

Please add the following Affiliation additionally for Jitka and Tereza:  
 Institute of Special Education Studies, Palacký University Olomouc, Olomouc, Czech Republic  
 and delete „Centre of“ in Affiliation 2

## Promoting running as the best treatment for lower back pain in physiotherapy practice: a best practice implementation project

Christina Jaster<sup>1,2</sup> • Jitka Klugarová<sup>3</sup> • Aleksandra Królikowska<sup>4</sup> • Anna Kołcz<sup>4</sup> • Tina Poklepović Peričić<sup>5</sup> •  
 Małgorzata M. Bala<sup>6</sup> • Tereza Vrbová<sup>3</sup> • Roland Becker<sup>1,2,7</sup> • Robert Prill<sup>1,2,7</sup>

AQ1

<sup>1</sup>Center of Orthopaedics and Traumatology, University Hospital Brandenburg/Havel, Brandenburg Medical School Theodor Fontane, Brandenburg a.d.H, Germany, <sup>2</sup>Centre of Evidence Based Practice in Brandenburg: A JBI Affiliated Group, Brandenburg Medical School Theodor Fontane, Brandenburg a.d.H, Germany, <sup>3</sup>Cochrane Czech Republic, Czech Republic: A JBI Centre of Excellence, Czech GRADE Network, Institute of Health Information and Statistics of the Czech Republic, Prague, Czech Republic, <sup>4</sup>Ergonomics and Biomedical Monitoring Laboratory, Department of Physiotherapy, Faculty of Health Sciences, Wrocław Medical University, Wrocław, Poland, <sup>5</sup>Department of Prosthodontics, Study of Dental Medicine, University of Split School of Medicine, Split, Croatia, <sup>6</sup>Chair of Epidemiology and Preventive Medicine, Department of Hygiene and Dietetics, Jagiellonian University Medical College, Kraków, Poland, and <sup>7</sup>Faculty of Health Sciences Brandenburg, Brandenburg Medical School Theodor Fontane, Brandenburg a.d.H., Germany

### ABSTRACT

**Objectives:** This project aimed to promote running as the best treatment for lower back pain (LBP) in an outpatient setting.

**Introduction:** LBP is one of the most prevalent conditions worldwide. Sixty-two percent of all Germans experience episodes of non-specific back pain at least once a year, with one-fifth developing chronic conditions. Intervertebral disc (IVD) degeneration is a natural process, contributing to periods of acute LBP. However, the scientific literature and guidelines partially overlook the significance of water management in IVD. This implementation project sought to address this gap by educating patients about this process. Running and/or walking were chosen as general approaches for treatment rather than specific disease-related approaches.

**Methods:** This implementation project was conducted in an outpatient physiotherapy clinic in Brandenburg, Germany, utilizing the JBI Evidence Implementation Framework. An evidence-informed clinical audit and feedback strategy was used to measure compliance with ten audit criteria. Five physiotherapists and 20 patients took part in the audits.

**Results:** At baseline, only 20% of participating physiotherapists screened for yellow flags regarding psychological issues. However, after project implementation, this criterion scored 100% compliance. Some patients performed exercises independently, but confusion persisted regarding the choice of beneficial exercises. Patients continued running, but those who took a break due to pain expressed uncertainty about resuming.

**Conclusions:** The project highlighted the effectiveness of collaborative efforts between patients and therapists to address the issue. The project team's conviction in action and solution strategies serves as the foundation for this collaboration. This implementation strategy provided “running” patients with the confidence to either resume or reintegrate running after an extended break.

**Spanish abstract:** <http://links.lww.com/IJEBH/A222>

**Keywords:** implementation project; intervertebral disc; lower back pain; physical therapy modalities; physiotherapy

*JBI Evid Implement* 2024; 22(0):1–11.

Correspondence: Robert Prill, robert.prill@mhb-fontane.de

The authors declare no conflicts of interest.

DOI: 10.1097/XEB.0000000000000441

**What is known about this topic?**

- Lower back pain (LBP) is one of the most common conditions worldwide.
- LBP is associated with chronic pain; therefore, treatment/secondary prevention should be an essential part of therapy.
- General activity and active therapy are crucial for good outcomes in chronic pain management.

**What does this article add?**

- It was possible to implement walking and running as a non-specific LBP treatment approach in an outpatient physiotherapy clinic.
- Information pamphlets and educational consulting during therapy sessions were effective in promoting individual non-specific exercises.
- Barriers such as motivation and compliance need to be further investigated in future projects.

