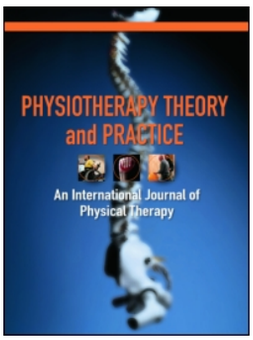

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How do physiotherapists understand and interpret the "Pain Attitudes and Beliefs Scale"? A cognitive interview study

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ABSTRACT

Background: The Pain Attitudes and Beliefs Scale (PABS) for physiotherapists aims to differentiate between clinicians' biomedical and biopsychosocial treatment orientations regarding nonspecific low back pain (LBP). *Objective*: To study the content validity of the Norwegian PABS by following international guidelines: exploring its relevance, comprehensibility and comprehensiveness. *Methods*: Cognitive interviews were performed using the Three-Step Test Interview, consisting of think-aloud techniques, retrospective probing and in-depth interviews. Eleven Norwegian physiotherapists with a diversity of professional backgrounds participated. *Results*: The participants encountered little difficulty in completing the PABS. All items were deemed relevant and important but five items had ambiguous formulations which can easily be handled. The biomedical subscale appeared to be a comprehensive representation of biomedical treatment orientation. The biopsychosocial subscale was found to lack items concerning cognitive behavioral aspects of LBP management, such as patient education, therapeutic alliance, shared decision making and graded exposure. *Conclusions*: This study provides empirical evidence that the Norwegian version of the PABS-PT is relevant and comprehensible, provided some minor adjustments. The biopsychosocial subscale, however, lacks comprehensiveness, as it is not able to capture important aspects of contemporary biopsychosocial best practice care. Measurement of biopsychosocial treatment orientation may therefore be incomplete.

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Pain Attitudes and Beliefs Scale; attitudes of health care professionals; low back pain; content validity; cognitive interview

Introduction

Low back pain (LBP) is a very common cause of pain-related disability worldwide, constituting a major management challenge for health care providers, including physiotherapists (Hartvigsen et al., 2018; Sanders, Foster, Bishop, and Ong, 2013). Over the past two decades, the traditional biomedical view on LBP as a purely patho-anatomical disorder has been greatly challenged (O'Sullivan, 2012; Waddell, 2004). Nonspecific LBP, especially when persistent, is now understood as a complex of symptoms that should be considered within a multidimensional bio-psychosocial framework. Evidence suggests that psychological and social factors are associated with persistent pain and disability and furthermore may act as prognostic indicators of poor outcome (Buchbinder et al., 2018; Foster and Delitto, 2011; Main, Foster, and Buchbinder, 2010). Clinical practice guidelines encourage a management approach that is both patient-centered and patient-informed, addressing psychosocial factors and focusing on increasing or maintaining activity and self-management (Bekkering et al., 2003; Koes et al., 2010; Oliveira et al., 2018; Savigny, Watson, and Underwood, 2009). However, adopting a more "psychologically informed" perspective on LBP management may present a challenge for physiotherapists (Main and George, 2011). Data suggests that a significant number of physiotherapists continue to work in an established biomedical practice pattern, characterized by advising their patients to restrict activity, be careful with their backs and reinforcing beliefs in a structural cause of back pain (Ali and Thomson, 2009; Burnett et al., 2009; Cowell et al., 2018; Daykin and Richardson, 2004; Gardner et al., 2017; Oostendorp et al., 2015; Pincus et al., 2007; Poitras, Durand, Cote, and Tousignant, 2012; Sanders, Foster, Bishop, and Ong, 2013; Swinkels et al., 2005; Synnott et al., 2015).

Available literature suggests that the attitudes, beliefs and preferences of clinicians are associated with their

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clinical treatment behavior and may serve as obstacles for the delivery of optimal care of patients with LBP (Domenech et al., 2011; Main, Foster, and Buchbinder, 2010; Pincus, Vogel, and Santos, 2012; Werner et al., 2008). Furthermore, there is strong evidence that the pain beliefs and illness perceptions of patients with LBP are associated with the beliefs and attitudes of the clinicians whom they have consulted (Darlow et al., 2012; Linton, Vlaeyen, and Ostelo, 2002; Vlaeyen and Linton, 2006), with a profound influence on patients' outcome (Main, Foster, and Buchbinder, 2010).

To gain knowledge on clinician-related factors impeding delivery of optimal care for patients with LBP and improve the implementation of clinical guidelines, a valid and reliable instrument is needed to map physiotherapists' pain beliefs about and attitudes toward persistent LBP (Foster et al., 2003; Pincus, Vogel, and Santos, 2012). The Pain Attitudes and Beliefs Scale for Physical Therapists (PABS-PT) is a widely used self-report questionnaire designed to differentiate between clinicians' biomedical and biopsychosocial treatment orientations (Houben et al., 2005a; Ostelo et al., 2003). The scale has been used in a number of cross-sectional and interventional studies to measure and evaluate the back-pain beliefs and treatment approaches of physiotherapists, medical doctors and chiropractors (Beneciuk and George, 2015; Bishop, Foster, Thomas, and Hay, 2008; Fullen et al., 2011; Hendrick et al., 2013; Innes, Werth, Tuchin, and Graham, 2015; Jellema et al., 2005; Overmeer, Boersma, Denison, and Linton, 2011; Simmonds, Derghazarian, and Vlaeyen, 2012; Sit, Yip, Chan, and Wong, 2015; Watson, Bowey, Purcell-Jones, and Gales, 2008). The original Dutch version consists of 19 items, however, both shorter and longer versions have been produced after cross-cultural validation into at least 7 languages (Duncan, 2017). A systematic review concluded that evidence on the measurement properties of the PABS-PT, although promising, was lacking and required further investigation of content validity, interpretability and reliability (Mutsaers et al., 2012). Aiming for further improvement, the Norwegian version was recently subjected to Rasch modeling, resulting in an improved version with two strictly unidimensional subscales and invariant item ordering, each holding seven items (Eland, Kvale, Ostelo, and Strand, 2016).

