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People's beliefs about the meaning of crepitus in patellofemoral pain and the impact of these beliefs on their behaviour: A qualitative study

Claire J. Robertson, MSc PGCE MCSP, Michael Hurley, PhD, Fiona Jones, PhD



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Authors:

Claire J Robertson MSc PGCE MCSP

Corresponding author:

wimbledon clinics, parkside hospital

53 Parkside, Wimbledon, London UK. SW19 5NX Tel 02089550665

clairerobertson@wimbledonclinics.co.uk

Professor, Michael Hurley, PhD

school of rehabilitation sciences, st george's, university of london/kingston university

Cranmer terrace, Tooting, London, SW17 ORE UK.

Michael.Hurley@sgul.kingston.ac.uk

Professor Fiona Jones, PhD

school of rehabilitation sciences, st george's, university of london/kingston university

Cranmer terrace, Tooting, London, SW17 ORE UK.

F.jones@sgul.kingston.ac.uk

Abstract

Background: A feature of patellofemoral pain is joint crepitus. Several causes of crepitus have been described, but previous research has focused on the pathological meaning of crepitus. No research has demonstrated a definitive link between noise and pathology and its importance and meaning to patients is unresearched.

Objective: To explore the beliefs of patients with non-osteoarthritic patellofemoral pain regarding their crepitus, and how this impacts on their behaviour.

Design: Qualitative design using semi-structured interviews.

Method: A general inductive approach was used as this is a previously unresearched topic. Underpinned by the health beliefs model, an interview schedule was used to reflect different elements. Inductive thematic analysis was used to generate themes to represent the dataset.

Participants were 11 patients diagnosed with non-osteoarthritic patellofemoral pain, crepitus as one of their symptoms, referred to an outpatient clinic.

Results/Findings: Three key themes emerged all with sub-themes within them. Firstly, belief about the noise had a sub-theme of search for and perceived meaning of noise. Symbolising ageing was another sub-theme whereby participants described feelings of premature ageing. The final sub-theme was emotional response with participants feeling a range of negative emotions. The second theme of the influence of others reveals participants describing two distinctly different relationships, one with friends and family and one with professionals. The final theme was avoiding the noise. A sub-theme of altering movement shows participants describing fear-avoidant behaviour.

Conclusion: Crepitus is a poorly understood symptom that creates negative emotions, inaccurate etiological beliefs and ultimately leads to altered behaviour.

INTRODUCTION

About 25% of people will have patellofemoral pain (PFP) at some point in their life[1]. A feature of PFP is joint crepitus – creaking and cracking of joints on movement. Patellofemoral pain and associated crepitus is commonly experienced during running, squatting, stair climbing, sitting, and kneeling[2]. Crepitus is usually described by patients as ‘grinding’, ‘creaking’, ‘clunking’, and is an extremely common sign and symptom in PFP. Several causes of crepitus have been described [3][4][5], but previous research has focused on the pathological meaning of crepitus. No research has demonstrated a definitive link between noise and pathology, and McCoy et al, (1987)[6] demonstrate that 99 percent of a cohort of subjects with no pain had patellofemoral crepitus. Overall its importance and meaning is unclear. Furthermore, crepitus is often present in the complete absence of any joint pathology [7]. Physiotherapy is recommended as an early treatment for this large patient population, so it is important that crepitus is understood better, in order that people receive the most effective and efficient physiotherapy treatment [8]. There are many other health professionals who will regularly encounter patients with PFP, for example, G.P.’s, rheumatologists and orthopaedic surgeons. This study should be of interest to those professionals looking to provide evidenced based practice.

Pathophysiological changes and consequences have been the primary interests of most research into PFP. Despite patients being much more concerned by the consequences PFP has on their activities of daily living and quality of life, there is very little “patient-centred” research in PFP and nothing about the importance that crepitus has on people’s health beliefs and behaviour. For example, patients rarely comment on the timing of recruitment of knee musculature (the focus of much pathophysiological research in this area), but are more concerned with the impact of the problem on their function, such as stair climbing.

