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Physiotherapists' ability to identify and manage specific low back pain: an exploratory vignette-based cross-sectional study

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Background

Low back pain (LBP) is a major global burden expected to increase in the years to come. Clinical practice guidelines recommend diagnostic triage as a first step to differentiate specific from non-specific LBP, which might be challenging in clinical practice.

Objectives

This exploratory study aimed to evaluate the ability of specialized musculoskeletal physiotherapists to recognize and manage cases of specific LBP.

Design

This study design is an online cross vignette-based-sectional study.

Methods

Physiotherapists (n=105) with a post-graduate degree in musculoskeletal/orthopaedic manual therapy were recruited in Belgium to participate in an online study (Direct Physio trial). We evaluated their ability to recognize specific underlying spinal pathologies through two clinical vignettes describing the symptoms of a patient with lumbar spinal stenosis (LSS) and spondyloarthritis (SA).

Results

The majority of physiotherapists suspected a specific cause of LBP in both vignettes (i.e., 69% for the LSS and 94% for the SA case). The detection rate of the correct spinal pathology was 47% for the LSS case and 28% for the SA case. As a first clinical step, 31% of the physiotherapists chose to refer the LSS case for medical management, compared to 94% for the SA case.

Conclusion

This exploratory study provides preliminary, condition-specific insights into the diagnostic triage performance of specialized physiotherapists. However, recognition of the diagnosis and referral decisions remain variable across the conditions explored. Future efforts should focus on the evaluation of clinical and cost-effectiveness of direct access to physiotherapists in healthcare trajectories.

Keywords: direct access; diagnostic triage; specific low back pain; physiotherapy

1. Introduction

Low back pain (LBP) is the primary cause of disability worldwide and its prevalence is expected to increase in the years to come [1]. A large proportion of people with LBP are classified as having non-specific LBP, reflecting current limitations in reliably identifying a single pathoanatomical source. In that case, pain and disability are influenced by interacting biological, psychological, and social factors [2–4]. However, in 5 to 10% of the cases, LBP is caused by a specific medical condition, such as spinal stenosis, disc herniation, vertebral fracture, malignancy, infection, spondyloarthritis or cauda equina syndrome. Clinical practice guidelines for the management of LBP recommend a diagnostic triage as a first step [5–7], which involves differentiating between specific and non-specific LBP. In first-line care, a combination of warning signals can raise the level of concern of the clinician and, in some cases, could lead to referring the patient for further examination in second/third line care [8].

Traditionally, the historical and legal trajectory for patients with LBP is to first consult a general practitioner (GP). GPs perform the diagnostic triage and determine the clinical trajectory. When a specific cause of LBP is suspected, patients can be referred to a specialist physician or to the emergency department, depending on the severity of the pathology [9]. However, when non-specific LBP is suspected, no referral to second/third line care is needed. In that case, conservative management is advised, which includes reassurance, exercise therapy, and manual therapy when appropriate [5–7,10].

Access to timely management for LBP is often delayed due to the high workload of GPs, particularly during periods of increased viral infections, such as seasonal flu outbreaks [11]. During these times, GP schedules are often saturated, resulting in prolonged waiting times for patients with LBP. This delay may contribute to the worsening of symptoms and highlights the need for alternative LBP care trajectories to ensure timely assessment and management.

Direct access to physiotherapy is already a recognized part of the usual care trajectory in different countries, in Europe and worldwide [12]. This means that a patient with musculoskeletal pain can schedule an appointment with a physiotherapist without referral by a medical doctor. Physiotherapists are trained to evaluate and manage musculoskeletal conditions such as LBP. This evaluation includes screening and management of psychosocial factors, allowing to reduce the risk of chronicity in patients and decrease potential costs for the healthcare system [13,14]. Physiotherapists see their patients more frequently compared to GPs, allowing them to quickly react and refer the patient if their condition worsens [15]. Moreover, studies have shown that direct access to physiotherapy significantly reduces over-medication and healthcare costs, and leads to higher patient satisfaction and better clinical improvement (in terms of pain and disability) compared to traditional care trajectories [16–19]. Despite these advantages and the international policy that recommends to implement direct access, it is not implemented in primary care and emergency departments of 30% of the member countries of the World Confederation for Physical Therapy [12].

A common concern regarding direct access to physiotherapy is that physiotherapists may lack the necessary competences to perform diagnostic triage in patients with LBP, jeopardizing urgent referral of people with specific LBP, including serious pathologies, to secondary care [20–23]. In direct-access settings, vignette-based studies show variability in clinicians' suspicion, diagnostic hypotheses, and referral decisions [20–23]. Importantly, triage and referral decisions are not solely knowledge driven. Evidence indicates that physiotherapists' beliefs and attitudes influence clinical decision-making and advice in low back pain [24,25]. Qualitative studies further suggest that perceptions of risk, diagnostic uncertainty, and even "gut feeling" may shape referral thresholds [26,27]. In addition, miscalibration in clinical judgment may contribute to both over-

and under-referral [28]. However, it remains unclear whether physiotherapists' knowledge, attitudes, and beliefs are associated with objective triage performance in a direct-access setting.

