An Evaluation of a Pain Education Programme for Physiotherapists in Clinical Practice

Abstract

Objective: The present study evaluated the implementation and acceptability of a pain education programme delivered to physiotherapists in clinical practice.

Methods: A pre test post test design with ten physiotherapists was employed. Descriptive and inferential statistics were used for outcome measure data. Focus groups were carried out with seven physiotherapists within one month post intervention. This data was analysed using the Framework Approach.

Results: Ten musculoskeletal physiotherapists were recruited. It was possible to develop and deliver the intervention and this was found to be acceptable to physiotherapists within clinical practice. The study explored trends within outcome measures; and one was considered appropriate. The focus groups yielded three interlinked themes, which related to the impact of the programme: "providing a context for pain education", "influence on aspects of the patient-therapist encounter" and "logistics of the education programme in clinical practice".

Conclusion: A pain education programme delivered to physiotherapists in clinical practice was both possible to deliver and acceptable to participants. A key strength of the programme was the applicability to real life practice, and something which physiotherapists valued. Whilst physiotherapists felt pain neurophysiology education was important, physiotherapists reported lacking confidence in implementing their pain neurophysiology knowledge with patients. Thus more time is needed to focus on pain neurophysiology education with the aim to increasing confidence with application of this approach in clinical practice.

Key words: musculoskeletal, pain, physiotherapy

Introduction

Globally, low back pain (LBP) is a common problem and will increase due to the aging population (Hoy *et al.* 2012). Self-management is encouraged for LBP (Balague *et al.* 2012) with physiotherapists playing a pivotal role in management, (Foster *et al.* 2011a) including self-management. Self-management involves the individual, with support if required in managing the biopsychosocial impact of a condition (Stewart *et al.* 2014) and physiotherapists are in an optimal position to utilise a biopsychosocial approach in the management of LBP (Foster *et al.* 2011b). However healthcare professionals (HCP) can have biomedical beliefs regarding pain (Nijs *et al.* 2013) with studies reporting that physiotherapists' attitudes and beliefs can influence the care they provide (Bishop *et al.* 2007; Daykin *et al.* 2004). Physiotherapists have displayed concerns regarding their skills to support people living with LBP to manage some of the biopsychosocial aspects of a pain experience (Sanders *et al.* 2013). This demonstrates the need for educational support in this area (Sanders *et al.* 2012; Snelgrove *et al.* 2013).

To make the biopsychosocial model relevant for clinicians, education that emphasises the neurophysiological aspects of pain to illustrate integration of psychological influences has been advocated (Darlow *et al.* 2012). Pain neurophysiology education (PNE) is encouraged for a clinical population to reduce the threat associated with pain and to improve attitudes and beliefs (Nijs *et al.* 2013). However, there is the need to focus on physiotherapists' attitudes and beliefs with PNE being a means to influence these (Darlow *et al.* 2012). One study comprising 288 participants evaluated the efficacy of a three-hour seminar regarding PNE for HCP. The study reported an increase in pain neurophysiology knowledge measured by a standardised questionnaire (Moseley, 2003). However, the influence of education on HCP attitudes and beliefs or exploration of the value for clinical practice was not explored. Whilst educational programmes exist that measure attitudes and beliefs tailored for physiotherapists, their focus has not been specifically PNE (Overmeer *et al.* 2009; O'Sullivan *et al.* 2013). It should be noted that the timing, content and length of courses were different, with one being an intensive course over two full days (O'Sullivan *et al.* 2013) and the other being delivered weekly over eight weeks in a university setting (Overmeer *et al.* 2009). There is the scope to develop a shorter course, requiring less time commitment, over a period of time to allow for reflection and implementation.