This study draws on a conceptual model informed by the health beliefs model, [9] that patients belief system about their health and what impacts on it will affect their overall outcome. This model is ideal for this study because

central to this study are the constructs of health and beliefs of the end user. The health beliefs model is a psychological model focused on the intrapersonal beliefs, in this instance the beliefs within each participant about their crepitus and how it impacts on their behaviour. Health beliefs are well documented with respect to low back pain [10], but not at all with respect to crepitus in patients with PFP. Therefore it is important to explore where patients derive their health belief about crepitus, and understand if negative, erroneous messages are reinforced by clinicians.

In order to research this novel topic, and explore health beliefs, qualitative research was chosen in order to allow flexibility and ensure the patient's perspective was explored. This work can be considered as phenomenological as it is aiming to explore the lived experience of patellofemoral crepitus, to patients. In order to ensure the design of this study was robust, the investigators used the COREQ checklist to ensure all elements of the research team, the theoretical framework, participant selection, setting, data collection and analysis were considered when planning the study.

This study explores the consequences of crepitus, patients beliefs and reasoning about how this overt, disquieting joint crepitus affects people's understanding about the symptom, what it means to their problems, prognosis and how this affects their subsequent behavior. It will provide greater insight into the real life experiences of this large but under-researched patient group, switches the focus to the biopsychosocial model of healthcare for this patient group [11] and puts the patient at the centre of treatment and research[12]. This will benefit people with PFP, physiotherapists pursuing improved clinical outcomes, and Physiotherapy as a profession. The specific research question for this study was:

What are Patient's beliefs about the meaning of crepitus in PFP and how does it impact on behaviour?

The overarching aim of this study is to help aid insight for those involved with the assessment and treatment of patients with PFP through new understanding of this topic. This new understanding is underpinned by patient-centred care, aimed at enhancing the clinician-patient relationship, communication and facilitates patient involvement in their care, [13]. It will also stimulate a new direction in PFP research.

METHOD

Design

Both a deductive and a general inductive approach was used. The deductive approach was answering the question of whether patients alter their behaviour in response to their crepitus. The general inductive approach explored the beliefs as this is a previously unresearched topic. Semi-structured in-depth interviews were performed by X, a female researcher, (MSc PGCE MCSP) who is both a clinical physiotherapist and experienced researcher. All interviews were carried out by the lead researcher in the same room at a private clinic. No one else was present. All interviews were recorded on an audio digital recorder, contemporaneous notes taken where necessary and later transcribed verbatim, and assigned pseudonyms. No notes were taken at the time to ensure that conversation flowed as was uninterrupted, but field notes were made after each interview. Underpinned by the health beliefs model, an interview schedule was used to reflect different elements to be covered:

1. Can you tell me what words you use to describe the (noise) in your knee?
2. How does it make you feel?
3. Does pain alter your feelings about your (noise)?
4. What do you think it means? Have you tried to find out what the (noise) means?
5. Have you discussed your joint (noise) with any health professionals?
6. Has anyone other than a health professional commented on the (noise)
7. Do you have any blood relative with knee problems? Does this alter how you think about your knee?
8. Do you avoid anything because of your knee (noise)?
9. Have you changed or modified anything because of your knee (noise)?

Point 7. Was added after three interviews as the first three participants all mentioned family members with knee problems.

Although the interview schedule was a guide, the interviews were semi-structured to permit free-flowing conversation. In keeping with the research

question, particular focus was placed on exploring the patient's beliefs about crepitus, and how their behaviour had adapted. No repeat interviews were performed. Each interview was approximately 45 minutes in duration. The transcripts were not returned to the participants as there was no ambiguity and it was felt unreasonable to further bother the participants with reading a lengthy transcript.

