

ORIGINAL RESEARCH

‘Knees being set on fire’: a qualitative study exploring the impact of intrusive mental imagery on chronic pain patients

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Abstract

Chronic pain is common and debilitating, and recommended treatments are only moderately effective for pain relief. Focus has shifted to refining targets for change within psychological therapy to improve pain management. Evidence has shown the role of intrusive images in many psychological disorders. However, only a few studies have advanced our knowledge of the presence and impact of mental imagery in chronic pain. This exploratory study aimed to increase our understanding of how people with chronic pain perceive intrusive visual images to influence their daily life. The study employed a qualitative design, using semi-structured interviews to explore the content, emotional valence, cognitive and behavioural impact of pain-related visual images of ten participants with self-reported diagnosis of chronic pain. Data analysis was conducted by performing an inductive thematic analysis. Three key themes were identified: (1) ‘I start to create images in my head’: pain-related mental images, which revolves around descriptions of participants’ most significant visual image; (2) metaphors for pain, related to the imagery as a means to conceptualise and give meaning to the pain; and (3) “With the pain comes the image”: a companion to pain, which focuses on the role of intrusive images in the experience of pain. Results show that pain-related mental imagery appeared to be an intrusive, uncontrollable, and vivid cognitive accompaniment for many pain sufferers. The findings suggest that mental images may serve as an additional target in cognitive behavioural therapy to enhance individuals’ cognitive, behavioural and emotional change.

Key learning aims

- (1) To understand the role of mental imagery in the daily life of individuals with chronic pain.
- (2) To examine the impact of intrusive images on the emotions, cognitions, and behaviours of people with chronic pain.
- (3) To consider clinical implications for CBT interventions targeting pain-related mental images to manage chronic pain.

Keywords: Chronic pain; Cognitive behavioural therapy; Mental imagery; Qualitative study design

Introduction

Mental imagery refers to cognitive representations accompanying the ‘experience of sensory information without a direct external stimulus’ (Pearson *et al.*, 2015; p. 590). Although the visual domain is predominant, mental images can also involve other sensory modalities, including

auditory, olfactory, gustatory elements, and bodily sensations (Iyadurai *et al.*, 2019). These visual representations are usually recalled from memory (Pearson *et al.*, 2015); yet, not all mental imagery is voluntary. Unlike voluntary or spontaneous recall, such instances of unintentional retrieval do not arise from deliberate effort or search, and are typically unwanted and negative in nature (Brewin *et al.*, 2010). These involuntary intrusions are often recurrent and vivid perceptual retrieval of life-threatening events which spontaneously intrude into consciousness, triggered by both situational and internal cues (Çili and Stopa, 2015; Hackmann *et al.*, 2000). Intrusive mental imagery is distressing and feels uncontrollable, and may act as an ‘emotional amplifier’ (Holmes *et al.*, 2008) as well as eliciting dysfunctional cognitive and behavioural responses that contribute to the onset and maintenance of symptoms in several mental health disorders (Hales *et al.*, 2014).

The presence of involuntary images in the wide range of psychopathology has been well-established (Harvey *et al.*, 2004); it is a hallmark of post-traumatic stress disorder (PTSD; Brewin and Holmes, 2003), and represents a common feature of many anxiety disorders (Hirsch and Holmes, 2007). Considered a transdiagnostic process, the content and the type of such intrusions, however, vary according to the core concerns of each disorder (Brewin *et al.*, 2010). For example, in health anxiety, images usually depict physical catastrophes centred on themes of death and serious disease, whilst reflecting negative beliefs about the self and the consequences of illness and death (Wells and Hackmann, 1993). Such images can prompt people to engage in avoidance, rumination, distraction and reassurance-seeking behaviours, which can in turn increase anxiety and pre-occupation with one’s health, leading to a vicious cycle (Muse *et al.*, 2010).

Because of the growing recognition of the pivotal role of dysfunctional images across many psychological conditions, greater prominence has been given to the development of imagery-based interventions in cognitive behavioural therapy (CBT), adopting a multitude of strategies to help patients discern and challenge their distorted thoughts (Blackwell, 2021; Fenn and Byrne, 2013). By probing various aspects of theories and models underpinning CBT approaches, mental imagery can provide a valuable experimental tool to assist patients’ recovery, facilitating cognitive, affective, and behavioural changes (Saulsman *et al.*, 2019).

One area where imagery may be important is chronic pain. Chronic pain is a major public health care problem, a significant source of suffering for 100 million people in Europe (Breivik *et al.*, 2006), affecting 35–51% of the adult population in the UK (Fayaz *et al.*, 2016). Accompanied by strong mental distress and functional disability (Dueñas *et al.*, 2016), chronic pain has a negative implication on the quality of life of its sufferers, making them prone to multiple mental health conditions (e.g. anxiety disorders, depression; McWilliams *et al.*, 2003). An international survey by Graham *et al.* (2020), assessing a large sample size ($n = 785$), demonstrated that 52% of the women with endometriosis-associated pain reported experiencing pain imagery. The authors go on to suggest therapeutic implications for pain management, such as targeting imagery within current evidence-based interventions such as CBT.