In order for education to change attitudes, the educational programme should consider real world application and give time for implementation (Ferris *et al.* 2001). Making education relevant to practice is imperative in HCP education (Holland, 2011). A study is proposed that aims to design and implement an education programme for physiotherapists focusing on PNE and application of this to practice. The aim of this study is to assess the development, delivery and acceptability of this education programme for physiotherapists in clinical practice. The study also sought to assess the appropriateness of two outcome measures, the Physiotherapist Attitudes and Beliefs Scale (PABS-PT) (Houben *et al.* 2005) and Health Care Providers Pain and Impairment Relationship Scale (HC-PAIRS) (Rainville *et al.* 1997), to measure attitudes and beliefs of the physiotherapists. Trends were analysed and differences compared between the pre and post intervention scores.

Methods

Study Design and Recruitment

This study used a pre-test post-test design and focus groups following the intervention to explore acceptability and implementation in clinical practice. The study was part of a Doctoral study which received University Ethical Approval, National Research Ethics Service approval and NHS Trust R&D approval.

Focus groups with participants following the intervention allowed for understanding of the acceptability of the intervention, alongside the capability of delivering this intervention with clinical practice. A generic qualitative approach was used, which was appropriate for this study as it does not align to a traditional qualitative methodology, and is appropriate for use with a study gathering mixed methods data (Percy, Kostere & Kostere, 2015). The outcome measures were taken before and after the intervention to consider their suitability for a future study.

Physiotherapists were eligible if they worked within musculoskeletal outpatients and worked with people with LBP in the last six months. Participants were recruited from two outpatient clinics within one NHS Trust. Eligible participants were provided with a participant information sheet and informed JM if they were interested to take part.

Intervention

The intervention was a pain education programme for physiotherapists within clinical practice. The programme included three sessions, which lasted approximately 2½ hours, once per month and was delivered by JM. JM is a physiotherapist and worked within the same Trust as the participating physiotherapists. The 'Explain Pain' paradigm (Butler *et al.* 2003) focusing on PNE guided the philosophy of the focus on PNE. Implementing a course over time, rather than a one-time delivery allows for application of skills and discussion at the returning session (Chipchase, *et al.* 2012). Three separate sessions were conducted monthly based on pragmatic issues of in service training timing. The application of a proposed model of presenting and understanding pain science to physiotherapists was utilised (Moseley, 2007). The content of the sessions was as follows:

Session one: Pain models including Descartes, the Gate Control Theory, Neuromatrix theory and the biopsychosocial model were discussed (Gatchel *et al.* 2007; Moseley, 2007; Wall, 2000; Melzack, 1999;). Pain neurophysiology, including pain mechanisms and descending control were included (Woolf, 2011; Nee *et al.* 2006; McMahon *et al.* 2005; Apkarian *et al.* 2005; Butler *et al.* 2003; Butler, 2000) and discussion of the integrated nature of the biological and psychological aspects of pain (Tracey *et al.*, 2007; Flor *et al.* 2005).

Session two*:* Studies concerning the application of pain neuroscience (Moseley, 2007) and communication and assessment (Goldingay, 2006a; Goldingay, 2006b) informed this session. Extracts from three patient interviews lasting between three and five minutes from qualitative interviews in an earlier study preceding this programme were chosen relating to the person's understanding of their problem, the influence of LBP on daily life, experience of physiotherapy and thoughts and beliefs regarding LBP. Persons unrelated to the study provided the voice for these annonymised extracts. Physiotherapists listened to the extracts once and used this as part of an activity to discuss what may be influencing that person's pain experience.

Session three*:* A range of evidence regarding PNE was discussed within the group. Studies focusing on PNE were examined during this aspect of the programme (Louw *et al.* 2011; Clarke, *et al.* 2011; Moseley, *et al.*, 2004; Moseley, 2002).

Quantitative data

Data Collection

Participants provided written informed consent before the intervention commenced. Participants were asked to complete two outcome measures, the PABS-PT (Houben *et al.* 2005) and the HC-PAIRS (Rainville *et al* 1995) immediately before and after the intervention.

