


Biomedical Dogmas Still Influence the Delivery of Exercise Therapy in Chronic Low Back Pain Management: Mixed-Methods Study

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Purpose: Non-specific, chronic low back pain (NSCLBP) is a leading cause of disability, prompting long-term rehabilitation. Positive patient beliefs and expectations towards lasting exercise engagement play a crucial role for a successful management of this condition. The aim was to investigate beliefs, unmet needs and expectations of NSCLBP patients for exercise-related health behaviour change in the context of rehabilitative care.

Patients and Methods: In a mono-centric mixed-methods study, we conducted semi-structured interviews with NSCLBP patients and care providers. We recruited in a rehabilitation clinic which is specialized in orthopaedics and internal medicine. Interviews were analysed deductively by combining health behaviour change theories with Donabedian's quality model of care. In a patient survey, disability (RMDQ), exercise behaviours, fear avoidance beliefs (FABQ), self-efficacy in chronic disease management (SES6G), process- and outcome-expectations (OEE-2) were queried and analysed descriptively.

Results: Twenty-two interviews were conducted and 40 questionnaires completed. Qualitative results revealed that NSCLBP patients had persistent biomedical perspectives on their health condition, marked by strong preferences for biomedical diagnostics and beliefs in the superiority of specific exercise regimes. Based on met expectations and positive movement experiences, patients' motivation was successfully fostered in the motivational phase of health behavior change. In the volitional phase, the postulated desire to receive self-management strategies was largely unmet. Psychosocial aspects of care were not widely accepted. The survey study sample showed a disability score (RMDQ) of $M = 6.8 (\pm 4.6)$. Mean scores of validated scales reflecting on attitudes, beliefs and expectations of chronic NSCLBP management were at FABQ-pa $M = 15.4 (\pm 6.0)$, FABQ-w $M = 24.0 (\pm 12.1)$, SES6G $M = 6.4 (\pm 2.3)$, and OEE-2 $M = 2.7 (\pm 0.5)$.

Conclusion: In this sample, patients' understanding of NSCLBP was still dominated by biomedical dogmas and perspectives. Inpatient rehabilitation predominantly addressed expectations towards the motivational phase of exercise-related health behaviour change.

Keywords: behaviour change, exercise, patient needs, musculoskeletal disorders, self-management

Introduction

Background

In Germany, 61.3% of the population suffer from non-specific back pain.¹ Compared to thoracic pain events, lower back pain is represented twice as frequently and 15.5% of all cases develop a chronic course of disease¹ indicating persisting symptoms of more than twelve weeks.² In this manner, back pain represents the second most prevalent reason for disability (6.1%) in Germany.³ In cases of ongoing back pain-related disability, inpatient medical rehabilitation represents a standard care approach of enabling patients to regain autonomy in areas of work, family and other social environments.⁴ In Germany, musculoskeletal disorders continue to account for the majority of inpatient rehabilitation services (36.5%).⁵

In the self-management of non-specific, chronic low back pain (NSCLBP) (patients' ability to deal with everything that accompanies a chronic condition including lifestyle changes, symptoms, social consequences, treatment approaches, and physical consequences⁶), exercise therapy has shown to be effective for a variety of patient relevant outcomes including pain, physical function and disability⁷ and represents the most frequently practiced rehabilitative intervention across a variety of clinical pictures.⁸ Available evidence recommends numerous global exercise regimes such as Pilates, Motor Control, Yoga, Thai Chi, Graded Activity, aerobic and resistance exercises and does not favour specific exercise regimes compared to the aforementioned.^{7,9} However, declining long-term patient engagement and adherence has shown to represent a significant challenge for maintaining treatment effectiveness of exercise interventions.¹⁰

Recognized patient-reported barriers to long-term exercise engagement include fears of movement and pain aggravation, diagnostic uncertainties, exercise interferences with daily life, as well as delayed palpable treatment effects.¹¹ Low levels of self-efficacy beliefs and self-confidence have shown to additionally influence exercise engagement.¹¹ Enablers supporting long-term exercise engagement encompass clear information on the cause, pathology, and prognosis of NSCLBP as well as personalised information on available self-management strategies.¹² According to Main et al,¹³ stated barriers and enablers to exercise adherence can be translated into three major domains of NSCLBP-patient beliefs ((a) beliefs about the nature of pain, (b) beliefs about specific fears of harm and injury and (c) self-efficacy beliefs).

After replacing a structure-oriented with a biopsychosocial treatment approach to NSCLBP, an investigation of health-related beliefs and expectations of affected populations became increasingly important. It is recognized that destructive beliefs (eg, about self-efficacy), fear avoidance, or catastrophizing can have a considerable impact on the course of recovery.¹³ In their characteristics, these beliefs can vary across countries and can be determined by socio-demographic factors such as age, education, income or psychological well-being.^{14,15} Shaped by beliefs and experiences, patients develop expectations towards medical care: For patients suffering NSCLBP, this can manifest in a desire for a specific biomedical diagnosis or a structure-oriented attribution of causal pain mechanisms.¹⁶

In this context, the biopsychosocial perspective on NSCLBP has changed the role of exercise therapy. Structure-oriented treatment goals were replaced by goals focussing on pain tolerance, activities and participation to rather self-manage a chronic condition than supposedly cure it. For the majority of physicians, therapists or other healthcare practitioners, this has become common sense; however, the translation of this knowledge to those being affected remains insufficient.

Objective

The aim of this study was to investigate which beliefs, unmet needs and expectations NSCLBP patients report in the context of exercise engagement in rehabilitative care. In this way, we aim to inform future rehabilitation programs enabling its stakeholders to properly address patient beliefs and expectations influencing rehabilitation success. In line with this objective, we stipulated the following research questions:

1. Which beliefs, unmet needs and expectations report NSCLBP patients in the context of exercise-related health behaviour change?
2. What are postulated barriers and facilitators to long-term exercise engagement?

