

A Qualitative Exploration of Video-Based Motor Action Observation Perceptions in Patients with Chronic Low Back Pain and Asymptomatic Participants: An Interpretative Phenomenological Analysis

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Abstract

Background: -

Objective: This qualitative study explores the experiences and perceptions of patients with chronic low back pain (CLBP) and asymptomatic participants as they observe exercise motor actions on videos accessed through social media, with an emphasis on identifying their interpretations, emotional responses, and potential differences between the groups.

Methods: A cross-sectional qualitative approach using interpretative phenomenological analysis was employed to gain an in-depth understanding of individual experiences, following the Consolidated Criteria for Reporting Qualitative Research criteria. The sample included 20 participants, 10 with CLBP and 10 asymptomatic, recruited from rehabilitation clinics and a university population.

Results: Three main themes were identified: emotional and motivational impact, self-assessment of physical ability, and cognitive assessment of movement. Patients with CLBP reported fear of movement, concern about potential pain, and greater difficulty interpreting the exercises, which affected their motivation and perception of competence. In contrast, the asymptomatic participants showed confidence in their ability to perform the exercises and used the videos as a motivational tool. Both groups paid attention to technical details, although motivations differed: the patients with CLBP sought to minimize risks, whereas the asymptomatic patients sought to improve their performance.

Conclusions: The results indicate that action observation might have divergent effects depending on the health status of the observer. For patients with CLBP, fear and difficulty interpreting observed actions limit their motivation. Future studies should consider the development of tailored interventions that address these barriers, improving the effectiveness of rehabilitation programs.

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Original Manuscript

A Qualitative Exploration of Video-Based Motor Action Observation Perceptions in Patients with Chronic Low Back Pain and Asymptomatic Participants: An Interpretative Phenomenological Analysis

Abstract

Aim: This qualitative study explores the experiences and perceptions of patients with chronic low back pain (CLBP) and asymptomatic participants as they observe exercise motor actions on videos accessed through social media, with an emphasis on identifying their interpretations, emotional responses, and potential differences between the groups.

Study design: A cross-sectional qualitative approach using interpretative phenomenological analysis was employed to gain an in-depth understanding of individual experiences, following the Consolidated Criteria for Reporting Qualitative Research criteria.

Participants: The sample included 20 participants, 10 with CLBP and 10 asymptomatic, recruited from rehabilitation clinics and a university population.

Results: Three main themes were identified: emotional and motivational impact, self-assessment of physical ability, and cognitive assessment of movement. Patients with CLBP reported fear of movement, concern about potential pain, and greater difficulty interpreting the exercises, which affected their motivation and perception of competence. In contrast, the asymptomatic participants showed confidence in their ability to perform the exercises and used the videos as a motivational tool. Both groups paid attention to technical details, although motivations differed: the patients with CLBP sought to minimize risks, whereas the asymptomatic patients sought to improve their performance.

Conclusions: The results indicate that action observation might have divergent effects depending on the health status of the observer. For patients with CLBP, fear and difficulty interpreting observed actions limit their motivation. Future studies should consider the development of tailored interventions that address these barriers, improving the effectiveness of rehabilitation programs.

Keywords: Motor actions observation; chronic low back pain; qualitative analysis; fear of movement; movement perception.

Introduction

Chronic pain is a major health problem, with impacts on both the individual and societal level due to its high prevalence and complexity. Fayaz et al. (2016) noted that chronic pain affects a significant proportion of the population, increasing overall disease burden. Among the manifestations of chronic pain, musculoskeletal conditions such as chronic low back pain (CLBP) and osteoarthritis are the most disabling. CLBP affects approximately 23% of the general population and contributes to physical inactivity and other limitations in daily life [1]. Chronic lumbar pain-related disability is a complex and multidimensional phenomenon [2]; the prevalence of disability among people with CLBP varies considerably, ranging from 11% to 80% according to various studies [2–4].

Action observation training is a treatment strategy classified under movement representation, defined as a “systematic method of cognitive-motor treatment that uses the observation of actions in movement from an egocentric or allocentric perspective, which includes a specific focus of attention and involves a process of analysis, interpretation and understanding of the action” [5]. It has been suggested that action observation evokes a real-time internal motor simulation of the movements visually perceived by the observer [6].

Action observation training is based on Bandura's (1977) social learning theory, which describes how the observer's attention, retention, and motivation influence the learning of new behaviors [7–10]. Social learning theory explains that individuals not only imitate what they observe, but also develop a deeper understanding and skill in motor actions [7,11].