Psychological treatments for chronic pain are recommended as part of a multi-modal treatment approach (Dale and Stacey, 2016). Acceptance and commitment therapy (ACT; Vowles *et al.*, 2014) and eye movement desensitisation and reprocessing (EMDR; de Roos *et al.*, 2010; Grant and Threlfo, 2002) are two more recent interventions developed for use in chronic pain, while CBT has been the dominant psychological treatment since the 1970s (Grant and Threlfo, 2002).

Cognitive behavioural therapy is a widely accepted and effective psychosocial approach for pain, integrated into interdisciplinary pain rehabilitation programs to induce functional remission and reduce medication use and healthcare utilisation (Gilliam *et al.*, 2021). While it is important to continue delivering CBT for pain due to its positive impact on patient outcomes, a systematic review by Williams *et al.* (2020) found that CBT has only modest benefits for pain management, and these benefits are not sustainable over the long term. Furthermore, the lack of clarity regarding pain treatment quality indicators in research (e.g. treatment content, and duration;

Yates *et al.*, 2005) makes it unclear which aspects should be included in interventions, additionally limiting the understanding of its effectiveness and how this is achieved (Zuhury *et al.*, 2021).

To date, few studies investigate the influence intrusive imagery might have on people with chronic pain. Evidence suggests that the effects of imagery on chronic pain are similar to those observed in other mental health conditions. However, little is known about the consequences of mental images on individuals' emotions, cognitions, and behaviours during pain.

Initial research by Berna *et al.* (2011) focused on examining the characteristics of intrusive mental imagery in a sample of individuals with chronic pelvic pain using a qualitative approach. Following their findings, the authors proposed a CBT-based framework to explain the potential role of imagery in chronic pain. In the study, images were described as carrying negative connotations, subsequently leading participants to engage in avoidance behaviours. Yet, determining whether these images directly affected cognition or merely reflected existing pain experiences proved to be challenging. By adopting semi-structured interviews, a similar study by Philips (2011) found that intrusive mental imagery exacerbated negative emotions (i.e. anxiety, sadness, and anger) in participants with both acute and chronic pain. However, this study did not delve deeper into the understanding of the cognitions, emotions and behaviours brought about by such imagery, nor did it explore the relationship between the potency of the images and the beliefs elicited by them. Recent research (Gillanders *et al.*, 2012; Gosden *et al.*, 2014) employed postal surveys for data collection instead. This has resulted in participants using descriptive metaphors for their pain instead of conveying actual images they experienced (Gillanders *et al.*, 2012). With studies not determining participants' thoughts and behaviours triggered by intrusive imagery, findings were therefore limited to the presence of imagery and their general characteristics.

With only two studies (Berna *et al.*, 2011; Philips, 2011) exploring such cognitions and behaviours on a sample of participants with chronic pain and intrusive imagery, the extent of this relationship remains unclear. Research specifically exploring the effects of intrusive mental imagery may therefore help elucidate critical treatment components to provide more effective interventions for managing the pain (Jensen, 2011). However, without the detailed information provided by a qualitative approach, it might be difficult to ascertain the impact of mental imagery on those with chronic pain. Hence, the current research attempts to bridge this gap by shedding light on participants' lived experiences of pain-related visual images, providing further insight into how intrusive imagery affects their day-to-day lives, and offering a potential future target to enhance cognitive behavioural therapy for chronic pain.

Aims and objectives

The current study aims to gain a deeper understanding of mental imagery in chronic pain by (1) exploring the nature and characteristics of intrusive imagery in those with chronic pain, (2) investigating the characteristics and personal meaning that participants attribute to pain and pain-related visual images, and (3) examining the perceived impact on emotions, cognition, and behaviour.

Method

Design

A qualitative design with an inductive approach to data analysis was used. Individual interviews were conducted online, with a semi-structured approach which allowed an extensive description of participants' pain-related mental imagery and the effect on their pain experience. The qualitative research was underpinned by a critical-realist ontology and followed a contextualist epistemological position (Braun and Clarke, 2006), assuming the existence of multiple realities

and the impact of factors such as participants' social context and experience with the imagery on the impact of imagery itself.

Participants and recruitment

Participation was limited to those (age 18+) with a diagnosis of chronic pain. This was self-reported, in that participants indicated a diagnosis of chronic pain had been given by a medical professional, however this was not formally confirmed. Participants were required to confirm that their pain had lasted for a minimum duration of 3 months and affected different locations of the body (in accordance with the ICD-11). In addition, experiences of intrusive mental images pertaining to their pain must be present. Individuals not fluent in English and with a history of psychotic illness were excluded due to the possibility of distinct perceptions of imagery from those discussed in the current study.