## INTRODUCTION

Lower back pain (LBP) is sometimes considered a condition, rather than a disease, and is classified as one of the most common ailments worldwide.<sup>1</sup> It is categorized into acute, subacute, and chronic back pain. The acute phase is characterized by symptoms being present for less than 4 weeks. From the fourth to the twelfth week, it is termed the subacute phase, and beyond this period, it becomes the chronic phase.<sup>2,3</sup> If a trigger is identified, it is labeled as specific pain; otherwise, it is classified as non-specific. Examples of specific triggers include bacterial infections, fractures of the vertebral bodies, stenoses, and disc prolapse. Approximately 62% of Germans experience non-specific pain at least once a year, and over one-fifth are affected by chronic, persistent pain.<sup>2</sup> Acute back problems of unknown etiology present a broad spectrum for treatment, with the main goals being pain reduction and secondary prevention. Validated measurement tools, such as the STarT Back Tool questionnaire, are often recommended.

The intervertebral disc is a crucial component of the spinal column and can induce pain due to its physiological properties. It facilitates the mobility of individual segments, and comprises a nucleus pulposus, annulus fibrosus, and the cartilaginous endplate.<sup>4</sup> In 1983, Brickley-Parsons and Glimcher described the degeneration of the intervertebral disc, a process which begins in adolescence and continues into adulthood.<sup>5</sup> It is characterized by a decrease in collagen type two and the formation of collagen type one, occurring analogously in the nucleus. In 2021, Baumgartner *et al.*<sup>4</sup> provided a more detailed description,

classifying the degeneration as an imbalance of anabolic and catabolic processes at the molecular level, resulting in a pressure drop within the nucleus pulposus. This pressure drop indicates dehydration, which can be confirmed by imaging techniques. Signs of water loss include gray and black shadows and unclear demarcation between the nucleus and annulus. This change elevates the risk of mechanical failure, affecting the biomechanics of the entire disc. Dehydration is promoted by the degradation of proteoglycans. Radial rupture occurs, leading to radiating tears. An internal disc rupture develops, which may be asymptomatic or result in radiculopathy, transforming the disc into a pain generator.<sup>6</sup> An accurate diagnosis is recommended, involving the exclusion of red and yellow flags, such as alarm signs in clinical testing, (e.g., bilateral painful lateral flexion with central pain) or psychological screening, identifying patients who are not suitable for pure biomechanical treatment.<sup>7,8</sup>

In the acute stage, non-steroidal anti-inflammatory drugs (NSAIDs) are recommended. However, this should be done at the lowest dosage.<sup>9</sup> Manipulative therapies show mixed to no superior results over drug therapy. Will *et al.* also postulate the short and moderate long-term effects of yoga in chronic patients.<sup>9</sup> This finding indicates that all LBP patients should remain active in a specific or unspecific way rather than overly resting.<sup>7,8,10</sup> Several forms of exercising and education are strongly advised in the subacute and chronic stages.<sup>7,8,11</sup> Consistent, dynamic, and prolonged exercise contributes to a healthy disc. Thus, walking and running support the physiological regeneration of the intervertebral disc. These forms of exercise address the causality of back pain because they facilitate the proliferation of essential proteoglycans for better storage of water in the discs.<sup>1,12–14</sup> Unfortunately, the National Health Care Guideline for Non-Specific Lower Back Pain – Abridged Version, 2nd edition of 2017 does not mention the relevance of water balance in the intervertebral discs. As a result, patients do not know what they can do to support their backs. The current project specifically focused on promoting patient education about the hydration of the intervertebral disc, a process that can be facilitated through regular engagement in walking and running. Additionally, relevant aspects for treating patients with LBP, such as LBP screening, communication, and documentation, have been addressed.

## OBJECTIVES

This project aimed to improve practice in physiotherapy among patients with LBP in an outpatient setting. An approach was established for facilitating regular walking or running. The specific objectives were to:

1. Ensure that the treatment of patients with LBP is consistent with the best available evidence.
2. Identify barriers that reduce compliance and develop strategies to address non-compliance.
3. Assess changes in compliance with implemented best practices.
4. Increase LBP patients' knowledge of intervertebral disc water management.
5. Expand patients' knowledge about LBP, and in particular about the value of walking or running.

## METHODS

This project was guided by the seven-phase JBI Evidence Implementation Framework,<sup>15</sup> which is grounded in an audit, feedback, and re-audit strategy. A baseline audit was conducted to measure current practices against recommended best practices. Feedback from the audit was used to identify barriers and design and implement strategies to improve practice. A post-implementation audit was then conducted to measure changes in compliance with best practices. The seven phases are discussed below.

### Implementation planning: Phases 1 to 3

#### **Phase 1: Identification of practice area for change**

The implementation project was conducted in a physiotherapy practice in Brandenburg. The main reason for choosing this topic was limited evidence on the diverse specific approaches, which would support the implementation of additional general and promising treatments on a regular basis.