Through neuroimaging studies, a number of authors have identified several neural mechanisms related to observational learning [12–14]. Recent evidence has shown that observing motor actions can increase activity in the autonomic nervous system [15–17] and promote corticospinal excitability [18,19].

From a neurophysiological perspective, action observation training involves the activation of central nervous system areas involved in the planning, preparation, and execution of movement [20–22]. The observation of action generates an effect known as motor resonance, in which the brain's motor commands are activated, allowing the observer to internally simulate the observed actions [23]. This phenomenon facilitates observational learning by allowing the observer not only to visually perceive the action, but also to activate motor representations that can be used in similar future performances. Although the mirror neuron system has been extensively studied in this context [24,25], it has recently been questioned whether this system is the only one involved in observational learning, pointing to the possible involvement of other brain areas [26]. The context in which action observation takes place also influences motor coding, suggesting that observers do not respond exclusively to motor features, but also to perceived intentions as a function of context. Gardner et al. [27] had claimed that familiarity with observed movements modulates brain activity in the action observation network. Thus, familiar movements generate increased activity in the inferior parietal lobe and medial temporal gyrus, reinforcing the idea that prior knowledge facilitates neural processing of observed actions [27].

Observational learning is a process by which individuals acquire new skills by observing the actions of others. Bandura (1977) pointed out that this type of learning involves cognitive processes, including attention, retention, motor reproduction, and motivation, in which self-efficacy plays a central role. Self-efficacy affects an individual's ability to learn and execute observed actions, influencing their confidence in the motor skills needed to achieve their goals [28]. In turn, selective attention is crucial, as shown by studies indicating that “automatic imitation” decreases when attention is directed toward irrelevant stimuli [29].

Action observation training has shown hypoalgesic effects in asymptomatic people [30,31] and in patients with chronic pain [32–34], as well as pain reduction in patients with acute postoperative pain [35]. However, these studies did not specifically assess how participants observe actions, implying that certain factors, such as possible aversion to observed motor actions or difficulty in understanding them, were not considered. This is a relevant aspect, given that some patients with chronic pain present significant alterations in the perception and processing of observed actions, as documented by Cracco et al. (2019).

Pain appears to influence motor simulation ability, a process in which the brain internally simulates observed actions. Cracco et al. (2019) observed that patients with pain reduced their automatic imitation of motor actions, suggesting that pain not only affects the perception of one's own pain experience, but also the ability to process and imitate the actions of others. This altered perception could be relevant for treatment, given that pain influences motor interaction and the perception of observed actions [36].

Previous studies have used the observation of actions in photographs or videos of daily activities to investigate the fear and difficulty of patients with musculoskeletal pain in their daily exercise performance [37–40]. This approach has also been applied to assess the impact of fear of movement on brain response, using neuroimaging in patients with CLBP [41]. However, these prior methods typically emphasize fear or difficulty and do not capture the broader perceptual, interpretative, and evaluative dimensions involved in observing motor actions—dimensions that are crucial for a more comprehensive understanding of patients' experiences.

The growing availability of social media and video-sharing platforms, such as YouTube, has opened up new avenues for delivering exercise programs aimed at preventing and managing low back pain, while also enhancing digital health literacy [42,43]. Recent research indicates that these tools enable tailored exercise routines and can improve user motivation, thereby supporting sustained participation in physical activity even among workers with high occupational demands [44]. Furthermore, parasocial relationships with content creators appear to strengthen viewers' engagement and adherence to recommended exercises [43]. In the context of action observation training, the use of social media videos becomes particularly relevant: it can encourage real-time motor simulation of the demonstrated movements, facilitate cognitive-motor learning, and potentially foster greater commitment to rehabilitation programs. Such an approach may be especially beneficial for individuals with chronic low back pain, who often experience significant barriers to conventional exercise therapy due to pain-related fear, difficulty performing daily tasks, or limited access to in-person clinical support.

The aim of this study was to examine, through a qualitative analysis, the experiences and perceptions of patients with chronic low back pain and asymptomatic participants regarding the interpretation, evaluation, and understanding of video-based motor actions or exercises. Furthermore, it aimed to identify possible significant differences between the groups in their perceptions, interpretations, emotional responses, and skills related to action observation.

Considering the previous literature, this study contributes by moving beyond traditional approaches—often restricted to assessing fear or difficulty—toward a more comprehensive perspective on how individuals perceive, interpret, and evaluate observed movements. This broader view not only underscores the multidimensional nature of action observation in the context of chronic pain but also highlights potential pathways for improving rehabilitation strategies and patient education.

