

LIMITED ADHERENCE TO CLINICAL PRACTICE GUIDELINES AMONG BELGIAN PHYSIOTHERAPISTS: FINDINGS FROM A 2014–2016 CROSS- SECTIONAL STUDY

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ABSTRACT

Background and purpose: Despite evidence-based clinical guidelines promoting a biopsychosocial approach to managing low back pain, physiotherapists often fail to adhere to these recommendations, influenced by their attitudes. Therefore, this study aimed to explore Belgian physiotherapists' beliefs and attitudes toward low back pain management.

Methods: An observational, cross-sectional study was conducted in Belgium between 2014 and 2016. Physiotherapists' beliefs were evaluated using the Pain Attitudes and Beliefs Scale for Physiotherapists (PABS-PT), which contains a biomedical and psychosocial subscale, and Health Care Providers' Pain and Impairment Relationship Scale (HC-PAIRS). A clinical vignette was used to assess physiotherapists' adherence to guidelines recommending physical activity and work for low back pain. Associations between physiotherapists' demographics, PABS-PT subscales and HC-PAIRS were assessed using Student T-tests and chi-square for group differences, and Pearson's R for correlations.

Results: A total of 565 physiotherapists participated. Out of 561 physiotherapists, 59.5 % provided guideline-adherent recommendations regarding physical activity and 33.9 % out of 560 regarding

work. Physiotherapists with a stronger biomedical and weaker biopsychosocial orientation were less likely to adhere to guidelines concerning work and activity. Beliefs and adherence to guidelines were associated with years since graduation and socio-cultural differences. Sex-based differences were observed in guideline adherence related to activity, with male physiotherapists showing greater compliance.

Conclusion: The study provides evidence that between 2014 and 2016, guideline adherence among physiotherapists in Belgium was low and related to their attitudes and beliefs about low back pain. These attitudes, beliefs and guideline adherence were associated with physiotherapists' graduation year and socio-cultural factors.

Introduction

Low back pain (LBP) is one of the most prevalent health conditions in both men and women, leading to a personal burden, increased work absenteeism and high societal costs ([Yokota et al., 2015](#); [Lambeek et al.,](#)

[2011](#); [Hartvigsen et al., 2018](#)). Given its widespread impact, LBP presents a major challenge in health care ([Buchbinder et al., 2020](#); [Hart- vigsen et al., 2018](#)). To address this challenge, evidence-based clinical guidelines have been developed to guide healthcare providers, such as physiotherapists, to make informed treatment decisions ([Oliveira et al., 2018](#)). For example, guidelines for managing non-specific LBP recommend that healthcare providers assess and treat patients from a biopsychosocial perspective ([WHO, 2023](#); [Oliveira et al., 2018](#); [Van Wambeke et al., 2017](#); [Zhou et al., 2024](#)). This biopsychosocial approach recognises the complex interplay of biological, psychological, and social factors that influence LBP ([Campbell et al., 2013](#)).

The guidelines consistently recommend addressing “yellow flags” due to their prognostic significance, managing psychosocial factors, and implementing supervised exercise therapy and multidisciplinary treatment ([WHO, 2023](#); [Oliveira et al., 2018](#); [Van Wambeke et al., 2017](#); [Zhou et al., 2024](#)). In addition, healthcare providers are encouraged to reassure patients and advise them to stay as active as possible and maintain or return to normal activities and work. International guideline reviews indicate that these recommendations have stayed largely consistent since 2000 ([Kamper et al., 2020](#)). Similarly, the first Belgian national guideline for chronic LBP was published in 2006, recommending that physiotherapists encourage patients to maintain normal activities whenever

possible and ensure that the period of work absenteeism is kept as short as possible (Nielens et al., 2006). The updated LBP guidelines published in 2017 reinforced this recommendation by emphasising that returning to work and resuming normal activities are therapeutic objectives for individuals with LBP (Van Wambeke et al., 2017).

Adherence to clinical guidelines is of major importance for better patient outcomes (Fritz et al., 2007; Rutten et al., 2010; Golec and Valier, 2018) and can also lead to reduced healthcare costs (Childs et al., 2015; Weeks et al., 2019). However, despite the existence of clinical guidelines, it does not ensure physiotherapists' adherence to them (Buchbinder et al., 2020; Slade et al., 2016; Zadro et al., 2019). Physiotherapists' personal choice of treatment modalities are referred to as 'attitudes'. These attitudes can vary between physiotherapists and are influenced by different factors, such as therapists' perceptions, which comprise emotions i.e., how one feels towards LBP, and cognitions i.e., what one thinks about LBP, how to understand it (Leventhal et al., 2012). Thus, physiotherapists' orientation will strongly influence the treatment choice. Previous studies showed that physiotherapists with a biomedically oriented belief provide more guideline-discordant restrictive recommendations regarding physical activity and work activities than physiotherapists with a more biopsychosocial belief (Gardner et al., 2017). This highlights the need to further explore these beliefs and attitudes.