The adequacy of an instrument is strongly determined by its validity, that is, the extent to which it accurately measures what it intends to measure (de Vet, Terwee, Mokkink, and Knol, 2011). Content validity is considered to be the most important measurement property of an outcome measure and refers to "the degree to which the content of an instrument is an adequate reflection of the construct to be measured" (Mokkink et al., 2010). It deals with the relevance, comprehensiveness, and comprehensibility of an instrument with respect to its construct, target population, and context of use (Brod, Tesler, and Christensen, 2009; Patrick et al., 2011a, 2011b). The US Food and Drug Administration (FDA) (2009) and the Consensus-based Standards for the Selection of Health Measurement Instruments (COSMIN) initiative recommend considering content validity first, when evaluating measurement properties (Prinsen et al., 2016). Lack of content validity influences all other measurement properties: the presence of irrelevant items may lead to decreased internal consistency, unidimensionality and interpretability of the instrument, while the absence of important concepts may reduce responsiveness (Terwee et al., 2018b). Conversely, a high Cronbach's alpha is no guarantee that the construct of interest is being measured or that no important concepts are missing. A high test–retest reliability or responsiveness does not imply that all items are relevant (Terwee et al., 2018b).

Although the PABS has been subjected to psychometric scrutiny, there are no reports on how physiotherapists understand, interpret and respond to the items when filling in the PABS. In line with the newly revised COSMIN checklist regarding content validity, focusing on the relevance, comprehensibility and comprehensiveness of items (Terwee et al., 2018b), we explored, in a qualitative study, the content validity of the Norwegian version of the PABS for measuring the attitudes and treatment orientations of physiotherapists.

Methods

Design

We performed individual cognitive interviews of physiotherapists using the Three-Step Test-Interview (TSTI) method (Hak, Van der Veer, and Ommundsen, 2006). When preparing the study, we followed the checklist approach of the Cognitive Interviewing Reporting Framework (CIRF) (Boeije and Willis, 2013) and the COSMIN standard for evaluating the quality of content validity studies of PROMs (Terwee et al., 2018a). The study was approved by the Norwegian Center for Research Data (approval 60623).

Pain Attitudes and Beliefs Scale for physiotherapists

The PABS-PT consists of two subscales and aims to distinguish between a biomedical and a biopsychosocial treatment orientation regarding LBP management (Houben et al., 2005b; Ostelo et al., 2003). Each subscale in the Norwegian version contains 7

items. Responders indicate on a 6-point Likert scale (1 = totally disagree, 6 = totally agree) their endorsement of each item, thus generating scores ranging from 7 to 42 points. Higher scores on a subscale indicate a stronger biomedical or biopsychosocial treatment orientation. The conceptual model of the PABS incorporates the influence of clinicians' attitudes, cognitions and back pain beliefs on their treatment behavior (Darlow et al., 2012; Gardner et al., 2017). The developers described a biomedical treatment orientation as based upon the notion that pain and disability are the consequence of physical pathology or tissue damage. Diagnosis of the pathology provides the basis for treatment, likely resulting in a pain contingent treatment approach, adapting the treatment to the pain level of the patient. A biopsychosocial treatment orientation was described as the notion that pain may also be influenced by psychological and social factors, resulting in a time-contingent treatment approach, emphasizing graded activity according to a previously defined timeframe (Ostelo et al., 2003).

The construct validity and applicability of the PABS-PT is subject to ongoing discussion (Chiarotto et al., 2018; Duncan, 2017; Eland et al., 2019; Eland, Kvale, Ostelo, and Strand, 2016, 2017; Laekeman, Sitter, and Basler, 2008; Watson, Bowey, Purcell-Jones, and Gales, 2008). Recent testing suggested that the PABS-PT in its original form has limited discriminative ability because of limited spread of scores among physiotherapists (Eland et al., 2019). This has been hypothesized to be the consequence of a tendency for responders to give socially desirable answers when they are asked for their explicit attitudes toward LBP or of an imprecisely defined conceptual framework of biomedical and biopsychosocial treatment orientation (Eland et al., 2019).

Sampling and participants

A purposive sample of 11 Norwegian speaking physiotherapists with variation in professional characteristics, age and gender and an interest in LBP management was invited. General physiotherapists, manual therapists, specialist physiotherapists and psychomotor physiotherapists were recruited based on accessibility. Eight physiotherapists were working in primary care physiotherapy clinics, one was working in secondary orthopedic health care and two others were working as respectively a lecturer and a researcher in physiotherapy science. Personal enquiry and snowball sampling were used to recruit participants from a middle-sized university city in Norway. The participants received verbal and written information on the purpose of the study and procedure for the interview. Written informed consent was obtained prior to the commencement of each interview. The participants were given a small gift, valued up to € 40, as a gratitude for participation.