Methods

Study Design

This study employs an exploratory qualitative approach and was designed in accordance with the Consolidated Criteria for Reporting Qualitative Research [45] and the Standards for Reporting Qualitative Research [46]. These criteria were specified and applied at each stage of the study, ensuring completeness and transparency in data reporting and analysis.

A qualitative, cross-sectional methodology was adopted using Interpretative Phenomenological Analysis (IPA), as described by Smith [47]. This flexible and versatile qualitative method assesses the meaning that individuals attribute to their lived experiences, allowing the exploration, description, interpretation, and contextualization of these experiences from the perspective of a small number of participants [48–50].

Ethics

The study was approved by the bioethics committee of the La Salle University Center for Advanced Studies (CSEULS-PI-005/2020). The procedures performed in this study complied with the ethical principles of the Declaration of Helsinki for research on human subjects [51].

Prior to the semi-structured interviews, participants provided written informed consent, agreeing to participate, allowing audio recording, and acknowledging confidentiality terms that ensured their anonymity throughout the study. Specific measures for data anonymization included removing any personal identifiers from interview transcripts (e.g., names, contact details, contextual references) and replacing them with a unique alphanumeric code assigned to each participant. These codes were used at all stages of the analysis to maintain confidentiality. Additionally, all audio recordings and transcripts were stored on a password-protected server, accessible only to the core research team.

Participants

Patients with chronic nonspecific low back pain (CNSLBP) were recruited from two rehabilitation clinics in Madrid. The inclusion criteria were: a) having low back pain for at least 6 months; b) nonspecific low back pain; c) pain intensity of 3 or higher on the numerical pain scale; d) age between 18 and 65 years; e) having undergone a therapeutic exercise treatment that included instruction and learning through the observation of actions via videos; and (f) having accessed these exercise videos through social media at least three times in the last two months. The exclusion criteria included: a) having undergone back surgery in the past year; b) having specific spinal diseases such as malignant or inflammatory diseases of the joints and bones; c) having experienced spinal trauma in the past year; d) having infectious or tumorous diseases; e) presenting uncorrected visual impairments and/or cognitive disabilities that would prevent adequate understanding of audiovisual material; f) having difficulties in comprehension or communication; and g) having insufficient knowledge of Spanish to follow the instructions related to the collected variables.

For the recruitment of asymptomatic participants, a sample was drawn from the CSEULS campus through social media postings, faculty announcements, direct contact with participants, and posters. The participants recruited included students, administrative or teaching staff, and others in the area who wished to participate in the study. Inclusion criteria for asymptomatic participants were (a) no pathology or pain in the last 3 months; (b) age between 18 and 65 years; (c) previous experience in performing exercise with instruction and learning the exercises through videos; and (f) having accessed these exercise videos through social media at least three times in the last two months. The exclusion criteria for this group were (a) having uncorrected visual disabilities and/or cognitive disabilities that prevented adequate comprehension of the audiovisual material; (b) having difficulties in comprehension or communication; or (c) having insufficient knowledge of Spanish to follow the instructions of the variables collected. All participants provided written informed consent prior to the start of the research.

Study Context

To ensure an atmosphere of confidentiality and comfort, interviews and data collection were conducted in private offices within the facilities of the clinics where the study took place. During the interview sessions, only the researcher and the participant were present, without the intervention of third parties. This ensured an atmosphere of trust that facilitated openness and honesty in participants' responses.

Procedure

Semi-structured in-depth interviews were employed, applying an interview guide developed on the basis of research team meetings and the scientific literature on action observation in patients with pain. The interview protocol was designed according to the criteria set out by DeJonckheere and Vaughn [52].

The interview questions were tested on a pilot group of patients with CNSLBP not included in the study, allowing for adjustments such as simplifying certain terms and including additional questions to further explore related emotional experiences. Additionally, participants were asked the following question to assess their engagement with exercise videos: "Which social media or online platform did you use to watch the exercise videos, and how many times did you do so?". This preliminary phase eliminated the need for repeated interviews.

Audio recording devices were employed to capture the interviews, with the informed consent of the participants. Interviews lasted between 29 and 55 minutes, with an average length of approximately 42 minutes. Recordings were transcribed literally.

To ensure fuller responses or in cases of brief responses from participants, follow-up questions were used, such as "Could you expand on that?", "What do you mean by that?", or "Could you explain

more about...?” These additional questions were applied flexibly to gain a deeper understanding of the patients’ experiences.