Bogaert et al. (2024) reported that both Belgian physiotherapists and patients continue to encounter substantial barriers to implementing active guideline-based management, including poor awareness of guidelines, misaligned expectations and conceptions about LBP or feel unprepared for effective communication, exercise therapy and integrating psychosocial aspects (Bogaert et al., 2024). Similarly, surveys and interviews conducted among Belgian physiotherapists and the general population over the past decade have revealed that both groups continue to predominantly rely on biomedical explanations for LBP, often attributing pain to physical impairments and partially to completely neglecting psychosocial influences (Roussel et al., 2016; Vanderstraeten et al., 2023; Demoulin et al., 2022; Munneke et al., 2025). Although there are indications of a positive, albeit modest, trend toward improved attitudes and beliefs in Belgium over time, the progress remains relatively limited (Munneke et al. 2025, 2024). Similarly, the proportion of guideline-recommended and non-recommended care in musculoskeletal conditions has remained largely unchanged since the 1990s, while the use of treatments of uncertain clinical value has increased (Zadro et al., 2019).

These findings underscore the need for examination of physiotherapists' beliefs and attitudes in the Belgian context. Studies have shown that beliefs can differ based on geographical region and ethnicity ([Orhan et al., 2018](#); [Yoshikawa et al., 2020](#)) and potentially by sex ([Veldhuijzen et al., 2013](#)), suggesting that these factors may play a role in LBP guideline adherence. Identifying these factors could provide valuable insights for improving guideline implementation.

Hence, the aim of the present study is to explore the beliefs and attitudes behaviour concerning LBP management among physiotherapists in Belgium. This study was deemed of prime importance to assess whether Belgian physiotherapists adhere to the available evidence-based guidelines for the treatment of LBP and, hence, to identify possible targets for implementation work.

Methods

The Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) recommendations were followed to increase the generalizability and the strength of the report ([von Elm et al., 2007](#)). The procedures followed were in accordance with the Helsinki Declaration of 1975, as revised in 2013. Ethics approval was acquired by an independent Commission of Medical Ethics linked to the University Hospital of Brussels.

STUDY DESIGN

This cross-sectional study was conducted between 2014 and 2016 among graduated physiotherapists in Flanders, the Dutch-speaking region, and Wallonia, the French-speaking region of Belgium.

PARTICIPANTS

All licenced physiotherapists in Belgium were eligible to participate. Participants were recruited between October 2014 and March 2016 through phone calls and practice visits in various areas and different types of practices in Wallonia and Flanders. Additionally, participants were recruited at post-graduate lectures and courses for physiotherapists by asking the audience to participate prior to its beginning. Those who agreed to participate signed an informed consent form prior to the study. After providing consent, participants were invited to complete a battery of questionnaires. To minimize bias, all participants were informed that there were no 'correct' answers and encouraged

to share their actual thoughts and beliefs about LBP.

OUTCOME MEASURES

The battery of questionnaires included the following questionnaires.

- A questionnaire about the physiotherapist's socio-demographic background included age, sex and graduation year. This questionnaire was pilot-tested in Dutch on a sample that comprised physiotherapy students, non-medical students and academic physiotherapy staff who did not take part in the study ($n = 22$). They were invited by e-mail to fill in the questionnaire for evaluation. At the end, two questions were asked: "Is this questionnaire clear to you?" and "Do you have any comments about the formulation of certain questions?" Unclearities of all kinds were to be written down. Based on these answers, minor format modifications were made prior to administering the survey to the study cohort. The initial as well as the final questionnaire is added in attachment, see [Appendix 1](#).

- The Pain Attitude and Beliefs Scale for Physical Therapists (PABS-PT) ([Houben et al., 2005b](#)) - The revised version of the PABS-PT was used to evaluate whether physiotherapists had a biomedical or behavioural approach towards the management of patients with LBP. It contains a biomedical subscale (PABS-BIOM) with ten items and a psychosocial/behavioural subscale (PABS-PS) with nine items, which are scored on a six-point Likert scale. Total scores of the biomedical subscale range from 10 to 60 and higher scores indicate a stronger biomedical orientation. Total scores on the psychosocial/behavioural subscale range between 9 and 54 and higher scores indicate a stronger psychosocial orientation. Mean scores of previous studies range between 34.45 for the biomedical subscale and 31.74 for the biopsychosocial subscale ([Alshehri et al., 2020](#)). The reliability and validity of the Dutch version of the PABS-PT were found to be adequate. Previous studies analyzing the psychometric properties confirmed the two-factor model; however, the psychosocial/behavioural subscale items remained uncertain and showed poor internal consistency and discriminative ability ([Ostelo et al., 2003](#); [Mutsaers et al., 2012](#); [Eland et al., 2019](#)). The biomedical subscale has a satisfactory internal consistency ([Houben et al., 2005b](#)). The standard error of measurement (SEM) of the Dutch subscales is currently unknown. However, SEM values for the PABS-PT in other languages ranges from 3.3 to 3.57 for the biomedical subscale and 2 to 3.48 for the psychosocial/behavioural subscale ([Díaz-Fernández et al., 2023](#); [Magalhães et al., 2011](#)).