Snowball sampling was adopted to maximise recruitment during the planned sampling period of April to October 2022. The study was advertised online across social media platforms (e.g. Twitter, Facebook). As an incentive, participants were eligible to enter a randomised prize draw for one £50 Amazon eGift voucher upon completion of the study.

Measures

Demographic questionnaire

The demographic questionnaire gathered basic personal and clinically relevant descriptive information of the sample. Particularly, pain-related data included the first diagnosis of pain, primary pain location, pain duration, and average pain levels.

Visual analog scale

The visual analog scale (VAS) is a pain rating scale used to obtain a rough understanding of varying degrees of pain experienced by participants. The VAS has been extensively adopted in patients with chronic pain (Hjermstad *et al.*, 2011), with evidence supporting its reliability and validity (Bijur *et al.*, 2001; Gallagher *et al.*, 2002; Gift, 1989).

Short Health Anxiety Inventory

The Short Health Anxiety Inventory (SHAI; Salkovskis *et al.*, 2002) is a 14-item self-rated questionnaire assessing health anxiety. It is a reliable and valid measure that has shown high internal consistency (Abramowitz *et al.*, 2007) alongside high reliability across a range of clinical and non-clinical samples (Alberts *et al.*, 2013).

Given the high prevalence of health anxiety in patients with chronic pain (Rode *et al.*, 2006), the SHAI was employed to characterise subjects and to illustrate their levels of health anxiety using a clinical cut-off score of ≥ 18 (Salkovskis *et al.*, 2002). However, the measure was not included as one of the main outcomes of the study.

Semi-structured interviews

To fit the experience-type research question, an interview schedule was prepared before conducting the interview, yet without strictly adhering to it to provide responsiveness to participants.

The interview guide (Table 1) was adapted from past research exploring intrusive imagery (Berna *et al.*, 2011; Muse *et al.*, 2010; Philips, 2011) and covered several areas. From the clarification of intrusive imagery to the definition of an index image, the aim was to thoroughly explore the characteristics of the most distressing and significant visual representation, assessing

Table 1. Interview guide

Focus area
<ul style="list-style-type: none"> • Do these thoughts ever take the form of pictures or images in your mind? • Are the images recurring, or are they simply one-off moments? • How frequently does this image come into your mind? • How would you describe the clarity of this image? • How would you describe your viewpoint when seeing the image? • What do you think causes the image? • Does this image include any other senses? • How do you feel physically when you experience this image? • Is the image about the past, present or future? • Is the image related to past memories? • How do you usually feel when experiencing the image? • Thinking back to the last time you experienced this image, can you describe any thoughts that were going through your mind at the same time? • What does it mean to you that you have this image? • What does the image make you want to do when you've experienced it? • Is there any method you use to cope with the image when they come into your mind? • Do you avoid certain activities after experiencing the image? • Do you normally respond in these ways after experiencing pain? Or is it specifically because of the image?

the clarity, viewpoint, and triggers of the chosen one. Participants answered all the other questions in relation to the index image only, additionally investigating cognitions regarding the imagery and emotional and behavioural responses resulting from experiencing such image during pain.

Procedure

Those willing to participate accessed the study link provided on the advert. Individuals were directed to the Qualtrics platform, where they were fully informed of the nature and purpose of the study through an information sheet. Participants were also provided with a consent form to be filled in before completing the online demographic survey and SHAI. Eligible participants were then contacted via email to arrange the interview session, and further oral consent was sought prior to proceeding with it. At the end of the interview, participants were given a debrief form, containing useful sources of support.

Each semi-structured interview was conducted using Microsoft Teams by the first author (R.D.N.), and audio-recorded using encrypted devices. All interviews lasted approximately 30–45 minutes, were transcribed verbatim and anonymised for subsequent analysis. Complying with the Data Protection Act 2018, all interviews were stored securely and separately from personally identifiable data.

Analysis

Results from interviews were analysed by performing thematic analysis, using the six-recursive-phases guide described by Braun and Clarke (2006) while adopting an inductive, data-driven approach.

A minimum of 10 participants was set for this study. As per guidelines for thematic analysis (Braun and Clarke, 2006), a sample of between six and ten participants has been recommended for small projects, which may be particularly relevant to novel projects where relevance is not yet established. The sample size choice was also informed by previous similar study samples size, such as the interview study of Berna *et al.* (2011) which included 10 women, who were interviewed about their chronic pelvic pain experiences of mental imagery. Therefore, a sample of 10 participants was deemed sufficient for the qualitative analysis, despite unsuccessful efforts to increase the sample further.