During the interviews, the researcher took field notes to ensure full coverage of the topics discussed. Immediately after each interview, reflective notes were taken on the relevance of the topics of discussion to facilitate further analysis. This notebook was consulted during the transcription and analysis phases to incorporate reflective comments on the researcher’s insights and the interpretative process. Although interview transcripts were not automatically returned to participants for comments or corrections, participants were informed that they could request and review their transcripts if they wished.

Sample Size

A non-probability purposive sampling method was employed to select participants for both phases of the study. This approach is based on choosing participants according to the research question and the objectives of the study [53]. The sample consisted of 10 patients with chronic low back pain and 10 asymptomatic participants. This sample size is in line with recommendations that suggest including 2-12 participants for interpretative phenomenological analysis [54].

Qualitative Analysis

The qualitative analysis of the data was carried out in seven distinct phases to ensure accurate and consistent interpretation. In the first phase, transcripts were read and re-read to achieve deep immersion in the data. This was complemented by listening repeatedly to the interview recordings, capturing the emotions, tone, and emphasis of the participants.

In the second stage, exploratory notes and codes were recorded both manually (during the reading) and digitally through ATLAS.ti . [55,56]. This software was selected for its capacity to manage large volumes of qualitative data and to facilitate multi-stage coding.

The third phase involved generating experiential statements by identifying the most salient elements from the previous steps and constructing conceptual meanings based on both transcript content and researchers’ interpretations. In the fourth phase, the emerging connections and patterns among these experiential statements were examined in light of the study’s objectives. The fifth phase mapped and named these connections, resulting in the final coding scheme. The sixth phase repeated these processes for each interview, and in the seventh phase, individual experiential themes were refined to produce a synthesis of group-level themes.

To ensure reliability and validity within this analytic framework, data triangulation and investigator triangulation were employed. Specifically, two members of the research team coded the transcripts independently, and any inconsistencies in codes or interpretations were resolved through discussion to achieve consensus, with moderation by a third investigator when needed. This multi-researcher approach helped minimize potential biases and enhance credibility. Additionally, reflexivity was maintained through field notes and ongoing critical reflection, allowing the team to acknowledge and manage their own assumptions and perspectives.

Data saturation was considered achieved when no new themes or significant ideas emerged. This point was established through consensus among the researchers regarding the sufficiency and redundancy of the information collected. Themes were identified inductively from the data, facilitating an informed and authentic interpretation of participants’ experiences. Lastly, the selection of illustrative quotes for reporting the findings was made by consensus within the research team, ensuring that excerpts represented both typical and revealing perspectives. ATLAS.ti software was used for data management and analysis throughout the process [55].

Results

Sociodemographic Data from the Qualitative Analysis

The qualitative analysis was conducted with 20 participants (10 patients with CLBP and 10 asymptomatic participants), adult women and men of similar age. Of the total participants included in the study, 16 (80%) had performed action observation of exercise videos on YouTube, whereas the remaining 4 (20%) utilized Instagram for this purpose. Overall, the frequency with which participants reported viewing these exercise videos ranged from 5 to 10 occasions. Table 1 shows the sociodemographic characteristics of the participants who took part in the qualitative study.

Table 1. Characteristics of the qualitative study sample.

Patients with Chronic Low Back Pain							
Identification:	Sex	Age	Pain Duration (years)	BMI	Marital Status	Employment Status	Educational Level
Pain Patients (PP)	(M/F; Male/Female)						
-Asymptomatic patients (AP)							
PP1	Woman	44	7	25.8	Married	Sick leave	Secondary
PP2	Woman	46	12	28.6	Divorced	Active worker	University Studies
PP3	Woman	32	6	24.7	Single	Unemployed	University Studies
PP4	Woman	26	4	26.5	Single	Active worker	Vocational training
PP5	Woman	45	15	27.7	Married	Sick leave	University Studies
PP6	Man	56	10	23.5	Divorced	Unemployed	Secondary
PP6	Woman	51	7	27.7	Married	Active worker	Vocational training

PP7	Man	64	14	21.4	Married	Active worker	University Studies
PP8	Man	25	3	20.4	Single	Sick leave	Vocational training
PP9	Woman	39	19	34.1	Married	Sick leave	Secondary
PP10	Woman	62	16	22.3	Married	Active worker	University Studies