Moreover, these studies only included general physiotherapists, whereas evidence suggests that physiotherapists with specialized training have improved competencies compared to physiotherapists with a musculoskeletal interest but without specialization [29]. In Belgium, musculoskeletal physiotherapy (IFOMPT-level training) is a formally recognized specialization within physiotherapy. It requires completion of at least 75 European Credit Transfer and Accumulation System (ECTS) of postgraduate education in addition to a 240 ECTS physiotherapy degree. This training focuses on advanced clinical reasoning, systematic neuromusculoskeletal examination, and evidence-based management of complex disorders within a biopsychosocial framework. It also includes competencies in identifying indications and contraindications for manual therapy, understanding musculoskeletal pathologies, and interpreting medical imaging principles skills that are directly relevant to first-line diagnostic triage. However, to date, no study has investigated the diagnostic triage ability of these specialized physiotherapists for low back pain in Belgium.

Accordingly, the main objective of this study was exploratory and was to examine the ability of specialized physiotherapists in musculoskeletal management (IFOMPT level) to suspect, identify, and refer cases of specific LBP. A secondary exploratory objective was to investigate whether their knowledge, attitudes, and beliefs concerning LBP were associated with correct diagnostic triage, defined here as the suspicion, identification, and referral of patients with specific LBP. We hypothesized that specialized physiotherapists show sufficient ability to perform a correct diagnostic triage for patients with LBP, and that biomedical attitudes and beliefs about LBP would increase the referral rate.

2. Methods

2.1. Study design

This cross-sectional study was part of a pragmatic non-randomized clinical trial (Direct Physio trial), registered on Clinicaltrials.gov (NCT05215093), to compare the (cost-)effectiveness of direct access to physiotherapy for acute LBP in Belgium. The study was supported by the Belgian National Institute for Health and Disability Insurance (INAMI/RIZIV) and driven by four partner universities in Belgium. The study was approved by the local ethical committee. The results are reported using STROBE guidelines for observational studies [30].

2.2. Setting

This study was carried out online through the secured internet platform Qualtrics (Qualtrics, Provo, UT). The recruitment took place between April 2024 and 2025. Participants accessed the platform using their own digital device (e.g., computer, tablet, smartphone) at the location and time of their convenience. The information for participants detailing the study (rationale, objectives, and legal) was provided after accessing the platform. After providing informed consent, participants were invited to complete the online survey. The online survey included the questionnaires, followed by two clinical vignettes with two open questions (see 2.4 Variables). The timing to complete the study was estimated to take 20 minutes.

2.3. Participants

Dutch- and French-speaking physiotherapists were informed about the possibility to participate in a clinical trial evaluating the effectiveness of direct access to physiotherapy in Belgium (through the DirectPhysio trial). Various recruitment strategies through different networks, such as the national association of physiotherapists (e.g., Axxon), universities, hospitals, and private practices, were used [31]. Moreover, media campaigns involving national journals were used. The inclusion criteria were: to be clinically active as a physiotherapist in Belgium; to have a post-graduate degree in musculoskeletal and/or orthopaedic manual therapy (IFOMPT accredited); and to regularly manage patients with acute LBP in current clinical practice. Self-identification was used for these inclusion criteria.

2.4. Variables

Participants completed four questionnaires and two clinical vignettes offered in the language of the participant (i.e., French or Dutch), more specifically the Health Care Providers' Pain and Impairment Relationship Scale (HC-PAIRS) [32–34], the 10-item version of the Back Pain Attitudes Questionnaire (Back-PAQ-10) [35–37], the Pain Attitudes and Beliefs Scale for Physiotherapists (PABS-PT) [38], as well as questions related to two clinical vignettes depicting patients with a specific cause of LBP.

The HC-PAIRS assesses attitudes and beliefs concerning physical impairments for patients with chronic LBP [39]. It consists of 13 statements that are rated on a seven-point Likert scale ranging from 'totally disagree' to 'totally agree'. The total score ranges from 13 to 91 with a higher score reflecting higher beliefs in a strong relationship between pain and impairment [32]. Good psychometric properties of this questionnaire have been established in graduated HCPs, including physiotherapists [32,39,40].