Table 2. Thematic analysis six-phases guide

Phase	Process
Familiarisation	Audio-recordings were transcribed into written form by the first author (R.D.N.), who started to annotate an initial list of ideas for coding
Coding	The production of initial codes involved a systemic work of reading and re-reading both the initial notes and each transcript, writing labels alongside in the margin. All transcripts were double-coded by the research team
Generating initial themes	The primary researcher (R.D.N.) was principally engaged in establishing collating codes into over-arching themes and sub-themes and clustering them together according to their conceptual similarities
Reviewing and developing themes	R.D.N. created a table with description of each theme to help with reviewing the candidate themes and sub-themes to ascertain whether they exhibited a good fit with the dataset
Defining and naming themes	Three key themes and six sub-themes were agreed between R.D.N. and J.D. during an iterative process of defining and redefining, where high agreement was reached through discussion and reflection. This was an ongoing process throughout the analysis
Generating the report	The write-up was an integral part of the analytic process, which implied a coherent narrative account supported by verbatim extracts from interviews

Table 3. Characteristics of participants

Pseudonym	Demographic characteristics		Pain characteristics			Psychological characteristics
	Gender	Age	Pain diagnosis	Pain duration (years)	Average level of pain	SHAI score
Jen	F	25	Fibromyalgia	3	4	26
Alice	F	26	IBS, endometriosis	1	6	19
Marie	F	27	Endometriosis, interstitial cystitis	13	4	23
Anna	F	28	Fibromyalgia	4	8	30
Louise	F	31	CRPS, cEDS	9	6	9
Patty	F	36	Whiplash injury	8	4	25
Milly	F	49	Chronic musculoskeletal pain	32	3	13
Marc	M	56	Rheumatoid arthritis	23	8	32
Megan	F	61	Arthritis, RLS	24	10	24
Arthur	M	71	Neuroendocrine cancer	11	10	38

All transcripts were double-coded by the research team (R.D.N., J.D.) to improve robustness of the analysis. The analytic process (Table 2) was shared by the authors through an iterative process of discussion and reflection, where minor discrepancies were debated and codes were revised accordingly. When high agreement was reached and consensus was achieved for the final coding, codes were categorised to then advance with the generation of themes and sub-themes.

Results

Characteristics of 10 interviewees are shown in Table 3. The sample consisted of eight females (median age = 29.5, IQR = 16) and two males (median age = 63.5, IQR = 15), with mixed diagnoses of chronic pain and pain affecting different areas of the body. However, one participant reported an unconfirmed diagnosis that was consistent with the clinical presentation and diagnostic criteria of chronic musculoskeletal pain.

Participants described a median pain duration of 10 years (IQR = 19) and a median average pain level of 6 (IQR = 4). Participants' SHAI scores (median = 24.5, IQR = 11) are also illustrated in Table 3. Eight participants had a SHAI score above the clinical cut-off (≥ 18), indicating the high prevalence of health anxiety among the sample. Two participants did not cross the threshold.

Most participants ($n = 7$) reported experiencing images on a daily basis, whereas one individual reported weekly occurrences. Two interviewees were unable to specify the frequency of their imagery but mentioned its occurrence being linked to describing pain to others and during intense periods of pain, respectively.

Main themes

Three key themes and six sub-themes were derived from the thematic analysis, aligned with the study aims (Table 4). Themes are presented with quotations; participants are identified by pseudonym, age and gender.

'I start to create images in my head': pain-related mental images

Table 5 describes the characteristics of participants' most significant imagery, including description, triggers, frequency, valence and associated meaning, emotion and behaviour. Results will be reported in line with the aims set out within the Method section.

Imagery characteristics

Participants reported intrusive, clear and vivid images rich in details, with some of them containing different sensory modalities (e.g. physical sensations: 'Heaviness on my chest') other than the visual component. The frequency of images varied among the sample, depending on the pain levels, especially when the pain was at its worst, up to five times a day. All images but one resembled descriptive metaphors of the pain. One participant's imagery consisted of a future catastrophic worry linked to the causative accident that led to pain problems. In this case only, the respondent found it difficult to articulate the image, accompanied by emotional response due to the content of the depiction. Two participants also identified memories of a past traumatic experience (i.e. car accident, sexual assault) to be related to the index image. For all three respondents, the imagery sparked intrusive memories of the adverse event. Two of them additionally reported experiencing the image from an observer perspective, accompanied by a strong sense of reality: 'And you are just playing a really [unclear] video game where your body is attempting not to die from pain' (Jen, 25, F).

Triggers of the imagery

Participants did not experience intrusive mental imagery relating to the experience of pain prior to the onset of chronic pain. As pain was the identified root cause of participants' difficulties, such uncontrollable images intruded into consciousness mainly because of the 'excruciating pain', with imagery so intrusive, they appear even during the night-time in the form of dreams. One participant also voiced concerns regarding the side-effects of medications (i.e. opioids), having a 'big impact on the imagery', and pointed out the Covid-19 pandemic as a negative influence on the image associated with pain: 'Would this leave me more vulnerable?' (Patty, 36, F).

