

‘I didn’t pay her to teach me how to fix my back’: a focused ethnographic study exploring chiropractors’ and chiropractic patients’ experiences and beliefs regarding exercise adherence

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Aim: To inform future research and exercise prescription for patients with chronic low back pain (CLBP), this study explored chiropractors’ and chiropractic patients’ experiences and beliefs regarding the barriers and facilitators to prescribed exercise adherence.

Methods: A focused ethnographic approach was used involving 16 semi-structured interviews, including pilot interviews (n = 4) followed by interviews with chiropractors (n = 6) and chiropractic patients with CLBP (n = 6).

Results: Barriers and facilitators to prescribed exercise adherence revolved around four themes: diagnostic and treatment beliefs motivating behavior, passive-active treatment balance, the therapeutic alliance and patient-centered care, and exercise delivery.

Objectif : Pour fournir de l’information sur les recherches futures et les exercices prescrits aux patients souffrant de lombalgies (LC), cette étude consistait à examiner les expériences et les croyances de chiropraticiens et de patients qui constituent des obstacles à la fidélité ou des facteurs qui la favorisent.

Méthodologie : Étude ethnographique comportant 16 entrevues semi-structurées et des entrevues pilotes (n = 4) suivies d’entrevues avec des chiropraticiens (n = 6) et des patients souffrant de LC (n = 6).

Résultats : Les obstacles à la fidélité aux exercices prescrits et les éléments qui la favorisent sont liés aux quatre points suivants : croyances sur le diagnostic et le traitement motivant le comportement, équilibre entre traitement passif et traitement actif, alliance thérapeutique et soins centrés sur le patient et fourniture d’exercices.

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Conclusion: *Exercise adherence may be facilitated in patients with CLBP with simple exercise prescription changes made by chiropractors. However, changing chiropractors' and patients' diagnostic and treatment beliefs that are barriers to exercise adherence appears challenging. Training chiropractors in pain neuroscience education and the intentional use of behavior change techniques warrants future investigation.*

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KEY WORDS: low back pain; exercise; adherence; chiropractic; qualitative

Conclusion : *Chez les patients souffrant de LC, de simples changements d'exercices apportés par le chiropraticien pourraient favoriser la fidélité aux exercices. Cependant, il semble difficile de changer des croyances sur le diagnostic et le traitement qui s'opposent à l'observance. Un examen plus approfondi de la pertinence d'une formation en neurosciences de la douleur et du recours intentionnel à des techniques servant à changer le comportement serait justifié.*

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MOTS CLÉS : lombalgie; exercice; fidélité; chiropratique; qualitatif

Introduction

Clinical practice guidelines now recognize that most patients with acute low back pain (LBP) will improve with time, regardless of the treatment they receive.¹ However, patients often desire immediate symptomatic relief, so passive non-pharmacological treatments (e.g., spinal manipulation) are an option as they can provide modest improvements in pain and function with mild side effects.^{1,2} Yet, the positive effects of passive therapies typically are transient, so providing patients with reassurance combined with active self-management strategies (e.g., exercise) is recommended.³⁻⁵ Further, detecting and managing psychosocial factors for chronicity (e.g., movement fear-avoidance) is recommended in LBP guidelines across the world.⁶ For patients who have transitioned to chronic low back pain (CLBP), guidelines place a greater emphasis on a biopsychosocial approach, including education and self-management through exercise.^{5,7}

In Canada, 96.5% of chiropractors have reported using exercise as a part of their treatment plans.⁸ Patient exercise adherence is associated with favorable clinical outcomes⁹; yet, available data on patients with CLBP suggests they have poor adherence¹⁰. Despite chiropractors regularly prescribing exercise and wanting to tackle the inactivity epidemic¹¹, little research has provided insight as to how chiropractors attempt to facilitate prescribed exercise adherence¹². In fact, when looking broadly at the non-specific chronic low back pain (NS-CLBP) and exercise adherence literature, few studies have explored

the perspectives of exercise-prescribing clinicians (e.g., medical doctors, physiotherapists) or their patients with NS-CLBP.¹³⁻¹⁶ A systematic review by Slade *et al.*¹³ reported lack of time, diagnostic uncertainty, and fear of movement and pain aggravation as some of the most consistently cited patient perceived barriers to prescribed exercise adherence. In contrast, patient perceived facilitators to prescribed exercise adherence included: good clinician-patient communication, detailed exercise instruction, demonstration, and feedback, as well as follow-up and reassurance provided by the prescribing clinicians.¹³

Clearly there is a massive challenge; exercise is a frequently recommended intervention in clinical practice guidelines for CLBP and chiropractors commonly prescribe it; yet, patient adherence is low which impacts outcomes. Rarely do studies incorporate both the patients' and the exercise-prescribing clinicians' experiences and beliefs regarding the issue of exercise adherence.¹⁵ To inform research and the development of strategies to improve exercise engagement in the chiropractic context, this study aimed to explore chiropractors' and chiropractic patients' experiences and beliefs related to exercise adherence.