Participants

Purposive sampling was used to select a group of patients with non-osteoarthritic PFPS. The patient's eligible for this study were patients referred to a private clinic specializing in musculoskeletal care. Patients were included if they were adults, (>18) who could understand and speak English, with a clinical diagnosis of PFP, and were able to commit to up to 45 minutes interview, with recording. They were excluded if they were under 18 years of age, had referred pain from the spine and or hip, tibiofemoral pathology of any nature on the ipsilateral side, or osteoarthritis of the PFJ as diagnosed on x-ray or MRI. All participants were approached by telephone regarding participating and the researcher X explained about the goals of the study. No other relationship was formed between the researcher and participant prior to the interview, and none had received treatment at the clinic prior to their interview. All participants gave written consent after full verbal and written information about the study.

Data Analysis

Inductive thematic analysis was used to generate themes to represent the dataset [14][15]. Thematic analysis is a flexible research technique that provides a rich and detailed account of data [16], but acknowledges the potential influence of the researcher. Thematic analysis allows the analyst to theorise individual motivations and perceptions, in a relatively straightforward manner, as it assumes that language is a true representation of meaning and experience [17] rather than a socially produced condition[18].

The lead researcher independently read and re-read the transcripts at least three times to immerse herself with the dataset. She then independently coded the dataset using initial and focused codes. The other researchers (academics and not working in this clinic) also read and coded some of the transcripts in order to enhance credibility. Initial codes remained close to participants own words to capture ideas. Focused coding and subsequent thematic representation then allowed the organisation of similar/dissimilar ideas [19]. Similarities and dissimilarities were discussed between the three authors until a consensus regarding the overarching themes was achieved, so that no important issues were overlooked and an accurate, clear and balanced interpretation of the data was achieved. The emergent themes were then compared with the initial dataset to ensure they were representative, improve the validity of results and minimize bias. This approach helped prevent researcher's preconceived ideas from influencing the themes generated.

Examples of quotations that exemplified each theme were gathered.

Throughout the process of writing up there was a cyclical referring back to the transcripts in order to ensure the findings arise directly from the raw data, and ensure dependability. The participants were sent the findings but no further comments were forthcoming.

RESULTS

Sample

11 patients were interviewed to reach data saturation. No one approached refused to participate. The sample consisted of four men and seven women with a mean age of 35 years. The youngest participant was 24 and the oldest 49 years. All participants meeting the inclusion criteria agreed to take part and there were no refusals.

Themes

Cyclical analysis of the transcripts and subsequent coding led to the emergence of three themes, namely, belief about the noise, influence of others, and avoiding the noise. Each of these was represented in all eleven

transcripts, and were relevant to the original research question. Within each theme there are two or three sub-themes that exemplify more specific issues that arose repeatedly in the transcripts, (Figure 1). All quotes are given with the identifying participant number.

Belief about the Noise.

Search for and perceived meaning of noise. Participants voiced a need to know what the noise meant, and none felt they understood the meaning of the noise. In contrast to getting used to the noise, participants commented that their anxiety about what the noise meant built over time. Participants expressed anxiety relating to the uncertainty of what it meant.

Something is not right and it makes you worry about the joint. (1)

It does make me a bit worried, maybe that something is going on in there.(3)

It makes me very emotionally uncomfortable and worried about why and what is happening and whether I made something worse, very much the unknown.(11)

Some participants had actively tried to research the meaning themselves to give them information that they had not gleaned from health professionals. For example many had searched on the Internet, but all had beliefs about what their interpretation of the meaning of the noise was. Participants talked of visual interpretation of how the joint must look, and often associated the noise with descriptors of joint degeneration.

Inside the bone is rubbing because there is a noise, you could imagine it's the bone grinding on the bone, (2)

I think it means my knee is wearing away. But I daren't Google it. (7)

Symbolising Ageing. Participants frequently voiced concern that their knee was prematurely ageing, and many linked this with their belief that the noise represented bone-on bone, or wear.