Procedure

The interviews were conducted at the participants' workplace or at the University of Bergen by two interviewers (LHM and NE) between September 2018 and April 2019. Both interviewers have long clinical experience as physiotherapists, LHM is currently senior researcher with extensive experience in qualitative research methods. NE is working as a manual therapist in private practice and as a PhD candidate. Complete interviews were audio-recorded and supplemented with field notes. A pilot interview was conducted at the study's start to test the setting, the TSTI procedure and the interview guide. Seven to ten interviews are considered sufficient to confirm participants' comprehensibility of an item, dependent on the complexity of the questionnaire and the characteristics of the target population (Terwee et al., 2018b; Willis, 2005). We stopped further data collection when no new themes emerged regarding content validity (Boeije and Willis, 2013). Before stopping, we also considered the variation in participants' subscale scores, as a larger variation possibly reflects a more satisfactory diversity in opinions and perspectives.

The Three-Step Test Interview (TSTI)

The Three-Step Test Interview (TSTI) combines observational and interviewing techniques to identify how items are interpreted and whether problems occur during the completion of the questionnaire (Hak, van der Veer, and Jansen, 2008; Paap, Lange, van der Palen, and Bode, 2016). The TSTI encompasses three consecutive steps: first, a concurrent thinking aloud phase; second, a retrospective probing phase; and third, a semi-structured interview. The method has successfully been used before in this field (Pool et al., 2010). During the thinking aloud phase, the participants complete the questionnaire and verbalize their thoughts while doing so. The interviewer does not comment or help, but observes and listens attentively, while taking notes (Bode and Jansen, 2013). In the second, retrospective probing phase, the participants are interviewed regarding their response behavior (Boeije and Willis, 2013): the interviewer uses spontaneous probes to get insight into incomplete observations from phase 1, such as *"I saw you hesitate and frown, but what did you actually think when you filled out that question?"*. In phase three, the semi-structured interview, the participants are invited to

explain their earlier comments and to share their opinions about the questionnaire. In this phase, the participants are probed for the comprehensiveness of the questionnaire.

Data collection

After being instructed on the think-aloud method, the participants completed the 14-item Norwegian version of the PABS-PT, followed by debriefing and a semi-structured interview. An interview guide was produced and, if necessary, modified when new themes emerged after an interview. The interview guide for the semi-structured interview contained open questions about the participant's understanding of the instructions and response options, the intended meaning, comprehensibility and relevance of each item and general questions about the instrument as a whole, including any possible missing conceptual content. We validated throughout the interview by checking our understanding of the participants' comments. At the end of each interview, the co-moderator gave a comprehensive summary of the interview, on which the participant was invited to comment and react. The complete interview guide is provided as supplemental material (Appendix).

Analysis

The interviews were audio-recorded, transcribed verbatim and analyzed by hand using thematic analysis as described by Willis and Artino (2013). First, participants' statements and comments were arranged in a cognitive interview summary table (Patrick et al., 2011a), per item across the three steps of the interview by the first author. Comments made in step three concerning the scale's comprehensiveness were analyzed separately. Next, comments on and interpretations of items were labeled and subsequently categorized per item by the first author. The labels were then analyzed and described. Labels and identified themes were reviewed by a second reviewer (LHM) with reference to the source transcripts, and the joint version was discussed in the whole group of researchers. When unclear, comments and interpretations were illustrated with examples of participant quotes. Analyses and interpretations were done in Norwegian. Summaries of findings and quotations were translated into English, making efforts to retain the original meaning in the Norwegian language. The PABS subscales were considered to fulfill the criteria for sufficient content validity when at least 85% of their items were relevant for the construct, present no important comprehensibility problems and refer to the construct of interest (Terwee et al., 2018b).

Results

The Three-Step Test- Interview proved to be a useful technique. Five themes emerged regarding the relevance and comprehensibility of the individual items, and three themes emerged regarding the comprehensiveness of the scale.

The Three-Step Test Interview

The purposive sample encompassed 11 physiotherapists (6 female and 5 male) consisting of 5 general PTs, 2 manual therapists, 2 psychomotor PTs and 2 specialist PTs. Two participants had a PhD degree and two had a master's degree. Ages ranged from 24 to 70 years (median 48 years). Clinical experience ranged from one year since graduation until one year before retirement. The cognitive interviews lasted from 32 to 65 minutes (median 44), moreover, the questionnaire took 5 to 20 minutes (median 11) to complete in the think-aloud phase. Often, participants first ticked a response option, followed by explaining their response, rather than reasoning out a response decision. For that reason, the second step of the TSTI (i.e. retrospective probing on the participant's response behavior) was unnecessary in many cases. The median biomedical score was 19 points (IQR = 13–24, minimum 11, maximum 27 (theoretical scoring range 7 to 42)); the median biopsychosocial score was 35 points (IQR = 30–36, minimum 23, maximum 39 (theoretical scoring range 7 to 42)). Five participants corrected one or two of their earlier responses after reflection in the third phase of the interview. The response options in the biomedical subscale appeared to be skewed toward the participants' disagreement, except for item 2. Response options in the biopsychosocial subscale were skewed toward agreement, except for item 9 (Table 1).

Relevance and comprehensibility of the individual items

The participants commented on the comprehensibility of five biomedical and six biopsychosocial items. They reported that four items (biomedical items 1, 4, 7 and biopsychosocial item 14) had to be re-read more than one time before its meaning could be grasped. We identified five categories concerning the relevance and comprehensibility of the individual items: (1) Difficult or unclear formulations; (2) Items containing problematic words or phrases; (3) Items missing a frame of reference; (4) Participant both agreeing and disagreeing; and (5) Items not interpreted as intended. Table 2 summarizes the number of participants' comments in each category

Table 1. Distribution of response options among participants B to L for all 14 items of the Pain -Attitudes and Beliefs Scale for physiotherapists.