The Back-PAQ questionnaire (10-items version) [35] assesses attitudes and underlying beliefs about back pain on a five-point Likert scale. The scoring of the answers ranges from +2 to -2. Items 6-7-8 have a reversed score. The total score ranges from -20 to 20 with negative scores reflecting beliefs that are unhelpful and vice-versa. To interpret the Back-PAQ, five themes are related to the items: "vulnerability of the back", "relationship between back pain and injury", "activity participation while experiencing back pain", "psychological influences on recovery" and "prognosis of back pain". All items were written in the second person to

personalize the questionnaire. The purpose of this personalization is that responders present their own beliefs rather than projecting their beliefs onto people with LBP or presenting their beliefs about people with LBP [35].

The PABS-PT allows to differentiate physiotherapists with a biomedical versus a biopsychosocial treatment orientation for LBP [38,41]. This questionnaire comprises 19 questions on a six-point Likert scale divided in two sub-scores: biomedical orientation ranging from 10 to 60 (PABS-PT-BM with 10 questions) and biopsychosocial orientation ranging from 9 to 54 (PABS-PT-PS). The scoring of the answers ranges from 1 to 6 (totally disagree to totally agree, respectively) [41,42].

Two clinical vignettes depicting patients with a specific cause of LBP were developed in a previous project for the purpose of evaluating diagnostic triage skills in a general physiotherapy population. These vignettes were reused in the present study to assess diagnostic triage performance among specialized physiotherapists with a similar methodology [23]. We operationalize diagnostic triage performance as vignette-based decision-making performance rather than real-world clinical competence. The first one depicted the symptoms of a patient with lumbar spinal stenosis; the second one described the symptoms of a patient with spondyloarthritis (see Appendix 1). These two specific pathologies were chosen to be explored for multiple reasons. First, spondyloarthritis was chosen because diagnostic delay remains substantial and largely occurs after patients entered the healthcare system, with a median delay of 5-6 years with significant clinical, economic and humanistic burden [43–45]. Furthermore, spondyloarthritis is frequently underdiagnosed in patients with chronic low back pain consulting non-rheumatologists in Belgium [46]. The SUSPECT study [46] demonstrated a high prevalence of previously undiagnosed spondyloarthritis among patients with chronic back pain seen by non-rheumatologist specialists, highlighting the risk that this condition may be missed in primary contact settings. This underscores the importance of evaluating the ability of specialized physiotherapists to suspect and appropriately refer patients with inflammatory back pain features for rheumatological evaluation before management. Second, lumbar spinal stenosis is a common cause of back and leg symptoms in adults, especially in primary care populations [47]. Systematic reviews report variable prevalence estimates of lumbar spinal stenosis, with clinical diagnosis in primary care populations ranging around 15-25%, underscoring that physiotherapists are likely to encounter this condition frequently. Furthermore, care pathways for lumbar spinal stenosis are explicitly severity and phenotype-dependent: international expert consensus supports combined stratified and stepped care pathways in which immediate investigation is advocated when indicated [48]. Clinical presentation and referral decision for lumbar spinal stenosis are context-dependent, frequently requiring nuanced clinical reasoning rather than reliance on a single diagnostic label. The decision to pursue further imaging or specialist referral for lumbar spinal stenosis depends on multiple factors including symptom severity, functional impairment, and differential diagnosis considerations, making it a relevant vignette to test physiotherapists' triage reasoning in a direct access model [48,49].

A structured, iterative approach was used to develop the clinical vignettes, following established methodological recommendations for vignette-based research [50,51]. An interdisciplinary expert panel (including physiotherapists, orthopaedic surgeons, and general practitioners) was involved in initial vignette construction and refinement to enhance content validity and clinical relevance, as recommended in recent vignette development studies that emphasise expert review to improve clinical relevance and validity of scenarios [50,51]. To further ensure clarity, realism, and applicability to routine practice, an external face validation step was conducted in which first-line practitioners (physiotherapists and general practitioners not otherwise involved in the study) reviewed the vignettes and provided structured feedback. Incorporating

feedback from target end-users is recognised as an important component of vignette validation to improve comprehensibility and ecological validity [51].

Participants answered two open questions: *“In your opinion, what are the causes/contributing factors to this patient’s pain?”* and *“What would be your first management approach for this patient?”*. Open-ended responses were scored using a predefined coding framework developed prior to data analysis. Three outcomes were evaluated for each vignette: (1) suspicion of a specific underlying cause, (2) correct identification, and (3) appropriate referral decision. Each outcome was scored dichotomously (0 = absent/incorrect, 1 = present/correct). The coding framework is available in Table 1.

