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Discriminative Validity of the Pain Attitudes and Beliefs Scale for Physical Therapists

Nicolaas D. Eland, Alice Kvåle, Raymond W.J.G. Ostelo, Henrica C.W. de Vet, Liv I. Strand

Background. The Pain Attitudes and Beliefs Scale (PABS) for Physical Therapists aims to measure clinicians' biomedical and biopsychosocial treatment orientations regarding nonspecific low back pain.

Objective. The objective of this study was to assess whether the PABS can differentiate between subgroups of physical therapists hypothesized to differ in treatment orientations.

Design. This study was a cross-sectional survey.

Methods. The PABS was completed by 662 Norwegian physical therapists with a diversity of professional backgrounds. Twenty-four a priori hypotheses on expected differences in PABS scores were formulated. Sufficient discriminative ability was defined as a minimum of 75% confirmed hypotheses. Hypotheses on differences in scores were tested for the biomedical and biopsychosocial subscales separately as well as for combinations of the 2 subscales, representing responders with high biomedical and low biopsychosocial PABS scores and vice versa.

Results. Of the 24 hypotheses, only 15 (62.5%) were confirmed. Between-group differences concerning the separate subscales were small, varying from −0.63 to 1.70 scale points, representing values up to 6.0% of the total subscale ranges. Between-group differences were larger when combined subscales were used, varying from 1.80 to 6.70 points, representing values up to 25.1% of the total subscale ranges. Despite little spread in scores, 24% of respondents demonstrated extreme attitudes.

Limitations. The lack of convincing scientific evidence from previous research on differences in attitudes and beliefs between physical therapists was a limitation for the formulation of hypotheses.

Conclusions. Discriminative validity of separate subscales of the PABS was not supported. Combining the 2 subscales into global treatment attitudes enabled better discrimination. Little spread in biomedical and biopsychosocial orientations explains why more than one-third of the hypotheses were not confirmed. Either Norwegian physical therapists are basically similar in their treatment orientation or the PABS is not able to detect any differences between them.

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The traditional biomedical view of low back pain (LBP) as a purely structural or biomechanical disorder has been greatly challenged over the past 2 decades.[1,2] There is now a growing understanding that chronic, nonspecific LBP should be considered within a multidimensional biopsychosocial framework because there is convincing evidence that disability levels are more closely associated with cognitive and behavioral aspects of pain than with pathoanatomical ones.[3,4] Therefore, clinical guidelines recommend that health care providers, including physical therapists, incorporate the biopsychosocial model into their clinical practice and address and modify patients' maladaptive cognitive, pain, and movement behaviors, if indicated.[5,6] However, data suggest that a significant number of therapists continue to have a biomedical approach in their clinical reasoning,[7–10] characterized by advising patients to restrict activity, be vigilant about their backs, and reinforcing beliefs in a structural cause of back pain.[11–13]

Available literature suggests that the attitudes and beliefs of clinicians can serve as obstacles or facilitators for the delivery of optimal care to patients with LBP.[14,15] Several studies have shown that physical therapists' attitudes and beliefs are associated with their advice given to patients regarding activity and return to work, as well as with their choice of intervention.[12,16–21] Furthermore, there is evidence that physical therapists' beliefs about back pain are associated with the pain beliefs and illness perceptions of their patients,[8,17,21] with a profound influence on patients' outcomes.[14] To better understand the complexity of professional practice behavior and how to improve implementation of clinical guidelines in LBP management, a valid and reliable measurement tool is required to determine clinicians' attitudes and beliefs regarding chronic LBP.[9,15,22]

The Pain Attitudes and Beliefs Scale (PABS) for Physical Therapists (PABS-PT) is the most extensively studied tool in this respect[23] and has been used in a number of cross-sectional and interventional studies.[12,20,24–26] Although originally developed for physical therapists, the instrument has also been used to assess medical doctors' and chiropractors' conceptions of LBP.[27–31] The original Dutch version had 36 items, and several shorter versions have been developed in a number of languages. Although reasonable psychometric properties have been reported,[32] there is a continuing discussion about the construct validity of the scale.[28,33–35]

Scores on the PABS-PT have been shown to predict clinicians' recommendations for return to work and activity and judgments of the harmfulness of certain physical activities.[20,33,36] However, earlier reports on modest α values and separation indexes[34,35] raised questions about the ability of the PABS to differentiate between clinicians with a traditional biomedical orientation and those with a biopsychosocial approach, a prerequisite for use of the scale in practice.[37]

Therefore, the construct validity of the scale should be explored more extensively. Construct validity refers to whether scores or differences in scores of an instrument are consistent with a theoretical model of the construct.[37] The international COSMIN (Consensus-Based Standards for the Selection of Health Measurement Instruments) panel recommends construct validation by hypothesis testing.[38] As stated in the COSMIN taxonomy, "known group" or discriminative validity is evaluated by formulating hypotheses about the differences in the instrument scores between subgroups of persons.[39] These hypotheses need to be formulated a priori (preferably before data collection) and be as specific as possible; ie, the magnitude of differences one considers acceptable should be explicitly quantified. Without specific hypotheses, the risk of bias is high because retrospectively it is tempting to conceive alternative explanations for small differences, instead of concluding that the questionnaire might not be valid.[40]

The aim of this study was to explore the discriminative ability of the PABS-PT by testing specific a priori hypotheses about expected differences in PABS scores between subgroups of physical therapists. Hypotheses were formulated on the basis of evidence from research and theoretical considerations and were either confirmed or not confirmed, depending on their consistency with the result of the analyses. The PABS was considered to have adequate discriminative validity if at least 75% of the hypotheses were confirmed, in line with proposed consensus-based criteria.[40]

Methods

Sampling and Design

Data for our analysis were collected from Norwegian physical therapists responding to a cross-sectional web-based survey as described in detail elsewhere.[34] Briefly, 2 samples of convenience, totaling 3849 physical therapists, were invited by e-mail to complete the PABS-PT and provide demographic details. Sample 1 (n = 2860) was recruited by the Norwegian Physical Therapist Association, and sample 2 (n = 989) was recruited by the researchers from membership lists including all physical therapist specialists in Norway. Because current law requires trade unions to anonymize their members' affiliation, we had no account of nonresponders in sample 1 and were only able to send reminders to participants in sample 2. Responses from 921 therapists were obtained, resulting in an overall response rate of 24.8% (16.7% in sample 1 and 47.5% in sample 2). Physical therapists who had not been involved in back pain management for the last 6 months were excluded (n = 147). Of the remaining 774 participants who filled out the questionnaire, 662 provided valid PABS scores and were included in the analysis. In a comparison of participants who completed

the PABS with those who did not complete the PABS, the latter were older and more experienced. No differences were found with regard to other demographic or professional variables.