Outcome measures

The PABS-PT consists of 19 items and is measured using two factors. Factor 1 is biomedical orientation and factor 2 is biopsychosocial orientation. Scoring highly on factor 1 would indicate a more biomedical orientation whilst a higher factor 2 score demonstrates a more biopsychosocial treatment orientation (Houben *et al.* 2005). Scores for factor 1 are added together and the same for factor 2 to produce a biomedical and biopsychosicial score (Ostelo *et al*. 2003). The 19-item version PABS-PT was utilised for this study (Houben *et al.*2005). The items in each factor are rated on a 6 point likert scale from totally disagree to totally agree (Houben *et al.* 2005). A systematic review (Mutsaers *et al.* 2012) investigating the psychometric properties of the PABS-PT found this measure to be responsive to educational interventions.

The HC-PAIRS consists of 15 items and is measured using a 7 point Likert scale (Rainville *et al.* 1995). Response anchors are bipolar ranging from 'completely disagree' to 'completely agree', with questions 1, 6 and 14 reverse scored. A lower score is associated with less likelihood of associating impairment to pain (Bishop *et al.* 2007). The 15-item HC-PAIRS has 4 factors which are 'functional expectations', 'need for a cure', social expectations' and 'projected cognitions' (Bishop *et al.* 2007). It has been proposed that items ten and thirteen can be removed from the HC-PAIRS questionnaire and to have a thirteen item one factor questionnaire due to uncertainty regarding if 'cognitions' measures the targeted belief (Houben *et al.* 2004). Analysis of this pre and post outcome measure explored the 15 item total score and a 13 item total score.

Data Analysis

Descriptive statistics including the median and interquartile range of the outcome measures for pre and post intervention were calculated. Changes between the pre and post intervention scores for the PABS-PT

and HC-PAIRS were analysed using Wilcoxon Signed Ranks Test. Data were analysed using SPSS (IBM Corp).

Qualitative Data

Data collection

JM facilitated two focus groups with physiotherapists who had taken part in the intervention. Two focus groups were used due to availability of clinicians and each lasted under one hour. The focus groups were carried out on NHS premises. Given that JM had facilitated the intervention this allowed for natural discussion. The topic guide was prepared alongside the research team to guide the focus group, which is detailed in figure 1. The questions were subject to discussion between JM and NA, who is a physiotherapist and psychologist, with questions being amended and revised based on discussions. The questions were informed by the focus of the study to explore feasibility and acceptability of the education programme in clinical practice. Questioning opened with a general statement encouraging participants to speak freely about their experiences of the education programme. Questions exploring self-management were informed by a preceding study in this Doctoral programme that explored physiotherapist understanding and support in self-management. The PNE programme was developed to help support physiotherapists with self-management.

1. Experiences of the education programme
   Probes
   - Opinion of programme
   - Relevance to practice
   - Use in practice/ influence on practice
   - Method of delivery
   - Content
   - Outcome measure – how find using/relevance
   - Frequency/length of programme
   - Areas to develop/positives
2. Use of PNE in practice
3. Understanding of self-management
4. Approach to self-management/management
5. Views on PNE as a method to facilitate self-management of chronic or recurrent LBP

Figure 1: Topic Guide for Focus Groups

Following the first focus group being conducted, the research team reviewed transcripts. The use of more probing and elaboration of physiotherapist experiences of the content of the programme was required. JM reflected on the interview technique after the first focus group to develop the second focus group. JM was aware of her own position in relation to this topic and influence of this in conducting interviews. Part of the process of this programme of research was to engage in frequent discussion with the research team that prompted on-going reflection about the topic and relationship to the research.