It should not be happening at my age...I would equate it more with someone older, say if my mother had noise in her knees and I would be, Oh that is okay, that is older, you know more normal...and so having it at my age is obviously more distressing.(11)

Participants also commented that it made them feel slower and aged as a person. This was linked with being less active also as a result of pain, but with probing participants consistently said it was primarily the noise that made them feel old.

My grinding knees make me feel old.(10)

The perceived connection with ageing also created negative thoughts about their knee in the future, and this was compounded if they had an older relative with a knee problem. Many made the presumption that their crepitus signaled that they had the same knee problem as their older relative and that inevitably they would end up the same in the long-term.

It is the fear that comes with the noise, and the fear that it is causing long-term damage. (8)

Emotional Response. During their interviews the interviewer noted that participants frequently displayed strong negative emotions about their crepitus. Although some of this was driven by the aforementioned lack of understanding regarding meaning, some of these were specifically directed at the noise itself.

It's like chalk on a blackboard; it makes you feel a bit queasy really.

The crunchiness disturbs me. It makes my skin crawl because it does not sound healthy.(1)

I am always a little bit scared when I stretch my leg out because I am thinking, am I going to hear that noise.(9)

Many participants commented that they particularly disliked hearing the noise when in the presence of others, and that they felt self-conscious, and at times embarrassed.

When I used to do yoga everybody in the place could hear them. I really did feel embarrassed. I couldn't stand it so I stopped.

I am more conscious of it if I am around people...I do not like it so I attempt to sit stiller.(2)

Influence of Others.

Friends and Family. Comments from family and friends came up in all the transcripts. At times this was light-hearted, but in many instances comments

served to reinforce negative belief systems. In many instances it was a comment about the noise itself.

If I was with my Mum...every time it makes the noise, she sort of winces. (4)

If my daughter and husband both hear the grinding noise they both go 'shhh' at the same time and my husband goes, 'aah, stop it'.(3)

I was in school assembly when I was in primary school, 38 years ago! We used to sit on the back on the table and swing our legs and my knees used to make a noise and people used to laugh at me. It made me feel ghastly-actually embarrassed.(5)

Participants also recalled how others had voiced concern over the meaning of the noise, and suggested avoiding the noise, or seeking a medical opinion. Some participants wondered if so many people commented because it wasn't deemed to be offensive to point out a symptom such as joint noise.

Most people say you need to get that checked out.(9)

My mother will say, ah your knees are not so good..telling me not to kneel down or if I am doing jobs with her like gardening or whatever, she'll be like, 'get out of the way, I'll kneel down', but she is in her 60's! (4)

Professional Views. Overall participants had had poor experiences with health professionals with respect to empathy, explanation and management of their crepitus. Participants had often seen many different health professionals, particularly GP's, physiotherapists and orthopaedic surgeons. Many participants felt that despite them describing their crepitus as a major symptom, it was often disregarded.

They just seem to say the noise is irrelevant. It's just poppy joints and then I just thought it doesn't feel like that.(8)

Nobody said anything about it even when they asked about the symptoms. I was just completely glossed over and ignored, okay and I suppose maybe it's because it isn't important more than the pain to them, but it is to me.(1)

Participants particularly highlighted that they wanted to understand more about their crepitus, in order to know how they should react to it.

I didn't know whether it would click more or click less, whether I should push through it, whether I should stop if something aggravates the clicking, and then maybe I hadn't been quite as forthright with the questions, but nobody offered up anything, any explanation at all about it.(6)

Although in the minority, those that had received explanations about the crepitus and how to manage it highlighted that this had been very helpful.

Having spoken with my physiotherapist I know it is not actually an effect of what I am doing, you know that it is a common thing, so I decided to kind of get on with it.(6)

The explanation was helpful. Even though obviously I don't like the noise I now do not stop doing things because of this.(4)

Avoiding the Noise

Altering Movement. Several participants identified that they had found if they moved in an altered way that they would avoid the noise. The motive for doing this varied from wanting to avoid damage, to simply trying to avoid hearing the noise that they disliked.