Methods

Study design

We used a focused ethnographic design^{17,18} involving

individual semi-structured interviews. Focused ethnographies are conducted by researcher(s) who possess background knowledge in the area of interest. They are problem-focused and context-specific, focus on a specific group's shared experiences, limited to a small number of participants, conducted in a short time frame, conducted to help explain the complex nature of the specific shared experiences and issues within the targeted group(s), and are often used to help enhance healthcare services and practices.^{17,18} Further, focused ethnographies do not require fieldwork/participant observation; a feature that makes a focused ethnography significantly different than a traditional ethnography.¹⁸

The semi-structured interview guides reflected expectancy theory, as they attempted to unravel how past experiences helped shape current beliefs, preferences, motivation, and ultimately, behavior.¹⁹ In its basic form, expectancy theory suggests that individuals will be motivated to engage in a specific behaviour if they believe that their efforts will result in a positive performance which will result in an outcome that is tied to a desirable reward.¹⁹ In an attempt to obtain unprimed information from the participants, there was a deceptive component to the study design. The participants did not know that the authors were specifically studying prescribed exercise adherence. Instead, participants were advised (in the consent forms and verbally) that the interviews would be broad, exploring chiropractic treatment preferences in adults with CLBP. The initial sample size estimate of six chiropractor participants and six patient participants was predetermined with the anticipation of reaching saturation.²⁰

This study was positioned in the post-positivist paradigm that advocates a structured scientific approach. The approach taken by the researchers appreciated that each study participant had their own unique perspective and experiences; however, there were attempts at illuminating/approximating a single reality²⁰ and to "see the whole picture"^{21 p.18}. The goal was not to obtain pure objectivity, but to strive towards objectivity by using triangulation as well as rigorous and transparent methods, and therefore this study was conducted and reported considering the consolidated criteria for reporting qualitative research (COREQ).²² Ethics approval was obtained from the Dalhousie University Health Sciences Research Ethics Board.

Recruitment and eligibility criteria

▪ **Patient participants:**

Posters were placed on local community bulletin boards and distributed to Nova Scotian chiropractic offices to recruit adults (18-65 years old) with CLBP (greater than three months) currently receiving chiropractic care. Interested participants who emailed the first author were administered a patient participant screening questionnaire that asked details regarding their CLBP and what type of treatments they had received in the last six months. Only those who had received exercise instruction or advice were eligible to participate. In an attempt to recruit patients with NS-CLBP, they were excluded if they had significant pathologies or diagnoses that are known to contribute to LBP. This included pregnancy, infection, tumor, fracture, or significant structural changes with radicular signs/symptoms.

▪ **Chiropractor participants:**

Chiropractors were eligible if they were licensed and practicing in the Halifax metro area, Nova Scotia, Canada. Eligible chiropractors' email addresses were obtained through the Nova Scotia College of Chiropractors website. If a personal email address could not be obtained, their clinic was contacted via email or phone. Interested participants were administered a chiropractic participant screening questionnaire through email that asked what types of treatments they offer patients with NS-CLBP. Only chiropractors reporting that they very often prescribe home exercise for their patients were included in the study.

Data collection

▪ **Questionnaires and demographics:**

To contextualize the sample, participant characteristics were gathered. This included the administration of questionnaires to the patient participants; the Keele STarT Back tool that measures risk of a poor outcome/chronicity²³ and the Revised Oswestry Disability Index that measures level of disability/impairment²⁴. Patient participants' age, sex, and duration of CLBP, and chiropractor participants' sex and years in practice were also collected.