Item #	Totally disagree	Largely disagree	Disagree to some extent	Agree to some extent	Largely agree	Totally agree
Biomedical subscale						
1. Reduction of daily physical exertion is a significant factor in treating back pain	B,C,L	G,I	E,F,H	D,J	K	
2. Pain is a nociceptive stimulus, indicating tissue damage		D,G	E,IJ,L	B,C,F,H	K	
3. Patients with back pain should preferably practice only pain free movements	D,F	B,G,IL	C,E	J	H,K	
4. If therapy does not result in a reduction in back pain, there is a high risk of severe restrictions in the long term	B,F,L	D	E,K	C,G,J	H,I	
5. Pain reduction is a precondition for the restoration of normal functioning	F,G,L	B,H	D,E,J,K	C	I	
6. If patients complain of pain during exercise, I worry that damage is being caused	B,D,F,G,L	C,E,H,J	I,K			
7. The severity of tissue damage determines the level of pain	D,F,G	C,E,H,K,L	B	I		J
Biopsychosocial subscale						
8. A patient suffering from severe back pain will benefit from physical exercise		K	L	J	C,D,F,G,H,I	B,E
9. Functional limitations associated with back pain are the result of psychosocial factors	L		B,D,G,J,K	C,H	E,F,I	
10. Therapy may have been successful even if pain remains				B,H,I,K	C,E,J	D,F,G,L
11. If ADL activities cause more back pain, this is not dangerous		L		I,K	C,D,E,G,H,J	B,F
12. Even if the pain has worsened, the intensity of the next treatment can be increased				I,J,K	C,E,G	B,D,F,H,L
13. Learning to cope with stress promotes recovery from back pain				B,J,L,K	E,G,H,I	C,D,F
14. Exercises that may be back straining should not be avoided during the treatment			C,K	I	D,E,J,L	B,F,G,H

Table 2. Overview of problems encountered and commented by the participants (n = 11) when completing the Pain Attitudes and Beliefs Scale for physiotherapists.

Items		(1) Difficult or unclear formulation	(2) Containing problematic words	(3) Lacking a frame of reference	(4) Agreeing and disagreeing	(5) Not interpreted as intended
	Biomedical subscale	# of participants indicating problems				
1	Reduction of daily physical exertion is a significant factor in treating back pain			5		
2	Pain is a nociceptive stimulus, indicating tissue damage		2	2	4	6
3	Patients with back pain should preferably practice only pain free movements					2
4	If therapy does not result in a reduction in back pain, there is a high risk of severe restrictions in the long term					4
5	Pain reduction is a precondition for the restoration of normal functioning					
6	If patients complain of pain during exercise, I worry that damage is being caused					
7	The severity of tissue damage determines the level of pain		2	3		
	Biopsychosocial subscale					
8	A patient suffering from severe back pain will benefit from physical exercise	1				
9	Functional limitations associated with back pain are the result of psychosocial factors			3	3	2
10	Therapy may have been successful even if pain remains			2		
11	If ADL activities cause more back pain, this is not dangerous					1
12	Even if the pain has worsened, the intensity of the next treatment can be increased					
13	Learning to cope with stress promotes recovery from back pain		2			
14	Exercises that may be back straining should not be avoided during the treatment	5				

for all items. The five categories are presented in more detail below with illustrative participant quotes for some.

Theme 1: Difficult or unclear formulations

The participants reported that the items were formulated clearly, except for item 14 ('Exercises that may be back straining should not be avoided during the treatment'). Five participants had trouble responding to this item because of the double negation. Two of them had to re-read the item several times, whereas the other three participants misunderstood and changed their response from disagree to agree after reflection in phase two of the interview. One participant (L) remarked that the formulation in item 8 ('A patient suffering from severe back pain will benefit from physical exercise') is unclear in the context of nonspecific LBP:

> This is an unclear and hardly measurable statement. What is 'severe back pain'? (…) Pain is subjective for every single individual. So, I think it is somewhat imprecise.

Theme 2: Items containing problematic words or phrases

The participants' choice of response options appeared to depend on their perception of "tissue damage" in items 2 and 7. This phrase was by the majority of participants recognized as a soft tissue lesion, such as a contusion, rupture, sprain or inflammatory reaction, not necessarily in connection with LBP. Participant J said on item 7 ('The severity of tissue damage determines the level of pain'):

> I was a bit confused. If you mean a disc protrusion, I wouldn't say it is a tissue damage, I consider it a joint damage.

One participant (E) looked upon tissue damage as aberrant radiological findings in the lumbar spine. Two participants were unsure about the meaning of "coping with stress" in item 13. Others understood "coping" in connection to pain: "understanding one's pain", having one's pain explained" or "learning to live with back pain". In contrast, the word "stress" was mostly understood as having a demanding life, but also as a bodily phenomenon. Participant J:

> I quite simply image a person that is very tense in many different ways.

Theme 3: Items missing a frame of reference

The participants were indecisive when the meaning of a statement depended on contextual factors that were not mentioned in the item. They typically expressed this by saying, "it depends", meaning that they required a kind of specification.