Participants

The study sample encompassed general physical therapists, physical therapists who are also osteopaths, and 3 specialized physical therapist groups: manual therapists, psychomotor physical therapists, and physical therapist specialists (in general practice, sports, orthopedic, or rheumatologic physical therapy). Differences in educational background, practice settings, and professional philosophy are summarized in Table 1. As professional philosophy, training, setting, and practice vary in these professional groups, attitudes and beliefs are expected to vary as well.

Questionnaire

Demographic data from responders included details on sex, education, age, years in practice, specialization, practice situation, professional interest in the management of LBP, familiarity with clinical guidelines for LBP, and responders' own experience of LBP. We asked participants whether they had followed 1 or more of 13 given postgraduate courses. They also reported their preference for 1 of 4 conceptually different clinical approaches: pain contingent,[41] time contingent,[42] focus on bodily impairments, or focus on reactivation and participation.[43]

The PABS-PT consists of 2 subscales that distinguish between a biomedical and a biopsychosocial treatment orientation regarding LBP management.[36,44] Responders indicate on a 6-point Likert scale (1 = totally disagree, 6 = totally agree) their endorsement of each item. Higher scores on a subscale indicate a stronger treatment orientation. In the present study, we used the Rasch model–modified Norwegian version of the PABS-PT, consisting of 2 strictly unidimensional subscales, with an invariant, hierarchical item ordering, each holding 7 items.[35] Rasch model–converted person location scores range from 7 to 40 for the biomedical subscale, and from 7 to 32 for the biopsychosocial subscale.[35]

Hypotheses on Differences Between Subgroups

Subgroups of physical therapists were categorized in 3 ways: by primary specialization, self-reported clinical approach, and demographics/professional characteristics. To develop hypotheses on expected differences between mean scores of these subgroups, the literature was searched for studies providing information about differences in back pain beliefs among health care providers. Ten studies were found describing physical therapists' measured back pain beliefs,[19–21,36,44–49] whereas 15 studies compared back pain beliefs of various other health care providers.[9,16,17,28,29,31,50–58]

Hypotheses based on literature and theoretical considerations were formulated in an iterative consensus process involving all authors. Expected differences in scores were quantified and agreed by all authors before testing.[40] As previous findings indicate a limited spread of scores on both subscales,[12,35,48,59] we expected very small mean differences between groups. Therefore, a mean difference of at least 1 scale point was accepted as an indication for an adequate discriminative ability in subgroups. One scale point is equivalent to 3% of the total biomedical subscale range and 4% of the total biopsychosocial range. Values were arbitrarily chosen but comparable with values found in another study.[48] The hypotheses are discussed in detail below and presented in Table 2.

Hypotheses on Differences Between Subgroups of Primary Specialization

An earlier study found that biomedical specialists (manual therapists and McKenzie therapists) scored statistically significantly higher on the biomedical subscale as opposed to biopsychosocial specialists.[44] In a qualitative study, Thornquist[60] described significant and important differences in professional views and approaches during patients' encounters with a psychomotor physical therapist and a manual therapist. We hypothesized therefore that manual therapists would have higher biomedical scores than psychomotor physical therapists (hypothesis 1).

Biopsychosocial specialists (including chronic pain therapists or pain rehabilitation therapists) have consistently been found to score higher on the biopsychosocial subscale than manual therapists.[44,48] Therefore, we expected Norwegian biopsychosocial specialists (ie, psychomotor physical therapists) to score higher on the biopsychosocial subscale than manual therapists (hypothesis 2).

Differences in back pain beliefs between physical therapists and chiropractors or osteopaths have appeared to be consistent.[9,36,56] Two studies independently demonstrated that osteopaths significantly endorsed a more biomedical approach than did physical therapists[9] and manual therapists.[61] In our study, we therefore expected osteopaths to have higher biomedical scores than general physical therapists (hypothesis 3), physical therapist specialists (hypothesis 4), manual therapists (hypothesis 5), and psychomotor physical therapists (hypothesis 6).

Hypotheses on Differences in Responders' Self-Reported Clinical Approaches

A pain-contingent approach (patient activity level based on current pain level) is considered to be a core characteristic of the biomedical approach,[41] whereas a time-contingent approach (patient activity and exercises based on a predefined time frame, irrespective of pain) is considered a core biopsychosocial approach.[6,10,36,42,62]

Table 1.
Characteristics of Professional Groups Included in the Study

Clinicians	Education/Training	Role in Norwegian Health Care	Professional Philosophy/Practice Settings
General physical therapists	3-y undergraduate Bachelor of Science program (BSc)	Patients need referral from physician/manual therapist; no direct access	Rehabilitation and exercise/movement therapy, massage, and electrotherapy
Physical therapist specialists	2-y clinical Master's program in specific areas of postgraduate competence (MSc) or equivalent	Patients need referral from physician/manual therapist; no direct access	General practiceSports physical therapyOrthopedic physical therapyRheumatologic physical therapy
Manual therapists	2-y clinical Master's program in musculoskeletal physical therapy (MSc) or equivalent	"Gatekeeper" function in primary health careExtended scope of practiceCan refer to medical specialist for examination	Encouraged to make objective and exact structural and functional diagnoses and often use a postural-structural-biomechanical approach
Osteopaths	Physical therapists with an additional 3-y Bachelor's program in osteopathy	Osteopathy is not an authorized health care profession in Norway	Manipulative medicine for visceral, parietal, and craniosacral systemsReasoning models based on the relationship between structure and function in the human body
Psychomotor physical therapists	2-y clinical Master's program in psychosomatic and psychiatric physical therapy (MSc) or equivalent	Patients need referral from physician/manual therapist; no direct access	Psychological and phenomenological perspective, emphasizing the close connection between thoughts, emotions, muscular tension, and respiration

In this study, we therefore expected those responders who reported treating until the patient is (largely) pain free to have higher biomedical scores than responders who reported prearranging a certain time frame for treatment (hypothesis 7). Higher biopsychosocial scores were expected for responders who applied a prearranged time frame than for those who reported treating until pain free (hypothesis 8). As hypotheses 7 and 8 concern core characteristics of the constructs, we expected larger differences (at least 1.5 scale points) between subgroups. Higher biomedical scores were expected for responders who reported prioritizing restoration of muscle strength, joint mobility, and coordination than for those who prioritize the patient's management of activities of daily living and functional work tasks (hypothesis 9). Higher biopsychosocial scores were expected for responders who reported prioritizing reactivation and return to normal daily activities and work tasks than for those with a focus on body function and structure (hypothesis 10).