▪ **Interviews:**

Four pilot interviews were conducted with two practicing physiotherapists and two Dalhousie University students who had previously been prescribed exercise for CLBP. The pilot interviews were used to help refine the

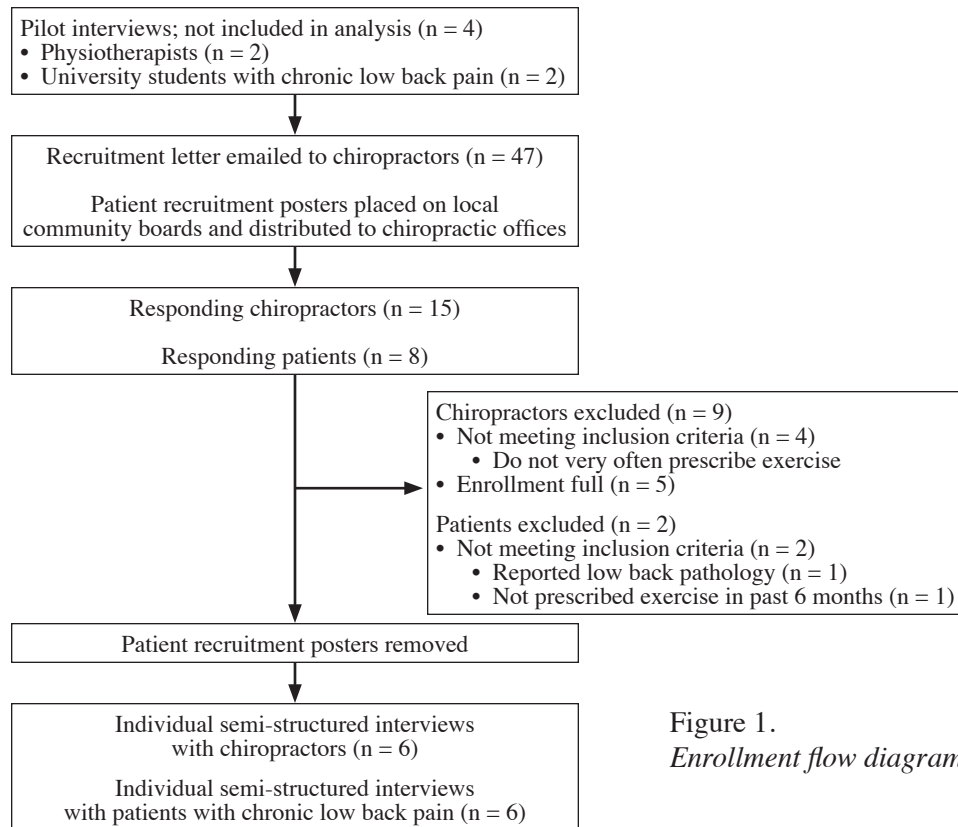


Figure 1.
Enrollment flow diagram.

flow and comprehension of the interview questions, and to confirm the ability to conduct interviews with deception (not knowing that the focus was on exercise). The pilot interviews were not included in the analysis. After the patient and chiropractor participants were recruited and consented to participate, the first author (male chiropractor and graduate student with qualitative research training) led one-to-one audio-recorded semi-structured interviews in a private room at Dalhousie University. The interviews were 50-90 minutes and the second author (female physiotherapist and Associate Professor) attended each interview to contextualize the data and to ask for clarifications as needed. The two years leading up to the study, the first author (interviewer) was involved in various chiropractic-related activities in Nova Scotia. This resulted in him being in contact with most of the chiropractors in Nova Scotia. This provided him with exposure to insider knowledge, specifically the beliefs and practice

patterns of Nova Scotian chiropractors. Although this exposure was limited, it appeared to facilitate trust and a candid conversation during the audio-recorded interviews with the chiropractors. He did not have any contact with any of the patient participants prior to conducting the study. The second author did not have any contact/exposure to any of the participants prior to the study.

During the interviews, the participants were given the opportunity to provide a rationale regarding their past and current behaviors and to discuss in-depth the issues that they believed were important regarding CLBP management. With this approach, information was obtained in an unrehearsed, non-contrived manner. Although the focus of the study was to understand perspectives regarding prescribed exercise adherence, had the interview questions been strictly on this topic, the participants may have felt judged somehow and might have obscured their true treatment beliefs and priorities. Therefore, the interviewer

Table 1.

Summary of the themes generated from semi-structured interviews with chiropractors (n = 6) and patients (n = 6) regarding the barriers and facilitators to prescribed exercise adherence in patients with non-specific chronic low back pain.