Methods

Design

ExBackTation is a mono-centric, sequential mixed-methods study. In the first phase, semi-structured, interviews were conducted with NSCLBP patients and employed healthcare providers of the recruited rehabilitation clinic. Interviews were complemented by a one-time sociodemographic survey. Secondly, an exploratory, cross-sectional survey was developed on the basis of qualitative findings. This sequential process is based on the mixed-methods research methodology as it was introduced by Elizabeth G. Creamer.¹⁷ The survey was conducted with NSCLBP patients being enrolled in a NSCLBP rehabilitation program. ExBackTation is registered on the German Clinical Trials Registry (DRKS00029059).

Context

In Germany, about 85% of rehabilitative services are provided in inpatient rehabilitation clinics.¹⁸ Central objective of inpatient rehabilitation is to reduce consequences of health burdens on all areas of social inclusion such as recreational and work-related activities.¹⁹ According to the German Social Code 9 § 42, patients suffering from primarily somatic health conditions remain in inpatient rehabilitation programs for three to five weeks. Under regular conditions, participation in a rehabilitation program can be reimbursed by a social insurance agency every four years. The German Pension Insurance Fund represents the most important sponsor of inpatient rehabilitation services.

A special characteristic of the German rehabilitation system is represented by a separation of social insurance responsibilities of rehabilitative services compared to other healthcare services. While rehabilitation services are usually paid by the German pension insurance fund, other healthcare services are primarily reimbursed by statutory health insurance agencies. This circumstance requires self-responsibility in the application processes for inpatient rehabilitation services and frequently results in fragmented intersectional information exchange among different levels of care providers.¹⁸

ExBackTation was conducted in a rehabilitation clinic under authority of the German Pension Insurance Fund Berlin-Brandenburg. The clinic is located about 70 kilometres north of Berlin and is specialized in diabetic, orthopaedic and trauma rehabilitation.

Sampling and Recruitment

For the interview study, participants were selected by a purposive sampling strategy. Eligibility criteria for patient interviews were an ICD-10-M.54 diagnosis in the lumbar spine region and an active enrolment in a medical rehabilitation program targeting NSCLBP during interview recording. We included patients with an age between 18 and 60 years as this represents the most represented age group in German inpatient rehabilitative care. Moreover, patients needed to report a persistent pain history of at least 12 weeks and needed to have a minimum of fluent German language skills. Exclusion criterion was a patient history with specific back pain (including radicular syndromes, spinal fractures, malignancy, spinal infection, axial spondyloarthritis, cauda equine syndrome).

Inclusion criteria for healthcare provider interviews comprised an employment of at least two years in the rehabilitation clinic as well as a weekly contact to the targeted patient group. Professions of orthopaedics, nursery, physiotherapy, psychology and social work were targeted.

Patients were approached by orthopaedic physicians within the first medical consultation session of their rehabilitation program. Physicians were informed about inclusion criteria and received a checklist for recruitment. Healthcare providers were approached face-to-face via an inter-professional team meeting. Informed consent had to be signed by each participant.

For the survey study, patients were recruited exclusively. As the survey study was exploratory in design, we did not calculate a sample size and targeted the maximum possible number of questionnaire returns over the phase of recruitment. Inclusion criteria followed criteria of the interview study (Table 1). Recruitment was conducted by weekly informative meetings in which the research team introduced aims and objectives of the survey study to the targeted patient group. Patients were invited to this meeting in their third week of rehabilitation.

Data Collection

For each patient and healthcare practitioner interview, data were collected (June 2022 to October 2022) using semi-structured interview-guides which additionally included narrative, biographical elements of patients' medical history (see Additional file 1). The interview-guides were piloted by the first two interviews which did not result in major adjustments. All interviews were conducted face-to-face at the rehabilitation clinic. Data were audio-recorded and transcribed verbatim (November 2022 to December 2022). During each interview, notes were taken to document salient statements and ideas. Data saturation was rated to be achieved as soon as no additional themes emerged in three consecutive interviews. No repeated interviews were carried out. Each interview participant received a small monetary reimbursement for participation (50.00 Euro). Participants were also given the opportunity to inspect their interview transcripts by contacting the research group.

Table 1 Sociodemographic Characteristics of Interview Participants (N = 22)

ID Code	Gender	Age	Back Pain History (Years)	Number of Sick Leave Days (Months)	Level of Pain ^a (NRS)
P 1	Male	34	20	5	3
P 2	Female	55	20	12	6
P 3	Female	31	21	1	7
P 4	Female	29	6	6	7
P 5	Female	55	5	0	3
P 6	Female	56	40	12	5
P 7	Male	42	3	9	6
P 8	Female	55	30	9	6
P 9	Female	36	9	5	3
P 10	Female	22	4	12	5
P 11	Male	46	7	2	5
P 12	Female	56	8	4	5
P 13	Male	54	30	0	7
P 14	Male	49	12	6	5
P 15	Male	59	15	6	5
P 16	Male	58	25	50	7
P 17	Female	53	27	24	5
P 18	Female	60	10	2	3
ID Code	Gender	Age	Occupation	Work experience (years)	# NSCLBP patients per quarter
HP 1	Female	56	Nurse	38	N/R
HP 2	Male	42	Physician	3	60
HP 3	Female	35	Social worker	14	120
HP 4	Female	22	Sports therapist	2	400

Notes: ^aLevel of pain reported at the day the interview was carried out; #: Number.

Abbreviations: ID, identification; NRS, numeric pain rating scale ranging from 1 to 10; P, patient; HP, healthcare provider; N/R, not reported.