- The Health Care Providers' Pain and Impairment Relationship Scale (HC-PAIRS) ([Rainville et al.,](#)

1995) - The HC-PAIRS evaluates the attitudes and beliefs of healthcare providers regarding the relationship between pain and impairment in patients with LBP. Total scores range from 13 to 91 points, and higher scores reflect stronger beliefs in the relationship between pain and impairment. Answers are marked on a seven-point Likert scale. The HC-PAIRS with thirteen items after modifications following a factor analysis on a sample of Dutch therapists appeared to be a reliable and valid measure with acceptable internal consistency and construct and criterion validity (Houben et al., 2004; Muller et al., 2024). The thirteen-item version also showed a unidimensional construct (Muller et al., 2024). However, less is known about the discriminative ability. The SEM of the Dutch PABS-PT is unknown, however, for other language versions, it ranges from 3.75 to 4.34 (Moran et al., 2017; Magalhaes et al., 2011)

- Clinical vignette developed by Rainville et al., (2000) - This clinical vignette describes a factory foreman with persistent, severe back and leg pain after a motor vehicle accident and only minimal evidence of spinal degeneration on MRI (Rainville et al., 2000). The purpose was to evaluate treatment recommendations concerning daily physical activity (question 3 of the clinical vignette) and continuing work in their professional life (question 4) to assess the physiotherapists' attitudes. Rainville et al. developed three scenarios with different degrees of spinal pathology, symptoms and work requirements, without any evidence of structural damage or neurological compression that would require surgery (Ostelo et al., 2003; Houben et al., 2005b). In the present study, only the third clinical vignette was used to limit drop-out due to lengthy questionnaires. The Dutch version of this clinical vignette was used (Houben et al., 2004). Answers 1 or 2 in the clinical vignette were defined as adequate recommendations for activity level (i.e. 1-no activity limitations, 2-avoid only painful activities) and work (1-full time, full duty; 2-full time, moderate duty), which translates the scores into a dichotomous guideline consistent or inconsistent answer (Domenech et al., 2011). This classification of guideline-consistent and inconsistent answers aligns with previous studies (Fouillé et al., 2023; Husted et al., 2020) and is consistent with the Belgian guideline regarding chronic LBP of 2006 (Nielens et al., 2006) and LBP of 2017 (Van Wambeke et al., 2017), based on the authors' evaluation. The validity of clinical vignettes is uncertain, varying from minimal differences to poor concordance with actual behaviour and standardized patients (Peabody et al. 2000, 2004; Brunner et al., 2016; Overmeer et al., 2009).

All questionnaires were available in Dutch and had already been validated in this language. As no French version of the questionnaires was available, they were translated through a validated

process based on the procedure described in international standards for translating questionnaires ([Cruchinho et al., 2024](#)). Five stages were performed: translation from Dutch to French by two independent researchers and then reconciled. This version was translated back to Dutch by two independent researchers and then reviewed by an expert committee. This pre-final version was pre-tested by a small group of physiotherapists, which resulted in the final versions used within this study and within previous studies assessing attitudes in Belgian graduate and undergraduate physiotherapists ([Leysen et al. 2021a, 2021b](#)).

STATISTICAL ANALYSIS

The normality of the data for continuous variables was assessed using Q-Q plots. If the data were normally distributed, parametric tests were applied; otherwise, non-parametric methods were used.

The link between guideline adherence regarding activity and work and subgroups of PABS-PT and HC-PAIRS was assessed using Student t- tests. Differences between male and female physiotherapists on PABS-PT subgroups and HC-PAIRS were assessed using a chi-square test. Student t-tests were used to assess differences between Dutch and Frenchspeaking physiotherapists on PABS-PT subgroups and HC-PAIRS, and chi-square for differences in guideline adherence.

Differences in years since graduation between guideline adherence and non-guideline adherence was assessed using Student t-tests. Pearson's r was used to assess the correlation between years since graduation and the subgroups of the PABS-PT, as well as between years since graduation and the HC-PAIRS. A correlation below 0.1 was considered as no correlation, >0.1 as weak, >0.3 as moderate, and >0.7 as a strong correlation ([Dancey and Reidy, 2007](#)).