Theme	Barriers	Facilitators
1. Diagnostic and Treatment Beliefs Motivating Behavior	a. Chiropractor and/or patient fear-avoidance; the back described or viewed as fragile/prone to injury and increased pain attributed to increased damage. b. Lack of specific diagnosis or diagnostic uncertainty. c. Chiropractor and/or patient emphasis on structural causes of pain; exercise not viewed as the best treatment solution.	a. Chiropractor provides education on hurt versus harm and strength of back. b. Chiropractor provides a reasonable/credible pain explanation. c. Chiropractor and/or patient understands multidimensional nature of pain and benefits of exercise.
2. Passive-active Treatment Balance	a. Chiropractor and/or patient focus on a passive “fix”; exercise not prioritized. b. Exercise overload; too many prescribed exercises, too early.	a. Chiropractor confronts maladaptive passive care expectations and gradually transitions to active care. a. Manual therapy provided short-term, while maintaining priority of active care long-term.
3. The Therapeutic Alliance and Patient-centered Care	a. Poor clinical relationship. b. Patient perceives the practitioner does not understand them.	a. Trust and rapport developed. b. Chiropractor helps patient set meaningful exercise-based goals.
4. Exercise Delivery	a. Chiropractor does not provide, or provides a poor explanation of the purpose behind exercises. b. Prescribed exercises are complicated or hard to follow. c. Little time spent on exercises in the clinic and no timeline or progression outlined.	a. Chiropractor provides a clear explanation of the purpose behind exercises. b. Prescribed exercises are simple with repeated exercise demonstration and review. c. Having exercise timeline where chiropractor/patient looks for progress.

followed the lead of the participants and molded the interview to elicit significant exercise-related information while also exploring other areas that were important to the participants regarding CLBP care. Sample interview guide questions are found in Appendix A. Each author took field notes during the interviews. The interviews were transcribed verbatim and the participants were provided with a copy of their transcripts through email and given the opportunity to provide clarifications or feedback.

Data analysis

The transcriptions were imported into NVivo™ software for analysis (Version 10 © QSR International Pty Ltd., Victoria, Australia). A systematic approach for analyzing

ethnographic data developed by Roper and Shapira was used.²⁵ The authors independently coded the data, triangulating the patient and chiropractor participant interviews to identify overarching explanations regarding the barriers and facilitators to prescribed exercise adherence. The authors had regular meetings throughout the data analysis steps to discuss field notes, compare coding for each transcript, and to mutually develop themes. The determination of data saturation was an iterative process; the authors regularly discussed recurrent and new themes before conducting further interviews. To increase the validity of the generated themes, study participants were also e-mailed a summary of the preliminary themes and given the option to express disagreement and provide clarifications.

Table 2.

Sample supporting quotes for each theme generated from semi-structured interviews with chiropractors (n = 6) and patients (n = 6) regarding the barriers and facilitators to prescribed exercise adherence in patients with non-specific chronic low back pain. Bolded phrases are for thematic emphasis.

Themes	Sample Quotes
1. Diagnostic and Treatment Beliefs Motivating Behavior	Male Patient 3: ... they (previous healthcare provider) said that it's probably just muscle and if I rest or do a couple of stretches it's going to go away soon, but it didn't help at all ... Second time I went I think I actually asked the doctor if I should get an x-ray or something ... I thought maybe I did something to my bones or cracked them or there is a fracture... Male Chiropractor 2: ... because it's complex, right, as we know, it's not as simple as people make it out to be. That's often the challenge. It's easy, it's your SI joint, it's your facet joint, they love that, they tell their friends that it's their joint, and that's the problem it's the joint on this side at this level and that's why I'm in pain. Male Chiropractor 4: ... I've probably sent people for x-rays as peace of mind for the patient... Female Patient 1: I was really stressed out, mentally and physically, and I had a really bad flare-up, and I was like, I need to go to school but this is killing me and I think it took about a week for it to resolve, so I'm kind of scared for the future, especially next year on how it's going to affect me and how I can prevent that from happening. So I think that's kind of what's motivating me to do these exercises, as regular as I am now, because I really don't have time for that next year... Female Patient 6: When it flares, I am bed-ridden for six days... the longest was 14 days... Straight bed, like would go from my bedroom to my bathroom, that would be it ... Because I think my back deteriorates. I think in my head, I think that little disc that pushes out a little bit every once in a while, and then I bend over or then I twist the wrong way, and then the final little pop happens, and then I'm a mess. Whereas if I went and got aligned on a regular basis, it would never come out as much. Male Chiropractor 1: ... just from experience and with knowing the literature, the first thing we do is we just have a chat ... I think the biggest thing is reassurance and we just try, within reason, we try to make them understand that nine times out of ten they are not broken. We just try to change the mind-set right out of the get go. Female Chiropractor 6: They'll come in with some kind of fear... they're like 'my back will never feel better' or 'I'll never be able to pick up my two year old niece' or that kind of thing? So I try to empower them, and teach them that it's not that their back is broken, it's just that their back hurts, right? ... So it's like allaying fears and educating, really.
2. Passive-active Treatment Balance	Female Patient 6: I paid her to fix my back. I didn't pay her to teach me how to fix my back ... Maintenance (chiropractic adjustments) is huge. That should be stressed more. Because if I had known that way back when, I might have been better ... Exercises for low back... don't waste paper by photocopying that for me. Male Chiropractor 1: ... they still feel like they need or they want the adjustment ... we do it if we need to... but we don't just kind of cater to expectations or wants from previous experiences... If you look at active and passive care, the big thing that we talk about with this population is that really it's not going to be me, it's more going to be you ... it's more about what you're going to do away from here, and some people aren't really comfortable with that ... They'd rather get the fix. In one treatment.
3. The Therapeutic Alliance and Patient-centered Care	Female Patient 2: It's a partnership, it really has to be a partnership... Female Chiropractor 6: I think it's the red light green light thing... finding the window, finding what (exercise) fits in their lifestyle and in their paradigm of who they wanna be, right?