Data analysis

The Framework approach (Ritchie *et al.* 1994) was used to guide the analysis of the qualitative primary data within this study. Framework analysis utilises interrelated steps to facilitate the management of qualitative analysis (Ritchie *et al.* 2002). Framework analysis is a credible approach, demonstrating a clear audit trail of the steps of data analysis and how raw data became the final themes (Gale *et al.* 2013). Framework analysis has five connected steps, which include familiarisation; identifying a thematic framework; indexing; charting, and mapping and interpretation (Ritchie *et al.* 2002). During familiarisation, JM read transcripts and listened to audio recordings. This facilitated the development of a thematic framework through noting recurrent and key themes within the data. This framework was applied to all transcripts in a systematic way, termed 'indexing' (Ritchie *et al.* 2002) with the framework being developed and refined throughout this process. Following indexing, data was summarised into a matrix based chart for each theme and sub theme. This 'charting' stage involves examining the charted data to uncover elements and dimensions (Spencer *et al.* 2014). Elements are concise statements present in the responses from individuals; these elements are then grouped into a dimension, which differentiates the focus of the elements (Spencer *et al.* 2014). The dimensions are then grouped into categories, allowing refinement of the overall final themes (Ritchie *et al.* 2003). This process facilitated interpretation and exploring connections within the data (Spencer *et al.* 2014) in order to develop the final themes. JM conducted the analysis, and gained peer checks from MF and NA.

Results

Sample characteristics

Ten musculoskeletal physiotherapists were recruited from two musculoskeletal outpatient clinics in one NHS trust. This number is comparable to Simpson *et al*. (2015) who also explored the acceptability of an intervention. There were two male and eight female physiotherapists with a mean of 10.6 years of clinical experience. Eight of the physiotherapists attended three sessions, with two of the physiotherapists attending two sessions. Seven physiotherapists took part in one of two focus groups following the education programme, with this sample containing a range of clinical experience. Studies focusing on physiotherapists' views of managing back pain have recruited fewer than ten individuals with valuable findings (Singla *et al.* 2014; Wynne-Jones *et al.* 2014). Table 1 details the characteristics of the physiotherapists.

Table 1: Participant characteristics

Physiotherapist	**Gender**	**No. of years Qualified**	**Attended all 3 sessions**	**Taken part in a focus group**
PHY1	Male	8	Yes	Focus group 1
PHY2	Female	17	Yes	No
PHY3	Female	5	Yes	Focus group 2
PHY4	Female	14	No, missed session 3	No
PHY5	Male	3	Yes	Focus group 1
PHY6	Female	19	Yes	Focus group 2
PHY7	Female	18	Yes	Focus group 2
PHY8	Female	8	No, missed session 2	No
PHY9	Female	10	Yes	Focus group 1
PHY10	Female	4	Yes	Focus group 1

Quantitative Results

Data from pre and post outcome measures were included if a physiotherapist attended a minimum of two sessions. One HC-PAIRS questionnaire had one question left blank; a 'neutral' score of four was used as recommended with HC-PAIRS when less than 10% of the measure had a missing value (Houben *et al.* 2004b). Within group differences for the two outcome measures are presented in table 2. The median and interquartile range pre and post intervention and the change scores are detailed. None of the outcome measures showed a statistically significant change in median scores.

Table 2: Median PABS-PT and HC-PAIRS pre and post intervention scores

Outcome measure	Baseline score median (range, IQR)	Post intervention score median (range, IQR)	Change in median score	z statistic	ρ value
PABS-PT Factor 1	29 (19-34, 22.5-33.5)	25 (16-32, 19.5-29)	4	-1.694	0.09
PABS-PT Factor 2	37 (33-41, 34.5-39.5)	37.5 (35-42, 35-40.5)	0.5	-.409	0.68
HC-PAIRS 15 item	47.5 (33-58, 36-52)	45 (35-58, 37-55)	2.5	-.205	0.84
HC-PAIRS 13 item	36 (24-40)	32 (26-42.5)	4	.000	1.00

The median change in this sample for the PABS-PT factor 1 was a reduction of 4 points post intervention. Post intervention a higher proportion of scores concentrated around lower end of the scale with nine scores of 30 and below in comparison to the pre outcome measure, which had six. The PABS-PT factor 2 showed a small increase in score from 37 to 37.5.

