



Original Article

University College of Osteopathy students' attitudes towards psychosocial risk factors and non-specific low back pain: A qualitative study

Tristan Paul Eric Delion, Jerry Draper-Rodi*

University College of Osteopathy, 275 Borough High Street, London, SE1 1JE, United Kingdom



ARTICLE INFO

Keywords:

Low back pain
Manual therapy
Psychosocial factors
Biopsychosocial model

ABSTRACT

Objectives: The aim of this study was to explore University College of Osteopathy (UCO) students' attitudes, beliefs and opinions towards psychosocial (PS) factors when treating patients presenting with non-specific low back pain (NSLBP).

Methods: A qualitative research design with elements of grounded theory was used. Nine final year UCO students were recruited and interviewed at the UCO teaching centre. Data collection and analysis occurred simultaneously through the constant comparative method of analysis.

Results: Three main themes emerged from the data analysis: 1) Definition and interpretation of PS factors towards NSLBP; 2) Assessment and management of PS factors; 3) Competence and difficulties towards PS factors.

Conclusions: The level of understanding was homogeneous amongst the participants on the understanding of PS factors and their role in a NSLBP presentation. They assessed for PS factors throughout the case history and tend to rely on their instincts. Two types of strategies towards the PS factors management were identified. However, lack of clinical experience and lack of training on the management of PS factors were identified as the main barriers encountered by students when treating patient with NSLBP.

Introduction

Each year, 40% of the UK population suffer from back pain and 2.5% will experience chronic low back pain (CLBP) [11]. In 1998, the annual expenditure for low back pain (LBP) accounted for £12.3 billion with £1.6 billion corresponding to healthcare costs and £9 billion due to production loss [31,36]. More recent cost evaluation work was conducted in the USA and showed similar high costs with combined direct and indirect costs for LBP between \$85 billion and \$238 billion [10]. LBP is the most common symptom experienced by patients seeking osteopathic care in the UK [13].

LBP is a complex phenomenon integrating biological, social as well as psychological components [7,16,40]. Each component of the biopsychosocial (BPS) model has its own importance and any serious biological conditions (red flags) that could cause LBP should be carefully evaluated during the case history [35]. A non-specific LBP (NSLBP) can be diagnosed when it is not possible to identify a specific cause to the spinal pain [32]. Once clinicians have identified a patient with NSLBP, they should consider the social and psychological aspects of patient's experience of pain [12,35]. PS factors are intrinsic to each individual and have a role in the pain perception for patients presenting with NSLBP; they include a non-exhaustive list such as anxiety, fear and

avoidant behaviour as well as depression, anger, self-efficacy, catastrophising, social support, and work environment [25]. There is some evidence that anxiety, depression, job dissatisfaction and misbeliefs about back pain are predictors of developing CLBP, and that a rapid identification of those factors could help the practitioner to provide a specific and targeted treatment [38].

The National Institute for Health and Care Excellence (NICE) guidelines for LBP have recently been updated and recommend the assessment for psychosocial (PS) factors. They outline the relevance of PS factors as they can help practitioners to identify patients at risk of developing CLBP [35]. To comply with those guidelines, manual therapists can refer to the flag system. Yellow, black and blue flags can help practitioners to identify barriers to recovery and issues that patients may experience. Evaluating flags may help the practitioner to offer an effective and an adapted individual treatment for the patient [27]. The flag system is also recommended as it may help to determine the level of intervention to minimize the cost of treatment [20]. Although widely recommended, the flag system remains controversial. Whilst identifying PS factors is essential for effective treatment, there is a need to put more emphasis on the qualitative aspects of the yellow flags [54].

Practitioners can also use the STarT Back Screening Tool.

* Corresponding author.

E-mail address: J.Draper-Rodi@uco.ac.uk (J. Draper-Rodi).

Recommended by the NICE guidelines (2016) and the British Pain Society, this tool has shown its validity and reliability to identify and subgroup patients at risk of developing CLBP [22,41,44]. Whilst it shows promising results, the STarT Back Screening Tool also has limitations as it only integrates quantitative data and does not allow clinicians to understand the patient as a whole [54].