Themes	Sample Quotes
3. The Therapeutic Alliance and Patient-centered Care (continued)	Male Chiropractor 3: <i>If you're coming because you're in pain ... you want to be out of pain, let's see how we can get you out of pain. So the focus should be revolving around their wants, not trying to subjugate their wants to my own, but at the same time, sometimes people can't see past that pain. They're so buried in the pain that the idea that they could be out of pain is totally foreign, but then in addition the idea that they would think past the pain and wonder what will I do with my life if it didn't hurt? ... So I think it's important ... as people start coming out of the pain ... start letting them see the variance, you know, you've got options. So what are we going to do now that you're feeling well ... trying to help people, you could do more exercise, you could do more stuff, you don't have to still not do things for fear.</i>
4. Exercise Delivery	Male Chiropractor 2: <i>in reference to common exercise delivery and how this may be perceived to patients: Obviously it doesn't seem that important, I only spent three minutes on it and they didn't even ask me about it at the second visit. I agree with patients, how important could it be? You didn't assess it, you showed me in two minutes and ever since then you just ask me if I'm doing it? You don't even ask me, don't even watch me do it again, you don't even test me? Imagine if the school system was like that? Did you study? Yeah, I studied. Great, you passed, 80%, there you go, you don't have to write the test.</i> Male Patient 5 regarding previous practitioner: <i>First of all, I have to make sure I was doing it right, and sometimes I wasn't sure if I was or not ... He (chiropractor) did it with me ... the next time I'd come in he'd add another one in ... he showed me these same exercises four or five times, which was good ... I knew I was doing them right then, I felt pretty confident...</i> Male Patient 4: <i>I guess, in my case, he could explain ... what would happen and where everything would position and how that would help you long term to get better ... Instead of just printing off some exercises and just doing them sort of thing. Just explain what's important...</i> Male Chiropractor 1: <i>We try to really map it out in layman's terms, this is why this is affected and this is why if we can take the time to put in the work, it's going to help. I think that's been the most effective approach for sure, for adherence. I think they just need to understand ... I'm not giving you three random things to work on at home because I feel like you should do exercise ... I think knowledge is power, and once they can understand, and I've had the light bulb moment where you just try to throw in exercise versus this is what's happening here, this is how this is going to address that problem...</i> Male Patient 5: <i>But he had a plan, he said 'this is where I expect us to be...' and she (previous practitioner) never really had that plan.... With the chiro, he said 'here we are (patient's name), here's where I expect us to be' ... and after a month, he said 'we're a little bit off but we're pretty much right on track' and that made it.. that made me.. kind of dive in, right? We're seeing results and we're right where we should be...</i> Female Patient 2: <i>He (the chiropractor) only gave me a couple (exercises). And they're part of my repertoire, and they do work. Just simple stuff...</i> Chiropractor 2: <i>Yeah, for me it's kind of, the simple ones, just because of ease of use...we'll actually do the exercises that are the best and convenient ... the best exercise is the one that they'll do.</i> Male Chiropractor 1: <i>I just think supervision is great initially because if you can show them how to move and they can do it safely and effectively, that's confidence, and so they'll probably be more in tune to work on that at home as opposed to here you go, do this twice a day, three sets of 8 to 10 ... I think videos are great, and actually what I've started doing probably over the last year... I just ask them if I can film them, and then so I dictate everything, so I have them do the movements as I talk and I film, and then they just have it on their phone, and ... Yeah, I think it's even more valuable than just here's some pictures and descriptions ... it's a science, being able to communicate that information, so I think the video is good, probably one of the better things. ... it's my voice that they've heard how many times, so it's familiar, and we go through step by step every little detail, and if I see them do something during the movement we're correcting it on the video, so there's also that reinforcement.</i>