The HC-PAIRS 15 item median score demonstrated a reduction of 2.5 points from 47.5 pre intervention to 45 post intervention. The 13 item HC-PAIRS median score showed a reduction in 4 points from 36 pre intervention to 32 post intervention. As can be seen from table 2 IQR, a range of lower and high scores were gathered for this small group.

Qualitative Findings

The two focus groups contained four and three physiotherapists respectively. The analysis yielded three interlinked themes. Figure 2 illustrates the development of these themes through Framework Analysis.

INITIAL THEMATIC FRAMEWORK

1. **Theory content**
   - 1.1 Theoretical knowledge gave background
   - 1.2 Application of theory
   - 1.3 Difficult language
   - 1.4 Lot of theoretical content
2. **Application to practice**
   - 2.1 Linking theory to practice
   - 2.2 Case studies
   - 2.3 Using skills already have
   - 2.4 Influence on own practice
   - 2.5 Having a tool
   - 2.6 Appropriateness for practice
3. **Subjective assessment**
   - 3.1 Listening
   - 3.2 Time for subjective assessment
   - 3.3 Limitations of set assessment sheets
   - 3.4 Factors that influence pain
4. **Pain education**
   - 4.1 Use of pain education in practice
   - 4.2 Challenges with pain education
5. **Outcome measure applicability**
   - 5.1 Usable outcome measure
   - 5.2 Difficulty interpreting outcome measure
   - 5.3 Influences on outcome measure
6. **Recommendations for development of the education programme**
   - 6.1 Directed study
   - 6.2 Split theoretical content
   - 6.3 Provide hand outs
   - 6.4 Provide a test
   - 6.5 Success stories
   - 6.6 Frequency of programme
7. **Aspects involved in managing LBP**
   - 7.1 Physiotherapist role
   - 7.2 Patient understanding
   - 7.3 Realistic expectations
   - 7.4 Important for patient to accept pain
   - 7.5 Support
   - 7.6 Goal setting
   - 7.7 Functional tasks
   - 7.8 Self-management patient responsibility
   - 7.9 Patient having control

GROUPING ELEMENTS AND DIMENSIONS TO FORM CATEGORIES

- The value of pain theory
- Application and relevance to practice
- Taking time for the patient story
- The value of listening for management
- Roles and self-management
- Pain education
- Structured study
- Clarity of outcome measure
- Fit of programme into practice

ARRIVING AT THE FINAL THEMES

Providing a context for pain education
- The value of pain theory
- Application and relevance to practice

Aspects of the patient-therapist interaction
- Taking time for patient story
- The value of listening for management
- Roles and self-management

Logistics of the education programme in practice
- Structured study
- Clarity of outcome measure
- Fit into practice

Figure 2: The process of developing final themes through Framework Analysis

Theme 1: Providing a context for pain education

Physiotherapists who had taken part in the education programme valued the theoretical aspect. Physiotherapists found the theory regarding pain physiology useful to include providing a foundation. Although they may have covered pain neurophysiology in the past, they appreciated revisiting this area.

> I really liked it because I haven't touched on it since I finished uni so I was in need of a refresher certainly, it was really in depth, and aimed at the right level. I think too much deeper and I'd have struggled a bit, to be honest with you (PHY5).

> It's nice to go over the physiology and anatomy… once you're out in clinical practice you don't get that anymore… so actually all that information is really useful (PHY7).

This theoretical aspect of the programme allowed physiotherapists to link this to the presentation of pain in clinical practice. In some cases, this understanding of pain enhanced the credibility given by physiotherapists to people living with pain. Through understanding the physiology physiotherapists could appreciate why pain persisted. It was of value to be able to see the physiological processes occurring during a pain experience.

