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**Investigations for Radiculopathy: The Patient Perspective. A Qualitative, Interpretative Inquiry**

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HIGHLIGHTS

* Patients highly valued the informative role of investigations (MRI)
* Access to investigations was reported to be difficult and protracted
* Relevant findings enabled validation, empowerment and decisive decision-making
* Non-concordant findings were difficult to understand, or move forward from
* Important implications have been identified for policy and clinical practice

ABSTRACT

Background: Clinical guidelines recommend that investigations, such as magnetic resonance imaging, are offered only when likely to change management. Meanwhile, the optimal process of diagnosing radiculopathy remains uncertain and, in clinical practice, differences of opinion can occur between patient and clinician regarding the perceived importance of investigations.

Objectives: To explore peoples’ experiences of investigations and the effect of concordance between clinical presentation and investigation findings.

Methods: In this qualitative study, 14 participants who had recently undergone investigations for a clinical presentation of radiculopathy were purposively recruited from an NHS, Primary Care Service in the United Kingdom. Based on the principles of interpretative phenomenological analysis, individual, semi-structured interviews were recorded and transcribed verbatim. Data were managed using a framework approach and analysed thematically.

Findings: Although people reported wanting investigations to understand the cause of symptoms and inform management, access to them was reported to be difficult and protracted. When investigations revealed potentially relevant findings, people experienced relief, validation, empowerment and decisive decision-making. Disappointment emerged, however, regarding treatment options and waiting times, and long-term prognosis. When investigations failed to identify relevant findings, people were unable to make sense of their symptoms, relinquish their search to identify the cause, or to move forward in their management.

Conclusions: This study provides the first reported in-depth interpretation of peoples’ experience of undergoing investigations specifically for radiculopathy. Important implications have been identified for: investigation referral criteria; shared-decision-making; information sharing and managing expectations and disappointment.

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KEYWORDS:

Interpretative phenomenological analysis;Investigations; MRI; Patient experience; Radiculopathy

BACKGROUND

Radiculopathy is one of the most common variations of low back pain (LBP), with conservative estimates suggesting a lifetime prevalence of 12.2% (Konstantinou and Dunn, 2008). Characterised by leg pain, usually radiating below the knee, with variable neurological deficit, radiculopathy is caused by compromise of a lumbar-sacral nerve root(s). In about 90% of cases this results from a prolapsed intervertebral disc (PID), with other causes including spinal stenosis and, rarely, sinister pathology (Koes et al., 2007). At times, particularly in persistent radiculopathy, the cause may never be found (Hopayian and Notley, 2014). Radiculopathy differs to somatic referred pain, which is back-related leg pain caused by structures other than the nerve, such as the joint, ligament or muscle.

Although the prognosis of radiculopathy is favourable for many, the presence of leg pain, compared to LBP alone, adversely affects symptom severity, disability, absence from work and outcome (Konstantinou et al., 2013). For up to 30% of people, significant on-going symptoms continue beyond a year (Koes et al., 2007). With the annual cost of radiculopathy to the United Kingdom economy estimated to be £268 million in direct medical costs and £1.9 billion in indirect costs (van Tulder et al., 1995, Foster et al., 2017), radiculopathy is a considerable burden to both the individual and society.

Radiculopathy is usually diagnosed clinically and treated with physiotherapy or self-care for the first 6-8 weeks, with people who fail to improve likely to be referred to a spinal specialist to determine the most effective treatment (National Institute for Health and Care Excellence (NICE), 2016, National Health Service (NHS) England, 2017). Unless a serious cause is suspected or symptoms are rapidly deteriorating, investigations (magnetic resonance imaging (MRI) or computed tomography (CT)) are recommended only for those people for whom it is likely to change management (by indicating eligibility for surgery or pain clinic intervention) (Royal College of Radiologists (RCR), 2012).

The optimal process of diagnosing radiculopathy is however, uncertain and complex. All tests have poor diagnostic accuracy, with pooled sensitivity of MRI (testing nerve root compression (NRC)) 0.25) (Tawa et al., 2016); specificity of crossed straight leg raise (for prolapsed intervertebral disc) 0.28 (van der Windt et al., 2010); and (in a primary study) the odds ratio of 6-item history (testing for NRC) 0.65 (Verwoerd et al., 2014). These findings show that it is difficult to be confident that MRI will accurately detect radiculopathy; that clinical examination will exclude other causes of symptoms; or that history taking will accurately determine whether radiculopathy is present or not. Thus, there is no ‘gold standard’ diagnostic test and synthesising evidence is difficult as the condition diagnosed may be radiculopathy, prolapsed intervertebral disc or nerve root compression. Questions also remain about the optimal timing of investigations; their ability to predict the likely need for intervention; and their effect on physical and mental health (Chou et al., 2009, El Barzouhi et al., 2016). Furthermore, in clinical practice, differences of opinion can occur between patient and clinician regarding the importance of investigations, with people perceiving clinical assessment alone to be insufficient to diagnose radiculopathy and determine treatment. To successfully negotiate how investigations are used in managing people with radiculopathy, it is imperative to hear the patients’ voice. The importance of involving patients in the design and delivery of services is recognised by the Department of Health (DOH) and the National Institute of Health Research (NIHR) to be crucial in achieving safe, effective and acceptable healthcare (DoH, 2014; NIHR, 2016).