Table 1. Coding framework for the vignette analysis

Category	Score	Description	Examples
Suspicion of a specific pathology	1	The participant indicates that a specific underlying cause may be present, even vaguely or subjectively (e.g., “something seems off here”).	“Possible inflammatory back pain” “Symptoms suggest lumbar spinal stenosis” “Something seems off here”
	0	The participant does not suggest a specific underlying cause, or the response is non-specific LBP.	“Non-specific low back pain” “Mechanical back pain” “Psychosocial factors”
Correct identification	1	The participant explicitly names the precise expected diagnosis (e.g., spinal stenosis, lumbar spinal stenosis, or spondyloarthropathy, spondyloarthritis).	“Ankylosing spondylitis” “Lumbar spinal stenosis” “Spondylarthropathy”
	0	The response is vague or general (e.g., inflammatory disease, spinal problem), even if it indicates a serious condition, but does not identify the exact diagnosis.	“Inflammatory back pain” “Spinal problem with neurological symptoms” “Chronic back pain”
Referral	1	The participant indicates referral to an appropriate medical professional.	“Refer to rheumatologist for further evaluation” “Refer to a medical doctor for opinion” “Refer to an orthopedic or neurologist specialist”
	0	No referral is indicated, or only a treatment attempt is proposed without seeking medical advice.	“I will test new exercises” “I will analyze active movements” “Start treatment without referral”

Two independent raters (AF and PS) performed the coding: one native French-speaking and one native Dutch-speaking member of the research team. Both raters independently evaluated all responses. Prior to formal scoring, a pilot coding exercise was conducted on a subset of participant responses to verify and refine the coding rules and ensure shared understanding of the framework.

No disagreements occurred during the final scoring process. In the event of disagreement, a third bilingual member of the research team (NR) was designated to provide an additional opinion to reach consensus. Responses were coded in their original language (French or Dutch) by the bilingual research team, ensuring semantic equivalence across languages. Although binary scoring does not capture partial or nuanced clinical reasoning, this approach was chosen to reflect clinically actionable decisions, namely whether a specific pathology was explicitly suspected, correctly identified, and appropriately referred.

2.4 Statistical methods

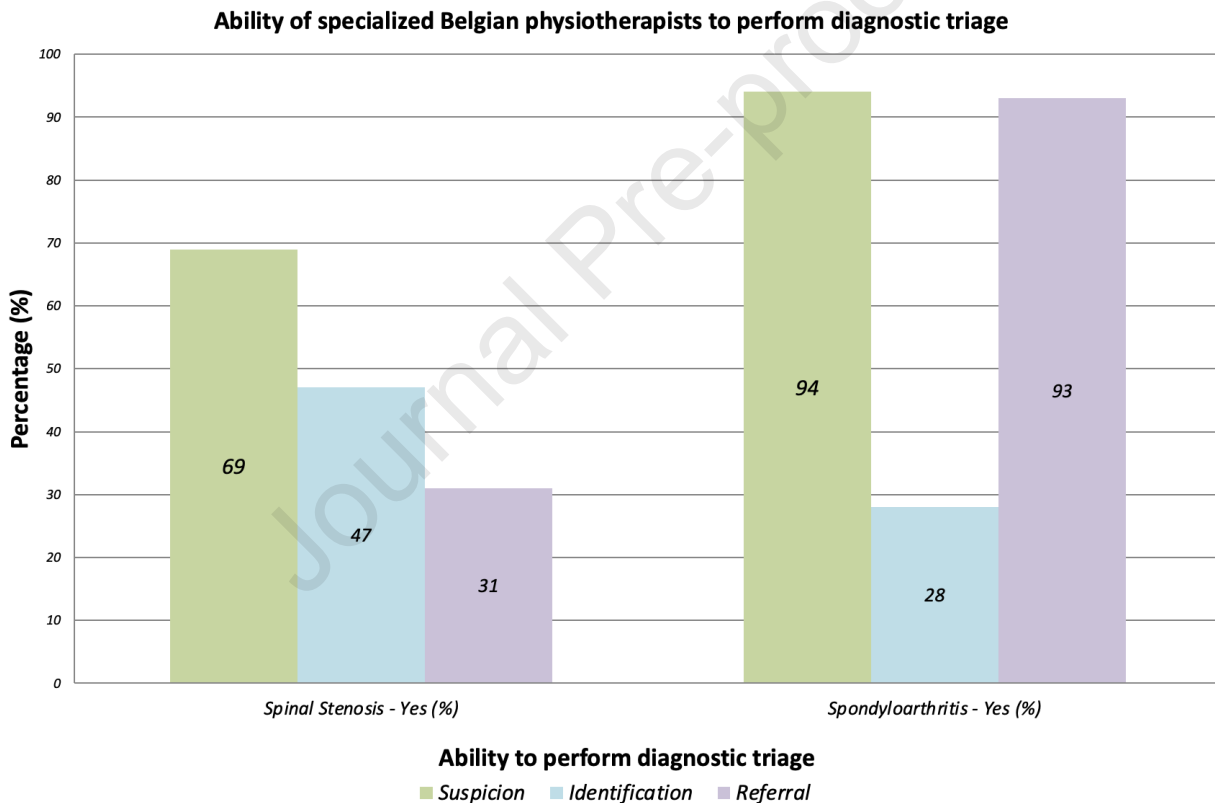
Descriptive statistics were used to describe the ability of specialized physiotherapists for diagnostic triage (clinical vignettes) and their knowledge, attitudes and beliefs (questionnaires). A binary logistic regression was used to analyze whether the knowledge, attitudes, and beliefs of specialized physiotherapists were predictive for their ability to correctly suspect, diagnose, or refer patients with specific LBP. The significance level was set at $\alpha = 0.05$. Only participants with complete data were included in the analysis.