Hypotheses on Differences in Demographic and Professional Characteristics

Although a systematic review reported that doctors' attitudes and beliefs were influenced by demographic factors such as age and sex,[53] only sparse information was found on demographic impact factors among physical therapists.

Sex. Findings regarding sex differences in pain beliefs were inconsistent. Four studies did not find any differences in beliefs between female and male physical therapists or doctors.[25,29,36,63] By contrast, Dutch female physical therapists were found to score higher on the biopsychosocial subscale,[44] whereas Brazilian male physical therapists had higher biomedical scores.[49] Because of inconsistent findings in the literature we refrained from formulating hypotheses with regard to sex.

Age. Older clinicians (>55 years old) have been reported to be more cautious with recommendations for activity and recommended bed rest[50] and be more influenced by their personal fear avoidance beliefs.[64] One study reported that older physical therapists (≥42 years old) scored significantly higher on the biomedical subscale,[44] whereas 2 other studies reported nonsignificant differences[20,36] between older and younger physical therapists. Doctors more than 55 years old showed more biomedical beliefs in 1 study,[50] whereas another study found no influence of age on doctors' back pain beliefs.[51] Younger Chinese doctors showed more negative back pain beliefs than doctors over 40 years old.[58] In the present study, we hypothesized that physical therapists over 55 years old had higher biomedical scores (hypothesis 11).

Own experience of back pain. A person's own experience of back pain does not seem to affect the pain beliefs of physical therapists[44–46] or doctors.[29,51] However, Chinese doctors with back pain were found to be more fear avoidant.[58] We refrained from formulating hypotheses on physical therapists' experience of their own back pain.

Table 2.
A Priori Formulated Hypotheses to Examine the Discriminative Validity of the Pain Attitudes and Beliefs Scale[a]

Hypothesis	Expected Difference in Scale Points	Observed Difference in Scale Points	Hypothesis Confirmed (Yes/No)	
			Biomedical Subscale	Biopsychosocial Subscale
Primary specialization: differences in subscale scores				
1. Manual therapists have higher mean biomedical scores than psychomotor physical therapists	≥ 1.0[b]	−0.6	No	
2. Psychomotor physical therapists have higher mean biopsychosocial scores than manual therapists	≥ 1.0[c]	−0.02		No
3. Osteopaths have higher mean biomedical scores than general physical therapists	≥ 1.0	0.9	No	
4. Osteopaths have higher mean biomedical scores than physical therapist specialists	≥ 1.0	1.2	Yes	
5. Osteopaths have higher mean biomedical scores than manual therapists	≥ 1.0	1.7	Yes	
6. Osteopaths have higher mean biomedical scores than psychomotor physical therapists	≥ 1.0	1.1	Yes	
Self-reported clinical approach: differences in subscale scores				
7. Physical therapists reporting a pain-contingent approach have higher mean biomedical scores than physical therapists reporting a time-contingent approach	≥ 1.5	1.3	No	
8. Physical therapists reporting a time-contingent approach have higher mean biopsychosocial scores than physical therapists reporting a pain-contingent approach	≥ 1.5	1.5		Yes
9. Physical therapists reporting a focus on body function and structure have higher mean biomedical scores than physical therapists reporting a focus on activity and participation	≥ 1.0	0.5	No	
10. Physical therapists reporting a focus on activity and participation have higher mean biopsychosocial scores than physical therapists reporting a focus on body function and structure	≥ 1.0	0.5		No
Demographic and professional issues: differences in subscale scores				
11. Physical therapists > 55 y old have higher mean biomedical scores than younger physical therapists	≥ 1.0	1.1	Yes	
12. Physical therapists reporting substantial knowledge of national clinical guidelines for LBP have lower mean biomedical scores	≥ 1.0	1.0	Yes	
13. Physical therapists who have followed courses in cognitive behavioral therapy have higher mean biopsychosocial scores	≥ 1.0	1.1		Yes
14. Physical therapists who have followed courses in cognitive behavioral therapy have lower biomedical scores than physical therapists who have not	≥ 1.0	1.2	Yes	
15. Physical therapists who have followed courses in cognitive functional therapy have higher mean biopsychosocial scores	≥ 1.0	0.9		No

(continued)

Table 2.
Continued

Hypothesis	Expected Difference in Scale Points	Observed Difference in Scale Points	Hypothesis Confirmed (Yes/No)	
			Biomedical Subscale	Biopsychosocial Subscale
16. Physical therapists who have followed courses in cognitive functional therapy have lower biomedical scores than physical therapists who have not	≥ 1.0	1.3	Yes	
17. Physical therapists who have followed a postgraduate study program in basic body awareness therapy have higher mean biopsychosocial scores than physical therapists who have not	≥ 1.0	0.05		No
18. Physical therapists who have followed a postgraduate study program in basic body awareness therapy have lower biomedical scores than physical therapists who have not	≥ 1.0	−0.3	No	
Global treatment attitude: differences in subscale scores[d]				
19. Physical therapists with a "purely" biomedical global attitude have higher mean biomedical scores than physical therapists with a "purely" biopsychosocial global attitude	≥ 2.0	6.7	Yes	
20. Physical therapists with a "purely" biopsychosocial global attitude have higher mean biopsychosocial scores than physical therapists with a "purely" biomedical global attitude	≥ 1.5	6.3		Yes
21. Physical therapists with a "more" biomedical global attitude have higher mean biomedical scores than physical therapists with a "more" biopsychosocial global attitude	≥ 1.0	2.2	Yes	
22. Physical therapists with a "more" biopsychosocial global attitude have higher mean biopsychosocial scores than physical therapists with a "more" biomedical global attitude	≥ 1.0	2.6		Yes
23. Physical therapists with a "purely" biomedical global attitude have higher mean biomedical scores than physical therapists with a "more" biomedical global attitude	≥ 1.0	1.8	Yes	
24. Physical therapists with a "purely" biopsychosocial global attitude have higher mean biopsychosocial scores than physical therapists with a "more" biopsychosocial global attitude	≥ 1.0	2.6		Yes
Number (%) of hypotheses that were accepted			10/15 (66.6)	5/9 (55.5)