#### **Phases 2: Engaging change agents**

The team comprised five physiotherapists, all possessing academic qualifications with at least a bachelor's degree. Additionally, two experts in JBI methodology were engaged to provide methodological support. Among the five colleagues, one assumed the role of project leader, responsible for creating a patient flyer with a QR code.

#### **Phase 3: Assessment of context and readiness to change**

After participating in the JBI Evidence-Based Clinical Fellowship program, the principal investigator of the project contacted the head of the clinic with the idea for the project. The head of the clinic demonstrated unwavering support for the project from its inception.

### Baseline assessment and implementation: Phases 4 to 5

#### **Phase 4: Baseline audit**

Before conducting the baseline audit, an initial meeting was held where the project leader apprised the team of the main goal of the project, and the need for change was duly recognized. Ten audit criteria were developed based on JBI evidence summaries.<sup>8,10,11</sup> All audit criteria were thoroughly deliberated by the team, and their alignment with best practices was scrutinized.

Out of the ten audit criteria, two were specifically addressed: inconsistent recommendations regarding running as a treatment for LBP, and the omission of yellow flags during the initial patient assessment. Criterion 6 required minor enhancements, as some patients engaged in exercise without clear guidance on permissible activities. A representative team sample encompassing all team members and a sample of patients was systematically constructed. The sample sizes in both the baseline and follow-up audits were the same, and each procedural step was meticulously documented in the patients' records. Table 1 shows the audit criteria, sample, and method used to measure compliance in the baseline audit.

#### **Phase 5: Implementation of changes to practice**

In this phase, which spanned July to October 2021, the Getting Research into Practice (GRiP) approach was used by the team in their interactions with patients and in the assessment of the audit results. After reviewing the results, barriers were identified and improvement strategies were developed or modified. It emerged that most barriers existed within the audits rather than within the project team itself. To regularly remind the project team members about the implementation project, a sign was hung in the staff-room in addition to the regular meetings.

To identify yellow flags, the German version of the STarT Back tool was used (see Appendix I, <http://links>).

*The tables are not readable due to dark color*

**Table 1: Audit criteria, samples, and method used to measure compliance**

No.	Audit criteria	Baseline sample	Follow-up sample	Method used to measure compliance with best practice
1.	Patients presenting with back pain are assessed (focused history-taking and physical examination) to identify those with benign (mechanical/musculoskeletal origin) low back pain (LBP) and those with red or yellow flags.	5 team members	5 team members	STarT Back Tool The therapist uses the questionnaire to determine yellow flags. After treatment, the questionnaire is placed in the patient's file to ensure that it has been completed.
2.	Patients with red or yellow flags upon assessment are referred to appropriate specialists.	5 team members	5 team members	Educating the patient about why a referral back to the diagnostic specialist and imaging specialist may be necessary.
3.	Unless a serious underlying pathology is suspected, patients with LBP are not referred for lumbar imaging.	5 team members	5 team members	Understanding for the patient and documentation.
4.	Patients with LBP are advised to stay active and avoid bed rest	5 team members	5 team members	Understanding for the patient and documentation.
5.	Patients should be informed about self-management strategies for LBP.	5 team members	5 team members	Understanding for the patient and documentation.
6.	Patients with LBP perform exercises as part of their management plan.		5 team members / 20 patients	Documentation. After the therapist prescribes exercises, these are documented in the patient's file.
7.	Where appropriate, patients with LBP receive physical therapy in addition to exercise as part of their management plan.	5 team members	5 team members	Understanding of the patient in the treatment and documentation.
8.	Where appropriate, patients with LBP receive superficial heat to provide pain relief.	5 team members	5 team members	Understanding of the patient in the treatment and documentation.
9.	Patients with LBP are not provided with interventions that have no evidence of effectiveness (including traction, therapeutic ultrasound, orthoses, electrotherapy).	5 team members	5 team members	Understanding of the patient in the treatment and documentation.
10.	Patients with LBP are advised to walk or run.	5 team members / 20 patients	5 team members / 20 patients	Documentation. After the therapist prescribes exercises, these are documented in the patient's file.

lww.com/IJEBH/A223 for the English version). This questionnaire maps the patient's daily limitations in relation to back pain. Five of the nine statements address anxiety, avoidance behavior, possible catastrophizing, and possible depression. Three statements address yellow flags associated with the chronification of back pain. Red flags include fractures, infections, malignant disease, or cauda equina syndrome.<sup>16</sup> All patients with LBP were screened for these red flags during their initial treatment.

The flyer, designed by the project leader, explained ways of seamlessly integrate running into the daily

routines of patients (see Appendix II, <http://links.lww.com/IJEBH/A224>). It featured a comprehensive table with a 7-week program for learning how to run, along with a documentation aid for self-reflection and additional patient-friendly information. This flyer played a pivotal role in the overall implementation strategy.