> I also thought just kind of having a better understanding, oh yeah right, that is going on, so there's actually something physically chemically happening (PHY10)

> They're not just making it up (PHY9)

Although physiotherapists found the theoretical aspect of the programme valuable; to develop understanding and gain the most from the programme, they suggested splitting the theoretical aspect into two or more sessions. Alongside finding the theoretical aspect useful, albeit with some challenges, physiotherapists attributed value to linking the theoretical aspect to the clinical setting. It was important that physiotherapists could see how to apply this information and use this in clinical practice. Linking the programme to the physiotherapists' specific context allowed associations to be made with their clinical

practice and consider the relevance and application of this. Contextualising the course through extracts was felt to be beneficial. However, two physiotherapists felt some positive extracts would have added to the course, rather than the focus being people who were finding day to day with LBP difficult.

> Where you can see how to apply it, whereas often, I feel those skills are taught as a different skill and then it's like it doesn't fit in to what we do, so we can't do it, so if you're getting trained part of you is switching off because you know you can't apply it (PHY1)

> Even some success stories, people saying what has helped them and what gained a bit more positive (PHY6)

Physiotherapists appreciated the course was not intended to provide a range of new skills, but to be able to effectively use the skills they already have. The links between understanding of pain and day to day practice allowed physiotherapists to consider how they could support someone with LBP in their clinical practice. Physiotherapists recognised their position as having the potential to positively influence and support someone with LBP.

> I think the focus on, the bits that physio can use that you could bring to it, I suppose the way you sort of reminded that actually, don't throw your hands up as much or say I don't know how to help this person, but recognise that you're in a position to try, that's in my mind a bit more based on that (PHY1)

> In a nutshell I think you have made me aware of what we do on a daily basis without going outside of the norm, just by sitting and listening to people...I didn't think I had the tools…we've all got the tools we maybe don't realise and do we put them into practice enough (PHY7)

Theme 2: Influence on aspects of the patient-therapist encounter

A prominent element of the education programme discussion concentrated on physiotherapists reporting change in their practice. Specifically, this included spending more time listening to the patient during the

subjective assessment and how this influenced subsequent management. These discussions led on to the wider clinical encounter and management approaches, in particular self-management, which was specifically explored.

Taking time to listen to the patient story during the subjective assessment was something the physiotherapists placed more emphasis upon following the education programme. This included spending more time allowing the patient to discuss what they felt was relevant and verbalise their thoughts and concerns, rather than having a predefined agenda.

> If we're spending a session talking, then we're spending a session talking (PHY1)

> I think it's made me more aware of listening subjectively…I tend to try and put stuff in the boxes and if it doesn't go in the box I'm quick to disregard it but now I certainly am more considerate of everything else that may be going on as well so I do certainly give them more time, listening with regards to their pain (PHY5)

> If you give people more time you will find they tell you things they wouldn't have… the problem is we have these set assessment sheets and you have to follow them and I think sometimes it might not be a bad idea if we had a blank piece of paper (PHY9)

Physiotherapists demonstrated an appreciation of the multidimensional nature of pain and the factors that can influence this experience. Throughout the patient therapist encounter, physiotherapists were actively considering what might be influencing someone's pain. Unhelpful beliefs regarding pain were considered and targeted.

> I spend more time treating patients targeting their beliefs about you know using words like crumbling spine; I'll end up in a wheelchair, actually targeting that (PHY3)

Understanding the patient's condition and associated pain was seen as essential regarding future management, including self-management. Pain physiology education was discussed and considered as

valuable, following specific questioning on this topic. There was a change with how physiotherapists reported explaining pain with less focus on structure. Physiotherapists discussed their wider role providing advice; tools and a source of support making people feel valued and understood. Pain physiology education posed a challenging task as physiotherapists found it difficult to implement in terms of gauging the right level. Whilst the value was certainly recognised, physiotherapists reported hesitations in utilising this based on their own confidence and understanding.