[a]LBP = low back pain.
[b]1.0 biomedical subscale point is equivalent to 3% of the total interval-level subscale range (7–40).
[c]1.0 biopsychosocial subscale point is equivalent to 4% of the total interval-level subscale range (7–32).
[d]The global treatment attitude was retrieved by combining the quartile scores on the biomedical and biopsychosocial subscales.

Years of experience. There is inconsistent evidence that the number of years in practice and clinicians' attitudes and beliefs are associated.[9] No associations have been found for physical therapists in New Zealand[25] or the Netherlands,[36] whereas less experienced Brazilian physical therapists were more likely to follow a biomedical approach.[49] In contrast, doctors who had been qualified for a shorter time had significantly lower biomedical scores[28,29] and significantly higher psychosocial scores.[29] No influence of years of practice on fear-avoidance beliefs were found in French doctors.[51] Because of inconsistent findings in the literature, we refrained from formulating hypotheses on differences in work experience.

Guideline adherence. Medical doctors who used guidelines had significantly lower biomedical scores.[29] Furthermore, physical therapists with lower biomedical PABS scores were more likely to report that LBP guidelines were useful in the decision-making process for a patient with nonspecific LBP.[25] In this study, we hypothesized that physical therapists who were familiar with LBP guidelines had lower biomedical scores than physical therapists who were unfamiliar with them (hypothesis 12).

Posteducational courses. Within traditional physical therapy, assessment and management of back pain has mainly been, and partly still is, focused on its somatic dimension.[10] Over the years, a diversity of posteducational courses within hands-on therapy, electrotherapy, and exercise therapy have supplied physical therapists with clinical skills and knowledge from a biomedical perspective. Although strictly biomedical education has been found to exacerbate negative beliefs about LBP,[19] we did not expect specific biomedical courses to affect PABS scores in this study. This was because most physical therapists probably have attended such biomedical courses, which results in insufficient contrast. Conversely, physical therapists with postgraduate training in chronic pain management were found to have lower biomedical scores and higher biopsychosocial scores than those who did not have such training.[20,48] Biopsychosocial-oriented educational workshops have also been found to influence the LBP beliefs of physical therapists.[19,24,26,48,65]

In this study, we expected higher biopsychosocial scores and lower biomedical scores for physical therapists who had followed workshops or courses on cognitive behavioral therapy[6] (hypotheses 13 and 14), cognitive functional therapy[66] (hypotheses 15 and 16), and basic body awareness therapy[67,68] (hypotheses 17 and 18) than for physical therapists who had not followed these courses.

Discriminative Ability of the PABS

We compared subgroups of responders with high biomedical and low biopsychosocial scores on the PABS-PT with subgroups with low biomedical and high biopsychosocial scores, as applied in previous studies as a supplement to 2 separate subscale scores.[12,24,48] This descriptive categorization separates the "obvious cases" from the "nonobvious cases," classifying responders with similar scores on both subscales as neutral. To do this, quartile scores of both treatment orientations were combined.[48] Therapists were considered to have a "purely" biomedical global treatment attitude when their scores were in the highest quartile of the biomedical subscale range and in the lowest quartile of the biopsychosocial subscale, and a "more" biomedical global treatment attitude when their score on the biomedical subscale was 1 quartile higher than their score on the biopsychosocial subscale. The same applied vice versa for a "purely" biopsychosocial global treatment attitude and a "more" biopsychosocial global treatment attitude. We expected score differences between all 4 groups. Between the 2 most extreme groups ("purely biomedical" and "purely biopsychosocial" global attitude), we expected the largest differences (at least 2.0 biomedical and 1.5 biopsychosocial scale points) (hypotheses 19–24).

Data Analysis

Rasch model–derived person location estimates were used as the dependent variable in analyses, providing unbiased interval-level scores and thus greater accuracy when scores between groups of persons are compared and calculations such as means and differences are applied. The Rasch model–modified scores were retrieved using the RUMM2030 software package.[69] Data were analyzed using the Statistical Package for the Social Sciences (SPSS) version 24 (IBM SPSS, Chicago, IL, USA). Descriptive statistics were applied to summarize demographic data and PABS scores. From inspecting scores on Q-Q plots, the normality of data could be presumed. Independent sample *t* tests were used to retrieve differences in mean subscale scores and their confidence intervals. As statistical significance of differences is highly dependent on sample size, which was large in our case (n = 662), we considered the magnitude of the difference (at least a 1-point difference) in our hypotheses instead of *P* values.[38]

Results

Demographic Characteristics

The survey collected valid PABS scores from 662 Norwegian physical therapists. Demographic characteristics of professional subgroups are summarized in Table 3. Most of the general physical therapists and osteopaths were less than 40 years old (57.2% and 59.1%, respectively) and had less than 20 years of work experience (70.2% and 79.5%, respectively). Most of the psychomotor physical therapists were women (86.5%), were more than 40 years old (79.6%), and had more than 20 years of work experience (55.7%). Physical therapist specialists showed similar characteristics. A substantial portion of psychomotor physical therapists (31.3%) worked in private solo practice, whereas only 8.4% of manual therapists and 4.8% of physical therapist specialists did so. Manual therapists and osteopaths were more likely to be men.