The study included 20 patients who sought treatment at the physiotherapy inpatient clinic following a doctor's referral for LBP. In line with German regulations, physiotherapists are required to follow instructions from doctors. Both male and female patients aged 25 to 60 years took part in the study.

Patients with additional diagnosed conditions beyond LBP which could affect their ability to run or walk were deemed ineligible. Furthermore, individuals aged over 60 years were excluded due to their vulnerability to facet joint osteoarthritis and the need for specific therapy management.

## IMPACT EVALUATION AND SUSTAINABILITY: PHASES 6 TO 7

### **Phase 6: Follow-up audit**

A follow-up audit was conducted from October to December 2021 to measure any changes in compliance with best practices. The follow-up audit adhered to the same principles as the baseline audit.

### **Phase 7: Sustainability of project changes**

Going forward, all patients with LBP will be provided with guidance on incorporating walking/running into their routine. The flyer, serving as an instructional tool, was prominently displayed in the practice and utilized during treatment sessions to facilitate explanation. Furthermore, regular reminders regarding the recommendation for walking have been communicated to all colleagues involved in the implementation process.

## RESULTS

### **Baseline audit**

The baseline audit was conducted from April to July 2021. The results are shown in Figure 1.

In the team sample, 100% compliance was observed for Criteria 2 to 9. Therefore, there was no need for further action. However, room for improvement was noted for Criteria 1 and 10. For Criterion 1, the patients were screened for red flags during the physical examination, but yellow flags were not addressed. For Criterion 10 regarding walking or/and running, only some physiotherapists regularly advised walking or running.

In the patient sample, room for improvement was noted for Criterion 6. All patients knew that they should avoid bed rest and be active instead. Patients typically discovered what worked for them through a process of trial and error. The commonly identified beneficial factors included applying heat and engaging in gentle exercise. Notably, patients consistently reported an exacerbation of pain if they remained in a sedentary position for an extended period. The majority of patients

had a history of being runners; however, only a limited percentage (15%) continued running. Most had discontinued running due to pain-related issues and were uncertain about when it would be appropriate to resume running.

## Strategies for Getting Research into Practice (GRiP)

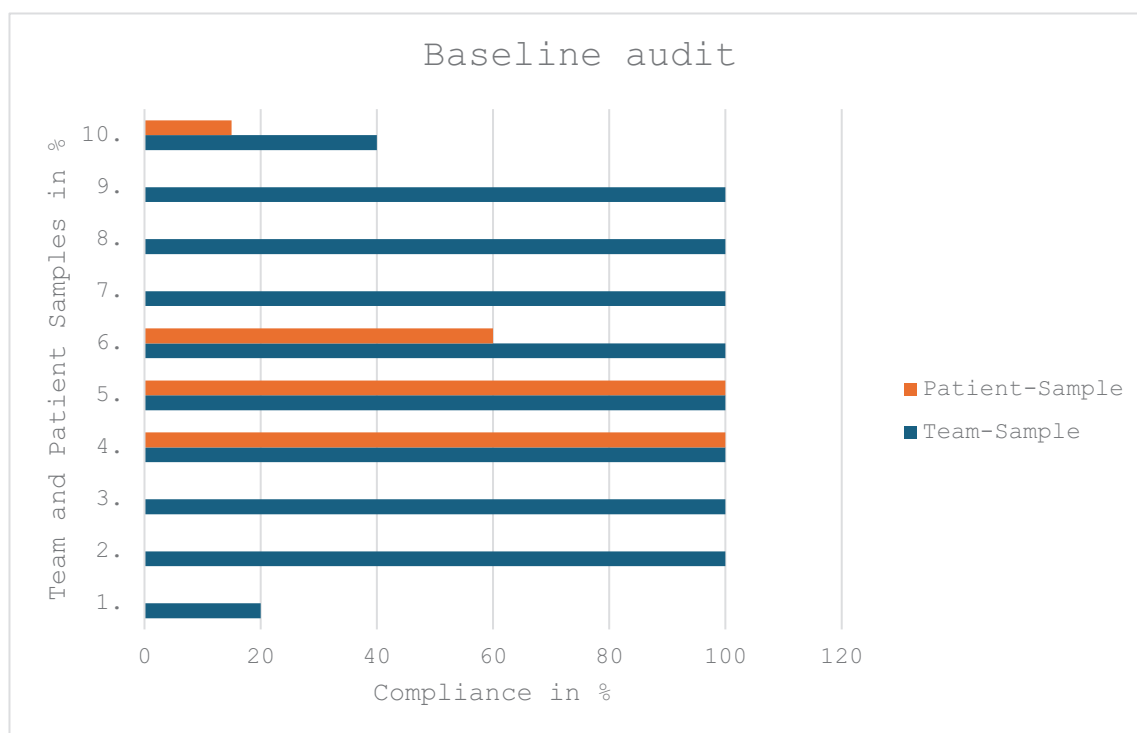
After conducting the baseline audit, we identified five barriers to compliance with best practices. We considered strategies and outcome measures to address those barriers. We also identified the necessary resources, as shown in Table 2.

