaching their previously stated goals. Table 3 shows the effect sizes of the PDI items for both groups. They were all significantly different between the groups ($p < .01$).

Correlations

Table 4 represents the correlations between PDI change scores and COPM performance/COPM satisfaction change scores. Correlations were weak in the discrepancy group, compared to weak to moderate correlations in the group without discrepancy.

Interviews

Saturation was reached after 22 interviews. New explanations for discrepancy were classified into existing categories if they contained somewhat related items. An overview of the categories of patient-reported explanations for discrepancies is given in Box 2. Patient statements about the cause of discrepancy were variable. The category 'improvement of coping skills' included better acceptance of disabilities or limitations, more relaxation, and improved management of rest and activities during the day. The irrelevant items of the PDI most often mentioned were sexual behavior, self-care, and life-support activities. In 20 of these cases, the physiatrist outcome about satisfaction at discharge was very positive. In two cases the COPM and PDI outlined a more positive result compared to the physiatrist outcome. Fluctuation of complaints and irrelevance of an item of the PDI were their explanations for discrepancy. In an additional analysis of patients with no discrepancy, all patients (9 out of 35 patients) confirmed by interview that there was no discrepancy.

Discussion and conclusions

Discrepancies in outcomes of the pain rehabilitation program occurred often. When it occurred, physiatrist-rated outcome reflects a more positive outcome compared to the COPM and PDI. Patients' statements about discrepancy included themes as coping skills and irrelevance of (items of) the outcome measures.

Our findings are in line with others who also found discrepancy in outcome measures of IPRP [14,15]. Various explanations for discrepancy in this study have to be mentioned. Multiple factors, like female sex, older age, and a positive patient-therapist/physiatrist relation, are reported to influence the level of satisfaction and treatment outcome [14,28,29]. Plausibly, according to the results of our study, these factors are not the cause for discrepancy. During IPRP, therapists are using the ability approach to coach patients, while the standardized evaluations apply a disability orientation. These approaches are discordant and may explain part of the discrepancy. The COPM has a more positive approach to functioning and is individualized, so it was hypothesized that the COPM was completely relevant to evaluate the results of the

Table 1. Descriptive statistics of study sample: COPM, PDI and physiatrist ($n = 80$).

	Discrepancy $n = 45$	No discrepancy $n = 35$
Gender (female, %)	29 (64)	26 (74)
Age (mean (SD))	43 (12.4)	40 (12.4)
Pain intensity baseline (mean (SD)) (NRS, 0–10)	6.2 (1.3) ^a	5.8 (1.5) ^b
Pain intensity discharge (mean (SD)) (NRS, 0–10)	5.5 (1.7) ^c	3.8 (1.2) ^d
Educational level	$n = 38$	$n = 33$
% low ^e	21	12
% intermediate ^f	42	52
% high ^g	37	36
COPM performance		
Baseline (mean (SD)) (0–10)	5.0 (1.3)	4.0 (1.2)
Discharge (mean (SD)) (0–10)	6.5 (1.2)	7.3 (1.2)
Difference (ES (95% CI))	1.2 (0.8–1.7)	2.8 (2.1–3.4)
MCIC reached (% (n yes))	40 (18)	97 (34)
COPM satisfaction		
Baseline (mean (SD)) (0–10)	4.1 (1.3)	3.3 (1.2)
Discharge (mean (SD)) (0–10)	6.4 (1.2)	7.2 (1.4)
Difference (ES (95% CI))	1.8 (1.4–2.3)	3.0 (2.3–3.7)
MCIC reached (% (n yes))	55 (25)	97 (34)
PDI		
Baseline (mean (SD)) (0–70)	35.4 (12.2)	42.3 (11.5)
Discharge (mean (SD)) (0–70)	30.8 (13.7)	18.7 (10.2)
Difference (ES (95% CI))	−0.4 (−0.8–0.1)	−2.2 (−2.8–1.6)
MCIC reached (% (n yes))	31 (14)	97 (34)
Physiatrist		
Satisfaction (median, IQR) (0–6)	1.0 (1–2)	1.0 (1–1)
Positive result (% (n))	96 (43)	97 (34)

NRS: Numeric rating scale; SD: standard deviation; COPM: Canadian Occupational Performance Measure; PDI: Pain Disability Index; ES: effect size; MCIC: minimal clinically important change; IQR: interquartile range.

^a $n = 26$.

^b $n = 15$.

^c $n = 14$.

^d $n = 10$.

^eNo education, primary school, lower vocational education.