Total HC-PAIRS and PABS-PT subscale scores were calculated based on available responses, with a maximum of two missing items permitted per scale. Participants with more than two missing items on a scale were excluded from the analysis. Regarding socio-demographic background and clinical vignette responses, participants were excluded if the response was missing.

A p-value less than 0.05 was considered statistically significant. For statistical analysis IBM SPSS Statistics 25 was used.

Results

In total, 565 physiotherapists participated: 280 from Flanders and 285 from Wallonia, see [Table 1](#). Their mean age was 35 (± 12) years, with 244 (43 %) males and 315 (56 %) females. The mean number of years since graduation was 11 (± 12) and 16 % of the participants were enrolled in a postgraduate course at the time of study participation.

Based on the clinical vignette, 334 out of 561 (59.5 %) physiotherapists gave recommendations that are in line with current guidelines concerning the patient’s physical activity and 190 out of 560 (33.9 %) regarding work situation, see [Fig. 1](#). This implies that 41.5 % of participating Belgian physiotherapist’s did not comply with current best evidence guidelines regarding activity recommendations for patients having LBP, and 66.1 % did not adhere to best evidence guidelines regarding returning to work recommendation for patients having LBP.

Table 1. Demographic characteristics and low back pain-related beliefs of 565 physiotherapists in Belgium.

	Mean $\pm$ SD [Min-Max]
Age	35 $\pm$ 12 [21–70]
Sex (percentage female)	56
Years since graduation	11 $\pm$ 12 [0–51]
PABS-BIOM (possible range 10–60)	31 $\pm$ 7 [13–53]
PABS-PS (possible range 9–54)	33 $\pm$ 5 [19–50]
HC-PAIRS (possible range 13–91)	46 $\pm$ 10 [19–79]

Legend: PABS = Pain Attitudes and Beliefs Scale for Physical Therapists, BIOM = Biomedical subscale, PS = psychosocial/behavioural subscale, HC-PAIRS = Health Care Providers’ Pain and Impairment Relationship Scale, SD = standard deviation.

Fig. 1. Attitudes of 565 physiotherapists in Belgium based on the clinical vignette responses.



Data represents percentages of the total responses that were consistent/inconsistent with guidelines.

LINK BETWEEN BELIEFS AND ATTITUDES

Overall, physiotherapists with guideline-adherent recommendations regarding activity had significantly lower HC-PAIRS and PABS-BIOM scores, see Fig. 2. No significant difference was found in PABS-PS.

Physiotherapists who gave guideline adherent recommendations regarding work had significantly higher PABS-PS scores, and lower PABS-BIOM and HC-PAIRS scores.