Asymptomatic Participants

AP1	Man	57	-	19.4	Married	Active worker	University Studies
AP2	Woman	43	-	22.3	Married	Active worker	University Studies
AP3	Woman	32	-	20.6	Married	Active worker	University Studies
AP4	Man	22	-	25.8	Single	Student	University Studies
AP5	Woman	60	-	21.3	Married	Sick leave	Secondary
AP6	Man	34	-	18.5	Single	Unemployed	Vocational training
AP7	Man	52	-	21.9	Single	Active worker	University Studies
AP8	Woman	41	-	19.8	Divorced	Active worker	Vocational training
AP9	Woman	23	-	20.9	Single	Student	University

Studies						
AP10	Woman	38	-	24.9	Married	Active worker
Secondary						

BMI: Body mass index

Results of the Interpretative Phenomenological Analysis

Three main themes and several sub-themes were derived from the IPA (see Table 2): Emotional and Motivational Impact, Self-Assessment of Physical Capacity, and Cognitive Assessment of Movement. Detailed descriptions and in-depth analyses of each theme and sub-theme are presented below, including literal quotes from participants to exemplify the analysis, as well as comparisons between the patients with pain (PPs) and the asymptomatic participants (APs).

Table 2. Themes and sub-themes extracted from the Interpretative Phenomenological Analysis.

Main Themes	1. Emotional and motivational impact	2. Physical Capacity Self-Assessment	3. Cognitive Assessment of Movement
Sub-themes	- Fear of movement - Avoidance behaviors and beliefs - Motivation for movement	- Competence - Perceived demand	- Attention to activity - Understanding of action - Familiarity with the motor action - Evaluation of instruction

Emotional and Motivational Impact

This topic focused on describing how watching exercise videos influenced participants' emotions and motivation, highlighting the importance of this visual medium in the perception of and emotional response to physical activity. The visualization of movement through video can evoke emotions that could in turn influence willingness to participate in exercise, influencing the effectiveness of exercise programs:

PP3: "I am worried about watching the videos and then doing the movements incorrectly and causing more pain."

PP7: "I pay particular attention to movements that require me to bend my back, I have to be careful with these exercises, I don't find them very suitable for this pain."

Sub-theme: Fear of Movement

Fear of movement is especially relevant when participants observe exercises that they perceive as potentially painful or harmful. This fear is deeply rooted in anticipation of pain based on previous experiences or observation of movements that appear challenging or dangerous. This fear might be related to pain anticipation behaviors, which could arise from previous experiences or from observing movements that the individual might assess as very challenging or dangerous:

PP5: "I see some exercises and I am afraid to do them because I know it will hurt."

PP10: "I feel worried when I watch the videos and then do the movements incorrectly and that it might cause me more pain."

Visualization through videos can magnify this fear if the movements are not adequately interpreted or adapted for those with severe physical limitations, highlighting the need for adaptation of the exercises in visual formats. In addition, repeated exposure to visualization of the exercises or movements could be a therapeutic measure to reduce the fear of movement:

PP6: "It would be good to look for videos that offer a lot of modifications and clear explanations, especially designed for people with chronic pain. The good thing is that as you watch more exercises you become less afraid to do them."

Sub-theme: Avoidance Behaviors and Beliefs

Avoidance of certain movements can be directly influenced by how the exercises are presented in the videos. If the movements appear too complex or risky, it could encourage avoidance beliefs that limit participation:

PP1: "The most correct way to do the exercise is important to avoid hurting myself."

PP6: "I pay close attention to movements that might cause me pain so that I don't do them."

PP7: "I pay particular attention to movements that require me to bend my back, I have to be careful with these exercises, I don't find them very suitable for this pain."

Excessive caution can result in a reduction in the physical activity needed to maintain or improve musculoskeletal function, encouraging cycles of inactivity.

Sub-theme: Movement Motivation

Motivation to participate in exercise can be significantly affected by how individuals perceive their own ability and the potential benefit of the movements observed in the videos:

PP5: "The videos help, but I'm not sure that they help in all occasions."

PP8: "I was happy to think that these exercises could be a solution to my problem."

For the APs, the videos could have acted as a motivational tool by demonstrating the effectiveness of the exercises. For the PPs, motivation might have depended more on the perceived safety and adaptability of the exercises to their specific needs:

AP10: "I felt well motivated because the exercises in the videos were easy for me."

PP2: “At first I felt insecure, but with practice, I gained more confidence.”

PP7: “It didn’t go too well at first, because some movements I tried to do caused me pain, but I must also admit that I found some other exercise videos that I could do with very little discomfort.”