Five participants (B, E, F, H, and L) distinguished between acute and long-lasting complaints while completing items 1, 7 and 9. Participant B said on item 9 ('Functional limitations associated with back pain are the result of psychosocial factors'):

> A premise for a consistent response is a definition of whether this concerns long-lasting or acute complaints.

Furthermore, two participants (B and J) found that items 2 ('Pain is a nociceptive stimulus, indicating tissue damage') and 10 ('Therapy may have been successful even if pain remains') only could provide valid responses when they consider long-lasting complaints.

In addition to unclarity about acute or chronic complaints, five participants (C, D, E, F, and H) pointed at a second lack of frame of reference in item 1. The necessity of a "Reduction of daily physical exertions" in treating back pain was considered to depend on what the exertion implies, as heavy physical industrial work differs from an office job. Participant E said:

> Some exertion should be reduced and avoided, but what is meant by exertion? Exertions may be negative, but when activity is meant, it's positive. Here I agree and disagree, dependent on how physical exertion is defined.

Theme 4: Participants both agreeing and disagreeing

Five participants (C, D, E, F, and H) tended to both agree and disagree when completing item 2 ('Pain is a nociceptive stimulus, indicating tissue damage'), complicating a consistent response. Participant D:

> Basically, I would say this is a correct statement, however, within the definition of non-specific LBP it is very often wrong.

Three participants (B, D, and G) changed their original response in item 9 ('Functional limitations associated with back pain are the result of psychosocial factors') from disagree to agree or vice versa after re-reading and reflecting in the second and third phase of the interview. Participant D:

> I feel for answering both agree and disagree, because psychosocial factors are important (…), but only one of many elements. We cannot really generalize back pain in that way.

One participant (G) changed his response from disagree to agree:

> Because I misunderstood functional limitations as physical limitations.

Theme 5: Items not interpreted as intended

Although an item may be clearly understood, its meaning may be interpreted in a way that is not in line with its intention, affecting the scoring. Six participants (B, C, E, F, H, and L) interpreted item 2 ('Pain is a nociceptive stimulus, indicating tissue damage') as a general statement regarding pain neurophysiology and all were uncertain when responding. In contrast, three participants (D, J, and G) reasoned exclusively in the light of nonspecific LBP and clearly disagreed. However, responses may be affected by the fact that the Dutch and Norwegian versions of item 2 reads slightly different ('Pain is the result of tissue damage').

Two participants (H and J) interpreted item 3 ('Patients with back pain should preferably practice only pain free movements') as:

> Patients with back pain prefer to practice only pain free movements.

Obviously, they agreed on erroneous grounds, because when probed, they explained that pain-free exercises are not always possible, and patients should be challenged on their pain.

Composite formulations may result in unexpected interpretations. The two-part structure of item 4 ('If therapy does not result in a reduction in back pain, there is a high risk of severe restrictions in the long term') required some re-reading but lead nevertheless to unexpected interpretation. Participants' responses appeared to depend on which part of the sentence they emphasized. Six participants (B, D, E, F, K, and I) emphasized the last part of the item and disagreed, reasoning that there is no strong association between the degree of pain and disability, or that bouts of LBP usually settle by itself. Conversely, four participants (G, H, I, and J) agreed, emphasizing the first part and interpreting the item as concerning patient compliance:

> Lacking pain alleviation can in my experience lead to patients losing their faith in recovery, and they may end up in a vicious circle of stress, bad sleep and inactivity (Participant H).

Item 9 ('Functional limitations associated with back pain are the result of psychosocial factors') was by most participants interpreted as: "functional limitations in back pain are associated with psychosocial factors". Two participants interpreted the item correctly as a causal relationship. Participant H:

> If I read this right, it sounds as if functional limitations are the direct result of psychosocial factors.

One participant (D) both agreed and disagreed on the item, because

> When psychosocial factors are concerned, we often expect them to be something basically negative. But psychosocial factors may be positive, like a high degree of self-efficiency.

Reasoning this way, the item obviously makes less sense.

Item 11 ('If ADL activities cause more back pain, this is not dangerous') was by most participants understood as addressing responders' fear avoidance beliefs. However, one participant (I) interpreted the item from an unexpected and unintended perspective:

> Yes, it is dangerous when patients stop living their lives because they have pain in their back.

The participant gave a legitimate response by shifting focus from the patient's back to his/her daily life.

Few participants suggested improvements of individual items. One participant (H) proposed to simplify the text in item 1, for example into:

> Reducing daily physical exertion is important when you treat LBP.

Two participants mentioned that they better understood items 2 and 7 when they imagined "tissue damage" replaced by "lesion".

Comprehensiveness of the scale as a whole

Regarding the comprehensiveness of the scale, the participants were asked about: 1) Their general impression of the scale, including the introduction, instructions and response options; 2) Whether there are any missing conceptual aspects and what the scale captures; and 3) The relevance of the items, considering their own clinical experience. These three themes are presented in detail below with some illustrative participant quotes.

Theme 6: The participants' general impression of the scale

The introduction and the instructions were considered to be clear. The introduction was felt to facilitate responding because specific spinal disorders and pathological changes were excluded and because it was stated that not the knowledge of back pain was tested. Five participants proposed to include in the introduction whether acute or chronic LBP was concerned. Generally, filling in the questionnaire made the participants reflect on their own beliefs and health perspectives. Therefore, some felt a strong urge to provide explanations for their responses. Four biomedical items (items 1, 2, 3, and 4) provoked negative evaluative comments from three participants (C, F, and G):

> These are bombastic statements. You can't say that you totally agree or disagree (Participant C).