^fLower level secondary school, intermediate vocational education.

^gPre-university education and up, including university.

Figure 1. Discrepancies between COPM, PDI, and physiatrist-rated outcome ($n = 45$). COPM: Canadian Occupational Performance Measure; PDI: Pain Disability Index.**Table 2.** Distribution of the possible combinations of discrepancy ($n = 45$).

Outcome measure	Percentage discrepant to the physiatrist (%)
COPM performance	11
COPM satisfaction	7
PDI	27
COPM performance + COPM satisfaction	9
COPM performance + PDI	13
COPM satisfaction + PDI	7
COPM performance + COPM satisfaction + PDI	27

COPM: Canadian Occupational Performance Measure; PDI: Pain Disability Index.

program. However, the results of this study reveal that there is also discrepancy between the physiatrist-rated outcome and the COPM scales. An explanation for this may be the response shift phenomenon. First, by the treatment itself patients can redefine their goals, change their expectations about disability relief, and

the internal standards of measurement can change during the program [14,30,31]. Reassessing the COPM during the pain rehabilitation program may capture these changes. Second, changes in internal standards may lead to satisfied patients with more disability than expected. The psychological part of the program focusses on acceptance and coping and patients mentioned during the interviews that improvement of coping skills and acceptance of disability influenced their satisfaction level in a positive direction while functioning, one of the main domains, was not significantly improved. Psychological items are very relevant in measuring health and satisfaction, next to the functional, PDI- and COPM-like, items [15,17]. In contrast, PDI items as sexual behavior, self-care and life-support activities were often described as irrelevant by patients. High disability scores on one or more items that are highly relevant for patients may be underestimated in the total score if other items are irrelevant. This may have caused discrepancy between the PDI and the physiatrist. Overall,

Table 3. Pre- and posttest data of the PDI items.

PDI item	Discrepancy <i>n</i> = 45	Discrepancy <i>n</i> = 45	ES	No discrepancy <i>n</i> = 35	No discrepancy <i>n</i> = 35	ES
	Pre-test Mean (SD)	Post-test Mean (SD)		Pre-test Mean (SD)	Post-test Mean (SD)	
Family/ home responsibilities	5.6 (2.2)	4.8 (2.2)	−0.4	6.8 (2.0)	3.3 (2.0)	−1.8
Recreation	6.5 (1.9)	5.2 (2.0)	−0.7	7.4 (2.2)	3.6 (2.1)	−1.8
Social activity	5.5 (2.6)	5.0 (2.4)	−0.2	6.4 (2.4)	2.7 (1.9)	−1.7
Occupation	6.7 (2.0)	5.4 (2.3)	−0.6	7.3 (2.2)	3.6 (2.0)	−1.8
Sexual behavior	5.1 (2.8)	4.0 (2.8)	−0.4	5.9 (2.9)	2.7 (2.5)	−1.2
Self-care	2.9 (2.4)	3.1 (2.9)	0.1	4.5 (2.7)	1.1 (1.2)	−1.6
Life-support activities	3.2 (2.5)	3.2 (2.8)	0.0	3.9 (2.8)	1.7 (2.2)	−0.9

PDI: Pain Disability Index; ES: effect size; SD: standard deviation.

Table 4. Correlations between COPM and PDI change scores.

	Total group <i>n</i> = 80	Discrepancy group <i>n</i> = 45	No discrepancy <i>n</i> = 35
COPM performance – PDI (<i>r</i> , (<i>p</i>))	−0.57 (<0.001)	−0.17 (0.255)	−0.45 (0.006)
COPM satisfaction – PDI (<i>r_s</i> , (<i>p</i>))	−0.52 (<0.001)	−0.21 (0.176)	−0.21 (0.236)

r: Pearson correlation coefficient; *r_s*: Spearman correlation coefficient; COPM: Canadian Occupational Performance Measure; PDI: Pain Disability Index.

concentrating on what is important for patients at baseline and during the pain rehabilitation program may provide a more accurate picture of relevant treatment effects [15,32,33] and this can further explain or resolve the discrepancy partially.