Table 4. Themes and sub-themes, with summary of themes and illustrative quotes

Themes	Summary of themes	Sub-themes	Illustrative quotes
1. 'I start to create images in my head': pain-related mental images	The theme provides contents and descriptions of participants' self-identified images, with their causing triggers	(a) Imagery characteristics (b) Triggers of the imagery	(a) <i>'I can see the imagery very clearly and I know what is going on, but I can't hear anything. It's really bright in the room as well. But there is no taste, there is no smell ...'</i> (Patty, 36, F) (b) <i>'The thing is that the pain is so intense, that those images are there all, all, all the time'</i> (Arthur, 71, M)
2. Metaphors for pain	The images are used as a means to describe and interpret the pain to both the self and the others. The theme will discuss the conceptualisation process that participants undertake to better understand the whole experience of living with chronic pain	(a) Language for pain (b) Meaning behind the image	(a) <i>'It can be hard to describe the pain exactly to somebody, especially when they probably are never gonna feel that sensation, 'cause it's very abnormal pain sensation'</i> (Jen, 25, F) (b) <i>'I think it's not so much about the world around me. I suppose it's more about me not being able to cope with the pain'</i> (Marc, 56, M)
3. 'With the pain comes the image': a companion to pain	The theme elaborates on participants' aptitude towards the struggle of living with chronic pain and how their lives have changed since their diagnosis, highlighting the dual role that the imagery has in relation to the experience of pain	(a) 'It's part of me now': acceptance of pain (b) 'It makes it more real': the facilitator of pain	(a) <i>'It's a visualisation of something that's out of my control ... Like you can try and make the pain better ... You can do everything that everybody recommends you to do. And you will still be in pain'</i> (Anna, 28, F) (b) <i>'Even if you have a cut, if you don't see it, you won't feel the pain, until you actually look at it and you are like "Oh my God, I have a cut on my hand"'</i> (Alice, 26, F)

Table 5. Summary of participant image characteristics

Pseudonym	Image content	Image description	Triggers	Image frequency	Image valence	Associated meaning	Associated emotion	Associated behaviour
Jen	'A toddler with a shank [...] going for it, like, twisting it'	Pain as an attack	Pain	Not reported	Negative	Visual representation of the pain, means to conceptualise the pain	Anxiety, anger, annoyance	Bodily monitoring, dissociations
Alice	'Just having a little cactus bowl in my body with the spikes just poking me constantly'	Pain as an object, as an attack	Pain	Weekly (one/two times)	Negative	Visual representation of the pain, means to conceptualise the pain	Frustration, exhaustion	Distraction by focusing on other imagery e.g. watching television, distraction by engaging in social interactions, avoidance of quiet rooms
Marie	'An abdomen that has got [...] like an iron mark, like a burn mark on it and it's got like barbed-wire going around it. It's got, it's got some knives dug in'	Anatomical representation of pain	Pain	Daily, when in pain	Neutral	Visual representation of the pain, means to conceptualise the pain	—	—
Anna	'A blackness with red stabbing [...] A lightning flash or red, like, red stabbing of lightning'	Electricity, pain as an attack	Pain, unexpected movements	Daily (multiple times)	Negative	Visual representation of the pain, means to conceptualise the pain	Anxiety	Avoidance of pain, limitation of physical movements
Louise	'Just have a massive hacksaw cutting it off [...] like somebody's put it in that clamp and they're literally swinging the wrench like tightening it up around it'	Sharpness, pain as an attack	Pain, rumination, looking at the injured area	Daily (up to five times), when pain is at its worst	Negative	Visual representation of the pain, means to conceptualise the pain	Anger, frustration, hatred, annoyance	Distraction by engaging in other activities e.g. playing sudoku, avoid looking at the affected area of the body
Patty	'Me dying, you know, on my death bed'	Future catastrophe	Pain, rumination, medications, Covid	Daily, depending on pain levels	Negative	Failure as a mum	Low mood, distress, panic, upset, loneliness	Googling symptoms, avoidance of pain, distraction by using the phone
Milly	'It is like a lightning bolt or an electric shock'	Electricity, pain as an attack	Pain, describe pain to others	Not reported	Neutral	Visual representation of the pain, means to conceptualise the pain	—	—
Marc	'Somebody stabbing, somebody sticking something in'	Pain as an attack	Pain, attempt to suppress the image itself, rumination, boredom	Daily, when in pain	Negative	Visual representation of the pain and his inability to deal with the pain, means to conceptualise the pain	Low mood, distress, loneliness	Limitation of physical movements, distraction by listening to music
Megan	'I have images of me chopping my legs off'	Sharpness	Pain	Daily, when in pain	Positive	Visual representation to eliminate the pain and be pain-free	Hope, relief	Distraction by thinking about the image
Arthur	'These burning flames, [...] these forest fires'	Burning heat	Pain	Daily (up to four/ five times)	Neutral	Visual representation of the pain, means to conceptualise the pain	—	—

Metaphors for pain

Language for pain

Participants described pain using violent terms, such as ‘stabbing’ and ‘impaling’, when reporting their accounts of pain experience. In such narratives, participants conceptualised the ‘unnatural’ pain sensation to both the self and those unfamiliar with their condition by employing the imagery as a metaphor for pain. As an alternative method of communication, participants better articulated the severity of their pain and their feelings towards it: ‘I’m still pretty adamant that there aren’t really any words that you can use to make somebody understand what [the pain] is like when it’s really bad’ (Louise, 31, F).