Mean PABS Scores and Quartile Cutoff Points

Subscale scores were derived from person location estimates calculated in the Rasch measurement model. The mean biomedical score was 20.26 (standard deviation [SD] = 2.57; range = 7–34), the mean biopsychosocial score was 19.04 (SD = 2.45; range = 7–32) (Tab. 4). The scores on the 2 subscales were negatively correlated ($r = -0.42$; $P < .0001$). For the division into 5 categories of global treatment attitude (by combining both subscales), quartile cutoff points were calculated at 18.8 and 21.7 points for the biomedical subscale (median = 20.3) and at 17.7 and 20.5 points for the

Table 3.
Demographic and Practice Details of the Five Professional Groups of Physical Therapists[a]

Characteristic	Total Sample (N = 662)	General Physical Therapists (n = 215)	Physical Therapist Specialists (n = 49)	Manual Therapists (n = 183)	Osteopaths (n = 44)	Psychomotor Physical Therapists (n = 171)
Female sex	413 (62.3)	157 (73.0)	37 (75.5)	57 (31.1)	14 (31.8)	148 (86.5)
Age, y						
20–30	71 (10.7)	56 (26.0)	0 (0)	7 (3.8)	8 (18.2)	0 (0.0)
31–40	188 (28.4)	67 (31.2)	9 (18.4)	59 (32.2)	18 (40.9)	35 (20.5)
41–50	167 (25.2)	42 (19.5)	12 (24.5)	51 (27.9)	9 (20.5)	53 (31.0)
51–60	167 (25.2)	35 (16.3)	19 (38.8)	50 (27.3)	9 (20.5)	54 (31.6)
>60	69 (10.4)	15 (7.0)	9 (18.4)	16 (8.7)	0 (0.0)	29 (17.0)
Years of experience						
1–10	197 (29.8)	102 (47.4)	2 (4.1)	43 (23.6)	18 (40.9)	30 (17.8)
11–20	180 (27.2)	49 (22.8)	13 (26.5)	56 (30.8)	17 (38.6)	45 (26.6)
21–30	136 (20.5)	35 (16.3)	17 (34.7)	47 (25.8)	7 (15.9)	42 (24.9)
>30	136 (20.9)	29 (13.5)	17 (34.7)	36 (19.8)	2 (4.5)	52 (30.8)
Practice situation						
Private solo practice	98 (15.8)	23 (11.9)	2 (4.8)	15 (8.4)	7 (16.3)	51 (31.3)
Private group practice	397 (63.8)	95 (49.0)	20 (47.6)	158 (88.8)	36 (83.7)	86 (52.8)
Pain clinic/hospital	127 (20.3)	76 (38.1)	20 (47.6)	5 (2.8)	0 (0.0)	26(16.0)
Knowledge of clinical guidelines (CG)						
Have read CG	299 (45.2)	93 (43.3)	27 (55.1)	102 (56.0)	16 (36.4)	60 (35.3)
Knowledge of main issues of CG	184 (27.8)	52 (24.2)	14 (28.6)	65 (35.7)	8 (18.2)	44 (25.9)
Little knowledge of CG	123 (18.6)	54 (25.1)	5 (10.2)	12 (6.6)	12 (27.3)	40 (23.5)
Have not read CG	56 (8.4)	16 (7.4)	3 (6.1)	3 (1.6)	8 (18.2)	26 (15.3)
Self-reported clinical approach						
Pain contingent	219 (37.8)	56 (29.9)	11 (31.4)	63 (35.6)	25 (61.0)	63 (45.7)
Bodily functions are a priority	165 (28.4)	60 (32.1)	9 (25.7)	55 (31.1)	8 (19.5)	33 (23.9)
Time contingent	49 (8.4)	19 (10.2)	4 (11.4)	9 (5.1)	5 (12.2)	12 (8.7)
Activity and work tasks are a priority	147 (25.3)	52 (27.8)	11 (31.4)	50 (28.2)	3 (7.3)	30 (21.7)
Global treatment attitudes						
Purely biomedical	80 (12.1)	32 (14.9)	8 (16.3)	15 (8.3)	8 (18.6)	17 (9.9)
More biomedical	201 (30.4)	67 (31.2)	12 (24.5)	50 (27.5)	21 (48.8)	51 (29.8)
Neutral	122 (18.5)	40 (18.6)	9 (18.4)	28 (15.4)	5 (11.6)	40 (23.4)
More biopsychosocial	178 (27.0)	54 (25.1)	10 (20.4)	60 (32.8)	7 (15.9)	47 (27.5)
Purely biopsychosocial	79 (12.0)	22 (10.2)	10 (20.4)	29 (15.8)	2 (4.5)	16 (9.4)

[a]Data are reported as number (percentage) of therapists.

Table 4.
Biomedical and Psychosocial Scores on the Pain Attitudes and Beliefs Scale for Physical Therapists and Differences Between Subgroups of the Physical Therapist Sample (N = 662)

Parameter	No. of Therapists	Mean (SD) Biomedical Subscale Scores, Range 7–40	Mean Difference[a]	95% CI	*P*	Mean (SD) Psychosocial Subscale Scores, Range 7–32	Mean Difference[a]	95% CI	*P*
Total sample	662	20.26 (2.57)				19.04 (2.45)			
Primary specialization									
Manual therapists	183	19.7 (2.4)				19.2 (2.7)			
vs psychomotor physical therapists	171	20.3 (2.5)	**−0.63**	1.14 to −0.11	.016	19.1 (2.3)	**0.02**	−0.50 to 0.54	.95
Osteopaths	44	21.4 (3.6)				18.0 (1.8)			
vs general physical therapists	215	20.5 (2.5)	**0.89**	0.02–1.76	.05	18.9 (2.3)	−0.93	−1.66 to −0.20	.01
vs physical therapist specialists	49	20.2 (2.6)	**1.15**	−0.13 to 2.44	.08	19.3 (2.9)	−1.23	−2.23 to −0.24	.016
vs manual therapists	183	19.7 (2.4)	**1.70**	0.82–2.57	.001	19.2 (2.7)	−1.11	−1.80 to −0.42	.002
vs psychomotor physical therapists	171	20.3 (2.5)	**1.06**	0.14–1.98	.02	19.1 (2.3)	−1.10	−1.84 to −0.36	.004
Self-reported treatment approach									
Pain contingent	219	20.6 (2.3)				18.6 (2.5)			
vs time contingent	49	19.2 (2.8)	**1.34**	0.59–2.09	.001	20.1 (2.7)	**1.46**	0.67–2.24	.001
Focus on impairment	165	20.4 (2.5)				18.9 (2.1)			
vs focus on activity and participation	147	19.9 (2.6)	**0.51**	−0.20 to 1.07	.07	19.4 (2.5)	**0.47**	−0.04 to 0.99	.08
Demographics and professional issues									
20–55 y old	526	20.0 (2.5)				19.1 (2.4)			
vs >55 y old	138	21.1 (2.7)	**1.10**	−1.58 to −0.63	<.001	18.6 (2.5)	0.49	0.33–0.95	.036
Knowledge of national clinical guidelines (NCG)									
Have read NCG	299	19.7 (2.7)				19.4 (2.6)			
vs moderate, some, or no knowledge of NCG	363	20.7 (2.4)	**1.00**	1.39–0.61	<.001	18.7 (2.3)	0.74	0.36–1.11	<.001
Course in cognitive behavioral therapy									
Yes	121	19.3 (2.9)				19.9 (2.8)			
vs no	541	20.4 (2.3)	**1.16**	0.66–1.66	<.001	18.8 (2.3)	**1.07**	1.61–0.52	<.001
Course in cognitive functional therapy									
Yes	67	19.05 (2.40)				19.81 (2.61)			
vs no	595	20.37 (2.47)	**1.34**	0.69–1.99	<.001	18.94 (2.41)	**0.87**	−1.48 to −0.25	.006
Study program in basic body awareness									
Yes	136	20.48 (2.24)				19.04 (2.49)			
vs no	526	20.20 (2.64)	0.28	−0.20 to 0.76	.25	18.99 (2.27)	0.05	−0.41 to 0.51	.83