*Barrier 1:* Lack of team skills to identify yellow flags. *Strategy:* The team leader presented the STarT Back Tool to the team. *Resources:* Resources were also a barrier; for example, time for team meetings or consultations or regular audits was a relevant factor. *Outcomes:* Implementation of yellow flag screening and STarT Back tool were evaluated via assessment of the documentation. After the initial treatment, every physiotherapist documented the use of the instrument and outcomes in the patient file.

*Barrier 2:* Incorporating exercise into the patient's daily life. *Strategy:* Throughout the treatment process, the physiotherapist sought to emphasize that daily exercise could be seamlessly integrated into everyday activities, such as going for short walks. Furthermore, the physiotherapist demonstrated simple yet effective strengthening exercises that could be easily performed at home without the need for equipment. *Resources:* A team meeting was convened to explore potential exercises. The team collectively engaged in the exercises and deliberated on possible challenges associated with their incorporation into daily life. *Outcomes:* The physiotherapist checked whether the patient had completed the prescribed activities and documented them in the patient's file.

*Barrier 3:* Lack of patient knowledge about the water management of the intervertebral disc. *Strategy:* Patients were educated about the intervertebral disc and water management. After the treatment, patients received a flyer with patient-oriented information. *Resources:* A team meeting was held to ensure that all staff members shared the same information with patients. *Outcomes:* Documentation in the file about the outcome and education.

*Barrier 4:* Lack of advice about running or walking. *Strategy:* In the first treatment session, the



Note: Blue represents the project team, orange represents patients.

### Audit criteria

1. Patients presenting with back pain are assessed (focused history-taking and physical examination) to identify those with benign (mechanical/musculoskeletal origin) LBP and those with red or yellow flags.
2. Patients with red or yellow flags upon assessment are referred to appropriate specialists.
3. Unless a serious underlying pathology is suspected, patients with LBP are not referred for lumbar imaging.
4. Patients with LBP are advised to stay active and avoid bed rest.
5. Patients should be informed about self-management strategies for LBP.
6. Patients with LBP perform exercises as part of their management plan.
7. Where appropriate, patients with LBP receive physical therapy in addition to exercise as part of their management plan.
8. Where appropriate, patients with LBP receive superficial heat to provide pain relief.
9. Patients with LBP are not provided with interventions that have no evidence of effectiveness (including traction, therapeutic ultrasound, orthoses, electrotherapy).
10. Patients with LBP are advised to walk or run.

**Figure 1: Compliance (%) with best practices in the baseline audit.**

physiotherapist gave the patient an assignment to walk or run. *Resources:* In a meeting, the project leader explained the flyer to the team members. The team was also encouraged to remind the patient to go for a

run. *Outcomes:* After the physiotherapist gave the instructions, they documented this in the file.

*Barrier 5:* Lack of patient motivation. *Strategy:* This was addressed through continuous education and

**Table 2: Getting Research into Practice (GRiP) analysis**

Barrier	Strategy	Resources	Outcomes
1. Lack of team skills to identify yellow flags.	Presentation of the STarT Back questionnaire to the team.	Team meeting.	Results were evaluated using the tool, and the use of the tool was documented.
2. Incorporate exercise into the patients' daily life.	The team proposed simple daily exercises for every requirement level.	Team meeting.	Documentation in the patient file.
3. Lack of patient knowledge about water management of the intervertebral disc.	The patient received education about the intervertebral disc and water management.	Team meeting.	Documentation in the patient file.
4. Lack of advice about walking or running.	In the first treatment session, the physiotherapist gives advice and information about walking or running.	Team meeting.	Documentation in the patient file.
5. Lack of patient motivation.	The therapist gives patients the leaflet and additional education about the pathogenesis of LBP.	Every personal contact with the patient.	Documentation in the patient file.

consultation. We reminded the patients to run, walk, or do Nordic walking during every treatment session, underlining the relevance of these forms of exercise for the lumbar disc. *Resources:* In conjunction with reminders, we provided patients with user-friendly materials, including a flyer with an illustration of the intervertebral disc as well as self-help strategies. *Outcomes:* Documentation in the file was the outcome.

### Follow-up audit

Figure 2 shows the results of the follow-up audit and a comparison with the baseline audit. In the team sample, the most notable change occurred in Criterion 10, regarding the recommendation to run or walk, which rose from 40% at baseline to 100% in the follow-up audit. Regarding Criterion 1, at baseline, only one out of ten colleagues (20%) screened patients for yellow flags. At follow-up, this increased significantly to 80%. Therefore the two main goals of the team implementation were achieved. In the patient sample, Criterion 6 rose from 60% to 80%.