I bend more from the waist sometimes because the noise makes me think, that is not good I will do that differently. (11)

Climbing the stairs and things, I would try and do something a little bit strange with my leg in order to avoid hearing the noise...I was flicking my leg to the side.(7)

Avoiding Activities in Day-to-Day Life. Participants voiced conscious decisions to avoid activities of daily living because of the noise from their knee. Activities such as squatting down to a low cupboard, or running for the bus were cited frequently, and avoiding stairs was commented on by many participants.

I'm flat hunting at the moment and I've decided to only look at ground-floor flats. I'm fed up with the noise. I'm reminded of my knee all the time at work, you know as it's heavy work. I don't want to be reminded at home too. It makes me anxious, worried, thinking about it when I don't want to. I feel a bit silly saying it but that's the reality.(9)

Physical hobbies had clearly been affected by participants belief about the noise, but for varying reasons. Some participants had stopped their hobby,

whilst others had changed what kind of exercise they were doing. One participant also cited that she would like to take up skiing but had never done so because of the noise from her knee. Several participants cited that they didn't like exercising in quiet environments like yoga where they felt self-conscious.

Anything that I associate with a very quiet environment and I would not have done that because I am conscious of it. (10)

Exercise was not just affected at a recreational level. Participants voiced that they would stop a physiotherapy exercise given to them if it brought about noise from their knee.

I'd feel a little bit worried about that, but then I'd just stop. I don't want to push my luck and live to regret it.(2)

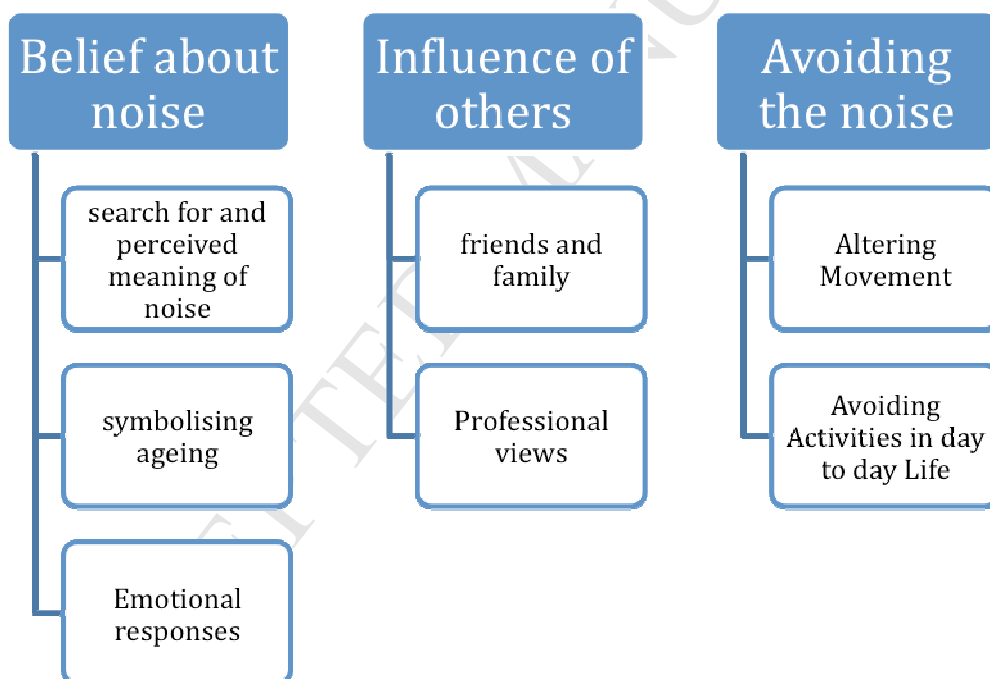


Figure 1. Themes and Sub-Themes.