BPS management of patients with NSLBP shows better outcomes than standard care alone with regards to physical and emotional functioning as well as cost savings [15,60].

In a randomised controlled trial (RCT) with a large sample (851 patients), patients were sub-grouped in low-risk, medium-risk and high-risk of developing CLBP. The intervention group received stratified care while patients in the control group were treated with standard care. Patients who received stratified-care showed higher improvements in pain reduction, disability, quality of life and psychological aspects compared to the non stratified-based care group [23]. A systematic review showed that multidisciplinary BPS rehabilitation for CLBP is more likely to benefit patients in the long term than usual care or physical care alone [26].

Despite the promising early evidence of BPS approaches on clinical assessment and management of NSLBP, manual therapists are either reluctant, or confused with this model [3]. This is supported by a recent study about physiotherapists' views on triggers for LBP where PS factors are rarely considered [53]. A systematic review of 12 qualitative studies investigating attitudes of physiotherapists towards PS factors and LBP shows that physiotherapists have a lack of expertise and a poor understanding on how PS factors can influence LBP [55]. Despite recognizing the influence of PS factors on LBP, many physiotherapists considered the management of these to exceed their competence. Some participants fully disregarded these PS influences, demonstrating little empathy with regards to the patient's pain experience. A recent qualitative research investigated the attitudes and beliefs of Italian physiotherapists towards PS factors showed that participants had a partial understanding of PS factors. They also reported having limited skills and education towards the assessment and management of PS factors [62].

Historically, osteopathy is considered as a holistic profession, where the body is seen as a unit [42]. Emotions and psychological aspects of a patient play an important role in illness and perception of pain [42]. However, results from a national Australian survey shows that clinicians, including osteopaths, commonly assess for mechanical factors and pain, and give less attention to the assessment of PS factors [28]. A qualitative study [56,57] investigating osteopaths' conceptions of practice showed that one group were adopting a more biomechanical approach whereas the other group was more BPS orientated. Another qualitative study explored the attitudes of osteopaths' students and clinic tutors who rejected the NICE guidelines [14]. Participants did not adhere to clinical guidelines because they perceived them as a threat to their professional identity. Although it is not clear whether the participants had a BPS approach, the rejection of the guidelines, which recommend a PS factors assessment and management, shows a certain inconsistency between the osteopathic principles and their clinical application.

Most research on manual therapists' attitudes regarding PS factors and LBP is from the physiotherapy profession. There is currently no literature available to understand how osteopaths integrate those factors with patients presenting with LBP.

Osteopaths in the UK have to assess for psychological and social determinants in order to make accurate clinical decision-making [17]. Osteopathic education in the UK includes training on the BPS model and its effect on pain and illnesses [17]. The University College of Osteopathy (UCO) is also offering an elective module called OsteoMAP, where final year students can learn how to treat patients with chronic pain, mixing Acceptance and Commitment Therapy and osteopathic management [6]. This new approach showed good results for the management of chronic pain [6]. To date, there are no studies

investigating osteopaths' attitudes, opinions and beliefs towards PS factors and NSLBP. The UCO students being the future of the profession and receiving an accredited BPS teaching [4] justified the need for an investigation about their attitudes towards PS factors and NSLBP.

The aim of this study was to explore the attitudes, beliefs and opinions of UCO students towards PS factors when they treat patients with NSLBP.

Methods

The “Consolidated criteria for reporting qualitative studies (COREQ): 32-item checklist” was used to present the study design, analysis and findings [59].

Study design

The study was conducted by TD, a male researcher, who was then studying in his final year of an undergraduate Master's degree in Osteopathy at the University College of Osteopathy (UCO). An academic clinician osteopath with experience in qualitative research and a professional doctorate in osteopathy (JDR) provided guidance and feedback throughout the research project.

In order to explore the attitudes, beliefs and opinions of UCO students towards PS factors when they treat patients with NSLBP, a qualitative approach was undertaken [34]. Semi-structured interviews with elements of constructivist grounded theory were used, allowing flexibility for the data collection and analysis [8]. Interviews were audio-recorded and transcribed verbatim by the researcher. Data were kept on the researcher's password-protected laptop. To increase reliability and validity of the data, transcripts of the interview were sent to participant to check for accuracy [2]. The interpretation and co-construction of the data was eventually influenced by the researcher's own experience as an osteopathic student in line with a constructivist approach to qualitative research [8].