Results

Participant characteristics

Three female patients (Revised Oswestry: moderate disability) and three male patients (Revised Oswestry: minimal disability) participated in the study. The six patient participants had a mean age of 34.5 years (SD 14.4) and a mean duration of low back pain of 10.0 years (SD 8.3). All were categorized as low risk for poor outcome/chronicity based on the STarT Back tool. Further, most of the participants stated that they had seen several different practitioners for their LBP; some had consulted with multiple chiropractors that had prescribed exercise. The six chiropractor participants had a mean of 8.3 years in practice (SD 7.3); one was female and five were males. Figure 1 illustrates the flow of the participants into the study.

Themes

Of the twelve participants, no one requested transcript alterations or expressed disagreement after receiving an email revealing the deceptive component of the study and a summary of the preliminary themes. The projected sample size was not altered and saturation was deemed to be reached as consistent codes and themes continued to emerge from the patient and chiropractor participants' narratives. After the twelve interviews, it was decided that further interviews would not likely generate any new significant themes and there were no areas requiring further probing or exploration based on the aim of the study. Four main themes were generated from the data: 1. diagnostic and treatment beliefs motivating behavior, 2. passive-active treatment balance, 3. the therapeutic alliance and patient-centered care, and 4. exercise delivery. There was significant conceptual overlap among the themes, with many quotes fitting into several themes. Each theme contains dimensions along a continuum, ranging from barriers to facilitators to prescribed exercise adherence. Further interviews may have revealed deviating experiences and beliefs, or sub-themes. However, it was anticipated that these findings would have fit within the themes already identified or expanded beyond the aim of the study. Table 1 summarizes the themes with corresponding barriers and facilitators identified. Table 2 provides supporting quotes for each theme.

Discussion

The results of this study suggest that in this sample, exercise adherence is not simply the patients lacking motivation or not having enough time in the day. Instead, the results suggest that adherence to prescribed exercise is the product of chiropractors' and patients' experiences and beliefs, the development of their clinical relationship, and the way exercise is prescribed and monitored in parallel with other treatment modalities. Most of the findings are congruent with existing qualitative literature exploring the barriers and facilitators to exercise adherence in patients with NS-CLBP, despite the majority of these studies being non-chiropractic focused and conducted outside North America.¹³⁻¹⁶ This includes the findings that exercise adherence may be facilitated with easy exercise delivery changes made by exercise-prescribing clinicians, including: prescribing simple exercises, limiting the number of exercises prescribed, demonstrating the exercises, providing feedback, and scheduling follow-up appointments to review the exercises and monitor progress. While most of the barriers and facilitators to prescribed exercise adherence reported in this study appear to be modifiable, effectively explaining pain and the long-term benefits of exercise appears to be quite challenging, as will now be discussed.

Our most complex theme, diagnostic and treatment beliefs motivating behaviors, has also been clearly described in the literature outside the chiropractic context. Slade *et al.*²⁶ explored how Australian physiotherapists prescribe exercise for patients with NS-CLBP. The authors described how the physiotherapists sought out diagnostic certainty as a means to improve their credibility and to get patients to adhere to an exercise plan. When outcomes were not what they or the patient expected, frustration and blaming occurred and some physiotherapists defaulted to inaccurate nocebo-laden structural explanations of pain or feigned a certain diagnosis.²⁶ Further, another study by Slade *et al.*²⁷ found that patients with NS-CLBP wanted their healthcare providers to explain their pathology and management (exercise) to reduce uncertainty. While these findings are congruent with our results, the patient participants in our study were less focused on finding the cause of their LBP than was expected based on existing literature from the patient perspective.^{13,16} There are many possible explanations for this. One possibility is that the patient participants' chiropractors had explained NS-CLBP in a