3. Results

3.1 Diagnostic triage ability of Belgian specialized physiotherapists

In total, 105 physiotherapists were included in the analysis. Descriptive results concerning the ability of physiotherapists for diagnostic triage are presented in Fig 1. The majority of physiotherapists correctly suspected the presence of a specific cause of LBP; 69% in the first vignette and 94% in the second vignette. The rate of detecting the correct specific spinal pathology was 47% for the spinal stenosis case and 28% for the spondyloarthritis case. In the spinal stenosis case, 31% of the physiotherapists chose to refer for specialized treatment as a first step in their clinical management, while 93% opted to refer in the spondyloarthritis case.

Fig 1. Amount (%) of specialized Belgian physiotherapists correctly performing the diagnostic triage of two clinical vignettes depicting patients with a specific cause of LBP (i.e., spinal stenosis and spondyloarthritis cases).



3.2 Knowledge, attitudes and beliefs of Belgian specialized physiotherapists

Descriptive statistics concerning the attitudes and beliefs of physiotherapists are presented in Table 2. Participants demonstrated low scores on the HC-PAIRS (median 37; Q1–Q3: 32–43) and on the biomedical subscale of the PABS-PT (median 21; Q1–Q3: 18–25). In contrast, higher scores were observed on the Back-PAQ (median 16; Q1–Q3: 14–19) and on the psychosocial subscale of the PABS-PT (median 39; Q1–Q3: 36–42). Overall, this pattern of results indicates a lower endorsement of biomedical-oriented beliefs and a higher endorsement of psychosocial-oriented beliefs regarding the management of low back pain.

Table 2. Descriptive statistics for the questionnaires related to knowledge, attitudes, and beliefs of physiotherapists

	n	Median [Q1, Q3]	Minimum	Maximum
HC-PAIRS (13 – 91)	105	37 [32, 43]	13	57
Back-PAQ-10 (-20 – 20)	105	16 [14, 19]	4	20
PABS-PT-BM (10 – 60)	105	21 [18, 25]	10	38
PABS-PT-PS (9 – 54)	105	39 [36, 42]	29	47

Abbreviations: HC-PAIRS: Health Care Providers' Pain and Impairment Relationship Scale; Back-PAQ-10: the 10th item version of the Back Pain Attitudes Questionnaire; PABS-PT-BM/PS: Pain Attitudes and Beliefs Scale for Physiotherapists with -BM (biomedical subscale) and -PS (psychosocial subscale).

3.3 Predictive value of the knowledge, attitudes, and beliefs for the ability of diagnostic triage

The results of the binary logistic regression showed that, overall, the knowledge, attitudes, and beliefs of specialized physiotherapists did not predict a correct suspicion, identification, or referral of the patients with specific LBP. Only two variables were statistically associated to the ability of referral for the patient with spinal stenosis, more specifically higher scores on the Back-PAQ-10 ($p = .047$) and PABS-PT-PS ($p = .002$) decreased the likelihood of a referral. The statistical analysis is detailed in Table 3.

Table 3. Binary logistic regression concerning the prediction of correct suspicion, identification of referral based on the knowledge, attitudes, and beliefs of specialized physiotherapists.

Clinical vignette	Variable	B	S.E.	Wald	df	Sig.	Exp(B)	
Spinal Stenosis	SUSPICION							
	BackPAQ 10	-0.038	0.074	0.266	1	0.606	0.962	
	HCPAIRS	-0.001	0.033	0.000	1	0.982	0.999	
	PABSBM	0.005	0.050	0.010	1	0.922	1.005	
	PABSPS	-0.007	0.058	0.013	1	0.908	0.993	
	Constant	1.573	3.460	0.207	1	0.649	4.819	
	IDENTIF.							
	BackPAQ 10	0.078	0.070	1.233	1	0.267	1.081	
	HCPAIRS	-0.005	0.031	0.026	1	0.872	0.995	
	PABSBM	0.018	0.047	0.150	1	0.699	1.018	
	PABSPS	0.031	0.054	0.318	1	0.573	1.031	
	Constant	-2.769	3.261	0.721	1	0.396	0.063	
	REFERRAL							
	BackPAQ 10	-0.154	0.078	3.939	1	0.047	0.857	
	HCPAIRS	0.002	0.036	0.003	1	0.956	1.002	
	PABSBM	-0.070	0.055	1.633	1	0.201	0.932	
	PABSPS	-0.154	0.064	5.852	1	0.016	0.857	
	Constant	8.942	3.851	5.392	1	0.020	7645.443	