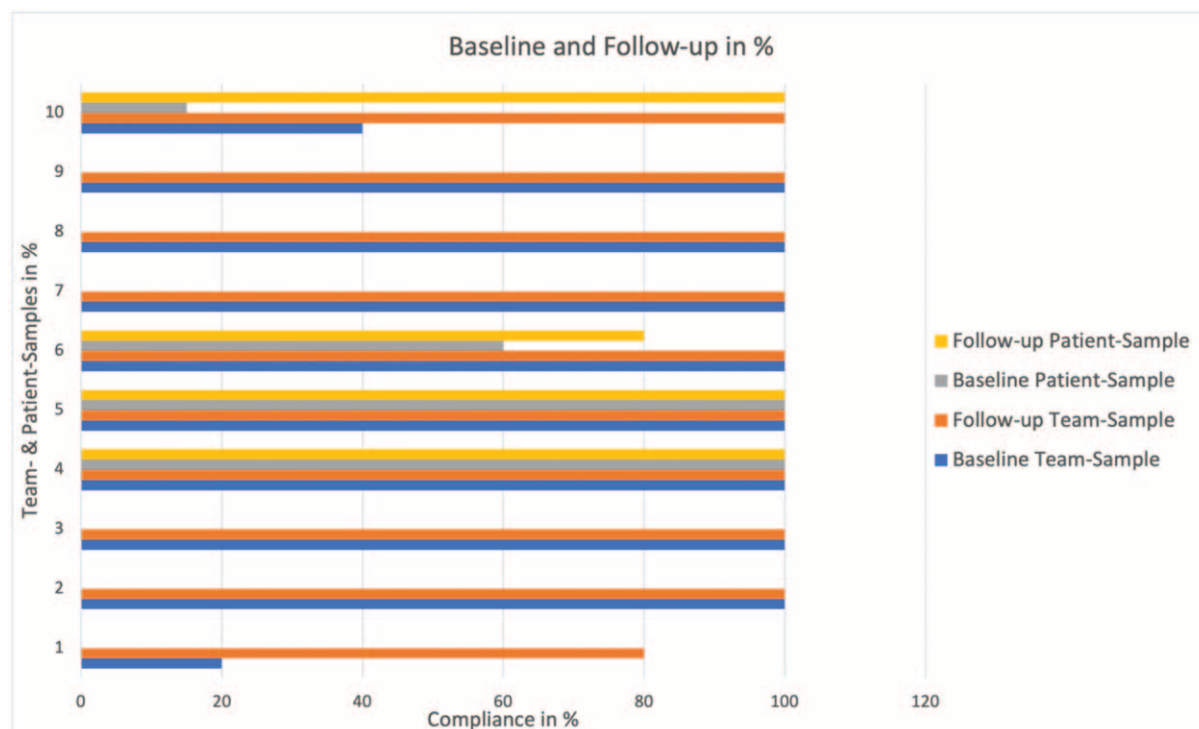
## DISCUSSION

This implementation project aimed to advocate walking and running as optimal approaches for treating back pain in physiotherapy practice, while simultaneously enhancing patients' overall understanding of LBP. This project exemplifies how novel information can be effectively disseminated to the intended

recipients in a patient-centric manner. The involvement of patients in educational discussions, along with accompanying leaflets, appears to be pivotal for the successful integration of running practices.

A crucial objective was to ensure that the treatment provided to LBP patients adhered to the best available evidence. Sustained compliance was established through a baseline audit, pinpointing benchmarks, recognizing the need for change, identifying barriers, and formulating strategies to overcome them. The proposed changes underwent an additional validation check. The project was carried out in an outpatient physiotherapy centre in Brandenburg, with five academic physiotherapists and 20 patients with LBP taking part. Throughout the project, patients received a prescription.

The project was based on the implementation of the seven steps outlined in the JBI Evidence Implementation Framework.<sup>15</sup> All audits were reviewed during group meetings, and a baseline assessment was conducted. The GRiP process identified five key barriers. The most impactful changes included the identification of yellow flags, an increased level of patient knowledge about exercise, and advice about running or walking. To fulfill one of the project goals, which was to enhance patient knowledge, the project leader created a patient-friendly leaflet. In the baseline audit, it was identified that the examination during the initial physical assessment did not include the evaluation of yellow flags. After the process was



**Figure 2: Comparison of baseline and follow-up audits.**

completed, the STarT Back Tool was incorporated into the first procedure.