Self-Assessment of Physical Capacity

This theme was based on how participants perceived and evaluated their own ability to perform the exercises presented in the videos. Self-assessment of physical ability can influence confidence, motivation, and willingness to participate in physical activities. It is possible that this perception of physical ability is established by factors such as previous experiences, current health status, and understanding of the instructions.

Sub-theme: Competence

Perceived competence refers to confidence in the ability to execute exercises effectively and safely. In the context of this research, we explored how this perception influenced participants’ willingness to engage in exercises visualized through videos, and how it differed between PPs and APs:

AP4: “My first impression was that the videos were well done and that the exercises seemed easy and useful.”

PP1: “I thought the exercises were adequate and I could find a way to do the exercises without it hurting me more.”

This text extract shows a positive perception of competence conditioned by the adaptability of the exercises. Confidence arose when they felt that they could perform the activities without exacerbating their pain.

The PPs showed confidence when they felt that they could adapt the exercises to their needs, which increased their perception of competence. The APs generally perceived the exercises as accessible, reinforcing their confidence. However, the perception of competence could fluctuate in both groups depending on the complexity of the exercises and the clarity of the instructions.

Subtheme: Expected Perceived Demand

Expected perceived demand refers to how participants assessed the difficulty and physical demands of the visualized exercises, as well as their anticipated ability to perform them. This perception can influence the confidence to perform the activity and the willingness to initiate a particular movement or exercise.

Participants expressed a variety of perceptions about the demands of the exercises, possibly influenced by their physical conditions, previous experiences, and personal expectations:

AP8: “I was curious to see if I could do those exercises.”

PP4: “They looked simple, but I was worried if I could really do those movements without more pain.”

AP2: “I thought from watching the exercises that they were very, very easy for my physical condition at the time.”

AP9: "I thought the videos were well explained and would be easy to follow."

The APs perceived the videos as a tool that gave them confidence, possibly because they allowed them to anticipate the difficulty of the exercises and mentally prepare for them. Pre-viewing might reduce uncertainty and increase confidence in performance:

AP8: "When I watch exercise videos it gives me confidence."

AP1: "Some exercises seemed too advanced for me. However, seeing how they were performed step by step in the videos I gained a little more confidence."

In the case of the PPs, pain could have influenced the perception of demand. Participants might have been generating an association between the difficulty of the movements and the exacerbation of the pain; on the other hand, although the exercises might have been evaluated as simple, there could be an underlying concern about the impact they might have on their painful condition. The expected perceived demand is not only based on technical difficulty, but also on the possible physical consequences:

PP10: "When I watched some of the exercises on video, I found it difficult to do exercises that require lying on your back."

PP5: "I felt a bit insecure because I thought the movements would be too difficult for my pain; it always happens to me that when exercises are too difficult they are worse for me because it hurts more afterwards."

PP4: "The exercises that required bending down and lifting things, I found them difficult and not for me."

Cognitive Movement Assessment

This topic addresses how participants processed and understood information related to the visualized exercises. It includes aspects such as attention to detail, understanding of instructions, and familiarity with the movements, all of which could have influenced the interpretation of the visualized movement and its possible execution.

Sub-theme: Attention to the Activity

Attention to the activity refers to the degree of concentration that participants devoted to technical details and specific aspects of the exercises during their observation. This attentional focus can be an essential complement in the process of observational learning and replication of the visualized exercises:

AP3: "I pay attention to the correct posture during each movement to make sure that I will do them well."

PP9: “I carefully observe all movements to understand how the exercise is performed.”

AP1: “I pay attention to the proper breathing that should accompany each exercise.”

AP6: “It is essential to watch the speed at which the exercises are performed to avoid doing them too fast.”

AP9: “The details of the posture, or for example the speed, are the things that interest me the most.”

The data revealed that both PPs and APs paid considerable attention to the technical details of the exercises when observing them. However, the motivations for and specific aspects to which they devoted these attentional resources differed between the groups.

Sub-theme: Action Comprehension

Action comprehension refers to the cognitive processing by which participants interpreted and assimilated the purpose, mechanics, and sequence of the exercises presented, especially through visual media such as videos. This sub-theme identifies how understanding of an action can directly influences the ability to learn the movement and the intention to perform it:

AP7: “Watching the videos of the exercises gives me clues on how to perform them.”

PP6: “When I watch the videos, sometimes I feel a bit lost, I don’t always understand how to do the movements just by watching.”