Spondyloarthritis	SUSPICION						
	BackPAQ 10	-0.302	0.286	1.117	1	0.291	0.740
	HCPAIRS	-0.069	0.079	0.761	1	0.383	0.933
	PABSBM	-0.136	0.172	0.625	1	0.429	0.873
	PABSPS	-0.198	0.161	1.502	1	0.220	0.821
	Constant	21.123	12.281	2.958	1	0.085	1491177666
	IDENTIF.						
	BackPAQ 10	0.247	0.145	2.875	1	0.090	1.280
	HCPAIRS	-0.018	0.043	0.175	1	0.676	0.982
	PABSBM	-0.054	0.081	0.434	1	0.510	0.948
	PABSPS	-0.106	0.080	1.783	1	0.182	0.899
	Constant	0.797	5.311	0.023	1	0.881	2.219
	REFERRAL						
	BackPAQ 10	-0.305	0.280	1.183	1	0.277	0.737
	HCPAIRS	-0.081	0.073	1.213	1	0.271	0.922
	PABSBM	-0.108	0.163	0.434	1	0.510	0.898
	PABSPS	-0.273	0.161	2.894	1	0.089	0.761
	Constant	23.831	11.950	3.977	1	0.046	2.238E+10

Abbreviations: B: estimated coefficient; S.E.: standard error; Wald: Wald Test; df: degrees of freedom; Sig.: statistical significance; Exp(B): odds ratio

4. Discussion

This study is the first to evaluate the ability of physiotherapists, specialized in musculoskeletal or manual physiotherapy, to perform diagnostic triage for LBP in Belgium. While more than two third of physiotherapists correctly suspected a specific cause of LBP in the clinical vignettes, these results merit further attention, as the number of PT that correctly identified the underlying pathology was quite low. Besides, despite progressive worsening of neurological symptoms, many PT did not mention referral of the patient with lumbar spinal stenosis as first step. The knowledge, attitudes and beliefs of the specialized physiotherapists about LBP were adequate. However, they were not related to diagnostic triage competences concerning LBP, with only two associations observed for spinal stenosis referral.

4.1 Diagnostic triage ability of specialized physiotherapists

When comparing the results of the present study with previous research conducted among physiotherapists, our findings show both similarities and differences. Earlier studies reported concerning results regarding diagnostic triage abilities in general physiotherapists [20,21,23]. For example, a recent Belgian study found that only 54% of physiotherapists correctly suspected a specific cause of low back pain (LBP) based on clinical vignettes [23], which lower than this study. Similarly, a Swiss study reported that half of the physiotherapists made a correct diagnosis, while a French study showed that only 18% correctly diagnosed a patient presenting with a critical medical condition [20,21]. While the rates of suspicion reported in these studies appear lower than those observed in our sample, the proportions of correct diagnoses are more comparable. The authors of the previous studies concluded that physiotherapists should strengthen their diagnostic triage competencies before direct access to physiotherapy can be widely implemented. However, differences in participant characteristics may partly explain the variability in results. In contrast to those studies, our sample consisted exclusively of physiotherapists specialized in musculoskeletal care (postgraduate training and/or IFOMPT level).

258

259 The results of the current study are comparable to other studies in specialized physiotherapists [17,52–58].
 260 Specialized physiotherapists, also known as ‘advanced practice physiotherapists’, were able to correctly use
 261 diagnostic triage for musculoskeletal disorders such as LBP. A systematic review highlighted that the
 262 concordance between specialized physiotherapists and physicians was good to very good for diagnostic triage
 263 [53]. Moreover, a randomized-controlled trial showed that triage of patients with inflammatory diseases, such
 264 as spondyloarthritis, by specialized physiotherapists was feasible and similar to rheumatologists and led to a
 265 decrease in healthcare utilization [52] Similar results on triage concordance between physiotherapists and
 266 physicians were found for spinal pain, knee disorders, and even in emergency departments [55,57,58].