way that reduced diagnostic uncertainty. There is some evidence that chiropractors have even more of a biomedical focus than physiotherapists.²⁸ It is possible that chiropractors' patho-anatomical explanations (regardless of their accuracy) reduced diagnostic uncertainty. If so, this creates a dilemma as providing detailed and specific patho-anatomical explanations for most cases of LBP is not consistent with best practice.²⁹ Interestingly, our patient participants were all categorized as low risk on the STarT Back tool, yet many described debilitating flare-ups and various psychosocial risk factors for chronicity (e.g., fear-avoidance, belief that pain equals damage). Further, most of the patient participants seemed to welcome and embrace patho-anatomical explanations for their pain.

While in-depth patho-anatomic explanations may facilitate passive care buy-in, this type of education may create rather than reduce psychosocial factors for chronicity. Darlow and colleagues reported that clinicians' biomedical-rooted explanations can have a lasting negative impact, with patients often viewing their backs as fragile and needing to be protected.³⁰ These beliefs might result in hyper-vigilance and guilt surrounding poor exercise adherence.³⁰ Further, we suspect that this may drive a quest for a fix and passive care dependence. While some clinical practice guidelines explicitly state education that increases the perceived threat or fear associated with LBP should be avoided²⁹, little guidance is provided beyond this. The concept of unintentional negative effects (nocebo effects) is rarely discussed in the context of exercise prescription or chiropractic in general.³¹ Therefore, it was not surprising when many of the chiropractors in our study (and chiropractors described by patient participants) wanted to fix the patient with tissue-based approaches and defaulted to patho-anatomical explanations of persistent pain. In many cases, this appeared to contribute to a poor passive-active treatment balance – negatively impacting exercise priority and adherence. Further, it appeared that some clinicians' fear-avoidant beliefs might have transferred to their patients.

Helping clinicians and patients better understand the science of pain, such as the hurt versus harm concept, may improve outcomes. Pain neuroscience education (PNE)^{32,33} is being adopted by professions outside of chiropractic as it can reduce diagnostic uncertainty, reduce perceived threat, and open the door to exercise prescription with greater adherence³⁴. Further, PNE re-

quires the building of a strong therapeutic alliance as various evidence-based explanations and techniques are used to change a patient's beliefs and behaviors.³⁵ Similar to other clinicians using PNE, chiropractors may be able to better help their patients by integrating PNE into their CLBP management, including exercise prescription. Further, behavior change theory has been evolving³⁶ and a taxonomy of behavior change techniques (BCTs) has recently been put forward, with each technique having varying levels of supporting evidence in different contexts³⁷. The use and description of exercise-based BCTs has also become the focus of clinical research.^{38,39} Interestingly, most of the chiropractors in our study, unknowingly, described the use of specific exercise-based BCTs to help patients adhere to prescribed exercise. Referring to a recently published BCT checklist used in the context of exercise prescription³⁸, the chiropractor participants in this study clearly described the use of: cognitive restructuring, graded exposure, providing information on consequences, setting graded exercises, booster sessions, prompting review of behavior exercise goals, and providing feedback on exercise performance. This suggests that chiropractors who prescribe exercise may benefit from behavior change training for non-psychologists – where they are taught how to intentionally and appropriately use evidence-based BCTs. PNE inherently involves BCTs, so they can be used in conjunction. Training in these areas could help chiropractors better understand pain, explore their own beliefs about pain, and ultimately deliver more accurate pain information alongside exercise prescription informed by behavior change theory. Still, more research on exercise adherence is needed that applies appropriate use of theory in the study design.⁴⁰ This will provide further evidence as to what BCTs may or may not be optimal in given contexts.

Limitations

One limitation of this study was the little variability in patient participants' levels of disability and risk for chronicity/poor outcome based on the administered questionnaires. All of the patient participants were low risk based on the STarT Back and were categorized as having minimal to moderate disability based on the Revised Oswestry. This limits the generalizability and transferability of the finding to patients scoring higher on the STarT Back and Revised Oswestry.

Another limitation is that the study only included chiropractors that frequently prescribe exercise. This may have produced a selection bias, unintentionally targeting those who are more rehabilitation focused, refining their exercise delivery. Therefore, the study may have included chiropractors that were more likely to identify positive exercise prescription experiences and facilitators rather than barriers. Additionally, this study only included one female chiropractor, potentially limiting the transferability of the findings. However, the interviews did provide a window to explore the practices of other chiropractors through patient and chiropractor participants' second-hand reports. Still, the generalizability and transferability of the finding must be considered with caution.