Recruitment and participants

Due to time constraint and location convenience, it was decided that the research would only focus on UCO students' attitudes, beliefs and opinions towards PS factors when they treat patients with NSLBP.

Theoretical sampling was used to recruit the participants, as it provides the most information-rich source of data for the research question [2]. Participants included UCO students in their final year, as they were considered to have more clinical experience and more educational training regarding PS factors and management of NSLBP than students in their first year in clinic. Students that were training for the management of CLBP by integrating Acceptance and Commitment Therapy to osteopathy were excluded (OsteoMAP elective), as they might have had a more BPS-orientated approach and this could have led to a potential bias (Table 1). UCO student participants were recruited until thematic sufficiency was reached [2].

After the approval from the Ethic Committee of the UCO, an email invitation was sent to final year UCO students. The email invitation contained the information about the process and aim of the study. The Patient Information Sheet explained the potential psychological harm for participants and how the risks were minimised. All participants had

Table 1
Inclusion and exclusion criteria.

Inclusion criteria	Exclusion criteria
● Full-time 4th year students ● Part-time 5th year students ● MSc UCO students.	● Students from other years ● Students who were doing OsteoMAP elective as they may have had a more BPS approach

Table 2

Interview guide.

1 Can you tell me a bit about your general experience at the UCO clinic?
2 What is your understanding of PS factors?
a Example
3 How relevant to you are PS factors with a NSLBP patient? Can you give me an example you had in clinic?
4 How well do you think UCO students can assess for PS factors?
5 How do you assess PS factors for a patient with NSLBP?
6 Once you have identified PS factors, how do you integrate PS factors in your management of patient with NSLBP?
7 How confident and self-competent do you feel assessing and managing PS factors with a patient with NSLBP?
8 Are there any potential barriers to assess and manage PS factors?
b Any strategies to overcome these barriers?
10 Are there any other perspectives you would like to share from your experience?

to sign a consent form prior to the interview and were allocated a code number to ensure confidentiality. The interviews were expected to last approximately 30 min.

Data collection and analysis

This research used a qualitative approach, with elements of constructivist grounded theory, where data collection and analysis were done simultaneously [8]. Data was gathered from face-to-face semi-structured interviews via audio recording and note taking [8]. A pilot interview was conducted prior to the recruitment with the research supervisor to assess for clarity and coherence of the opened-ended questions. Consequently, some minor amendments were made to improve the interview questions (Table 2). The first question aimed to build trust with the participants and to put them at ease. The rest of the interviews were open questions to gain insights and views of participants towards NSLBP and PS factors. The last question allowed the participants to provide any relevant information they wanted to share on the researched topic.

The interviews were conducted at the UCO teaching centre and aimed to explore the attitudes, beliefs, and opinions of UCO students towards PS factors when they treat patients with NSLBP. Word processing software and spreadsheet software were used to manage the data. Memo writing and a reflective diary were used, where thoughts, feelings and reflections helped the researcher to build a theory [2]. The constant comparative method of data analysis was used, as it was compatible with the inductive orientation of the research [34]. TD collected and analysed the data simultaneously. Thematic analysis followed the inductive process. Interview questions were modified as the research progressed, which gave flexibility for the researcher to explore the data [34]. Analysis started from the first interview and line-by-line coding was used as the first step of data investigation [56,57]. Participants could be invited for a second interview to confirm the themes generated from the transcripts' analysis.

Trustworthiness

The concept of trustworthiness is essential in qualitative research, as it provides a rigorous method for validity and reliability of knowledge [34]. However, the concept of validity and reliability of quantitative research are less relevant when it comes to a qualitative design [50]. To ensure the trustworthiness of the research project, the researcher adopted Guba's approach [19]. In his work, Guba proposed a shift from the quantitative terms of trustworthiness into new and more relevant terms for qualitative research (see Table 3).