The structure of the questionnaire followed two thematic blocks. In block (I), patient characteristics were investigated by self-developed items on sociodemographic characteristics, medical history data, as well as exercise behaviours. Additionally, disability was queried by the German version of the Roland Morris Disability Questionnaire (RMDQ).²⁰ In block (II), relevant constructs of patient beliefs and expectations were developed and selected on the basis of qualitative findings. They were explored by the German versions of the Fear Avoidance Beliefs Questionnaire (FABQ),²¹ the Self-Efficacy Scale for Chronic Diseases (SES6G),²² and the Outcome Expectancies scale – Version 2 (OEE-2).²³ Moreover,

a 12-item self-developed scale on process expectations (PES) was applied by using a 5-point-likert scale ranging from “strongly agree” to “strongly disagree”.

Data collection was ensured by using paper-pencil and online questionnaire formats. Paper-pencil questionnaires were distributed at the end of each informative meeting and were returned to the front desk of the rehabilitation clinic in a sealed envelope. Online questionnaires were accessed via a QR-Code printed on an information leaflet. For the online questionnaire, no cookies or IP-addresses were used or stored. Data collection of the survey study was held anonymously at any point in time and took place between May and September 2023.

Data Analysis

An inter-professional team of three researchers (health services research, psychology and physiotherapy) deductively identified eleven domains of analysis by combining the Integrated Theory of Health Behaviour Change (ITHBC)²⁴ ((a) condition-specific knowledge) with the Health-Action-Process-Approach (HAPA) model²⁵ ((b) motivational self-efficacy, (c) risk perception, (d) expectancies, (e) goal setting, (f) action planning, (g) coping planning, (h) social support, (i) self-efficacy (maintenance), (j) self-efficacy (recovery), (k) action control). The domain of (h) social support was further classified into social support domains suggested by the ITHBC ((h.1) social influence, (h.2) emotional, instrumental and informational support).²⁴ Additionally, we subdivided the domain of expectations into structure, process, and outcome expectations as it has been suggested by Geurts et al.²⁶ An illustrative frame of analysis is provided in Figure 1. A comprehensive description of the applied coding tree is provided in Additional file 2. Data reporting was guided by consolidated criteria for qualitative research (COREQ). A checklist of criteria is provided in Additional file 3.

LK and FW independently and iteratively coded a random sample of five interviews. Inter-coder congruity was emphasized by continuously discussing divergent codes. After clarification of insecurities in code allocations, LK coded remaining interviews. Trustworthiness of analysis was ensured by continuously seeking for similarities and differences of emerged key themes (LK, FW). Additionally, key themes were organized into a barrier and facilitator structure. This provided the opportunity to contrast or manifest modes of action of each identified theme. By quantifying identified barriers and facilitators to behaviour change in a descending rank of frequency, we supported the integrity and transparency of results. Triangulation of results was further emphasized by integrating perspectives of an inter-professional group of healthcare providers. MAXQDA Analytics Pro 20 was used to analyse qualitative data.

Survey data were analysed descriptively and were used to underline and complement qualitative results.

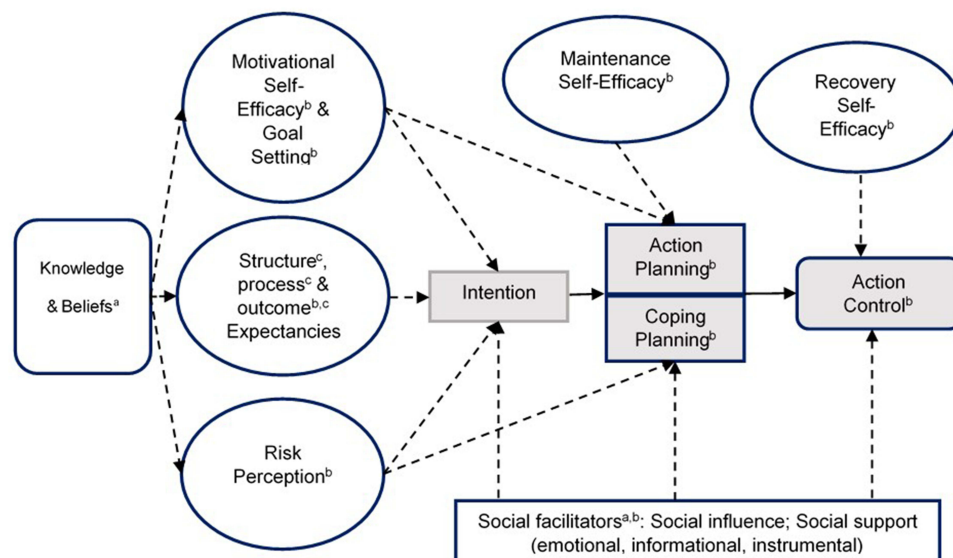


Figure 1 Theory-driven frame of analysis.

Notes: ^aIntegrated Theory of Health Behaviour Change; ^bHealth Action Process Approach; ^cDonabedian quality model of care. Gray shadings: Stages of health behaviour change^b; Blue outlines: Deductive domains of analysis.

Results

A total of 22 interviews were conducted with patients (N = 18) and an inter-professional sample of healthcare providers (N = 4). Three patients refused to participate due to privacy concerns. The mean interview duration was 32:55 min (SD ± 10:36 min). A detailed display of sociodemographic interview participant characteristics is provided in Table 1.

A total of 40 NSCLBP patients completed the survey. A full display of sociodemographic measures is provided in Table 2.