267 In the context of direct access to physiotherapy, suspicion of a specific cause of LBP and referral are the
 268 primary requirements for physiotherapists. This is verified by the high suspicion of a specific cause of LBP in
 269 the two vignettes (69% for spinal stenosis and 94% for spondyloarthritis), and high rate of referral (93%) for the
 270 spondyloarthritis case, which are reassuring results in a direct-access context. However, identifying the
 271 correct specific cause of LBP seemed to be more challenging as less than half of the specialized
 272 physiotherapists (47%) were able to correctly identify spinal stenosis, and only 28% spondyloarthritis.
 273 Concerning the spinal stenosis case, it is interesting to note that, despite a relatively higher detection rate of
 274 the correct spinal pathology (47%), fewer physiotherapists would refer that patient for further examination and
 275 treatment (31%) compared to the spondyloarthritis case (93%). This is probably due to the subtler history and
 276 milder signs and symptoms compared to the spondyloarthritis patient (see Appendix 1). For the spinal stenosis
 277 case, it is hypothesized that more information was needed and that physiotherapists would therefore have first
 278 performed a thorough neurological clinical examination and first session of treatment, instead of immediately
 279 making a referral. Another explanation could be that specialized physiotherapists might have used the
 280 principle of “watchful waiting” and safety netting before referring as proposed by Finucane’ framework for
 281 assessing serious spinal condition [8]. Though it is true that non-evolutive symptoms due to spinal stenosis
 282 can be managed with physiotherapy, quick changes related to aggravating symptoms, as present in the
 283 vignette case, should have prompted physiotherapists to refer the patient. This finding is therefore concerning
 284 and suggests that referral decision-making and interprofessional collaboration skills should be more explicitly
 285 strengthened within physiotherapy training programs and postgraduate specializations.

286 Overall, the results of the binary logistic regression showed that their knowledge, attitudes and beliefs did not
 287 predict their ability of diagnostic triage. However, it is interesting to specifically highlight that physiotherapists
 288 with higher psychosocial orientation and positive beliefs about the back (PABS-PT-PS and BackPAQ-10) were
 289 statistically less prone to refer the patient in the case of spinal stenosis. It is hypothesized that the positive
 290 results of their attitudes and beliefs concerning LBP have influenced their referral rate and that more
 291 comprehensive and positive beliefs about the lower back, as well as a more psychosocial orientation gave the
 292 therapists more confidence to determine whether a first treatment session would have positive effects, before
 293 considering referral. Future qualitative research could analyze this hypothesis.

294 4.2 Knowledge, attitudes and beliefs

295 The knowledge, attitudes and beliefs of specialized physiotherapists measured by the HC-PAIRS, Back-PAQ-
 296 10 and PABS-PT in this study are more adequate compared to a general population of physiotherapists that
 297 participated in previous Belgian [23,59] and international studies [24,32,60]. This is important in a context of
 298 direct access to physiotherapy, as the attitudes and beliefs of healthcare practitioners are related to those of
 299 their patients.

300 However, the knowledge, attitudes, and beliefs of the specialized physiotherapy cohort did not predict correct
 301 suspicion, identification, or referral of patients with specific LBP. While all guidelines recommend HCPs to
 302 have adequate biopsychosocial attitudes and beliefs concerning the management of LBP, this study shows

that other factors may explain the identification of patients with specific underlying pathologies. To our knowledge, no validated questionnaire exists to measure this knowledge.

4.3 Clinical implications

The results of the present study provide a mixed but informative picture. A substantial proportion of participants suspected a specific cause of LBP in both clinical vignettes (69% for spinal stenosis and 94% for spondyloarthritis), which is reassuring. Referral behavior, however, differed markedly between cases. In the inflammatory vignette, 93% of participants referred the patient, suggesting that physiotherapists are generally able to recognize clinical patterns that clearly warrant medical evaluation. In contrast, only 31% referred the spinal stenosis case, despite 69% suspecting a specific underlying cause.

These findings suggest that while physiotherapists are often able to detect that a presentation is not consistent with non-specific LBP, referral decisions may depend on the perceived severity, clarity, or progression of symptoms. In the spinal stenosis vignette, participants may have considered additional clinical examination, initial conservative management, or a strategy of watchful waiting before referral. Although such an approach can be appropriate in stable cases, evolving or aggravating symptoms, such as those described in the vignette, should prompt timely referral. Strengthening decision-making regarding when referral is indicated therefore appears particularly important.

Correct identification of the exact pathology proved more challenging, with 47% correctly identifying spinal stenosis and 28% identifying spondyloarthritis. While precise diagnostic labeling is not necessarily the central objective of physiotherapy practice, these findings highlight room for improvement in differential diagnostic reasoning, particularly for inflammatory conditions.

Importantly, the adequate biopsychosocial attitudes and beliefs observed in this sample are encouraging in a direct-access context. However, the association between stronger psychosocial orientation and lower referral rates in the spinal stenosis case suggests that even positive, guideline-consistent beliefs may influence referral behavior. This underscores the need for balanced clinical reasoning that integrates a biopsychosocial approach with vigilance for specific or progressive pathology.