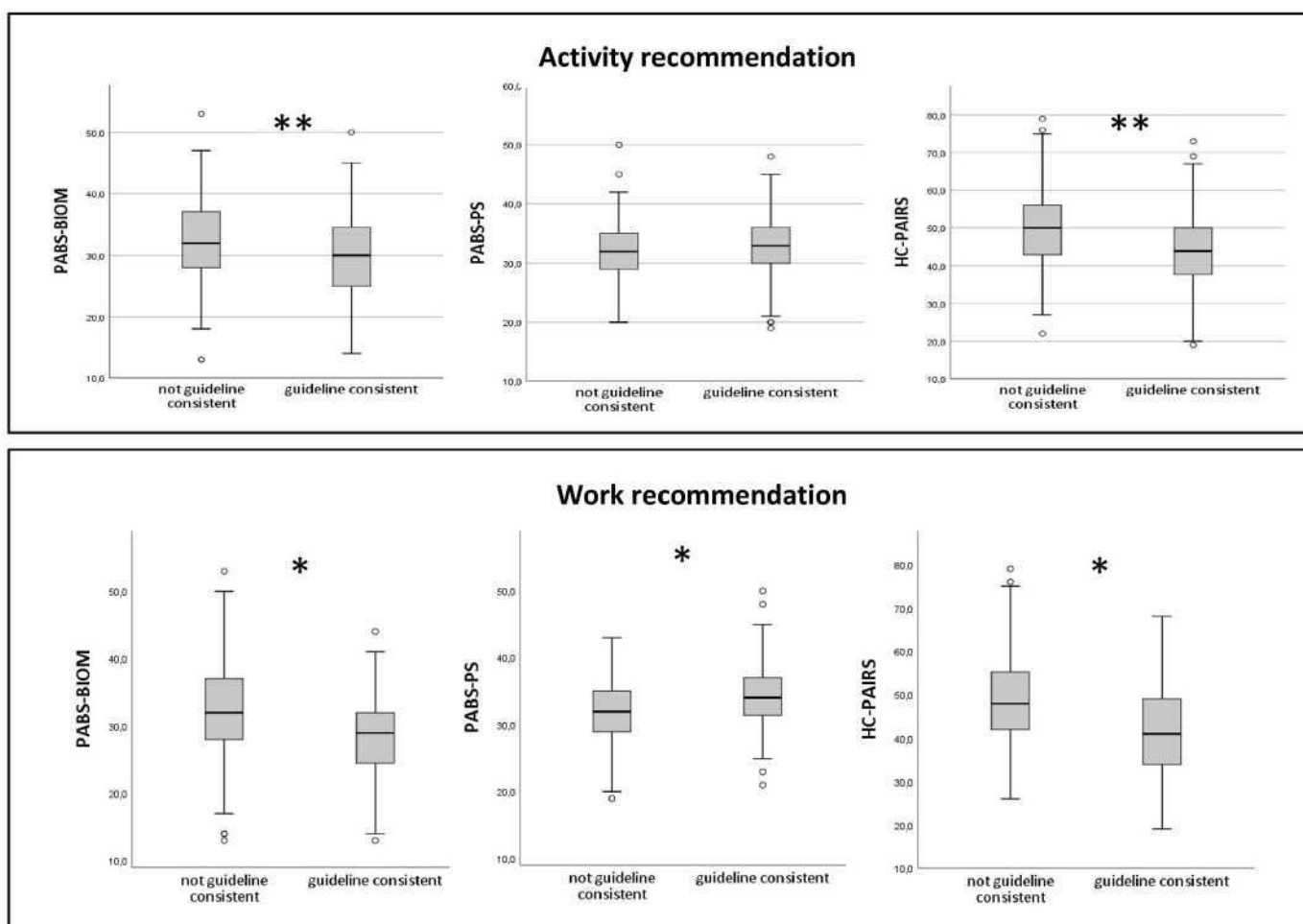
TIME SINCE GRADUATION

Significant weak associations were found between more years since graduation and higher PABS-BIOM ($r = 0.297, p < 0.001$) and the HC-PAIRS ($r = 0.278, p < 0.001$) scores, see Table 2. On the contrary, more years since graduation was weakly associated with lower PABS-PS ($r = -0.116, p = 0.007$) scores. Physiotherapists who make guideline adherent recommendations for activities were graduated more recently compared to the group of physiotherapists who do not adhere to the guidelines concerning activity recommendations (respectively mean 10.6 ± 11.2 years and 12.7 ± 12.6 years, $p = 0.045$). No significant difference was found in work absenteeism recommendation in relation to graduation year.

SEX DIFFERENCES

No differences between male and female physiotherapists were found in PABS-BIOM, PABS-PS and HC-PAIRS scores, or in guideline adherent recommendations for work. However, male physiotherapists made significantly more guideline-adherent recommendations for activity (65.4 % versus 54.7 %, $p = 0.011$) compared to female physiotherapists.

Fig. 2. Link between the beliefs and attitudes of 565 physiotherapists in Belgium.



Legend: PABS = Pain Attitudes and Beliefs Scale for Physical Therapists, BIOM = Biomedical subscale, PS = psychosocial/behavioural subscale, HC-PAIRS = Health Care Providers' Pain and Impairment Relationship Scale, with higher scores reflecting stronger beliefs in the relationship between pain and impairment. * = $p < 0.05$, ** $p < 0.01$.

Table 2. Associations between socio-demographic background and attitudes and beliefs.

	Years since graduation		Sex			Socio-cultural		
	Correlation/Mean, SD	p-value	Male	Female	P-value	Flanders	Wallonia	p-value
HC-PAIRS	r = 0.297	< 0.001	45.69 ± 9.82	46.86 ± 10.41	0.088	47.38 ± 9.53	45.28 ± 10.62	0.014
PABS-BIOM	r = 0.278	< 0.001	31.64 ± 6.71	30.98 ± 6.71	0.885	32.13 ± 6.25	29.87 ± 6.92	< 0.001
PABS-PS	r = -0.116	0.007	32.42 ± 4.76	32.77 ± 4.57	0.392	31.71 ± 4.38	33.52 ± 4.73	< 0.001
Activity recommendation								
Adherent	10.60 ± 11.92	0.045	65.4 %	54.7 %	0.011	69.7 %	49.6 %	< 0.001
Non-adherent	12.76 ± 12.62		34.6 %	45.3 %		30.3 %	50.4 %	
Work recommendation								
Adherent	11.65 ± 12.06	0.805	35.4 %	32.9 %	0.588	22.5 %	45.1 %	< 0.001
Non-adherent	11.37 ± 12.36		65.6 %	67.1 %		77.5 %	54.9 %	

Legend: PABS = Pain attitudes and beliefs scale, BIOM = Biomedical subscale, PS = psychosocial/behavioural subscale, HC-PAIRS = Health Care Providers' Pain and Impairment Relationship Scale, ± = standard deviation, r = Pearson correlation coefficient.