> I've went down the being more chemicals at the end of the nerves in the skin…then you're not saying it's in their head, you're saying physically (PHY10)

> I have gone through a very careful explanation in the past and then they didn't want to come in anymore as they thought I'd effectively just told them it's all in their head, which isn't what I said at all (PHY1)

> You've obviously got some patients who are going to come in and are not ready to accept they've got chronic pain which means some of the things you might try and use from the training you're actually going to come across a brick wall (PHY3)

The outcome of the patient therapist encounter concentrated on the physiotherapists advocating patient responsibility, the need for acceptance and having control in the management of LBP. Physiotherapists also viewed themselves as having an important role in supporting people living with pain to be able to manage and discussed an active partnership and people knowing when to seek help. Goal setting, exploring expectations and fitting management into and around functional tasks were also considered important.

Theme 3: Logistics of the education programme in practice

The physiotherapists felt the education programme regarding the structure, delivery and relevance for musculoskeletal physiotherapy was appropriate to deliver in clinical practice. Delivery by a

physiotherapist was valued and was viewed as adding positively to the programme enhancing engagement and application.

> I think its feasible… frequency gave time to apply clinically (PHY6)

> I think had you been a nurse or somebody telling it to us I don't know if I'd have been slightly less, not believing, but… less engaging if you weren't a physio because you know our situation and time constraints, setting and all that stuff, had you been someone from management level coming down I'd be slightly less willing to take it on board (PHY9)

Physiotherapists felt the outcome measures mapped with the programme and that two were adequate. There were some points raised regarding the difficulty of interpreting some of the questions and one physiotherapist reported experiencing their own back pain at the time, which they reported might have impacted upon their answers

A development to consider for future implementation of the programme would be more structured directed study. Regarding the theoretical aspect of the programme, physiotherapists commented that they would have valued more structured directed study and providing of materials related to pain neurophysiology. This was viewed as helping to prepare for the theoretical session.

> If we can do something to prepare to get our heads into the language of it (PHY1)

> Maybe group sessions and going through some work talking about it or you could even recommend a paper or something (PHY9)

Discussion

This study has demonstrated that it was possible to develop and deliver a pain education programme for physiotherapists in clinical practice that was acceptable to participants. The intervention was able to

recruit participants from two clinics in a timely manner. 80% of participants attended the three sessions, with two participants attending two sessions due to work commitments. The logistics of working hours influenced some participants being able to attend.

The outcome measures used within the study did capture some change, and followed similar trends to current studies in this area. The current study follows the trend of a study in which an eight day biopsychosocial pain management university course delivered (Overmeer *et al.* 2009). The findings showed greatest improvement on the PABS-PT biomedical scale factor one, with the biopsychosocial factor two showing less change. For the physiotherapists in the current study, there was a trend in change in biomedical beliefs indicated by PABS-PT, demonstrating the potential impact of a less intensive course focusing on PNE on this aspect. Currently, the PABS-PT provides no indication of what would be classed as a high or low score and thus no consensus of what score would demonstrate a clinically relevant change (Mutsaers *et al.* 2012). The current study was carried out within a UK NHS setting. In comparison, a survey based study conducted with a sample of physiotherapists from the UK completed the PABS-PT, with over half being based within the NHS (Bishop *et al.* 2008). The scores in this latter study were 5 points lower on PABS-PT factor two than baseline of this study and biomedical orientation two points higher. Thus, in comparison to this UK based study of physiotherapists (Bishop *et al.* 2008), the physiotherapists recruited for the current study appear more biopsychosocially orientated at baseline, thus this may be the reasoning to have demonstrated a small change in factor 2, biopsychosocial factor.

A study with physiotherapists using the HC-PAIRS, demonstrated higher baseline scores than the current study with the median score indicating a stronger belief of impairment associated with pain (Slater *et al.* 2014). Studies that explored the 13-item HC-PAIRS show a considerable difference between the current study scores. The baseline median for this study was 36 whereas the score is higher for other studies using this outcome (Slater *et al.* 2014; Houben *et al.* 2004). In a study that followed an evidence based pain management intervention, the HC-PAIRS score was found to be 37 (Slater *et al.* 2014) whereas in this current study it was 32. However, it showed a large variation in the range of scores, which is consistent with previous studies, which have also noted a large variation. Therefore, as the current study has a small sample size it is difficult to draw conclusions due to the impact of variability in a small sample.