Motivational Constructs

Condition-Specific Knowledge & Beliefs

A majority of patients associated specific body postures and exercises to be superior to general physical activity (eg, “Well, these treatments weren’t back related. Just walking and weight lifting doesn’t make it better”. P-02_Pos046). This belief was

Table 2 Characteristics of Survey Participants (N = 40)

Characteristics	Value
Age (years)	54.1 (±5.1)
Gender	
Female	21 (52.5)
Male	18 (45.0)
Other	0 (0.0)
Missing	1 (2.5)
Marital status	
Single	11 (27.5)
Married	22 (55.0)
Widowed	0 (0.0)
Divorced	6 (15.0)
Missing	1 (2.5)
Highest educational level	
No high school diploma	2 (5.0)
9 years of high school education	12 (30.0)
10 years of high school education	19 (47.5)
12 years of high school education	6 (15.0)
Missing	1 (2.5)
Employment	
No employment	4 (10.0)
Incapacitated	2 (5.0)
Retired	0 (0.0)
Minor employment	1 (2.5)
Part-time employment	6 (15.0)
Full-time employment	25 (62.5)
Missing	2 (5.0)
Back pain history (years)	11.9 (±9.2)
Disability (RMDQ)	6.8 (±4.6)
Exercise behaviours (minutes per week)	
Stretching or strengthening exercises	43.5 (±50.2)
Walk for exercise	83.3 (±65.7)
Swimming or aquatic exercise	21.5 (±47.2)
Bicycling	64.5 (±68.0)
Other aerobic exercise equipment (stairmaster, rowing, skiing machine, etc.)	22.1 (±39.7)

Abbreviation: RMDQ, Roland Morris Disability Questionnaire.

also echoed by healthcare providers who confronted patients with seemingly wrong body postures in order to regain exercise motivation and highlight the need for a specific training regime (eg, “Or simply demonstrating where your mistakes are. Just stand in front of the mirror and take a look at your posture. And yes, this is something I do a lot” HP-02_Pos026). In that respect, the choice of specific exercise regimes was argued with the removal of muscular imbalances (eg, “And we try to show them that doing strengthening exercises actually helps, due to muscular imbalances. Muscles are developed differently and that has to be aligned.” HP-02_Pos_038).

Patients additionally reported a desire to receive specific instructions for day-to-day activities (eg, “To receive new ideas [...] uh, cleaning out the dishwasher by paying attention to your posture and doing certain sport exercises. [...] I thought that was really good.” P-04_Pos092) and were eager to be educated about pain mechanisms in order to take ownership of their health condition (eg, “For a very long time, I believed my spinal disc hurts, even though it doesn’t even have nerves. If I had known that much earlier, I think I could have structured my whole life differently.” P-04_Pos026).

This is in line with our survey data and results of the FABQ in which 83% of respondents associated physical activity as causal contributor to their current pain status. In that regard, 68% agreed to the statement that physical activities which might make their pain worse should be avoided. Moreover, 70% of respondents believed that their professional occupation aggravated their chronic pain condition and 63% believed that a resumption of occupational activities would lead to increased pain experiences. On the other hand, only 10% of respondents believed that they would never be able to go back to their current occupation. In total, mean scale values referring to fear avoidance beliefs towards physical activity (FBAQ-pa) were at 15.4 (± 6.0 points) out of 24 possible points. Referring to work-related fear avoidance beliefs (FBAQ-w) mean scale values were at 24.0 (± 12.1 points) out of 42 possible points. A comprehensive display of items of the FABQ is provided in Figure 2.

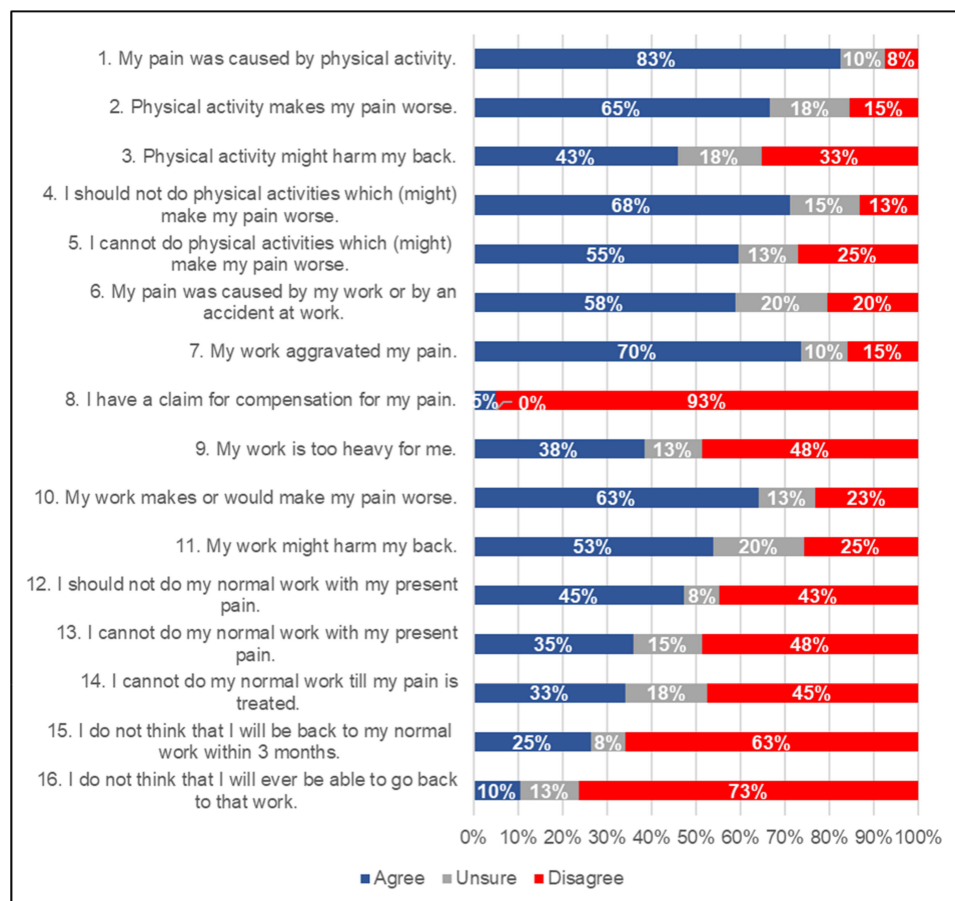


Figure 2 Item responses of the fear avoidance beliefs questionnaire (FABQ) (N = 40).