Conclusion

Identified barriers and facilitators to prescribed exercise adherence in chiropractic patients with NS-CLBP revolved around four primary themes: 1. diagnostic and treatment beliefs motivating behavior, 2. passive-active treatment balance, 3. the therapeutic alliance and patient-centered care, and 4. exercise delivery. Most of the barriers and facilitators to prescribed exercise adherence appeared to be modifiable, highlighting the possibility to strengthen facilitators and break down barriers. Exercise adherence may be facilitated in patients with CLBP with simple exercise delivery changes made by chiropractors. This includes making exercise simple, limiting the number of exercises prescribed, demonstrating the exercises, providing feedback, and scheduling follow-up appointments to review the exercises and monitor progress. However, changing chiropractors' and patients' diagnostic and treatment beliefs that are barriers to exercise adherence appears challenging. Further, addressing patients' fears while balancing passive and active care is not an easy task. In addition to BCT training, chiropractors may benefit from pain education training, such as PNE. Research is needed testing the use of PNE and BCTs in the context of chiropractic and exercise prescription. Combined PNE and BCT training may help chiropractors keep up to date with the current understanding of pain, explore their own beliefs about pain, and ultimately deliver more accurate pain information alongside more effective exercise prescription.

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Appendix A. Sample interview guide questions.

Chiropractor Interview Sample Questions	Patient Interview Sample Questions
Tell me a bit about yourself and your practice style? How do you explain mechanical or nonspecific back pain to patients? • Do you run into difficulties? • Do you feel they understand the information you provide them with? Tell me about the types of treatments you typically use for mechanical or nonspecific chronic low back pain? What treatments do you find are the most effective? <i>Prompt questions:</i> • Why do you feel that _____ is important/not important? • Why do you think patients with nonspecific low back pain seek to be assessed and treated by chiropractors? • What do they expect for treatment in the short term and the long-term? Can you think of any barriers these patients typically have, from their perspective, when it comes to following the exercise recommendations you give? <i>Prompt questions:</i> • What things do they say to make you think this way? • How do they act around you to make you think this way? • Were there any comments that they made to make you feel this way? What issues do you think may arise that may limit these patients low back treatment progress? <i>Prompt questions:</i> • Tell me more about the exercise or activity recommendations that you typically give these patients? • Do you find that patients follow these exercise or activity recommendations? • Why do you feel they do/don't follow the recommendations? • Specifically, what parts of the exercise or activity recommendations do they follow or not follow? • Can you think of anything that makes it easier or harder for them to follow the exercise or activity recommendations that you give? • What could chiropractors do to increase therapeutic exercise adherence in these patients? Do you think these patients could use motivation or support in the long-term? Is there anything that you find that motivates or makes patients more consistent with the low back advice or exercise that you give?	Tell me a bit about yourself and your back troubles? Have health care providers been able to explain your back troubles? <i>Prompt questions:</i> • Were the assessments what you expected them to be? • Tell me what was different than what you expected? Tell me about the types of treatments you have tried for your low back, this includes things you have tried at home? How effective do you think the treatment or advice you received was? <i>Prompt questions:</i> • What did you find was helpful? • What do you find has not been helpful? • Why do you feel that _____ was helpful/not helpful? • What exercises or activity recommendations do you feel were most helpful for your back pain? • What exercises or activity recommendations do you feel were the least helpful for your back pain? Tell me more about the exercise or activity recommendations you were given and how often were you supposed to do this exercise or activity? Overall, how did the exercise or activity go? <i>Prompt questions:</i> • Why do you feel you did/didn't follow the recommendations? • Specifically, what parts of the exercise or activity recommendations did you follow or not follow? Overall, do you feel that the activity or exercise recommendations you were given were beneficial for your back pain? <i>Prompt question:</i> • Why do you feel that way? • Do you think that the exercise or activity recommendations you were given would be beneficial for other individuals with similar low back pain? • Why do you feel that way? • Can you think of any barriers you had to following the exercise recommendations you were given? • Can you think of anything at all that made it easier or harder to complete your given exercise or activity recommendations? Moving forward, what types of assessments, tests, or treatment do you think would be the best for your low back, if anything at all? Do you feel that any of the treatments or recommendations you were given would be helpful in the long-term or when you are pain free? Was there anything you found that motivated you or made you more consistent with the low back advice you were given?