The focus groups following the education programme allowed for detailed insight into the acceptability of the programme whilst identifying areas for future development. The study demonstrates that physiotherapists valued the intervention due to the relevance to clinical practice. The physiotherapists who participated in the current study reported listening to the qualitative extracts valuable to link the PNE to identify potential influences on their pain experience in a real world setting. This shares some similarities with a previous study, which developed a pain film based on findings from a qualitative synthesis that focused on experiences of chronic musculoskeletal pain (Toye *et al.* 2015). Moreover, it should be noted that this latter study mainly recruited general practitioners and it only included one physiotherapist who valued listening to the film. Thus, the current study has demonstrated the value physiotherapists specifically place upon application to practice.

A workshop exclusively delivered to physiotherapists that used patient case studies in real life format and scientific evidence was evaluated through the Back Beliefs Questionnaire before and after the workshops (O'Sullivan *et al.* 2013). Although this programme was of an intensive delivery and incorporated functional movement the study shares similarities with the current study combining a theoretical aspect and patient extracts. Feedback regarding these aspects is similar to the current study with physiotherapists finding scientific information useful and the value of listening to patient case studies. O'Sullivan *et al.* (2013) provides a brief overview of what physiotherapists valued using email feedback however these exclusively discussed positive aspects of the programme, which is highlighted by the authors. In contrast, the current study highlights some challenges physiotherapists face alongside developing depth through focus groups. The current study has identified that physiotherapists are less confident regarding their knowledge of pain science and utilising this as an educational approach. Moreover, in relation to self-management, physiotherapists feel the patient's own understanding of this concept is vital. Therefore, a focus is required to support physiotherapists to overcome these challenges to enhance implementation of this approach within clinical practice.

The qualitative aspects of this study provide valuable findings regarding PNE. Although physiotherapists reported an increased confidence regarding eliciting unhelpful beliefs during a subjective assessment, they discussed a lack of confidence regarding specifically explaining pain neurophysiology to patients due to their own perceived level of knowledge, which they felt to be inadequate. This is interesting to note, as understanding of pain and education is often advocated regarding self-management

(Stewart *et al.*2014; Nicholas *et al.* 2013). There is a growing awareness of the emphasis required on pain management education in undergraduate education (Ryan *et al.* 2015). Thus, a focus on PNE at undergraduate level may help with respect to confidence in this area.

Limitations

The main study limitation of the study was the small sample size, which limits generalisability of the findings. The researcher who delivered the programme carried out the focus groups with participants, which may have influenced some responses generated. However, the focus groups generated points for development of the programme, thus were not all positive. JM ensured throughout the interviews to create a balanced discussion informed by the topic guide to not influence responses generated.

Conclusions

The findings from this pain education programme implemented in clinical practice provides valuable insights for the future development of PNE programmes for physiotherapists. Participants considered the programme to be acceptable in clinical practice in terms of content and delivery and reported that the relevance to practice and length of time of delivery was appropriate. A strength of the programme was the applicability to real life practice, which was valued by physiotherapists. The findings of the PABS-PT outcome measure followed the trend of similar studies and is worthy of exploration in a future study. The HC-PAIRS outcome measure showed great variation in scores, which provided limited insight given the small sample. PNE linked to patient extracts has developed physiotherapists understanding of the multidimensional nature of pain, and influences they can address in the clinic. Thus, in this regard it is a potentially useful means to support physiotherapists to consider the integrated nature of pain in order to support management of pain in clinical practice. Further research is required in a larger study in order to make recommendations with respect to the effectiveness of this intervention in clinical practice.

Declaration of interest

The authors report no conflict of interest.

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