In the Belgian healthcare context, where direct access is still in its early stages, these findings provide essential baseline data. They suggest that specialized physiotherapists demonstrate several key competencies required for safe triage, while also identifying specific areas, particularly referral decision-making in less overt presentations, that could benefit from targeted educational reinforcement.

4.4 Limitations and strengths

This study has several limitations. First, potential selection bias cannot be excluded, as physiotherapists were aware that the study was conducted in the context of direct access to physiotherapy. This may have influenced who chose to participate. Second, clinician characteristics were not collected. The absence of socio-demographic and professional data (e.g., years of experience, practice setting, ...) limits our ability to explore factors that may predict diagnostic triage performance. Third, this study was exploratory and only two clinical vignettes were used, which restricts the representativeness of the findings across the wide spectrum of serious spinal pathologies encountered in primary care. Furthermore, no comparator group (e.g., general physiotherapists) was included, which prevents attributing the observed findings specifically to musculoskeletal specialization. Future studies with larger and more diverse samples, broader clinical scenarios, and comparative designs are needed to better understand diagnostic triage performance in this context.

This study had also some strengths. First, this study is the first to explore preliminary results of the abilities of specialized physiotherapists in Belgium for diagnostic triage of LBP conditions, in a context where healthcare pathways are evolving. Second, this specific population of physiotherapists is under-studied in the literature.

5. Conclusion

In the context of direct access to physiotherapy, the ability to suspect a specific underlying cause and make an appropriate referral is an important component of clinical decision-making. This exploratory study provides preliminary, condition-specific insights into the diagnostic triage performance of specialized physiotherapists. Although more than two thirds of physiotherapists suspected the presence of a specific cause of LBP in the clinical vignettes, recognition of the condition and referral decisions appeared to vary across conditions. Knowledge, attitudes, and beliefs regarding LBP were generally adequate, but no clear association with triage performance was observed in this sample. Overall, these findings should be interpreted as hypothesis-generating and may help inform future research evaluating the clinical and cost-effectiveness of direct access to physiotherapists within formal care pathways.

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Appendix 1

1 - Spinal Stenosis

A 74-year-old lady visits her general practitioner because she is experiencing progressive difficulty with walking.

The general practitioner knows the woman as a brave and “tough” lady, although she always seems to have some sort of “ache.” He has been following her for years for a persistent problem of lower back pain. Various measures have already been taken: the lady did exercises under the supervision of a physiotherapist, took ibuprofen (which resulted in a stomach ulcer), and also received injections that each time made the back pain bearable for months.

But now it is different. Whereas she used to be able to positively influence her back pain by walking, walking is now very difficult. Every time she goes for a walk, after 500 meters she develops a very bothersome fatigue in both legs (radiating from the back of the thigh and calf down to the ankle), and it keeps getting worse. Last year, she could still walk two kilometres before having to sit down; since this week, she cannot even manage 500 meters. She is therefore forced to use a bicycle for such trips. Cycling, however, poses no problems.

She further mentions a sleepy big toe on the right, but that has remained stable over the past few months. She does not have nighttime pain and does not feel any paralysis in the lower limbs, but she is no longer confident in her walking pattern. Because of this, she no longer dares to go outside as often.

Her personal and family medical history are unremarkable. Besides the medication mentioned above, she does not take any other medication.

2 - Spondyloarthritis

John is an 18-year-old boy well known to his GP. Over the past six months, he has consulted his GP five times for recurrent diarrhea, pain in his buttocks and lower back.

A few years ago, he also had a period of pain in his lower back, but this disappeared with anti-inflammatory treatment. He used the same medication this time, but to no avail. What's particularly annoying is that John wakes up every night with pain at around 4am. He has to get out of bed, walk around the house for 15 minutes, then can go back to sleep. When he gets up in the morning, the same ritual repeats itself: he's stiff, has to walk, but after a quarter of an hour, everything has “warmed up” and he finds it easier to move.

John notices that moving during the day is good for him: every time he sits at his desk for more than an hour, he feels stiff and has to start moving.

John doesn't feel well: he's tired and has lost 5 kg in the last month. He explains that he sleeps very badly at night and often has diarrhea. He is discouraged by his work, which he normally loves.

He has no family history. In addition to complaints of diarrhea, emaciation, fatigue and back pain, John also complains of eye inflammation. He will soon be seeing an ophthalmologist about this.

Highlights

- Most specialized physiotherapists suspected a specific cause of low back pain
- Knowledge, attitudes and beliefs of specialized physiotherapists were adequate
- Knowledge, attitudes and beliefs did not predict their ability of diagnostic triage
- Identification of the diagnosis and referral decisions remain variable

Declaration of competing interests statement

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.