[a]Hypothesis-based differences are shown in bold type.

biopsychosocial subscale (median = 18.5). Table 3 shows that 80 responders (12.1%) were classified with a purely biomedical global treatment attitude and that 79 responders (11.9%) were classified with a purely biopsychosocial global treatment attitude.

Hypotheses on Mean Differences Between Subgroups

Table 2 summarizes which hypotheses were confirmed in each subscale. In the categories of primary specialization, self-reported clinical approach, and

demographics/professional characteristics, the biomedical subscale met 7 of 12 hypotheses (58.3%), whereas the biopsychosocial subscale met 2 of 6 hypotheses (33.3%). Differences in biomedical scores varied from −0.63 to 1.70 points, representing 0% to 5.0% of the total subscale range. Differences in biopsychosocial scores varied from 0.02 to 1.46 points, representing 0% to 6.0% of the total subscale range. Whereas neither subscale displayed adequate discriminative validity according to a priori established criteria, all 6 hypotheses in the category of global treatment attitudes were confirmed. When subscales were combined, differences in biomedical scores varied from 1.80 to 6.70 points (5.4% to 20.1% of the total range) and differences in biopsychosocial scores varied from 2.59 to 6.27 points (10.3% to 25.1% of the total range).

Table 4 presents scores and between-group differences for hypotheses concerning separate subscales. Figure 1A and B shows box plots for differences between subgroups of physical therapists, showing a limited variation on the levels of treatment orientation among therapists. Figure 2A and B shows a gradual decrease in biomedical scores and a gradual increase in biopsychosocial scores in the spectrum from purely biomedical to purely biopsychosocial global treatment attitudes.

Discussion

Principal Findings

The aim of this study was to examine the discriminative validity of scores on the PABS. A set of 24 a priori hypotheses were formulated regarding expected differences in treatment orientation between relevant subgroups of Norwegian physical therapists. We found that neither of the 2 subscales met the predefined requirement of adequate discriminative ability of 75% confirmed hypotheses. Of the 24 hypotheses, only 15 (62.5%) were confirmed. Between-group differences were small when biomedical and biopsychosocial treatment orientations were measured separately on their respective subscales. Between-group differences were larger when biomedical and biopsychosocial subscales were combined, classifying physical therapists as having either a "purely biomedical," "more biomedical," "neutral," "more biopsychosocial," or "purely biopsychosocial" global treatment attitudes. Despite the limited spread of scores, extreme treatment orientations (purely biomedical or biopsychosocial attitudes) were present in 24% of our responders.

Comparison With Previous Work

Most studies on PABS scores have reported small between-group differences.[12,24,28,36,44,48] In this study, we found that between-group differences had magnitudes around the least possible value for (ordinal) measurement, which makes it hard to decide on their relevance, especially in small-to-moderate samples. Comparability between studies is limited due to differences in wording and number of items. Only a few studies have reported the spread of scores: In a Dutch study,[48] interquartile ranges were highly comparable to ours, confirming a limited distribution, whereas in a Brazilian study interquartile ranges were somewhat larger.[49]

Two previous studies have classified responders in categories with high biomedical and low biopsychosocial scores and vice versa to identify extreme global attitudes.[12,48] In the United Kingdom, Bishop et al[12] identified 32% of their responders as having extreme global attitudes. These responders differed substantially from others regarding advice to patients that was not in line with clinical guidelines. Our proportion of extreme global attitudes was somewhat lower (24%). Basically, the percentages of extremes are highly dependent on the strength of the negative correlation between subscales. However, as negative correlations in the 2 studies are comparable ($r = -0.38$ and $r = -0.42$, respectively), the difference in proportions of extreme attitudes could be due to other factors, such as different samples or scoring methods.

Interpretation of Findings

Our findings should be seen in the light of small between-group differences and a limited distribution range of scores on both subscales.[35] With almost no spread in scores, separating respondents will necessarily be more difficult.[70] One explanation could be that physical therapists are eclectic in their approach and rather homogeneous as a group regarding their treatment orientation.[71,72] A common educational platform, despite diverse physical therapy specialties, based on a broad and uniform adoption of the International Classification of Functioning, Disability and Health could be a reason for such homogeneity within the physical therapy profession.[43] By contrast, conceptual differences have been shown to be larger when physical therapists are compared with allied health and medical professionals.[56,57] Another explanation might be social desirability bias in responses, as physical therapists have become more aware of clinical guidelines.[12] Social desirability has been addressed previously by examining the relationship between PABS scores (as a measure of deliberately reasoned, ie, explicit, attitudes) and a measure of automatically activated (ie, implicit) attitudes.[47] However, the role of social desirability remains unclear, as implicit attitude measures were not necessarily stronger predictors of clinical behavior than explicit attitude measures.[47]