Being a final year student interviewing peer colleagues from his cohort and receiving the same accredited teaching, the researcher was aware of his potential own bias and assumptions. Self-critical reflection was used during the data collection and analysis to explicitly state the TD's biases and assumptions. Meetings with JDR provided constructive

Table 3

Trustworthiness for qualitative research [19].

Quantitative terms	Qualitative terms	Criteria to ensure trustworthiness
Internal Validity	Credibility	Member checking; prolonged engagement with data; peer debriefing; researcher familiar with context and previous studies.
External Validity/ Generalisation	Transferability	Collect thick descriptive data; theoretical/purposive sampling.
Reliability	Dependability	Audit trail; stepwise replication.
Objectivity	Confirmability	Reflective diary; triangulation.

feedback about the research methodology.

Transcripts, dated memos writing, summary of participant's interviews and reflective thoughts provided an audit trail and reinforced the confirmability and dependability of the research [43]. Regular debriefing with JDR and member checking enhanced the credibility of the study. The researcher having a prolonged engagement with the data collection and analysis also contributed to the credibility of this research [43,50]. The in-depth and rich data gathered from the interviews allowed transferability of the result [43].

The thorough description of the study design and methodology reinforced the transparency of the research [18].

Findings

Ten students replied to the invitation email. Nine students (Table 4) were interviewed to reach data sufficiency. Participant 1 was interviewed a second time to further explore the themes that emerged from the data analysis. None of the participants requested amendments from the transcript that was sent to them for accuracy checking.

The analysis started at the 1st interview with note taking, and line-by-line coding (Table 5). The axial coding occurred after the 4th interview and allowed the researcher to link hypotheses and categories. Different concepts were created after the 5th interview.

Selective coding resulted in the emergence of three main themes, which described the views and attitudes of nine UCO students toward PS factors and NSLBP:

- Definition and interpretation of PS factors towards NSLBP
- Assessment and management of PS factors
- Competence and difficulties towards PS factors.

Each theme is supported by subcategories, which aim to illustrate the depth of the analysis.

Participants' definition and interpretation of PS factors towards NSLBP

Participants shared the view that PS factors are part of each individual, extrinsic to the musculoskeletal system, but affecting it directly. PS factors include psychological aspect and social environment of a patient such as family, work, friends, stress, anxiety and catastrophisation.

P7: "They are essentially anything you have ruled out from a person's body, any structures that you have ruled out, that contribute to someone's pain, so their belief system, their support system, social support system, essentially the social bit, their job, do they have a supportive family? Supportive friends? Are they in contact with people? Are they isolated? And then if I look at the psycho bit, would be how they are, their stress in general, do they worry about their pain? Catastrophising."

Participants also considered PS factors as being important and relevant for patients with NSLBP, and with a need to be assessed and addressed. They were viewed as potential barriers to recovery and potential risks for chronicity. They also played a role in how the patient

Table 4
Demographic details of participants.

Participant' code number	Gender	Age	Date of interview	Study pathway
1	M	22	21/09/2016 (1st interview) 10/01/2017 (2nd interview)	Full-time, M.Ost
2	M	24	27/09/2016	Msc. Pre.reg
3	F	23	11/10/2016	Full-time, M.Ost
4	M	26	18/10/2016	Msc. Pre.reg
5	F	26	23/10/2016	Full-time, M.Ost
6	F	22	27/10/2016	Full-time, M.Ost
7	M	23	02/11/2016	Full-time, M.Ost
8	M	27	04/11/2016	Full-time, M.Ost
9	M	23	08/12/2016	Full-time, M.Ost

perceives symptoms.

P3: "I think they're (PS factors) really relevant to me as a practitioner and also to the patient as an individual ... their sort of PS views, feelings are reflected in their LBP, so it may manifest into chronic things ... I think it's very valuable to consider them when thinking about treatment and management of patients in the clinic."

P6: "I think they have a big part in how people perceive their injury, how they perceive their body, how they perceive their recovery, so they all directly influence the rate of recovery."