Response options were considered adequate. However, the ambiguity found in some items made three participants (D, H, and J) reflect on the distance or difference between response options.

> The degree between "disagree to some extent" and "agree to some extent", was sometimes difficult to answer. Do I agree or do I disagree? And if I agree, I only agree to some extent (Participant J).

Theme 7: Conceptual aspects considered missing

The participants considered social participation to be missing key concepts in the PABS, although this is an important health promoting factor. Likewise, issues concerning return to work were absent. A psychomotor physiotherapist felt that items relating back pain to patients' narrative were missing. Two others noted to miss cognitive behavioral principles of LBP management, including graded exposure, patient involvement, shared decision making and creating therapeutic alliances. Further, items on patient education about pain physiology were reported missing. One participant missed a consistent tread throughout the questionnaire that could give direction to individual patient management, and illustrated this with a practice example:

> I often start my consultations by saying that in this consultation we will try to answer four questions: First, what do we think is your problem, second, how do you think I can help you. Third, what do you think you must do to help yourself in this situation and fourth, how long will this take? (Participant D).

Theme 8: The conceived relevance of the items

All participants considered every item to be relevant and important, considering their own practice. Two biomedical items were considered especially relevant, as they referred to practical LBP management, like adapting load and exercise to pain (item 1), and whether pain during exercise should be allowed (item 6). Three biopsychosocial items (10, 11, and 14) were considered especially relevant, because they invited to reflect on one's own perspective. For example, participant H said on item 10 ('Therapy may have been successful even if pain remains'):

> This item probes who decides if treatment is successful and which criteria for successful treatment should be followed.

The participants described the content of the scale simply as a mapping of physiotherapists' concern to motivate patients for physical activity, their fear avoidance beliefs and beliefs regarding tissue damage and the role of psychosocial factors in back pain.

The participants' own health perspectives and treatment orientations varied widely. Some participants emphasized examination of bodily structures and functions without rushing to assess psychosocial factors, others preferred reassurance, education and explanation on pain mechanisms or building alliances with patients. In general, evaluation of patients' understanding of their LBP was considered very important for education. One psychomotor physiotherapist emphasized body awareness in relation to emotions, rather than physical exercises, as basic aspects in his/her approach.

> Awareness of what is happening in one's body, that's what I see as my most important job as a physiotherapist. That patients get an experience of Self (Participant F).

In contrast, another participant (L) considered an item irrelevant for himself, but not for the physiotherapy profession. He said on item 9 (Functional limitations associated with back pain are the result of psychosocial factors):

> I don't dig into relationship break-ups or psychosocial conditions. I note what patients tell me and that's it. I feel that other therapists are so much better on that, so I refer patients to them.

Discussion

Main findings

The aim of the present study was to explore the content validity of the PABS for measuring the biomedical and biopsychosocial treatment orientations of physiotherapists. We followed the recently developed COSMIN methodology for assessing content validity of PROMs and examined whether the items of the two subscales were considered relevant and important, were understood and interpreted as intended and refer to the constructs of interest. Furthermore, we assessed whether there were additional areas of interest that are not covered by the subscales.

The participants had little difficulty completing the PABS. All items were deemed relevant, referring to biomedical or biopsychosocial treatment orientation, and in accordance with physiotherapists' clinical experience. The items were mostly well understood; however, several participants were uncertain whether acute or chronic pain conditions were concerned in some items (biomedical items 1, 2 and 7; biopsychosocial items 9 and 10). Furthermore, a double negation was identified in biopsychosocial item 14 and a somewhat complex formulation was found in biomedical item 4 and

biopsychosocial item 9. Although all items concerned conceptual aspects of biomedical and biopsychosocial treatment orientations as intended and defined by the developers, the participants reported to miss items concerning cognitive behavioral aspects of LBP management, such as patient involvement, patient education, therapeutic alliance, shared decision making and graded exposure.

Comparison with previous work

The PABS was originally developed by rephrasing items from existing patient reported outcome measures (PROMs) using an expert review procedure (Ostelo et al., 2003). Physiotherapists experienced in chronic pain management and cognitive behavioral therapy were consulted to review these items and develop additional ones. However, validity of the items was not checked other than by looking at their face validity (Houben et al., 2005a). Later cross-cultural adaptation studies of the PABS have mostly relied on a pretest survey to assess format, comprehensibility and acceptability (Dalkilinc, Cirak, Yilmaz, and Parlak Demir, 2015; Eland, Kvale, Ostelo, and Strand, 2017; Laekeman, Sitter, and Basler, 2008; Magalhaes, Costa, Ferreira, and Machado, 2011). No problems relating to completion of the questionnaire were reported, and comments received in pretests mainly concerned the layout. However, when examining the German version of PABS, Laekeman, Sitter, and Basler (2008) found that responders erroneously interpreted the questions of the questionnaire to concern acute LBP. Therefore, the authors recommended to clearly state that the questions concern chronic LBP.

Comprehensibility

In our study, two items tended to elicit rather inconsistent and indecisive responses: participants were unsure whether chronic or acute pain was meant when responding to biomedical item 2 ('Pain is a nociceptive stimulus, indicating tissue damage') and biopsychosocial item 9 ('Functional limitations associated with back pain are the result of psychosocial factors'). In our opinion, most identified problems with PABS can be addressed by minor adjustments of the questionnaire. For example, in items 1, 2, 7, 9 and 10 "back pain" may be replaced by "persistent or recurrent back pain". Alternatively, the instructions, may include a statement clarifying whether (sub)acute or persistent LBP are meant. Also, more consistent responses may be expected when the word "pain" in items 2 and 7 are replaced by "back pain" or the instructions specify that "pain" means "back pain". Some participants overlooked the double negation in biopsychosocial item 14 ('Exercises that may be back straining should not be avoided during the treatment'). Correction of the double negation is difficult, as this would change the item's meaning completely. A better solution would be to underline or capitalize the word "not".