Meaning behind the image

In this sense-making process, participants struggled to expand insight into their lives with chronic pain. For some participants, the images themselves were simply a visual representation of the pain. For others, the imagery gave meaning to their experience, revolving around the self and the catastrophic projection of an impending future, as pain was interpreted as a symptom of something life-threatening to come:

‘I feel like a failure, failure as a mum . . . It represents my desperation to make sure I am there for her [the daughter], to be a good mum to her. And my worst fear is not being able to do that.’ (Patty, 36, F)

‘With the pain comes the image’: a companion to pain

This theme captures the presence of the images as an accompaniment to pain experience. Particularly, it focuses on the imagery as a means to represent participants’ loss of control over pain, and the role of mental imagery in exacerbating their condition.

‘It’s part of me now’: acceptance of pain

The imagery depicted a separate entity other than the self; the pain. Pain was seen as an external factor out of participants’ control, who felt incredibly disconnected from it. However, what appeared to distinguish them was their attitude towards the uncontrollability of pain. For the majority of participants, the imagery felt like a reflection of their struggle to manage pain. One participant described his pain as ‘burning flames’ so intense that they ‘overrule everything’ (Arthur, 71, M), while others projected their pain onto external agents represented with weapons assaulting the self. Many participants also used pain-related words as ‘defeating’, suggesting strong feelings of a diminished sense of control, agency and identity over the experience of pain. The perceived lack of control over the experience of pain was evident as some participants reported their inability to cope with pain by passively accepting it:

‘And then you become resigned and you go through all the stages of grief with the fact that you’re in pain every day and then you get back to work.’ (Anna, 28, F)

On the contrary, one participant reported dealing with pain by actively engaging at mind levels to achieve distraction, because ‘if I accept it, then it’s all over’:

‘I’ve got two brains. I’ve got my brain and I’ve got my pain brain . . . They’re just constantly in a battle with each other all the time. I can’t let it win . . . So, rather than pain brain winning and being miserable, I might have a bit of pain brain and try and be productive at the same time.’ (Louise, 31, F)

'It makes it more real': the facilitator of pain

The imagery had a negative valence for the majority of participants. In most cases, such 'disturbing' images exacerbated negative thoughts and emotions connected to the pain, increasing anxiety, blame, frustration, and anger, and further leading to rumination of the situation:

'You just wish your mind wouldn't go in certain places . . . And it kind of reminds you "You're in pain, you're in pain".' (Alice, 26, F)

One participant reported that the image itself had 'more of an emotional impact' (Patty, 36, F) rather than the pain, experiencing tightening of the chest due to the intrusiveness and content of the imagery. In contrast, for Megan, the image was a source of coping towards her pain, representative of an imaginary sense of relief to be pain-free:

'That's when I start punching them [the legs] . . . I just, like, bang them up and down on the bed thinking that'd get rid of it, but it doesn't.' (Megan, 61, F)

According to three respondents, however, the pain was the primary concern. The imagery did not prompt any emotional and behavioural responses: 'I know I'm not gonna basically get a knife and put it into my stomach' (Marie, 27, F).

Attempting to avoid and suppress anything related to the unpleasant experience of either the pain or the imagery itself, some similarities were then observed in the use of coping strategies across the sample. Participants employed safety and avoidance behaviours, including behavioural restrictions (e.g. limiting physical movements), bodily monitoring and reassurance-seeking (e.g. googling symptoms), and distractions (e.g. watching television).

This was different for Milly, who adopted Graded Motor Imagery, meditation techniques, and virtual reality to aid her recovery. She suggests that imagery itself can be a 'powerful' tool for reframing distressing images, thereby altering their content and facilitating improvement:

'So, the tools, the awareness of the good things that are happening . . . The little steps to the recovery, recognising them, and knowing that . . . I am on the road to recovery and life is all good again.' (Milly, 49, F)

Discussion

The study investigated the experience of intrusive mental imagery in the daily life of individuals with chronic pain, offering further insight into its impact on their emotions, cognitions, and behaviours components.