Although PS factors are recognised to be extremely important, some participants considered that too much emphasis could be placed on them, and that the definition was too broad and unspecific:

P4: "I believe that PS factors play a major role into patient presentation of symptoms, especially the LBP but I'm not too happy about the definition of PS factors ... the term is so broad, that I really find it a bit blurred, unspecific."

P8: "I think they are all very important, I think sometimes we can maybe put a bit too much emphasis on it, in certain situation, maybe as a 3rd year (student), you are not quite sure what's going on with the patient, you might just say, the reason for the pain is BPS."

However, every student interviewed agreed on the fact that PS factors are key element for pain perception and presentation. Two participants discussed briefly the neurophysiology and the effect of PS factors on the nervous system, and how they can modulate pain.

P7: "You've got the stress model, so if someone worries about their pain, because they don't understand it, you know they get more stress, they got their hypothalamus fires up, the limbic system start processing it in the wrong way, the emotional processing of pain, it's the brain, and then it becomes hypersensitive state."

P9: "I think it could affect it in terms of their pain perception, so the pain processing, so where they interfere with kind of sensitisation, or altering descending inhibition within the central nervous system, or really focusing on pain, which can change their experience of it."

Assessment and management of PS factors

The data gathered from the interviews provided an insight on how participants assessed for PS factors and how it influenced their management plan.

Assessment of PS factors

All the participants reported assessing PS factors during the first appointment and following appointments as they felt it was difficult to obtain all the necessary information at the first session.

P2: "They need to be assessed through the consultation with the history taking as much as we can the first session, although in my opinion, it's a bit hard to know the psychosocial factors at the 1st session, so they will come out in the treatment after."

The evaluation was very individual to each patient, and student practitioners adapted their PS risk factors assessment depending on the patient's complaint. Participants asked questions about lifestyle, work, and social environment. They tried to understand how the pain could affect patients in their daily life. They also observed patient non-verbal cues, and possible physical manifestation of PS factors.

P3: "I initially look for those body language cues and how they present themselves, then how they verbalise, what they are feeling in term of what it feels like to them, whether they had it before, and how it's affecting them in their daily activities."

Although participants did not follow any specific guidance and used their gut feelings, the case history sheet provided a framework to investigate for PS factors.

P5: "I ask within the box of the case history, like extra activities, what do they do in their spare time ... I don't always think when I'm with the patient, this is my bio-psycho-social assessment. I think, that kind of evaluation, evaluating someone as a whole comes naturally."

Yet, considering PS factors as relevant for NSLBP, P4 was cautious and uncertain about such an assessment. Whilst P4 asked questions regarding the patient's PS environment, it was done for personal understanding.

P4: "I leave the assessment for BPS to my own understanding and my own perception of the person as a whole; I don't think I have any

Table 5
Example of line-by-line coding.

Quotes from interviews' transcription.	Line-by-line coding.
P1: "They (PS) are factors <u>outside of the musculoskeletal system (MSK)</u> which a patient possesses, which will influence their <u>health in general</u> ".	Extrinsic to MSK; Effect on patient's health
P2: "I try to <u>give the patient a lot of choices</u> , to be maybe <u>more social</u> , to do maybe <u>what she likes</u> ".	Patient's values orientated management.
P3: "That (PS factors) it's sort of <u>maintained the pain perception</u> because of the <u>negative emotions, feelings</u> and how that <u>affects the body</u> ".	Negative PS factors affect pain and patient's symptoms.

structured way of assessing for BPS factors.”

Two practitioners mentioned STarT Back screening questionnaires regarding the assessment of PS factors for NSLBP but have not used it in their learning experience at the UCO clinic. Although PS assessment is performed, participants did not categorise the patient with low and high risk of developing CLBP.

P7: “I don't particularly have a guide, I mean you do have screening tools, which are probably efficient, like STarT Back, which are effective, but I don't use it because I don't know why actually, but I might ask the patient what they think is causing their pain, how do they make them feel, and then just with my case history you can judge from their job, how they are stress.”

P9: “The new NICE guidelines are outlines, use of STarT Back questionnaire, which assesses PS risk factors for LBP and categorises patients in a way, which I think is a useful tool, but I haven't used it yet.”