A prominent finding of our study was the difference between patients with discrepant and non-discrepant outcomes. Our findings suggest that discrepant patients might constitute a (large) subgroup with specific characteristics. Their pain intensity reduced less than in the no-discrepancy group. Because in both groups the pain intensity maintained at a substantial level, it is assumed that the influence of this fact is small. The baseline COPM performance and baseline PDI indicated lower disability in the discrepancy group. This group exceeded the minimal clinically important change less often. Although no consented definition is present, in clinical practice these people are referred to as 'persisters', i.e. patients with overuse and no avoidance [34]. As 'persisters' tend to continue to persist in their activities, but with high levels of pain and distress, and low quality of life, their self-reported disability may be lower compared to the self-reported disability of 'avoiders'. In this subgroup, the pain rehabilitation program focusses on developing self-management strategies to deal with the pain and its consequences. Successful outcomes of IPRP may not necessarily mean that these patients are able to perform more activities, and will therefore not lead to lower disability scores. It is more likely that these patients are more satisfied in terms of coping or self-efficacy and that this is their primary goal of IPRP. Consequently, in this subgroup, effects measured by COPM and PDI may be low, yet patients are satisfied. As a result, the present outcome measures underestimate meaningful effects in this subgroup.

Strength of the study is that we performed the first study that compared different outcome measures of IPRP to the post-treatment effect measured by the physiatrist. We have captured some relevant explanations for discrepancy. The relevance of measuring results in a more positive, personalized way adds to findings of others, who have also found discrepancy [14,15]. Other studies focused on relevant domains for life satisfaction, but they did not explore it in terms of outcome measures of IPRP [1,17,35]. Implications for further studies are to investigate relevant individually meaningful aspects of IPRP and satisfaction by using patients' perspectives. The second step is to integrate them to develop a positive focused standardized, yet personalized, meaningful outcome measure [15,17,36].

Box 2. Categories of patient statements about the cause of discrepancy (*n* = 22).

Delay between discharge COPM/PDI and discharge assessment
Explanation to others improved
Fluctuation of complaints
Improvement of coping skills
Incorrect observation by physiatrist
Influence of relationship with physiatrist
Irrelevant outcome measure (COPM, PDI or both)
Item PDI irrelevant
Scoring was difficult

COPM: Canadian Occupational Performance Measure; PDI: Pain Disability Index.

There are some limitations in the present study. Our sample size was acceptable but limited due to missing data of the PDI. Eighty out of 166 patients were enrolled in the study. Data collection was difficult due to a very low response rate on the PDI at discharge. This could have caused a bias towards a positive result of the pain rehabilitation program because satisfied patients can be more willing to complete an outcome measure after discharge compared to dissatisfied patients. The PDI at discharge had to be completed at the computer at home after the pain rehabilitation program. With this low response rate, in the second half of the data collection period, the occupational therapist asked the patient to complete the PDI at the same moment that the COPM was completed. This may have caused a result bias due to different moments, varying from on average four weeks prior to and approximately two weeks after the physiatrist assessment, of completing the PDI. The second limitation is that one of the inclusion criteria was the duration of chronic pain for more than 6 weeks, however pain is often defined as chronic when it persists for at least 12 weeks. While it was not systematically assessed in this study, this sample is similar to other Dutch pain rehabilitation samples [37], which means that the mean pain duration in this study far exceeded these thresholds. Furthermore, the physiatrist asked the patient about satisfaction in general and reported on a 7-point Likert scale. More specific questioning about specific functioning in daily life may better correspond to other outcome measures. Further research to study relevant items of satisfaction and probably also the teams' opinion is desirable. The fourth

limitation is that the assessment by the physiatrist was performed approximately four weeks after discharge from the pain rehabilitation program. A difference in outcome due to fluctuation of patient's complaints, mood changes or further improvement in functioning could have led to different outcomes of the pain rehabilitation program. However, because of the very positive effects measured by physiatrist it is likely that this is not the only explanation. Another limitation of the study is that due to the small sample size subgroup analysis could not be performed for different diagnosis or locations of pain.

Conclusion

Discrepancy between outcomes of the pain rehabilitation program is commonly observed between all the outcome measures. Different means to assess disability and satisfaction reveal to be related, but different in several ways. Interviews suggest that presently used outcome measures may not fully capture relevant outcome domains. Reliance on one type of outcome measure may not comprehensively capture meaningful outcomes of IPRP. We, therefore, suggest further research that should focus on development of an outcome measure that reveals relevant pain rehabilitation goals so that the Dutch key indicator of IPRP can be adapted. As relevance differs between individuals and over time, this measure should allow for personalization to be truly valid. Consequently, patients' opinions should be involved in the developmental process.

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Notes on contributors

All authors were involved in the study design, discussed the results, commented on the manuscript and gave final approval of the version to be submitted for publication.

Disclosure statement

The authors report no declarations of interest.

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