Whereas 6 (of 9) nonconfirmed hypotheses did not reach the hypothesized magnitude of between-group differences, 3 hypotheses had outcomes that contrasted with the literature. Contrary to expectations, manual therapists tended to have lower biomedical and (slightly) higher biopsychosocial scores than psychomotor physical therapists. Furthermore, physical therapists (of whom 79% were psychomotor physical therapists) who had followed a basic body awareness therapy study program showed somewhat higher biomedical scores than those who had

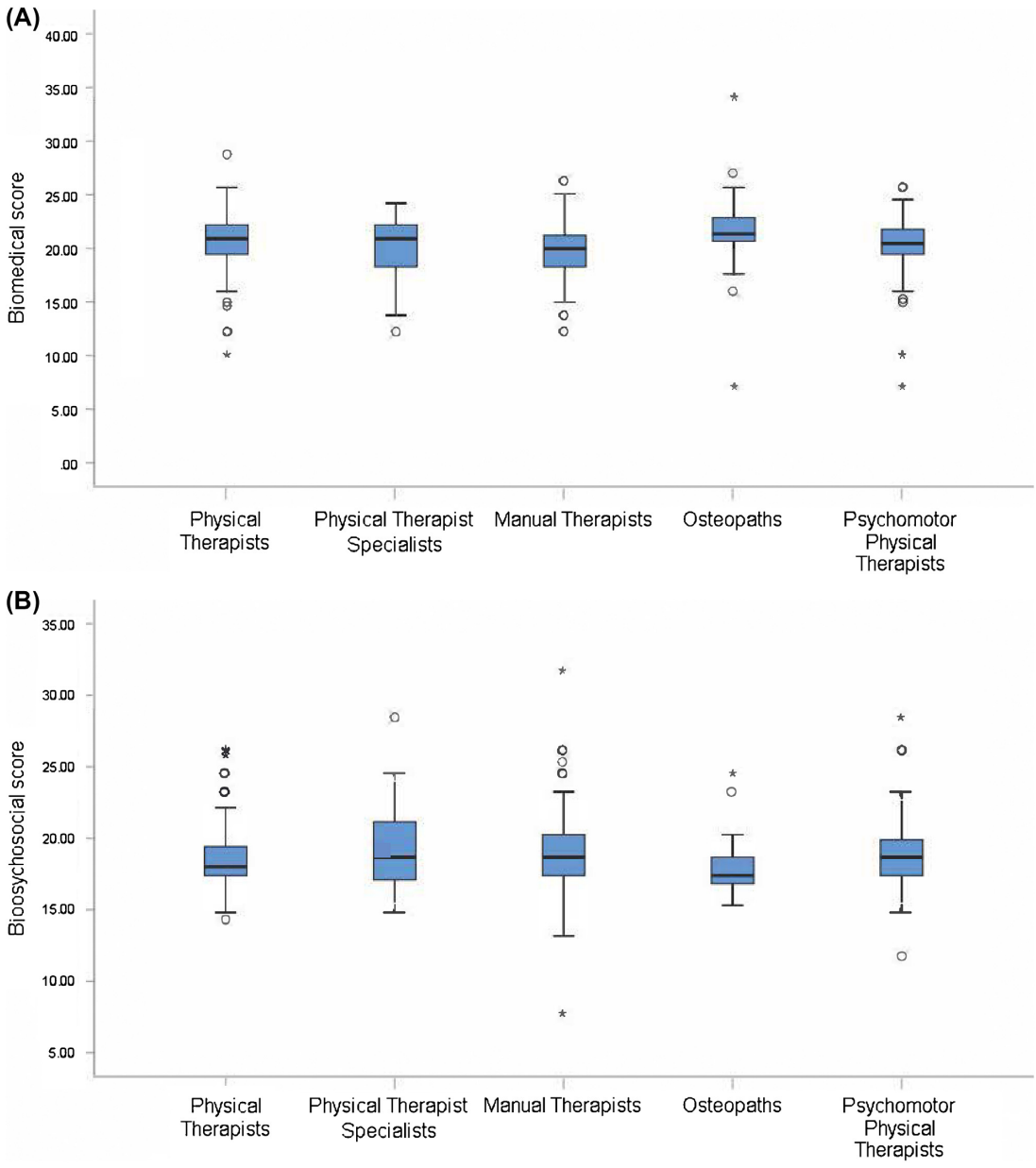

Figure 1.
Box plots displaying scores of professional groups of physical therapists on the biomedical subscale (A) and the biopsychosocial subscale (B) of the Pain Attitudes and Beliefs Scale for Physical Therapists. Asterisks indicate extreme scores that extend more than 3 box lengths from the edge of the box.

not. These unexpected findings might be explained by differences in responders' acquaintance with clinical guidelines and their age, affecting PABS scores. As our results show, 38.8% of psychomotor physical therapists had no or little knowledge of national clinical guidelines compared with only 8.2% of manual therapists (Tab. 3). In addition, 33% of psychomotor physical therapists were more than 55 years old, in contrast with 13% of general physical therapists and 18.5% of manual therapists.

Strengths and Limitations

A strength of our study was the use of scores derived from Rasch model analysis, representing a more precise estimation of responders' "ability" level of the trait of interest, compared with a simple summation of ordinal scores. Ordinal scores are, in contrast to Rasch model–derived interval scores, not invariant across the scale range, tending to measure larger differences between scores at the margins of the distribution range than in the