In Germany, if a patient experiences LBP, they consult a physician, resulting in first line treatment from a general practitioner, followed by an orthopedic physician, who then makes a referral for physiotherapy. This hierarchical pathway restricts physiotherapists' free and independent management of therapy, as they must adhere to medical advice. It is therefore difficult to change Criterion 3. Patients may sometimes be referred for an MRI at the first appointment with the doctor. Direct access to physiotherapy has not yet been established in Germany, which affects the potential influence and results of the change in this project, as imaging and prescription cannot be determined by the physiotherapist. It also shows potential for future implementation projects in different settings. In the German health care system, a patient covered by general insurance receives one prescription for six treatment sessions within a given time frame, usually 3 months. Patients with private health insurance receive ten therapy sessions per prescription. The paid time is 20 minutes for patients with general insurance. The

physiotherapist needs to interview and educate the patient within this time frame. Additionally, the prescribed treatment, which is not supposed to include the consultation time, but a specific treatment such as massage or physical therapy, must be conducted. This is hard to achieve in 20 minutes. As a result, the therapeutic focus is subsequently adjusted as it is not possible to conduct an assessment, interview, consultation, warm up, and treatment in this limited time frame. The authors consider that less frequent, but longer sessions may be more effective. Unfortunately, it is legally not possible to combine sessions.

Sustainability of treatment approaches requires changing the behavior of patients as a key aspect of compliance. We created a leaflet with basic information on back pain (Appendix II, <http://links.lww.com/IJEBH/A224>). In addition, the patient received self-help strategies, for example, help with daily exercise documentation (Appendix I, <http://links.lww.com/IJEBH/A223>). The table was developed for documentation and self-reflection purposes only, to increase patients' awareness about their own activity level. The final section provided instructions on learning to walk and run. This



included advice on interval training that incorporates jogging and fast walking. The approach incorporates setting achievable goals, and a mix of various endurance techniques to motivate beginners. Since the patients were required to carry out exercises and walking training in their home environment, therapeutic supervision was not possible. Throughout this process, individual motivation and knowledge often play a pivotal role. Some therapists could take advanced training in motivational communication strategies to promote general motivation. Motivational interviewing shows at least a small effect in many studies<sup>(41)</sup> and should be carried out by professionals. In a randomized controlled trial, physiotherapy and motivational enhancement treatment were investigated. Improvements were observed when combining both treatment methods.<sup>17</sup> Physiotherapists find implementation complicated because it also requires dealing with psychosocial factors. They have expressed the need for more knowledge and opportunities to share experiences and tools with patients.<sup>18</sup> The biggest obstacle to implementing motivational interviewing is the additional treatment time needed with therapists. Therefore, using digital methods (e.g., apps) could be helpful. Robust methods, prospective studies on running, and referring to existing evidence syntheses should be mandatory for future approaches for gaining more insight into the field.<sup>19</sup> Increased activity is evident in patients with sub-acute LBP. More research is needed to justify running as a preventive factor against back pain. In this context, more robust reviews and implementation projects are needed as key aspects of getting research into practice.<sup>20,21</sup>

Project limitations included the single-center design, no long-term follow-up, and the lack of generalizability. A more limited age range among patients may have resulted in different outcomes for the implementation of exercise-related approaches.

## CONCLUSION

This project successfully achieved its goal of promoting running and walking as a standard treatment and home-based approach for patients with LBP in an outpatient physiotherapy clinic. All physiotherapists in the clinic now endorse this approach. It appears imperative to provide patients with comprehensive information regarding the possibilities and limitations of therapy, including an explanation of the importance of water in the intervertebral disc and its crucial

connection to general movement and exercise. Future measures should focus on patient motivation and collecting data on potential confounding factors within the patient sample, as motivation appears to be a chief limitation for implementation.

## ETHICAL CONSIDERATIONS

No ethical approval was needed. The implementation team and authors adhered to the recommendations of the Declaration of Helsinki at all stages of the project. Patient and other stakeholder data were documented and reported anonymously.

## ACKNOWLEDGMENTS

The P3 team – Physio Praxis Prill, Zeuthen, Germany – for collaborating on this implementation project.

## FUNDING

The European Union funded this project through the Erasmus+ Strategic Partnerships program:

“Evidence Implementation in Clinical Practice” Grant number: 2020-1-DE01-KA203-005669. The funder played no role in the development of the project and did not influence the project in any way.