Self-Efficacy (Motivational)

Patients associated the rehabilitation stay with a regain of motivation to engage in physical activity and expand pain limits (eg, “You really need to get told that you have to continue to make it better. You don’t believe it yourself because you’re mentally blocked. It hurts, stop!” P-02_Pos220). However, motivational self-efficacy declined as soon as rigorous exercise engagement was not perceived to have tangible successes on health outcomes (eg, “I’m all motivated to be active, and yet I feel like it’s not leading to success because I’m either doing the wrong exercises or I have no idea”. P-06_Pos010). From the provider perspective, this stated regain of motivation to change lifestyle-related habits was considered to be a missing aspect in their daily debates with patients (eg, “They have to want it! Patients usually come across, and of course they’re stressed and everything, but they always want to take, but not give. They can’t always just say I can’t do anything anymore and need a pension.” HP-03_Pos032).

Expectations (Structure, Process, Outcome)

Primary structure expectation to the rehabilitation stay included a desire for permanent therapeutic relationships (eg, “Frequently, there are different people who give you treatments. Last week, for instance, I had two treatments with a physiotherapist and this week, there is none scheduled at all. [...] I would have expected more.” P-04_Pos076).

Process expectancies included the desire to receive proper biomedical diagnostics (eg, “Honestly, an image would have been nice. Or if the doctor would have examined my spine. [...] He just said, it didn’t really matter what it was”. P-03_Pos160). This desire was echoed by 55% of survey respondents who agreed to the statement that they expected to obtain a correct diagnosis of their condition during inpatient rehabilitation. Patients appreciated individualized exercise therapy meeting their specific healthcare needs and conditions (eg, “The trainers ask for wishes, whether it can be made heavier or lighter, in other words, in a way that suits each individual”. P-04_Pos078). Following our survey results, 70% of respondents mirrored this expectation and 80% of queried patients additionally appreciated the opportunity to test new movements and activities in a safe environment. Furthermore, 83% of survey respondents valued the opportunity to receive therapeutic reference persons during their rehabilitation stay.

Moreover, patients valued biomedical therapy approaches which were considered to be holistic (eg, “The osteopath has actually approached it more holistically. I don’t mean that she only included psychological aspects but that there must be something with the gut. And yes, I have food intolerances.” P-06_19). On the other hand, aspects of pain experience recognition, learning relaxation strategies, or strategies helping to develop supportive thoughts about their chronic condition seemed to have subordinate relevance to respondents. A comprehensive display of items reflecting process expectations is provided in [Figure 3](#).

Main outcome expectations towards the rehabilitation stay included the desire to learn self-control strategies during pain events (eg, “That I will eventually be shown things to control my body. [...] Whether mentally or physically”. P-14_Pos80). Moreover, patients were looking for professional support helping to adhere to developed exercise regimes (eg, “I go there in the hope to conquer one’s weaker self to be able to continue the whole muscle program”. P-15_Pos064).

Taking results of the OEE-2 scale into account, the main outcome expectation of survey respondents towards exercise was the expectancy to improve in muscle strength (83%). Additionally, 75% of respondents related a personal sense of accomplishment to exercise engagement but only 55% associated exercise with feeling physically better and only 43% agreed that exercise is an activity they enjoy doing. In total, the mean score of the OEE-2 scale was at 2.7 (\pm 0.5 points) out of 5.0 possible points.

Risk Perception & Goal Setting

Patients reported fears of back injuries which they related to supposedly incorrect and dangerous exercise regimes or body postures (eg, “I used to carry the wrong way, lift the wrong way. Yes, and for about 15 years now I’ve been getting slipped discs, lumbago. [...] You try to do less, but it doesn’t work out.” P-15_Pos004). These insecurities frequently led to fear avoidance behaviours and exercise disengagement (eg, “I came here with fear. It was really that bad that I didn’t even think, I could participate in therapy”. P-06_Pos110).