Management of PS factors

Whilst the evaluation process of PS factors highlighted similarities between participants, the management of PS factors for patient with NSLBP showed a certain discrepancy among the students. Two different approaches emerged from the data analysis, illustrated in Fig. 1.

One group of students were comfortable dealing directly with PS factors, by listening and talking to the patient, and it was thought to be a form of therapy. They also tried to integrate the PS factors into their management by encouraging the patient to be active and to do physical activities that patients valued and enjoyed. Two participants also mentioned the use of mindfulness exercises when treating patient with PS factors that may be obstacles to recovery.

P2: “If we are talking about stress, I might suggest mindfulness, if we are talking about depression, I will push my patient to go out with friends and I will tell the patient to do activities very good for the LBP, to try to engage the patient in the treatment with me in the room, but also engage the patient outside with a personal social life, aiming at doing what the patient likes.”

P5: “I use mindfulness techniques, box breathing techniques, advice on lifestyle, and advice on exercises, anything that is relevant, that can influence the social side or the psychological side, that would then be beneficial, impact on the LBP.”

The other group thought that it was not part of osteopathic intervention to directly handle the PS factors. They preferred giving pain education to the patient by using analogy, reassurance and being very careful with their communication.

P8: “So first of all, reassurance if they are NSLBP, and then alongside that reassurance, is putting things in lay terms, so putting explanation of what you think it's going on, in the right way that patient understands it, so they can get an idea of what's going on.”

P9: “Introduce them to pain education, educate them through kind of pain is not equal to tissue damage, and stuff like that, I think it's a good way of managing it ... talk about stress and its effect on the nervous system, kind of using analogy to make in a way this is easy to understand as possible.”

Competencies and difficulties towards PS factors

All participants seemed to be relatively confident and comfortable to assess for PS factors. They reported that it was taught well through lectures received at the UCO.

P1: “I think generally we are reasonably well prepared, we are taught about what the flags are; we go through practice situation with other peers, so we did practice interview and I think we are taught to pick them up pretty well.”

However, they reported limitations in PS assessment implicating time constraints, clinical experience, and patients perceiving osteopathy only as a manual therapy and not opening up to the practitioner.

P3: “I think a barrier would be the perception of what osteopathy is ... and time as a confounding factor, and willingness of the patient to open up.”

P4 mentioned that the assessment of PS factors was limited because there were no objective measures given to perform such an evaluation.

P4: “I'm really questioning myself about which tools a student or a qualified osteopath has to assess for bio-psychosocial symptoms?”

Alternatively, if participants were comfortable with PS factors assessment, they mentioned that they found the management to be more challenging. Low level of clinical experience, patient not opening up to the practitioner, high level of PS factors, lack of education towards management of PS factors, absence of tools and discrepancy among