SOCIO-CULTURAL DIFFERENCES

Compared to French-speaking physiotherapists, Dutch-speaking physiotherapists showed a significantly higher mean score on the PABS-BIOM (32.13 versus 29.87, $p < 0.001$) and the HC-PAIRS (47.38 versus 45.28, $p = 0.014$) and a significant lower score on the PABS-PS (31.71 versus 33.52, $p < 0.001$). However, the differences were smaller than the SEM.

In general, Dutch-speaking physiotherapists were more likely to make guideline-adherent recommendations concerning physical activity compared to French-speaking physiotherapists (69.7 % versus 49.6 %, $p < 0.001$). However, the opposite direction was observed for work recommendations, with fewer Dutch-speaking physiotherapists providing guideline-adherent recommendations about the patient's work continuation than French-speaking physiotherapists (22.5 % versus 45.1 %, $p < 0.001$).

Discussion

The aim of the present study was to explore Belgian physiotherapists' beliefs concerning LBP management and their adherence to the evidence-based clinical guidelines in 2014 and 2016. Overall, there is significant room for improvement in both the beliefs of Belgian physiotherapists and their adherence to guidelines. Less than two-thirds of the sample (59 %) recommended staying active, and only one-third (34 %) advised patients to continue working. Additionally, the findings suggest that physiotherapists maintain a moderately biomedical orientation, with beliefs that primarily link pain to physical impairment.

This reflects a tendency toward a biomedical perspective rather than a fully biopsychosocial approach, with limited alignment to psychosocial factors in their clinical practice.

Previous studies found similar adherence to guidelines in Belgian chiropractors ([De la Ruelle et al., 2022](#)) and physiotherapy students ([Munneke et al., 2024](#)) regarding patient advice for managing LBP. Moreover, among Belgian LBP patients, 23 % reported receiving recommendations from their general practitioners or immediate social environment to rest in bed, while only 14 % were advised to remain active ([Goubert et al., 2004](#)). However, more recent studies found more biopsychosocial beliefs in USA ([Rufa et al., 2021](#)), New Zealand ([Moran et al., 2017](#)), Brazil ([Ferreira et al., 2023](#)), Sweden ([Schröder et al., 2020](#)) and also more guideline adherence in Belgium ([Fourré et al., 2023](#)). This omission of the healthcare provider to comply with the evidence-based clinical guidelines may have a long-term impact on the patient's outcome of LBP and function. Indeed, it has been shown that higher percentages of guideline adherence are related to a greater improvement in physical functioning and lower health care utilization ([Rutten et al., 2010](#)). However, the amount of non-compliance with the existing clinical guidelines for the treatment of LBP remains substantial and is found to be a worldwide problem throughout healthcare disciplines ([da Silva et al., 2015](#); [Slade et al., 2016](#)).

LINK BETWEEN BELIEFS AND ATTITUDES

Physiotherapists' behaviour, including treatment recommendations, is influenced by their attitudes and beliefs about treatment and causes of LBP ([Bishop and Foster, 2005](#); [Bishop et al., 2008](#); [Domenech et al., 2011](#); [Leventhal et al., 2012](#); [Gardner et al., 2017](#)). The findings of this study in Belgian physiotherapists are consistent with existing literature from other countries about the relationship between beliefs and professional behaviour among physiotherapists. Physiotherapists with a strong biomedical view adhere less to clinical guidelines concerning work and activity recommendations in LBP than physiotherapists with a less biomedical orientation ([Rainville et al., 2000](#); [Ostelo et al., 2003](#); [Houben et al., 2005a](#); [Darlow et al., 2012](#)). This is in line with the study by [Rainville et al., \(2000\)](#), which concluded that the beliefs of healthcare providers, measured with HC-PAIRS, can explain up to 22 % of the variance in their work recommendations to a LBP patient. Physiotherapists with a stronger psychosocial beliefs adhere more to clinical guidelines concerning work, although no difference was found regarding activity. However, this could partly be explained by the poor discriminative ability of the psychosocial subscale ([Eland et al., 2019](#), [Mutsaers et al., 2012](#)).

TIME SINCE GRADUATION

The results of the present study point out that physiotherapists who graduated more recently generally hold lesser biomedical beliefs and stronger psychosocial beliefs compared to physiotherapists who obtained their degree further in the past. However, this association was weak. Our findings are in accordance with previous studies ([Pincus et al., 2007](#); [Christe et al., 2021](#); [Munneke et al. 2025, 2024](#)). In contrast, in the study of [Tan et al., \(2014\)](#) Chinese healthcare providers older than 40 held more positive beliefs about LBP and its consequences (measured with the Back Beliefs Questionnaire) than the younger groups ([Tan et al., 2014](#)). On one hand, the different measurement tools used across studies make it hard to compare study findings. On the other hand, the results will undoubtedly differ between countries, because of cultural differences in health care education, organization and utilization ([Bates et al., 1993](#); [Tait et al. 1982, 2004](#); [Orhan et al., 2018](#); [Yoshikawa et al., 2020](#)).