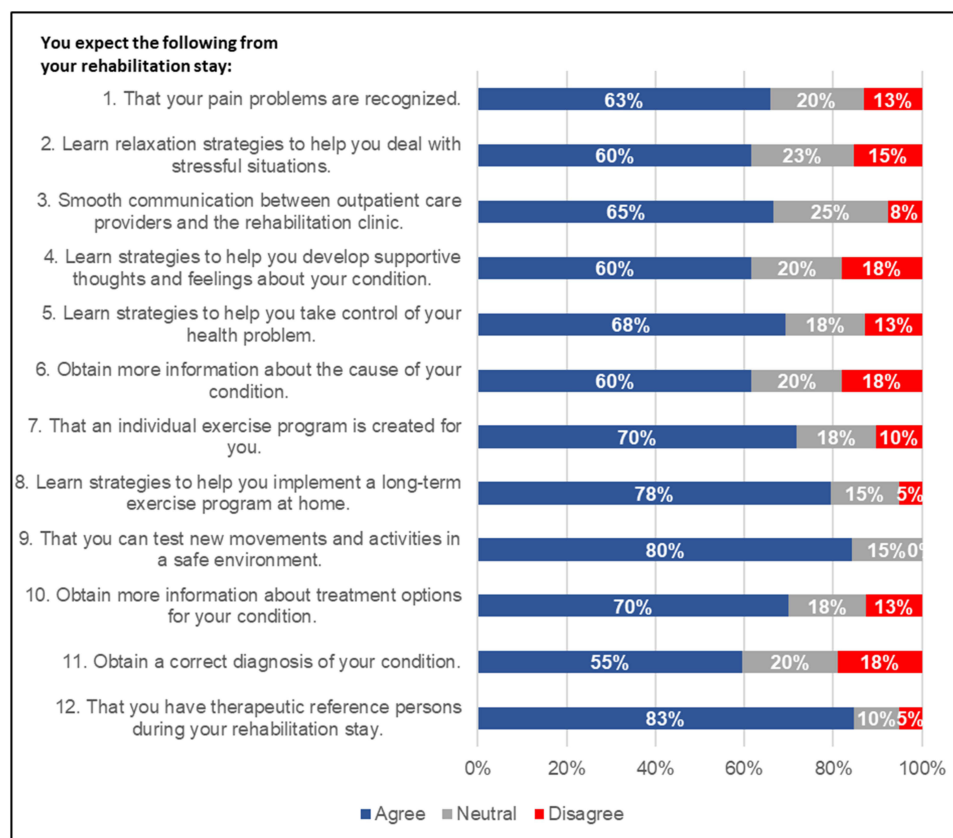


Figure 3 Item responses on process expectations (N = 40).

Patient goals predominantly included general muscle growth and physical fitness (eg, “Muscle growth, definitely!” P-18_Pos114). The awareness and acceptance of psychosocial health goals was strongly limited or even perceived to be offensive (eg, “It was always put on this psychological level. As if once this is alright, the back pain will be gone [...]”. P-06_Pos10).

Volitional Constructs

Action & Coping Planning

Patients were aware of the need to develop day-to-day strategies (eg, “If I don’t do anything for myself or against my pain, then nothing will happen”. P-02_Pos320). However, the implementation of these strategies was rather represented by a feeling than a specific mode of action (eg, “I cannot really say, this was it! But still things just became clearer to me. Yes, I can’t explain it at all, really”. P-06_Pos143). However, one patient intuitively planned to redesign her home environment to continuously engage in exercise and started to keep an exercise diary (eg, “I also placed my gymnastic mat in my room and didn’t just leave it in the box. It’s all there. My diary, so that I don’t have to set it up every time” P-05_Pos146).

Social Support

Family and friends were primarily considered to be supportive as soon as they reinforced fear avoidance behaviours (eg, “They [family] are super caring and attentive and take things out of my hand when they get too heavy”. P-04_Pos120). Contrary, one patient defined a caring husband as someone helping her to step out of her comfort zone (eg, “My husband is the pioneer. I don’t know if I would have done it myself, but it’s nice that he takes me along and says, come on, we have to”. P-05_Pos076).

Patients appreciated the rehabilitation clinic as a protective setting in which they were able to gain new movement experiences (eg, “That I’m allowed to try things out, that I can say, oh, wait, that doesn’t feel good, and there is really a counterpart who responds to it”. P-06_Pos064). This was also stated to be a deliberate standard of practitioners (eg, “I always try to make exercise so much fun to my patients”. HP-04_Pos020). Additionally, patients perceived social

exchange and group-based training sessions to facilitate exercise engagement (eg, “It’s nice to have a walking group, where people are staying together. Then, everyone has the same level”. P-02_Pos178).

Self-Efficacy (Maintenance & Recovery)

A main barrier to exercise maintenance included insecurities related to exercise-induced pain during training sessions (eg, “How can I move now? What’s making it worse or better, even if it hurts after the first step? P-06_Pos024). Patients additionally reported to quit exercise routines as soon as pain relief was noticeable (eg, “The problem is, just as it gets better, you stop, and that’s the mistake and then it starts again”. P-12_Pos26). Additionally, discontinuity of routines such as vacations or sick leaves was associated with an interruption of acquired health patterns. Even if a patient described herself as disciplined, she perceived these interruptions as challenging (eg, “I’m actually quite a disciplined person who just keeps going. Unless the next vacation comes, then you start over again from the beginning”. P-06_Pos168).

With regard to survey respondents’ perceived self-efficacy in managing their chronic condition, the mean score of the SES6G was at 6.4 points (± 2.3 points). Across items of the SES6G, response patterns appeared to be similar as the range of mean values for item responses ranged from 6.0 points (fatigue) to 6.69 points (doing things other than medication). Highlighting the 75% percentile of item responses, the 75% percentile of item 5 (reduction of physician consultations) was noticeably lower compared to remaining items. A detailed display of response patterns of the SES6 is provided in [Figure 4](#).

Action Control

In order to feel confident for a long-term commitment to exercise, patients expressed a desire for monitoring procedures which, at best, are supervised by ambulatory physicians or therapists (eg, “A continuous reminder would help me to stay on track. [...] Exchange with the doctor to do something over a long period of time other than being on my own”. P-04_Pos046). In that respect, healthcare practitioners felt that patients would rely too much on medical professionals and their therapeutic services which would not be sufficient to properly manage their chronic pain condition (eg, “The majority of patients try to do something at home, whether it’s rehabilitation sports or physiotherapy, but frequently it’s done once or twice a week, if at all and there is too much reliance on the therapist.” HP-02_Pos020). According to one healthcare provider, this delegation of responsibility would also reflect a lack of available post-rehabilitation management strategies for patients (eg, “Patients certainly try to work against the pain at home with training, but it’s rather rare to find that here. In most cases, they don’t even deal with it and don’t really have any strategies for at home.” HP-02_Pos020). On the other hand, healthcare practitioners did not describe it to be their responsibility to develop management strategies for patients’ home environments.