When addressed as outlined above, two minor problems remain. Biomedical item 4 ('If therapy does not result in a reduction in back pain, there is a high risk of severe restrictions in the long term') was interpreted differently because of its two-part structure. Biopsychosocial item 9 ('Functional limitations associated with back pain are the result of psychosocial factors') was not interpreted by all participants as the causal relationship between functional limitations and psychosocial factors. In an earlier study, this item was found to help identifying responders with the most extreme biopsychosocial attitudes (Eland, Kvale, Ostelo, and Strand, 2016). One way to facilitate the intended meaning of item 9, is by highlighting the word "result" in bold or italics.

Taking the problematic biomedical item 4 and biopsychosocial item 9 into consideration, six of seven items (> 85%) in each subscale appear to be appropriately worded and comprehensible, provided that all modifiable problems are addressed (Terwee et al., 2018b).

Comprehensiveness

The participants acknowledged the PABS-PT as a comprehensive representation of biomedical and biopsychosocial clinical orientation, in line with the developers' definitions (Ostelo et al., 2003). The biomedical items were considered to address the role of tissue damage, pain relief, spinal vigilance, fear avoidance and the believed pain/disability relationship. The biopsychosocial items were considered to address the acceptance of continued normal activity despite pain, and the impact of psychological, social and lifestyle factors on LBP. However, participants commented on missing issues that were related to best practice care, based on cognitive behavioral principles. Several participants emphasized the importance of graded exposure, patient education, addressing patient expectations, cognitive restructuring and enhancing self-efficiency in the management of nonspecific LBP, but these aspects were missing in the PABS. This emphasis on LBP management issues is reasonable, but basically beyond the intention of the PABS, which is to differentiate between two different health attitudes or treatment orientations. However, the PABS was developed two decades ago. Today the biopsychosocial model is generally

(theoretically) accepted in the physiotherapy profession and advocated as best practice care (Lin et al., 2020; Wijma, van Wilgen, Meeus, and Nijs, 2016), although not widely used as a basis for management (Lewis and O'Sullivan, 2018; Synnott et al., 2015, 2016). Furthermore, studies using the PABS have shown unexpected homogeneity in attitudes among physiotherapists (Eland et al., 2019; Vonk, Pool, Ostelo, and Verhagen, 2009). Illustratively, Table 1 shows that our participants were in full agreement on most biopsychosocial items. Our interviews, on the other hand, indicated that the participants had a variety of clinical approaches to LBP management. Therefore, the biopsychosocial subscale seems not comprehensive enough to capture important aspects of contemporary biopsychosocial treatment.

We believe that combining the PABS with other questionnaires may provide broader insights in clinician attitudes and beliefs. Recent studies evaluating the quality and impact of biopsychosocial educational interventions have supplemented the PABS-PT with other questionnaires measuring related biopsychosocial constructs (Bareiss, Nare, and McBee, 2019; Beneciuk et al., 2019; Demmelmaier, Denison, Lindberg, and Asenlof, 2012; Kongsted et al., 2019; Wang, Fisher, and Hall, 2018). These studies used clinician-level questionnaires such as the Practitioner Confidence Scale (PCS) (Bush, Cherkin, and Barlow, 1993) to measure clinicians' confidence in managing people with back pain; the Determinants of Implementation Behavior Questionnaire (DIBQ) (Huijg et al., 2014) to measure clinicians' implementation behavior; the Neurophysiology of Pain Questionnaire (NPQ) (Catley, O'Connell, and Moseley, 2013) to measure knowledge of pain physiology and the Patient-Practitioner Orientation Scale (PPOS) (Shaw, Woiszwillo, and Krupat, 2012) to measure patient centeredness.

Modification of the PABS-PT to improve content validity is expected to be an extensive and demanding process, which falls outside the score of the present study. Previous attempts to reframe the biopsychosocial subscale by adding items to the original PABS (Houben et al., 2005a), or development of a completely new biopsychosocial subscale (Duncan, 2017; Duncan, Foster, and Bishop, 2015) hardly improved the various measurement properties. Careful consideration followed by thorough testing is required before decisions of changes in the questionnaire are made. Our study highlights the themes that should be addressed in future improvement processes.

Strength and limitations

Standards for assessing the content validity of outcome measures were not available when the PABS was developed (Ostelo et al., 2003). The recently developed COSMIN checklist has broadened our understanding of content validity as the most important measurement property of an outcome measure and the most challenging one to assess (Terwee et al., 2018b). Our study used the Tree-Step Test-Interview (TSTI) to meet these standards (Hak, Van der Veer, and Ommundsen, 2006). The strength of the TSTI is that the think-aloud phase and the semi-structured interview complement each other (Oude Voshaar et al., 2012). Whereas think-aloud reduces interviewer-imposed bias, a semi-structured interview allows the interviewer to focus on relevant areas of interest.