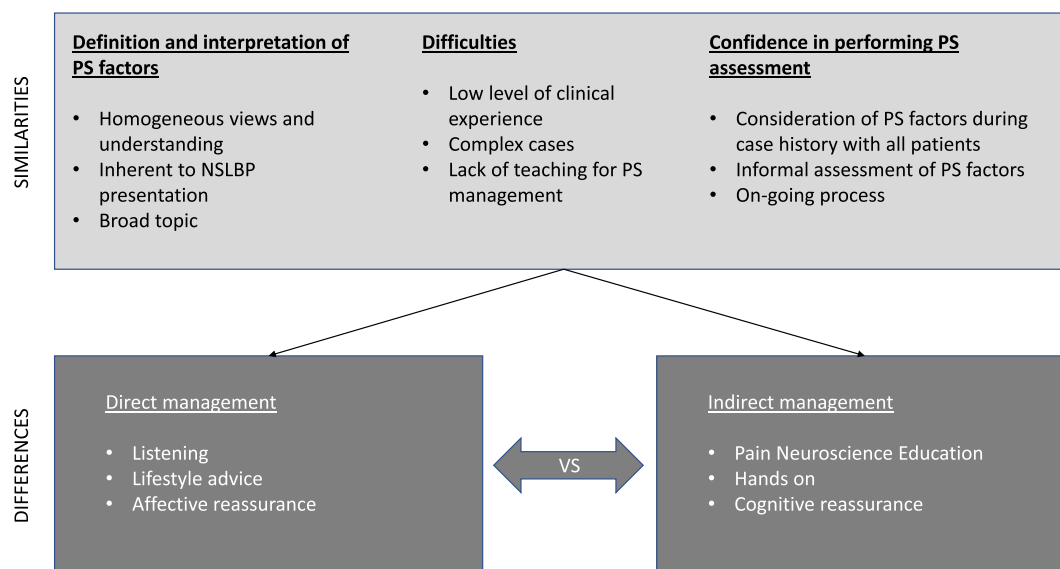


Fig. 1. UCO students' conceptualisation, assessment and management of PS factors and NSLBP”

clinic tutors were mentioned as being barriers and challenges when it came to address the PS risk factors.

P1: *"I think I'm reasonably competent in assessing them ... but I think managing them I need more experience, I don't feel very competent".*

P8: *"I would say, they (UCO) don't give much information on how we manage the patient like that ... I think you get more confidence the more time you are in clinic, but I would not say I feel completely competent and being expert with certain scenarios."*

Some participants also mentioned that they were trained to be an osteopath, which involved dealing with musculoskeletal presentation. Although they considered PS factors as being important for a NSLBP, they thought that their approach towards PS factors and NSLBP should be more hands on treatment and tissue related.

P9: *"I think in terms of confidence, it's quite hard to have that confidence to manage those problems, whereas with musculoskeletal aspects of their presentation it's much easier to influence those (musculoskeletal aspects), because you have a lot more confidence in dealing with them."*

Discussion

The aim of this study was to explore the attitudes, beliefs and opinions of UCO students towards PS factors when they treat patients with NSLBP. The UCO students interviewed were enrolled in the same final year of study in an accredited university masters degree that had an embedded BPS framework.

All students interviewed seemed to have a similar understanding of PS factors despite the BPS model being reported in the literature as broad and having a lack of consensus on the definition of PS factors [33,49,54]. The consensus amongst our participants may be due to them having received the same education about the BPS model [1]. This is also supported by the fact that no participants reported fear of movement whilst there are conflicting views on its effect on LBP [27,45]. There is also a lack of consensus in the literature on the influence of specific PS factors on pain perception and recovery [24,25] and their cumulative effects on LBP prognosis [5]. Whilst these gaps in the literature are important research avenues, educational decisions need to be made on institutional levels when designing curricula and these may explain the apparent consensus amongst students.

There was a difference in PS factors conceptualisation between the participants in this study and what is reported in the literature: a systematic review [55] found that practising physiotherapists did not perceive the importance and the role of PS factors and NSLBP. In this study, participants saw them as predictors of CLBP, and having an effect on pain perception and pathways, indicating that existing undergraduate training may become in line with current knowledge [25,30,38].

As recommended by different national guidelines [12,35], the participants assessed for PS factors when seeing patients with NSLBP, highlighting signs of good practice. This is supported by participants investigating pain perceptions, catastrophisation, anxiety, depressive feelings, stress, and social environment during their assessment of patient presenting with NSLBP, in line with recommendations on the assessment of patients with chronic pain [61]. Participants showed confidence in doing an assessment of PS factors. They also reported that the education they received provided them the skills to identify PS factors, which may indicate that the undergraduate curriculum content is suitable. The confidence reported by these participants is discordant with qualified physiotherapists' perceptions reporting that their assessment was limited due to inadequate education towards PS assessment [52,62]. Participants in this study conducted PS assessment in an intuitive form, similarly to physiotherapists' assessment [52]. They reported gaining a structure in their PS assessment with the case history sheet; their assessment continued also during the management phase.

The assessment remained mainly intuitive, and making informal judgment is less accurate than using formal instruments [28,37] and this may contribute to maladaptive approach and poor management of patients with NSLBP [38]. Participants in our study did not categorise their patients using PS risk factors assessment tools despite current recommendations [15,35], which may further increase inadequate treatment approach. One participant mentioned they did not receive training on the use of objective tools to investigate PS factors despite the STarT Back Screening Questionnaire (SBSQ) and the Copenhagen Psychosocial Questionnaires (COPSOQ) being available [29,35]. Whilst two participants mentioned the SBSQ, they had not used it. Whilst participants reported confidence in assessing PS factors with patients, it is unclear how competent they were at conducting it and why they were not using tools or aware of them. This would require further investigation to evaluate their competencies and this could be done by comparing their assessment findings with results from screening tools are showing promising evidence for the treatment and management of LBP [41].