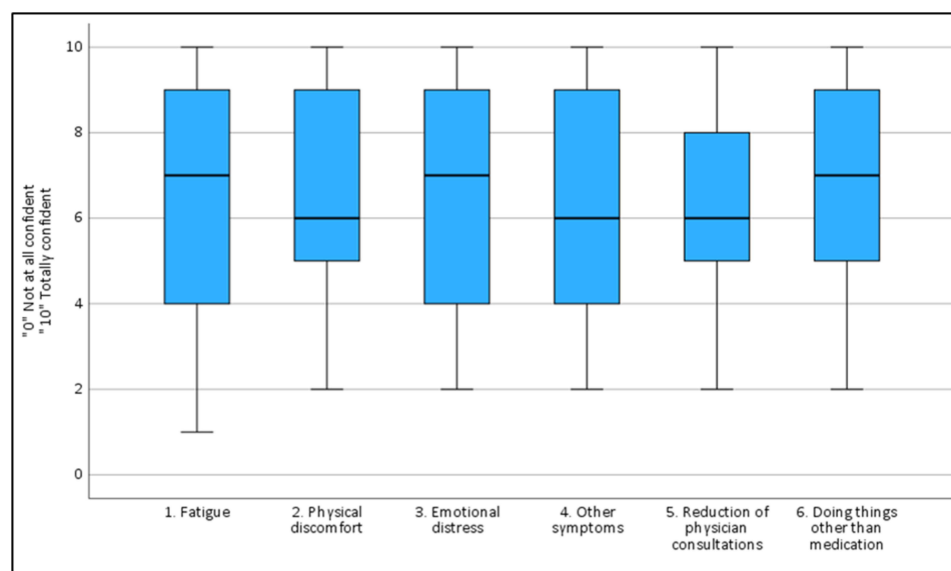


Figure 4 Item responses of the self-efficacy for managing chronic disease 6-item scale (SES6).

Table 3 Top 10 Patient Beliefs and Expectations Representing Barriers and Facilitators to Exercise-Related Health Behaviour Change (N = 22 Interviews)

Factor	Description	Domain	Rank ^a	Interviews N (%)
F-	Belief that exercise represents a deliberate standard	AC	1	22 (100)
F-	Expectancy to learn and receive self-management strategies	C-SK	2	20 (90.9)
B-	Belief in superiority of specific exercise regimes	C-SK	3	17 (77.3)
B-	Expectancy to explain chronic pain mechanisms by biomedical causes	C-SK	4	15 (68.2)
B+F	Belief that (no) integration of exercise routines into day-to-day life is possible	CP	5	14 (63.6)
B+F	(No) acceptance of psychosocial health goals	OE	6	11 (50.0)
B-	Exercise-related fear of injury	RP	7	10 (45.5)
B+F	(Delayed) tangible success of exercise engagement	SE-Mot	8	7 (31.8)
B-	Expectancy to receive extensive biomedical diagnostics	Pr-E	9	7 (31.8)
F-	Expectancy to receive individualized exercise therapy	Pr-E	10	7 (31.8)

Note: ^aRank based on the number of interview partners mentioning the factor.

Abbreviations: F, facilitator; B, barrier; AC, action control; C-SK, condition-specific knowledge; CP, coping planning; OE, outcome expectancies; RP, risk perception; SE-Mot, self-efficacy (motivational); Pr-E, process expectancies; SE-Mai, self-efficacy (maintenance); SS, social support.

A translation and consolidation of results into barriers and facilitators to exercise-related health behaviour change is provided in [Table 3](#).

Discussion

The ExBackTation study investigated the role of NSCLBP patients' beliefs and expectations on exercise therapy and the resulting barriers and facilitators to long-term exercise engagement. Results of our analysis support that perspectives on NSCLBP are still dominated by biomedical views which were expressed in strong desires for biomedical diagnostics and beliefs in the superiority of specific exercise regimes. Patient expectations towards inpatient rehabilitative care were mainly met in the motivational phase of health behaviour change which was manifested in positive experiences of reassurance, drawing motivation, gaining new movement experiences, or reducing fear avoidance beliefs. However, expectations on the volitional phase of health behaviour change resulting in a desire for structured and clear recommendations on how to self-manage their chronic condition were mainly unmet.

Comparing our results to previously conducted studies, the overrepresentation of biomedical perspectives on non-specific LBP is a well-known phenomenon as it has been elaborated in several studies. For instance, in a systematic scoping review of Chou et al, the authors systematically mapped patient needs in LBP management and identified needs for diagnostic clarity and legitimation of symptoms resulting in a strong desire for spinal imaging.²⁷ Additionally, LBP patients avoided injections or pharmacotherapy and perceived their desire to receive pain control strategies to be unmet.²⁷ Results of a qualitative study also suggest that LBP patients understand back pain as a biomedical condition as they believed that rest positively influences pain mechanisms.²⁸ From medical services, interviewed patients expected a reduction of pain, passive treatment approaches, specific exercise regimes and clear information on LBP courses and management options.²⁸

With respect to the role of exercise therapy for NSCLBP management, results of another qualitative study emphasized the influence of patho-anatomical and biomechanical explanations of pain on exercise perceptions.²⁹ In this way, the authors highlighted that benefits of exercise were mainly associated to preventive mechanisms of future back pain incidences.²⁹ However, patients did not associate potential benefits of exercise on pain reduction and the authors concluded that the rationale of exercise in the context of NSCLBP management was insufficiently communicated to patients.²⁹ In line with these findings, Slade et al identified that patients suffering NSCLBP tend to classify exercise regimes into categories of medical and non-medical exercise which ultimately led to a distinction of "right" and "wrong"

regimes.¹¹ This resulted in a desire to receive guideline-discordant, highly individualized training programs being tailored to patho-anatomical findings.¹¹

In line with our findings on barriers to exercise engagement, Vader et al conducted a qualitative study with chronic pain patients and identified that discomfort during exercise, fear of pain and increased risk perception influences exercise participation.³⁰ This strongly mirrors our findings on barriers to exercise engagement. In another qualitative study of Vader et al, described strategies for successful exercise engagement were to set up a mindset of success, find motivation and leverage social support.³¹ This partly mirrors our results as the inpatient rehabilitation stay was perceived to increase motivation to exercise engagement but not to set up for success or identify social support for the home environment.