SEX

While no sex differences were observed in biomedical and psychological beliefs, or in guideline-adherent work recommendations, male physiotherapists provided significantly more guideline-adherent recommendations for physical activity compared to female physiotherapists. However, previous studies have reported conflicting findings, highlighting the need for further investigation into potential sex

differences in this area ([Fullen et al. 2008, 2011](#); [Bartley et al., 2015](#); [Linton et al., 2002](#); [Munneke et al., 2025](#)).

SOCIO-CULTURAL DIFFERENCES

Belgium is a complex country, since it is composed of three Communities: the Flemish (60 %, Dutch-speaking), French (40 %) and German (<1 %) community. This forms a complex political system where “education” is the responsibility of the different communities. However, because of the research design and the presence of multiple confounders, the study cannot attribute the differences to educational factors. Therefore, further investigation is necessary to evaluate educational differences and its impact on healthcare providers’ attitudes and beliefs.

Overall, in the present study physiotherapists of the French Community show a less biomedical view and a greater adherence to the biopsychosocial model compared to physiotherapists of the Dutch

community. However, these differences in beliefs are relatively small and fall within the measurement error of the PABS and HC-PAIRS. The recommendations, however, indicate a more ambiguous picture with more guideline-adherent recommendations concerning activities made by Dutch-speaking physiotherapists compared to French-speaking physiotherapists, but the opposite direction accounts for work recommendations. Some issues in the composition of the two groups must be addressed. Firstly, the Dutch-speaking group is slightly older in general than the French-speaking group, where the former also shows greater variation in age. Secondly, the Dutch-speaking group in general is graduated a longer time ago than the French-speaking groups, where, again, the former also shows greater variation in years since graduation. Lastly, 25 % of the Dutch-speaking physiotherapists are currently following a postgraduate course, compared to only 8 % of the French-speaking physiotherapists. This depicts the different composition of both groups, which complicates comparison. Although the ambiguous results, the beliefs, as measured by the two questionnaires, do show an association with the attitudes, reflected by their recommendations. Specifically, physiotherapists with stronger biomedical perspectives tend to provide less guideline-adherent recommendations and vice versa, as stated earlier.

LIMITATIONS

This study has several limitations that warrant consideration. First, although the Dutch-speaking and French-speaking groups were both well represented, their slightly different compositions may have influenced group-level comparisons. Second, the absence of a prior sample size calculation, which makes it more uncertain if the sample size was sufficient to detect potentially relevant associations. However, the large recruited sample size helps to mitigate this concern. A third limitation relates to the timing of data collection. Participants were recruited between 2014 and 2016, and their recommendations were evaluated against the 2017 Belgian LBP guidelines. Although this guideline was published after data collection, key recommendations—particularly those concerning the continuation of physical activity and return to work—have remained largely consistent since the 2006 version ([Kamper et al., 2020](#); [Nielens et al., 2006](#)). While some shifts in physiotherapists' attitudes may have occurred over time ([Munneke et al. 2025, 2024](#); [Zadro et al., 2019](#)), available evidence suggests that these changes have been limited ([Munneke et al. 2025, 2024](#); [Zadro et al., 2019](#)). This supports the continued relevance of the 2014–2016 data for understanding current clinical practice and identifying persistent barriers to guideline implementation. Fourth, although the Dutch versions of the chosen questionnaires have been frequently tested and

demonstrated adequate clinimetric properties, the French-language versions have not been formally validated. A fifth limitation concerns the method of data collection. The use of self-reported questionnaires and clinical vignettes always holds limitations that are subject to this kind of research, including potential social desirability bias and ecological validity ([Edwards, 1953](#); [Daniels et al., 2011](#)). Although in real life, in practice, case analyzing would be the gold standard for evaluating physiotherapists' attitudes ([Koes et al., 2010](#)), these methods are significantly more resource-intensive. Clinical vignettes remain a feasible and reasonably valid alternative for measuring guideline adherence among large groups of physiotherapists ([Rutten et al., 2006](#)). Last, no subgroups of physiotherapists were identified, e.g. based on relevant experience with LBP patients or specialized courses followed. In-depth information gathering, as well as focus groups, could have enriched the understanding of underlying barriers and facilitators related to their attitudes and adherence to clinical guidelines.