Participants used different strategies in their patient management. Most of them tried to keep patients active, which is recommended for the management of acute and chronic episodes of LBP [35,39]. Some participants also included mindfulness in their management of NSLBP, showing that they are in accordance with promising evidence for the treatment of CLBP [9]. Another tool implemented by participants was reassurance. Whilst both affective and cognitive reassurances may have positive outcomes on patients and should be used in clinical practice [21,46], participants adopted either an affective or a cognitive approach, but none of them at the same time. Participants who felt intrusive to discuss PS factors with patients tended to use more pain neuroscience education alongside manual therapy, which is effective in the management of CLBP [47,58]. This discomfort to deal with PS factors management is common amongst manual therapists [52,55,62]. Although participants showed that they were following guidelines for the management of NSLBP [35,48], there was a discrepancy in the methods implemented for patient management. More research should focus on when and what methods osteopathic students use for the management of PS factors with patients with NSLBP. Participants had difficulties integrating PS factors into their management plans, leading some participants to adopt a more secure physical approach to the patient's complaints. Similar findings emerged from a systematic review of qualitative studies on physiotherapists managing PS factors [55]. A recent study [6] explored the effectiveness of OsteoMAP, a new approach for the management of patients with chronic pain and high levels of PS factors, and found that osteopathy combined with Acceptance and Commitment Therapy [51], showed promising effects on pain, mood, function and coping strategy. Training in OsteoMAP was an exclusion criterion in this study; further study on UCO students' management of patients with PS factors would be valuable.

Strengths and limitations

This is the first study that investigated the attitudes of osteopathic students towards PS factors and NSLBP. The outcomes of this research can provide a useful framework for further investigation into the assessment and management of PS factors by manual therapists. It also showed that there is a general awareness of the PS factors and that they are being considered into clinic. However, the results should be interpreted with care. This study was part of a Master's degree course and the researcher had no experience in the interviewing process. This may have limited the exploration of thoughts and concepts delivered by the participants. To limit this, TD conducted a pilot interview with JDR who has experience with qualitative research. The invitation email sent to the UCO students mentioned directly that the research was to explore their attitudes towards PS factors which could have potentially led to a recruitment bias, leading to appeal students with an interest in the researched topic. The interviews were conducted with 9 UCO students,

and the results from this study cannot be generalised to all the UCO students and the osteopathic students' population.

Conclusion and future directions

This qualitative study investigated nine UCO students' attitudes, beliefs and opinions towards PS factors when they treat patients with NSLBP.

The result indicates that the participants had a good and homogeneous understanding on what PS factors are and their implication in a NSLBP presentation. Although they considered PS factors important, some participants mentioned a lack of consensus and too much emphasis towards such risk factors. The participants seemed to be comfortable in the assessment process of PS factors, but the absence of a structure and awareness about screening tools need to be further investigated. Despite being the main challenge encountered by the participants, the management of PS factors when treating patients with NSLBP showed promising direction. The remaining main barriers were the lack of specific training on PS factors management and participants' low levels of clinical experience. Management of PS factors need to be better integrated in the education delivered at the UCO. The sample was from one osteopathic institution to allow an investigation of the confidence and skills of students from an environment that embeds the BPS model. Further research is needed to establish if the results apply to the general UCO and osteopathic' students population. Literature highlights the lack of consensus and difficulty to make a clear definition of PS factors. A standardisation of PS factors might help practitioners to investigate and manage better PS factors when treating patient with NSLBP.

Acknowledgments

We would like to thank the UCO final year students who took part in our study.

Appendix A. Supplementary data

Supplementary data related to this article can be found at <http://dx.doi.org/10.1016/j.ijosm.2018.04.006>.

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