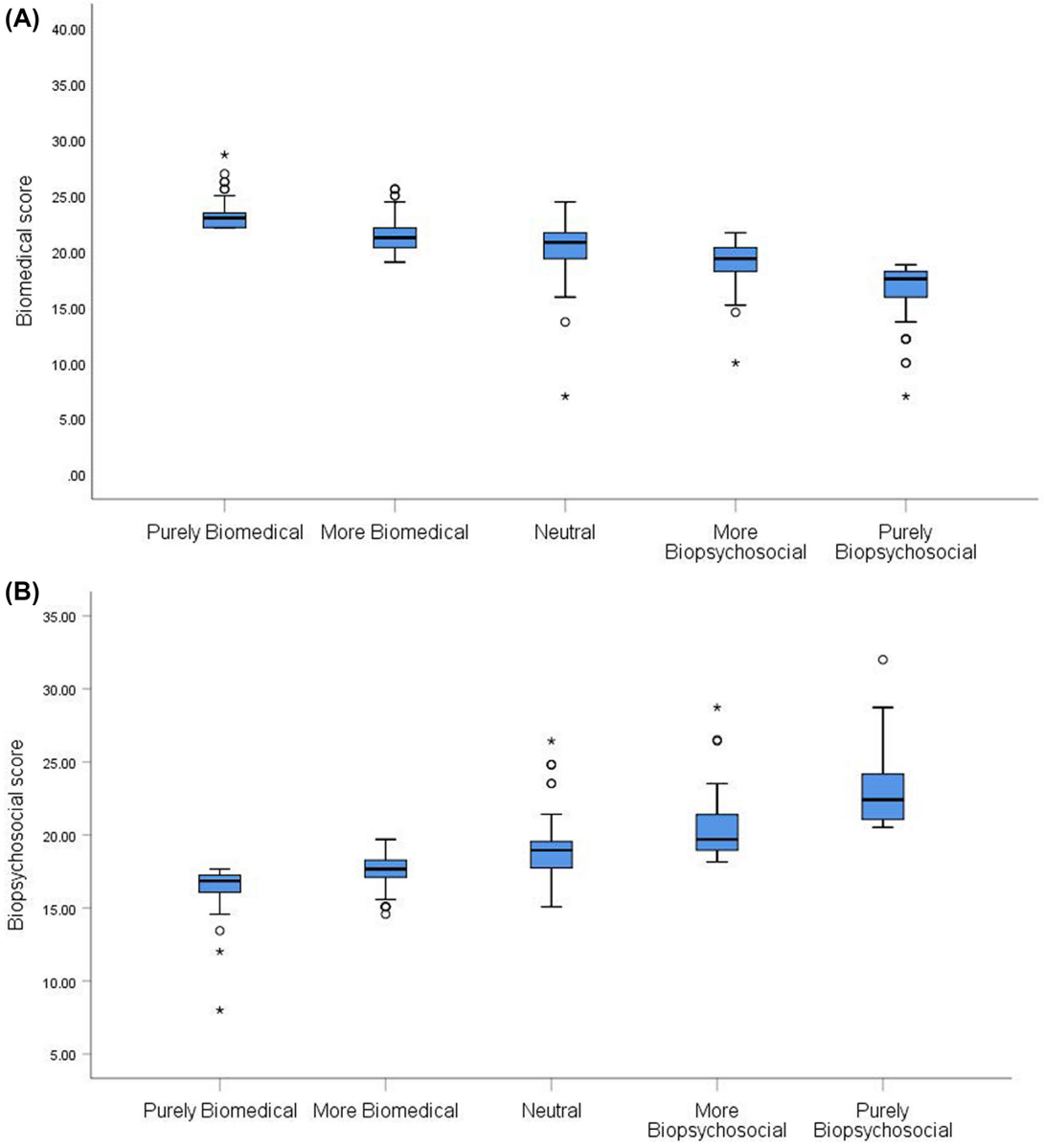

Figure 2.
Box plots displaying scores of 5 distinct subgroups of physical therapists with treatment attitudes ranging from purely biomedical to purely biopsychosocial on the biomedical subscale (A) and the biopsychosocial subscale (B) of the Pain Attitudes and Beliefs Scale for Physical Therapists. Physical therapists with a "purely" biomedical orientation scored very high on the biomedical subscale and very low on the biopsychosocial subscale, whereas therapists with a "purely" biopsychosocial orientation scored very high on the biopsychosocial subscale and very low on the biomedical subscale. The same was true for a "more" (or dominant) biomedical orientation and a "more" (or dominant) biopsychosocial orientation, but to a lesser extent. Therapists with a neutral attitude had similar scores on both subscales. Asterisks indicate extreme scores that extend more than 3 box lengths from the edge of the box.

middle range.[73] To verify this distinction, we performed a post hoc analysis of ordinal PABS scores, which revealed a 0.59-point larger mean difference between subgroups than did Rasch model–derived scores, resulting in 3 additionally confirmed hypotheses (biomedical hypotheses 3, 4, and 5).

A limitation of our study was the lack of strong scientific evidence from previous research on differences in attitudes and beliefs between physical therapists, as a basis for formulating challenging hypotheses. A limited number of demographic or professional factors were found to impact clinicians' beliefs, and the magnitudes of differences in beliefs between groups were generally

small.[21,53] To meet this shortcoming, we used the least possible mean difference of 1 scale point as a minimum requirement for adequate discriminative validity for most hypotheses.

A further limitation was our low response rate (24.8%), although our results were strengthened by the large sample size (n = 662). In addition, an obvious selection bias was present in our convenience sample with an overrepresentation of physical therapist specialists.[34] However, to evaluate discrimination, a spread of scores as wide as possible was needed. The diversity of clinicians with different specialties in our large sample should have provided a sufficient variability in opinions. Further, it is important to note that our results should be considered sample specific for physical therapists and not generalizable to clinicians of allied health care and medical professions. Neither are our results directly transferable to other countries' professional physical therapist groups, as the psychomotor physical therapists within our specific population represent a unique physical therapy tradition that is little known outside the Scandinavian countries.

Regarding the classification into extreme groups, incorporation bias was introduced when subscale scores were used to define the extreme groups followed by comparison of these groups by means of subscale scores. The result was a bias toward making the classification appear more powerful in differentiating than it actually is.[74]

Conclusion and Needs for Future Research

Discriminative validity of the separate subscales of the PABS was not supported. Combining the 2 subscales to classify physical therapists into global treatment attitudes yielded larger differences between subgroups and allowed for better discrimination. The question remains whether the little spread in scores found in our study is due to Norwegian physical therapists being basically similar in their treatment orientation or whether the PABS is not able to detect the differences expected to exist among physical therapists with diverse professional backgrounds and philosophies. Further research on PABS should focus on its content validity and the influence of social desirability on responses.

Author Contributions

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Providing participants: N.D. Eland
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Consultation (including review of manuscript before submitting): N.D. Eland, A. Kvåle, H.C.W. de Vet, L.I. Strand

Ethics Approval

This study was approved by the Norwegian Centre for Research Data (Approval 28806).

Disclosure and Presentations

The authors completed the ICJME Form for Disclosure of Potential Conflicts of Interest and reported no conflicts of interest.
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