However, biomedical attributions of causal LBP mechanisms are not unique features of the patient perspective and the role of healthcare providers on LBP management has to be considered. A systematic review of Darlow et al highlights the empirical certainty that healthcare providers' beliefs and attitudes about back pain are significantly associated with beliefs and attitudes of their patients.³² Moreover, moderate quality of evidence suggests that biomedical orientations as well as increased levels of fear avoidance of healthcare providers can be associated with a higher probability for guideline-discordant advice such as recommendations to limit physical or occupational activities.³² Another example of practitioner-related misbeliefs about NSCLBP management can be illustrated by an investigation conducted with general practitioners in Spain.³³ The authors of this qualitative study identified that interviewed general practitioners considered therapeutic exercise as a suitable approach to NSCLBP management but hesitated to prescribe it and continued to educate patients about postural hygiene or recommended limiting activities contrary to recommendations of international practice guidelines.³³

Strengths and Limitations

The sequential mixed-methods design of ExBackTation facilitated a data-informed and target group-oriented development of our survey instrument by taking results of the qualitative analysis into account. Barriers to survey participation were reduced to a minimum by enabling digital as well as analogue participation. Trustworthiness of qualitative data collection and analysis was ensured by following consolidated criteria of qualitative research (COREQ). As we used a face-to-face format in qualitative data collection, we were able to build rapport with interview participants and had the opportunity to capture additional emotional and behavioural responses. As the data collection of interviews combined narrative and semi-structured elements, we were able to ensure the highest possible level of information acquisition. Triangulation of qualitative results was guaranteed by integrating healthcare practitioners' perspectives on postulated research questions.

The representativeness of our findings must be interpreted under consideration of some limitations: Since ExBackTation followed a mono-centric study design, a potential influence of organizational particularities of the recruitment site on study results has to be considered. Moreover, the representation of study participants may have underlain a selection bias as participation was voluntary, which potentially resulted in a primary appeal of NSCLBP patients who made particularly positive or negative experiences with rehabilitative care. Moreover, we exclusively included patients who were enrolled in an inpatient rehabilitation program. These patients may significantly differ from patients being enrolled to outpatient rehabilitation programs, for instance, in the severity of their back diseases. As in Germany, rehabilitation program enrolments require patient-generated, proactive application procedures, participants of this study may have had above average levels of health literacy on aspects of health system knowledge and navigation capabilities.

Conclusion

People suffering NSCLBP still perceive this condition as primarily biomedical event. They expect medical rehabilitation to provide distinct biomedical diagnostics and tailored exercise regimes. They perceive inpatient medical rehabilitation as a protected setting in which they can experience reassurance, draw motivation, gain new movement experiences, and reduce fear avoidance beliefs. Medical rehabilitation seemed to meet most expectancies related to the motivational phase of health behaviour change. Expectancies related to the volitional phase of health behaviour change were predominantly related to the desire to acquire self-management strategies and were mainly unmet.

Main barriers to long-term exercise engagement were beliefs in the superiority of specific exercise regimes, an expectancy to explain chronic pain mechanisms by biomedical causes, exercise-related fear of injury and the expectancy to receive extensive

biomedical diagnostics. Main facilitators were beliefs that exercise represents a deliberate standard, the expectancy to learn and receive self-management strategies and the expectancy to receive individualized exercise regimes meeting personal preferences. Factors with two-sided characteristics (barrier or facilitator) were beliefs that (no) integration of exercise routines into day-to-day life is possible, (no) acceptance of psychosocial health goals, and (delayed) tangible successes of exercise engagement.

Abbreviations

EBS, Exercise Behaviours Scale; FABQ-pa, Fear Avoidance Beliefs Questionnaire – physical activity; FABQ-w, Fear Avoidance Beliefs Questionnaire – work; HAPA, Health Action Process Approach; HSU, Health Services Utilization Scale; ITHBC, Integrated Theory of Health Behaviour Change; NSCLBP, Non-specific, chronic low back pain; OEE-2, Outcome expectancies scale – Version 2; PES, Process expectations scale.

Data Sharing Statement

Due to German data protection standards, pseudonymized interview data cannot be made publicly available. Anonymized survey data can be accessed on reasonable request by contacting LK (corresponding author).

Ethics Approval and Informed Consent

For this study, ethical approval was provided by the Ethics Committee of the Brandenburg Medical School (E-03-20220322). All study participants of the interview study signed informed consent prior to participation. For the survey study, informed consent was given by confirming a checkbox prior to beginning the survey. The survey was held anonymously at any point in time. Informed consent of qualitative and quantitative study participants included the consent for publication of anonymized responses. This study complies with the Declaration of Helsinki (Fortaleza, Brazil, October 2013).

Consent for Publication

All interview participants gave informed and written consent prior to study participation. All authors have read and accepted the final manuscript version.

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Author Contributions

All authors made a significant contribution to the work reported, whether that is in the conception, study design, execution, acquisition of data, analysis and interpretation, or in all these areas; took part in drafting, revising or critically reviewing the article, gave final approval of the version to be published, have agreed on the journal to which the article has been submitted, and agree to be accountable for all aspects of the work.

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Disclosure

The authors report no conflicts of interest in this work.

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