The PPs could experience difficulties in fully understanding the exercises, especially if adaptations were not provided. They valued detailed explanations and modifications that allowed them to adjust the exercises to their abilities. APs used the videos to better understand the technique and improve their execution:

PP9: “I try to think how to perform the movement, but adapting it to my illness.”

PP2: “It is very important to see the different variations an exercise can have for people with pain as me”.

AP: “My attention goes to understanding how the exercise should be performed”

Sub-theme: Evaluation of Instruction

Evaluation of instruction refers to the process by which participants analyzed and assessed the clarity, quality, and effectiveness of the instructions provided in the exercise videos. This sub-theme explores how the characteristics of the instructions (such as accuracy, comprehensibility, relevance, and presentation) affected participants’ learning, understanding, and execution of the exercises:

PP6: “I like it when there is advice on how to perform the exercises in case of pain.”

AP10: “I like to see if there are indications on the correct execution for each exercise.”

The quality and clarity of instructions are important for both groups. The PPs needed adaptations and advice specific to their condition, whereas the APs valued flexibility and the possibility to adjust the pace of learning. Lack of additional directions or detailed explanations could be a barrier for both:

PP3: “I wish the videos were slower or had versions for beginner users.”

AP5: “I prefer the videos because I can control the pace and review the movements, plus I don’t like gyms too much and I can do the exercises at home with the help of the videos.”

Discussion

The present qualitative study analyzed the experiences and perceptions of patients with CLBP and asymptomatic participants when observing motor actions of videotaped exercises, focusing on aspects such as perception of effort, self-assessment of physical ability, and understanding of visualized exercise instruction. Using an IPA, significant differences in interpretation and emotional response to the observed movements were identified, which provided a comprehensive perspective on the use of action observation as a therapeutic strategy in people with CLBP. These findings provide new perspectives on the use of action observation as a tool in physical rehabilitation, addressing fundamental issues such as emotional impact, self-assessment of physical ability, and cognitive assessment of movement.

Emotional and Motivational Impact

The results of this study demonstrate that the observation of motor actions has a considerable impact on the emotional state and motivation of participants. For patients with CLBP, watching videotaped exercises could evoke fear of movement, especially for movements perceived as potentially painful. These findings are consistent with previous studies describing fear of movement as a significant barrier that could favor poor behaviors, muscle reactivity, physical deconditioning, and cautious movement [57]. This emotional response appears to be mediated by anticipation of pain and previous negative experiences with movement [58,59]. Previous evidence has shown that patients with low back pain who observed movements that could generate fear and be prone to pain, had variations in autonomic activity, as well as increased muscle tension [60]. In the APs, the videos acted more as a motivational tool, particularly when the exercises were perceived as accessible and adaptable to their current abilities.

The fear of movement observed in patients with CLBP could influence the ability of these individuals to fully participate in exercise programs, limiting functional recovery. However, we suggest that repeated observation of actions could offer therapeutic potential to reduce this fear through a process of gradual desensitization. For the APs, the videos also proved to have intrinsic motivational value, possibly because they offered a sense of control over activity performance [61]. Differences between the groups became apparent: although the APs tended to focus on opportunities to improve physical capacity, the PPs faced the challenge of overcoming anxiety and excessive caution, which could also negatively affect functionality [62].

Physical Capacity Self-Assessment

Self-assessment of physical capacity was marked by perceived competence and the expected perceived demand of the exercises presented. The APs tended to perceive the exercises as accessible and were confident in their ability to perform them. The literature suggests that self-efficacy, defined

as the belief in one's ability to perform specific actions, is a key determinant of physical ability [28] and is an important factor for exercise adherence [63]. For the PPs, self-efficacy appeared to depend largely on the adaptation of exercises to their needs and the perceived level of difficulty.

The PPs expressed concern about the possibility of exacerbating pain during the performance of some exercises, which highlighted the importance of tailoring rehabilitation programs for each individual. According to Ferrari et al. (2019), low self-efficacy in patients with chronic pain is associated with increased disability. Thus, the use of adapted videos could promote greater confidence in their ability to perform physical activities without risk of further harm, promoting better functional performance and reducing fear of movement.

Cognitive Movement Assessment

Cognitive movement assessment fundamental to the understanding and execution of the visualized exercises. This aspect involves attention to the technical details of the movements, understanding of the mechanics of the actions, and familiarity with the instructions. According to Bandura (1977), understanding of an action is essential for its effective execution, because it allows for proper retention and reproduction of the movement. Based on the findings of this study, in the PPs, attention was focused on minimizing the risk of additional pain. This phenomenon is aligned with theories describing pain hypervigilance, in which individuals focus excessively on bodily sensations that might indicate threat [64,65].