A limitation could be our sample size. Although eleven interviewees should be sufficient according to guideline recommendations (Terwee et al., 2018b), there is no guarantee that all important problems relating to content validity are identified, even if saturation is reached (Blair and Conrad, 2011; Perneger, Courvoisier, Hudelson, and Gayet-Ageron, 2015). However, we think that we maximized the detectability of problems by using think-aloud techniques and in-depth cognitive interviews and by thoroughly addressing each PABS item. Furthermore, we aimed to capture all relevant experience by recruiting physiotherapists with a presumed diversity of health perspectives such as manual therapists and psychomotor physiotherapists, as previous qualitative research had found contrasting clinical approaches between these specialties (Thornquist, 1992).

Another limitation is that only one researcher initially coded the key themes and issues, although a second researcher was involved in further reviewing of both codes and themes. Independent coding is ideal to ensure rigor of the analysis and prevent bias, however, it is not a requirement in cognitive interviewing that two researchers analyze the results together (Terwee et al., 2018b).

We consider the clinical background and experience of the interviewers a strength when it came to recognize the participants' points of reference. On the other hand, some information on comprehensiveness may have been lost, as certain issues, perceived by the interviewers as self-evident, may not have been brought up.

Relevance of the results

Our study highlights themes that should be addressed in future improvement processes. Until then, the PABS can be expected to perform better with the minor adjustments as proposed in this paper. Furthermore, our methodology and results may be useful in future content validation studies of PABS and other questionnaires. Finally, our results may be used to select and improve items when developing an item bank to measure health care providers' clinical approach in LBP management.

Conclusions

Our study provides empirical evidence that contents of the Norwegian version of the PABS-PT are relevant and have sufficient comprehensibility to measure physiotherapists' biomedical and biopsychosocial treatment orientation, provided some minor adjustments of the questionnaire. However, the biopsychosocial subscale does not comprehensively reflect contemporary best practice of biopsychosocial care for LBP based on cognitive behavioral principles. Our participants reported on important missing aspects such as patient involvement, therapeutic alliance, shared decision making, patient education and graded exposure. Measurement of biopsychosocial treatment orientation may therefore be incomplete.

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Declaration of interest

The authors report no conflicts of interest.

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Appendix. Interview Guide PABS

1. Introducing and chat (5min)

2. Information to participants regarding the purpose of the interview.

Generally, participants are told about the questionnaire, its use and that we want to test its performance by interviewing physiotherapists.

"The interview is to be used to make the PABS better and develop it further. We want to how easy or difficult it is to fill out the PABS by observing how you respond to the scale. Our intention is to test the quality of the questionnaire, we do NOT want to assess how good you are to respond to the questionnaire. The interview will be audio recorded and we need your consent to that. We have an obligation of confidentiality and we grantee anonymity to all participants. Everything that will be said or done in the interview is bound to confidentiality. Quotations will be used in publications, but without the possibility to identify the person who said it. The audio recording will be transcribed anonymized and stored in a place not assessible to others than the main researcher. This accounts to what you have filled out in the questionnaire and what you have said in the interview. Is there anything that is not clear for you, or do you have questions?"

3. Information about the Think Aloud process

"We ask you to say aloud what you think while you complete the questionnaire. We ask you, for the sake of the test, not to comment what you are doing or saying, just to think aloud. You do not have to explain your thoughts. Neither do you have to find up some thoughts just for being able to say

anything, for example to avoid silence. You just say the thought that come up naturally while you fill out the questionnaire. In the first part of the interview, I want to know how you respond. In the following parts I want to know why you answered the way you did and I want to know your opinion, but not quite yet. Pretend that I am not here when you fill out the questionnaire".

Phase 1. Think-aloud

(A) Exercises to get used to the think aloud technique
   1. When was the last time you had dinner out on a restaurant? Can you tell med everything you think of, while you try to find that date?
   2. Can you describe for me last time you were in a shopping center? Tell me in chronological order what you did, from entering the center until you left with the things you had bought.
   3. Imagine you are standing in front of your house or apartment. Can you describe your house while you are counting all windows.

(B) Get written informed consent before starting the interview.
(C) Start audio recorder. The participant fills out the questionnaire

Phase 2 Retrospective interview

The objective is to get hold of missing content. Examples:

(1) "What did you think when you filled out item 1"?
(2) "I saw you frown when filling out item 6. What did you think?"

Phase 3. In depth interview (with 3 to 5 key questions)

(A) Questions about the meaning and understanding of the scale
(1) How was it to fill out the questionnaire?
(2) How was the introduction and the instructions?
(3) How were the response options?
(A) Questions about every single item, asking for relevance and comprehensibility
(1) How do you understand item 1 as a statement? What is this about about? Whar would you say about item 6?
(2) Is this an important and relevant question for you and a clinician? Does this item have a place in the attitudinal scale?
(3) How do you understand "tissue damage, functional limitations, psychosocial factors, coping stress"?
(A) Questions about the construct (comprehensiveness)

The participant is explained that the scale intends to grasp physiotherapist' treatment orientation (health perspectives, which ranges from biomedical (like manipulation) to biopsychosocial (like cognitive behavioral therapy)

(1) Does the scale grasp physiotherapists' attitudes? What should I ask you if I wanted to know how you approach low back pain? Your treatment philosophy? Does this questionnaire capture what is important for you in your treatment approach?
(2) Is there anything missing in the questionnaire? Do you have any recommandations? What is not capture by this instrument that is important to you?

4. Summary/Closure

Professor LHM summarizes

(1) Had I understood you right?
(2) Is there anything you want to add to what you have said?

The participants are given thanks and presented with a small gift.