CLINICAL RELEVANCE

This study underscores the significant gap between evidence-based practice and attitudes and beliefs held by physiotherapists - a gap not limited to Belgium but recognized as a global problem ([Gardner et al., 2017](#); [Traeger et al., 2019](#)). International studies consistently reveal similar guideline-discordant attitudes and beliefs among physiotherapists and other health care providers ([Christe et al., 2021](#); [Gardner et al., 2017](#)). Health care providers' attitudes often diverge from guideline recommendations and prioritize their personal treatment preferences, clinical experience, and peer consensus over guideline recommendations, leading to inconsistent care ([Slade et al., 2016](#); [da Silva et al., 2015](#)). This is partly explained by the insufficient and inadequate educational programs, both a Belgian and global problem ([Munneke et al., 2024](#); [Briggs et al., 2015](#); [Thompson et al., 2018](#)). Previous studies have shown that adequate and sufficient educational interventions can improve physiotherapists' attitudes and beliefs towards LBP ([Munneke et al., 2025](#); [Kent et al., 2023](#); [Schroder et al., 2020](#)). It has demonstrated that physiotherapy students can become more oriented toward a biopsychosocial model, believe less in the relationship between pain and impairment and provided more guideline-adherent recommendations. This improvement is partly due to maturation, but also due to the health educational programs that physiotherapists undergo. Given this, the next logical step is to critically examine the curricula of both undergraduate and graduate educational programs to improve the beliefs towards a more biopsychosocial framework and the attitudes towards more guideline-adherent recommendations ([Thompson et al., 2018](#); [Vincenot et al., 2025](#)). These critical

examinations and potential interventions to improve the curricula should consider the differences in physiotherapists' attitudes and beliefs based on graduation years and socio-cultural background. Furthermore, conducting trend analyses among both graduate and undergraduate physiotherapists could provide valuable insights into how these attitudes evolve over time — an area that remains underexplored. However, even when beliefs and attitudes are improved, implementing guideline-adherent behaviour is challenging and multifactorial influenced. Physiotherapists often experience lack of confidence, difficulty in changing behaviour, discrepancies with patient expectations, and complexity of guidelines, which can lack specific recommendations ([Gardner et al., 2017](#); [Barth et al., 2016](#); [da Silva et al., 2015](#); [Poitras et al., 2012](#); [Qumseya et al., 2021](#); [Slade et al., 2016](#)). These challenges hinder essential changes needed to improve LBP care, such as integrating psychosocial factors into management and ensuring effective communication, including recommendations to stay active and continue working. As a result, these barriers can have significant implications for improving both patient outcomes and the healthcare system. To address these barriers, qualitative research could provide valuable insights into the underlying reasons for non-adherence and the challenges of implementing biopsychosocial-oriented care in clinical practice. ([Curran et al., 2012](#)). This information could be invaluable in further tailoring intervention strategies to improve guideline adherence among physiotherapists and ultimately, contribute to better patient outcomes, reduced healthcare costs, and a more consistent national approach to low back pain management.

Conclusion

The present study, based on data collected between 2014 and 2016, provides evidence that guideline adherence among physiotherapists in Belgium was low and related to their attitudes and beliefs concerning low back pain. These attitudes, beliefs and guideline adherence were associated with physiotherapists' graduation year and socio-cultural factors. Although the data are not recent, the findings remain relevant today, as recent studies confirm that Belgian physiotherapists continue to face significant challenges in adhering to clinical guidelines, and that the gap between recommended practice and underlying beliefs persists ([Munneke et al., 2025](#); [Zadro et al., 2019](#); [Bogaert et al., 2024](#)). Yet, key guideline recommendations — particularly regarding physical activity and return to work — have remained largely unchanged since 2006. This highlights an urgent need to improve targeted interventions to address this gap. Strengthening the integration of a biopsychosocial framework into both undergraduate and postgraduate education — while tailoring

these efforts to account for socio-cultural factors and graduation cohorts — may improve adherence and patient outcomes. Ultimately, improving guideline adherence is critical not only for enhancing patient care but also for reducing healthcare costs and promoting more effective national management of low back pain. Addressing these barriers will require coordinated efforts among educators, policymakers, and clinicians to ensure evidence-based low back pain care becomes the norm in physiotherapy practice.

CREDIT AUTHORSHIP CONTRIBUTION STATEMENT

Marijke Leysen: Writing - review & editing, Writing - original draft, Methodology, Investigation, Formal analysis, Data curation, Conceptualization.

Jo Nijs: Writing - review & editing, Supervision, Methodology, Investigation, Conceptualization.

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Kevin Kuppens: Writing – review & editing, Methodology, Conceptualization.

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Nathalie Roussel: Writing - review & editing, Supervision, Methodology, Conceptualization.

DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available from the corresponding author upon reasonable request.

ETHICS APPROVAL STATEMENT

The procedures followed were in accordance with the Helsinki Declaration of 1975, as revised in 2013. Ethics approval was acquired by an independent Commission of Medical Ethics linked to the University Hospital of Brussels.

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DECLARATION OF COMPETING INTEREST

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

APPENDIX A. SUPPLEMENTARY DATA

Supplementary data to this article can be found online at
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