DISCUSSION

This study identifies themes regarding patients beliefs about patellofemoral joint crepitus and how it impacts on their behaviour. There are no previous papers published on this topic, and therefore this study provides an initial insight into this field. The findings suggest that patients often hold negative beliefs about their crepitus and in turn this may negatively affect their

behaviour. Furthermore there is evidence to suggest that health professionals are not often assessing or managing these negative health beliefs. Given the prevalence of patellofemoral pain this is relevant to any practitioner interacting with patients with musculoskeletal complaints.

Leventhal et al., [20] presents a well accepted model of illness representations, suggesting that to understand their illness or condition people collect information from a number of sources, and have a particular interest in identity, causal attributions, expectations of duration, consequences, and perceived control and curability. This study revealed particularly strong beliefs about causal attributions, in particular what the noise itself meant. These beliefs were mostly housed in anxiety, and all had their own interpretation, often expressing belief of wear and tear and degeneration believing that the sound denoted pathology. Although there is no literature on PFJ crepitus the phenomena of inaccurate beliefs about the meaning of a body sound has been documented in the irritable bowel literature, where patients often have an inaccurate subjective theory as to the meaning of bowel sounds [21]. Furthermore, subjective causal assumptions are documented to be more powerful in conditions where a uniform etiological model has not been described, and particularly where the onset is insidious. There are therefore many interesting parallels between the search for belief regarding the meaning of crepitus seen in this study, and the illness representation seen in irritable bowel syndrome [22].

Amongst participants there was a common belief that crepitus denoted degeneration and enhanced feelings of premature ageing. Participants reported that the noise made them feel old, and at times this led them to be less active. Furthermore participants who had an older relative with knee problems consistently believed their crepitus signified that they would progress to be the same. Many participants found themselves in a negative cycle about fear of wear and tear, and reduced activity. This is commonly reported in the literature surrounding osteoarthritis [23]. In this instance the participants, (none of whom had osteoarthritis) had entered a cycle of fear-

avoidance through the inaccurate belief that their crepitus signified joint degeneration.

Negative belief systems were demonstrated through fear-avoidance, but in some participants catastrophising was also portrayed. In some participants this catastrophisation was in anticipation of hearing the crepitus, and attempts were made to avoid the noise. In the literature this is documented as a behavioural response to pain [24] but it has not been documented with respect to avoidance of noise. In the pain literature, whether through fear-avoidance, or catastrophisation, these behavioural responses are consistently associated with worse function [25]. The majority of evidenced physical treatments for patellofemoral pain are exercise based, primarily aimed at increasing strength [26]. Negative belief systems such as those exhibited in this investigation leading to avoidant behaviour need to be noted by physiotherapists as they are in direct conflict with the usual aims of physiotherapy intervention. There has been increased interest recently in the behavioural adaptations seen in patients with PFP [27][28]. However, the focus remains on the behavioural response to pain, and crepitus is not investigated.

One of the emerging themes was 'influence of others', and a sub-group was 'professional views'. Most participants had had a negative experience of interacting with a health professional with respect to their crepitus, and felt that it was not taken seriously, and was poorly understood as a symptom. This is unsurprising when there is a lack of literature and education on the topic. However, it is well understood from the literature on low back pain that physiotherapists belief systems will in turn impact on patient management, and hence outcome [29]. The authors therefore recommend a further study to directly investigate the beliefs of health professionals towards PFJ crepitus. This ideally would look at the beliefs of GP's, orthopaedic surgeons and physiotherapists, as these were the professionals cited in this investigation.

This preliminary qualitative study into patients beliefs about their PFJ crepitus and how it impacts on behaviour reveals a poorly understood symptom that creates negative emotions, inaccurate etiological beliefs and ultimately leads

to altered behaviour. Further research is now needed to understand the health professional's perspective, and to see if health professionals can impact upon this negative belief system, and ultimately change patient behaviour.

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Highlights:

- PFJ crepitus is a poorly understood symptom that creates negative emotions.
- Participants in this study demonstrated inaccurate etiological beliefs.
- Behaviour in response to PFJ crepitus was altered, and fear-avoidance was prevalent.
- Participants reported negative experiences with health care professionals.