Findings reflect that for those in the current study, mental imagery can be an intrusive, vivid and uncontrollable cognitive accompaniment to participants' pain experience. Findings identified three major themes: (1) 'I start to create images in my head': pain-related mental images; (2) metaphors for pain; and (3) 'With the pain comes the image': a companion to pain.

There is an overlap between pain-related visual images described here and earlier investigations of mental imagery in chronic pain sufferers. In the current study, participants described imagery-based language that fell into four of the thematic categories classified by Gosden *et al.* (2014). Descriptions of the images illustrated an anatomical representation of damage, depicted pain as a localised object and as an external entity assaulting the self, and were related to sensory qualities of pain. One interviewee reported a projection about the future in the form of a catastrophic worry, a theme evident in the study by Philips (2011). Some pain-related imagery reported by participants may also be considered to have parallels with 'flashback' and 'flash-forward' images identified in PTSD and depression (Brewin *et al.*, 2010; Holmes *et al.*, 2007b). Although the event was not

present in the imagery, the intrusive images were linked to past adverse experiences and led to intrusive memories, a cornerstone of PTSD (Brewin and Holmes, 2003; Ehlers *et al.*, 2004). In particular, the future-oriented imagery additionally resembled those centred on themes of future death in depressed patients found by Crane *et al.* (2012) and Holmes *et al.* (2007b). This may indicate that cognitions in chronic pain, such as mental imagery, may be correlated with those reported in PTSD and depression. Further research should investigate the association between chronic pain, PTSD, and depression.

All participants in this study defined their pain as a complex situation. As found in previous work (Gosden *et al.*, 2014), the imagery was a valuable means to better conceptualise the experience of living with chronic pain by elaborating its meaning through sensory aspects and object-based representations. Participants outlined their difficulties to describe their pain to others, with the imagery serving as a metaphor to express their condition, a tool of communication and bridge to understanding. Similar results were found in an earlier study (Warren, 2019) aiming to improve communication between patients and healthcare professionals through the use of visual representations, indicating the implication that pain metaphors may have in the diagnosis and management for pain. The communication of pain through imagery has also garnered strong interest among artists; Padfield explored the value of visual images in clinician–patient interactions and the expression of pain, aiming to investigate whether and how photographic images of pain, co-created with patients, could assist them in conveying their pain to clinicians and enhance mutual understanding (Padfield, 2003). The conceptualisation of pain has also been extensively studied by Moseley *et al.* (2012), who outline strategies to enrich or ‘power up’ those useful pain metaphors to help reflect and reconceptualise pain according to a biology of pain that underpins a biopsychosocial approach (Moseley, 2007). In therapy, metaphorical visualisations have frequently been employed in ACT to facilitate therapeutic change. In this context, the use of metaphors aims to assist individuals in coping with chronic pain by conjuring images of their unhealthy ways of thinking to better comprehend their experiences of pain (Lai *et al.*, 2023).

The perceived sense of control and agency was a common theme among the sample. The imagery was representative of participants’ loss of autonomy and ability to maintain their identities in the experience of pain, depicted as an external entity attacking one’s own life and self. The majority of participants felt indeed defeated by their pain, and reported passive reactions to episodes of persistent and disabling pain rather than active coping strategies to manage it. These results may be understood according to the cognitive concept of mental defeat, previously studied in research in PTSD and depression (Ehlers *et al.*, 1998; Gilbert and Allan, 1998). In chronic pain literature, Tang *et al.* (2007) defined mental defeat as a type of catastrophising, which implies negative self-beliefs about one’s ability to effectively cope with pain. Due to the uncontrollability of pain, patients perceive a loss of autonomy that triggers such a negative view of the self in relation to pain, increasing the sense of mental defeat that then hinders people’s engagement in pain-related coping strategies; a vicious cycle. Further quantitative work on mental defeat and chronic pain has confirmed this hypothesis (Tang *et al.*, 2010, 2013), and a later study illustrated that mental defeat was strongly associated with negative appraisals of the images (Philips and Samson, 2012).

Consistent with previous research (Berna *et al.*, 2011; Philips, 2011), for some participants the index image represented maladaptive self-schemas (e.g. ‘I am a failure’) alongside threatening and depressing appraisals of the future, while heightening negative emotions and dysfunctional behavioural responses. These results are in line with the hypothetical model of imagery and emotion applied to chronic pain proposed by Berna *et al.* (2011). The model is based on a CBT framework, whereby the distressing image can amplify pain experience. In the present study, pain was identified as the primary trigger to their imagery. Many participants described these images as enhancing the intensity of their emotions, consistent with the idea of imagery as an ‘emotional amplifier’ (Holmes *et al.*, 2008). In such cases, the imagery was often associated with negative emotions and cognitions, which led to avoidance of activities. This in turn worsened the