The APs, in contrast, appeared to be more concerned with technical accuracy and movement optimization, which could be linked to greater self-efficacy and confidence in their ability to control exercise. This difference suggests that whereas the PPs interpreted exercise primarily through a risk assessment lens, the APs interpreted exercise from a skill enhancement perspective.

Action comprehension was another relevant aspect, given that several PPs reported difficulties in interpreting how to perform the observed exercises. This is consistent with the literature highlighting that patients with chronic pain can experience impairments in the ability to generate mental representations of movement [66–68]. This alteration in mental representations could lead to, or at least encourage, a discrepancy between what an individual perceives they are able to do and what they can actually execute, which influences how they evaluate observed movements or exercises.

The study found that the PPs valued detailed instructions and exercise modifications, because these allowed them to adapt movements to their physical needs. Understanding of observed movements is associated with activation of brain areas involved in movement planning and execution, such as the mirror neuron system [69]. Lack of clarity in instructions could hinder correct interpretation of exercises and reduce confidence in performing them. Providing detailed explanations and visual adaptations could facilitate better understanding and self-efficacy expectations, as well as decreasing the perceived difficulty of the observed exercises.

Study Limitations

Despite the important findings, this qualitative study has some limitations that need to be considered. First, the qualitative analysis focused on subjective experiences and individual perceptions, which could have introduced significant variability among the participants. Although the use of semi-structured interviews allowed for in-depth exploration of the subjective aspects of the phenomenon studied, there is the possibility of inherent biases in the responses, particularly in the patients with CLBP, who could have been influenced by their emotional state or past experiences with pain.

In addition, the research focused on the perception and understanding of the exercises through videos, which could differ significantly from the actual experience of performing the exercises under direct supervision. The lack of direct observation of participants' motor responses limits the ability to directly link perceived experiences to observed motor performance. This limitation could be mitigated in future studies that combine qualitative analysis with direct assessment of motor performance during exercise execution.

Lastly, although a diverse sample was used in terms of age and sex, participants were recruited in a specific setting, which might limit the generalizability of the results to other populations with different socioeconomic, cultural, or geographic characteristics.

Future Studies

The findings of this study suggest a number of promising directions for future research. It would be of great interest to develop an instrument that allows for a multidimensional assessment of motor action observation in patients with chronic pain. Such an instrument could build on the themes and sub-themes identified in this qualitative study, such as fear of movement, cognitive assessment of movement, and self-assessment of physical ability, providing a standardized tool to assess these dimensions in an objective manner.

Future studies should also explore the implementation of therapeutic programs that integrate repeated exercise observation as a strategy to decrease fear of movement and improve motivation. It would be valuable to design longitudinal studies assessing the impact of these programs on treatment adherence, physical functioning, and pain reduction in patients with CLBP. Furthermore, it would be relevant to investigate the impact of various types of videos and observational perspectives, given that the literature suggests that egocentric and allocentric perspectives can activate different neural networks and affect the efficacy of motor learning [70].

Lastly, it is suggested that a mixed approach be integrated in future research, including both qualitative and quantitative analyses. This would allow us to assess not only patients' subjective perceptions and experiences, but also their correlation with quantifiable variables, such as pain intensity, self-efficacy, or motor performance during the execution of the observed exercises.

Conclusions

This qualitative study explored the experiences and perceptions of patients with CLBP and asymptomatic participants in relation to videotaped exercise observation, identifying significant differences in movement assessment, self-assessment of physical ability, and emotional and motivational impact. The patients with CLBP showed a greater fear of movement and difficulties in understanding and interpreting the visualized actions, which affected their motivation and willingness to participate in physical activities. On the other hand, asymptomatic participants perceived the exercises as accessible and felt motivated to perform the observed movements, stressing the importance of familiarity and clarity of instructions.

These findings highlight the need to tailor exercise programs and physical rehabilitation strategies according to the characteristics and needs of each patient. For patients with chronic pain, the use of adapted videos with clear instructions could increase the perception of competence and reduce fear of movement, favoring better adherence to and effectiveness of exercise programs.

Conflicts of Interest

None declared.

Abbreviations

AP: Asymptomatic Participants

BMI: Body Mass Index

CLBP: Chronic Low Back Pain

CNSLBP: Chronic Nonspecific Low Back Pain

CSEULS: La Salle University Center for Advanced Studies

IPA: Interpretative Phenomenological Analysis

PP: Pain Patients

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