## REFERENCES

1. Maselli F, Storari L, Barbari V, Colombi A, Turolla A, Gianola S, *et al.* BMC Musculoskelet Disord 2020;21(1):343.
2. Von Der Lippe E, Krause L, Prost M, Wengler A, Leddin J, Müller A, *et al.* Prävalenz von Rücken- und Nackenschmerzen in Deutschland. Ergebnisse der Krankheitslast-Studie BURDEN 2020. 2021 [cited 2021 Apr 18]. Available from: <https://edoc.rki.de/handle/176904/7893>
3. Pergolizzi JV, LeQuang JA. Rehabilitation for Lower back pain: a narrative review for managing pain and improving function in acute and chronic conditions. Pain Ther 2020;9(1):83–96.
4. Baumgartner L, Wuertz-Kozak K, Le Maitre CL, Wignall F, Richardson SM, Hoyland J, *et al.* Multiscale regulation of the intervertebral disc: achievements in experimental, in silico, and regenerative research. IJMS 2021;22(2):703.
5. Antoniou J, Steffen T, Nelson F, Winterbottom N, Hollander AP, Poole RA, *et al.* The human lumbar intervertebral disc: evidence for changes in the biosynthesis and denaturation of the extracellular matrix with growth, maturation, ageing, and degeneration. J Clin Invest 1996;98(4):996–1003.
6. Risbud MV, Shapiro IM. Role of cytokines in intervertebral disc degeneration: pain and disc content. Nat Rev Rheumatol 2014;10(1):44–56.
7. Casazza BA. Diagnosis and treatment of acute lower back pain. 2012;85(4):8.

8. Slade S. Evidence summary. Lower back pain: initial management. The JBI EBP Database. 2020;3.
9. Will JS, Bury DC, Miller JA. Mechanical lower back pain. *Am Fam Physician* 2018;98(7):421–8.
10. Pamaiahgari P. Evidence summary. Back pain (acute low) and sciatica: bed rest vs keeping active. The JBI EBP Database. 2019;2.
11. Pamaiahgari P. Evidence summary. Non-specific chronic lower back pain: exercise. The JBI EBP Database. 2020;4.
12. Sitthipornvorakul E, Klinsophon T, Sihawong R, Janwantanakul P. The effects of walking intervention in patients with chronic lower back pain: a meta-analysis of randomized controlled trials. *Musculoskelet Sci Pract* 2018;34:38–46.
13. Vanti C, Andreatta S, Borghi S, Guccione AA, Pillastrini P, Bertozzi L. The effectiveness of walking versus exercise on pain and function in chronic lower back pain: a systematic review and meta-analysis of randomized trials. *Disabil Rehabil* 2019;41(6):622–32.
14. Belavý DL, Quittner MJ, Ridgers N, Ling Y, Connell D, Rantalainen T. Running exercise strengthens the intervertebral disc. *Sci Rep* 2017;7(1):45975.
15. Porritt K, McArthur A, Lockwood C, Munn Z. JBI's approach to evidence implementation: a 7-phase process model to support and guide getting evidence into practice. *JBI Evid Implement* 2023;21(1):3–13.
16. Verhagen AP, Downie A, Popal N, Maher C, Koes BW. Red flags presented in current lower back pain guidelines: a review. *Eur Spine J* 2016;25(9):2788–802.
17. Vong SK, Cheing GL, Chan F, So EM, Chan CC. Motivational enhancement therapy in addition to physical therapy improves motivational factors and treatment outcomes in people with lower back pain: a randomized controlled trial. *Archiv Phys Med Rehabil* 2011;92(2):176–83.
18. van den Heuvel C, van der Horst J, Winkelhorst E, Roelofsen E, Hutting N. Experiences, barriers and needs of physiotherapists with regard to providing self-management support to people with lower back pain: a qualitative study. *Musculoskelet Sci Pract* 2021;56:102462.
19. Belavy DL, Tagliaferri SD, Buntine P, Saueressig T, Ehrenbrusthoff K, Chen X, *et al.* Interventions for promoting evidence-based guideline-consistent surgery in lower back pain: a systematic review and meta-analysis of randomised controlled trials. *Eur Spine J* 2022;31(11):2851–65.
20. Prill R, Karlsson J, Ayeni OR, Becker R. Author guidelines for conducting systematic reviews and meta-analyses. *Knee Surg Sports Traumatol Arthrosc* 2021;29(9):2739–44.
21. Prill R, Mouton C, Klugorová J, Królikowska A, Karlsson J, Becker R. Implementation of evidence-based medicine in everyday clinical practice. *Knee Surg Sports Traumatol Arthrosc* 2023;31(8):3034–6.

Manuscript No.

**Typeset by Thomson Digital  
for Wolters Kluwer**

Dear Author,

During the preparation of your manuscript for typesetting, some queries have arisen. These are listed below. Please check your typeset proof carefully and mark any corrections in the margin as neatly as possible or compile them as a separate list. This form should then be returned with your marked proof/list of corrections to the Production Editor.

## **QUERIES: to be answered by AUTHOR/EDITOR?**

<b>QUERY NO.</b>	<b>QUERY DETAILS</b>	<b>RESPONSE</b>
<AQ1>	Please confirm whether surnames/family names (red) have been identified correctly in the author byline.	