experience of pain and increased the new occurrence of the visual image. Notably, despite its predominantly negative valence, the imagery tended to have comforting effects in one participant. Similar depictions have been categorised as coping imagery in Berna *et al.* (2011, 2012). However, far from being positive, the image entailed self-harming behaviour that closely resembled thoughts of suicidal ideation in depression, as seen in Holmes *et al.* (2016). This may suggest that the outcomes associated with pain-related visual imagery may be akin to those found in mental health conditions. Conversely, for one participant, the imagery represented an actual tool to aid pain recovery, suggesting reframing the negative image into a benign visualisation by means of imagery-based strategies. This approach resembled the imagery rescripting technique adopted in CBT (Blackwell, 2021; Holmes *et al.*, 2007a), aiming to enhance access to positive mental images and encourage more positive mental processes in individuals dealing with chronic pain. Similarly in EDMR protocols for chronic pain management, where the use of an ‘antidote’ imagery becomes an important tool to reduce emotional distress and alleviate chronic pain (Grant and Threlfo, 2002).

Strengths and limitations

This exploratory study extends work in the under-explored area of intrusive mental imagery in chronic pain. The use of semi-structured interviews was a valuable source of enquiry to gain an in-depth understanding of participants’ experiences of pain and pain-related images compared with postal survey methods employed in previous studies (Gillanders *et al.*, 2012; Gosden *et al.*, 2014). However, the assessment of appraisal using a time-limited interview design proved difficult for some participants who considered the presence and meaning of the index image for the first time. These preliminary results indicate that imagery in chronic pain is worthy of further investigation, particularly as a potential target in cognitive behavioural approaches; however, future research will need to develop more reliable and effective approaches to clarify image appraisals. Difficulties in recruitment may be linked to a lack of understanding of imagery by participants, despite a definition of pain-related visual images provided in the participant information sheet; this may be the first hurdle to overcome in future work. Further factors contributing to our challenges in recruitment might stem from individuals’ difficulty in identifying themselves as ‘imagers’. The struggle could arise from the perceived lack of vividness and clarity usually associated with such experiences. Additionally, some individuals may be deterred from discussing their experiences for an extended period, due to the unpleasant nature of the images.

Participants were recruited using a purposive approach to sampling based on a diagnosis of chronic pain and the sample consisted of a heterogeneous group with mixed diagnoses. While there were clear common themes across the sample, further work may seek to examine whether there are differences or similarities between homogenous pain groups (e.g. headache, lower back pain) perhaps through replication or quantitative approaches. The small sample size does limit transferability; however, as an exploratory study in this field, and with findings consistent with existing research, this is a firm foundation for further development.

Clinical implications

Currently available treatments for pain are only mildly effective, and recent guidelines from the National Institute for Health and Care Excellence (2021) recommend CBT within a collaborative model of care to improve chronic pain management. These findings have implications for the delivery and adaptation of CBT for chronic pain, which may seek to take account of and target imagery within interventions. Imagery interventions have a strong evidence base (Saulsman *et al.*, 2019), and the findings from this study support the relevance of imagery in cognitive, affective and behavioural processes in chronic pain. Identifying meanings of common images associated with the pain may help to provide a gateway to underlying beliefs, which can be targeted to reduce the

potency of the image (Hales *et al.* 2014). Imagery-based treatment techniques, such as imagery rescripting (Holmes *et al.*, 2007a), can then facilitate cognitive restructuring, aiming at maladaptive core belief modification. Such imagery-based intervention may be useful to alter the content of negative images, which can be reappraised in a less distressing manner, facilitating cognitive and affective changes (Blackwell, 2019).

Conclusions

The present study offers further evidence of the impact that pain-related mental imagery may have on individuals suffering from chronic pain. Such uncontrollable, intrusive and vivid images may fit a classic CBT model, as the imagery can serve as an emotional amplifier of the pain experience. Future research is needed to develop better assessment and research-informed interventions targeting such distressing images for pain management.

Key practice points

- (1) Intrusive mental imagery can be a cognitive accompaniment to participants' pain experience.
- (2) Pain-related mental images can have an impact on the emotions, cognitions, and behaviours of those with chronic pain.
- (3) It might be beneficial to address and target mental imagery in CBT assessment and treatment.

Further reading

Berna, C., Tracey, I., & Holmes, E. A. (2012). How a better understanding of spontaneous mental imagery linked to pain could enhance imagery-based therapy in chronic pain. *Journal of Experimental Psychopathology*, 3, 258–273. <https://doi.org/10.5127/jep.017911>

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Gosden, T., Morris, P. G., Ferreira, N. B., Grady, C., & Gillanders, D. T. (2014). Mental imagery in chronic pain: prevalence and characteristics. *European Journal of Pain*, 18, 721–728. <https://doi.org/10.1002/j.1532-2149.2013.00409.x>

Data availability statement. The data that support the findings of this study are available from the corresponding author, J.D., upon reasonable request. The data are not publicly available due to them containing information that could compromise research participant privacy and consent.

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