An extensive scoping literature review[[2]](#footnote-2) identified only two studies (Rhodes et al., 1999, Espeland et al., 2001) exploring peoples’ perceptions of undergoing investigations for LBP +/- radiculopathy. These studies found that people (n=147) perceived investigations to be important in establishing with certainty the cause of their symptoms. This was particularly important when symptoms were worsening or over three months in duration. In contrast, when investigations did not identify a structural cause, some people perceived that the legitimacy of their condition had been challenged. The relevance of these findings may be limited as data were collected almost two decades ago and relate partly to x-rays and myelograms, now rarely used in radiculopathy. Whilst the existing literature provides insight into the perceived importance and effect of investigations in people with LBP, their role and effect in the radiculopathy subgroup remains unknown. Therefore, this study addresses the question: ‘what is the lived experience of undergoing investigations for radiculopathy in the context of conservative management (with specific consideration of the effect of concordance between clinical presentation and investigation findings)?

METHODS

This qualitative study was informed by the principles of interpretative phenomenological analysis (IPA), a methodology consistent with the aim of accessing and interpreting peoples’ experiences (Smith et al., 2009). Ethical approval was gained from the South West Ethics committee in September 2015 (15/SW/0247).

Participants and recruitment

The sample consisted of people with a clinical presentation of radiculopathy, who had recently undergone investigations and received the results, whilst attending an outpatient physiotherapy service of a NHS primary care Trust, in the UK. The study aimed to recruit 12-15 participants. No claims were made to reach data saturation, as each person’s experience of a phenomenon is unique. However, this number was considered enough to enable a rich, detailed analysis, informed by IPA principles, whilst providing sufficient information to answer the research question, and sufficient variation within the sample to enhance transferability (Guest et al., 2006; Baker and Edwards, 2012).. Purposive sampling was used to gain representation across age, gender and whether or not investigation results concurred with clinical presentation.

Eligible people were approached by their clinician, a spinal specialist, when they attended the service to receive their investigation results. The spinal specialists (defined as physiotherapists with ≥ 10 years musculoskeletal experience, who undertook radiological and/or clinical training ≥ four times a year) used information from their clinical assessment to determine whether a person’s presentation was consistent with radiculopathy, based on (Kongsted et al., 2012) criteria (Figure 1) which reflect accepted diagnostic criteria in clinical practice.

Figure 1: Criteria for diagnosing radiculopathy

Leg pain and *at least* *one* of the following (on the affected leg): sensory deficit (to touch or pin-prick); muscle weakness; impaired tendon reflex; a positive straight leg raise reproducing the person’s familiar pain; or a positive prone knee bend test combined with anterior thigh pain.

People were included in the study if they were: adults aged ≥ 18 years; had recently undergone investigations for a clinical presentation of radiculopathy; and had received the results in the past six weeks. To increase the homogeneity of the sample, people were excluded if they had undergone spinal surgery, or if the suspected cause of symptoms was sinister pathology or cauda equina syndrome. People were also excluded if they were unable to communicate without the assistance of an interpreter or provide consent, or had previously been treated by the researcher.

People who were potentially interested in participating were provided with verbal and written information about the study. With their express, written consent, the researcher was given peoples’ contact details and a statement indicating whether their radiological findings were concordant; potentially relevant; or non-concordant with their clinical presentation (Lurie et al., 2008), and an interview date was arranged.

Data collection

CR, a female spinal specialist and MRes student (with prior experience and training in conducting qualitative interviews), collected data between October 2015 and May 2016, using individual, face-to-face, semi-structured interviews. This was considered the best method to build rapport with individual participants and to explore emergent issues in depth. To minimise researcher bias, CR documented her biases and assumptions about using investigations for radiculopathy before starting data collection and took care to separate these from participants’ perceptions throughout the research cycle. CR was introduced to participants as a researcher, as this was her role in the study. Interviews were completed in a quiet room within the hospital, away from the physiotherapy department. They were based on a topic guide (Figure 2), to ensure core issues were explored with all participants, whilst providing flexibility to probe emergent issues. Open questions, encouraging breadth and depth, were informed by examples from related LBP/investigation/IPA studies (Smith and Osborn, 2007; Devcich et al., 2014) and minimal facilitation was used to prevent ‘leading’. The interviews were audio-recorded and transcribed verbatim. Field notes, recorded immediately following the interviews, were used to reflect on interview technique and emerging findings. Pseudonyms were used to maintain anonymity. In order to understand the environment in which investigations were undertaken, participants were initially asked about the effect that symptoms had on their life and their experiences of how radiculopathy was managed; these findings will be reported elsewhere. Participant validation of the transcripts/ findings was not undertaken.

Figure 2: Topic guide

1 Could you tell me how your leg pain was diagnosed initially, and what you were told about your condition?

 *Probes: did you have a diagnosis, how was it made; how did you feel about it; who gave diagnosis GP physio etc; prognosis; treatment options*

*2*  I understand you’ve had some investigations for your leg pain, Could you tell me about how the issue of investigations came up?

 *Probes: who initiated, barriers to access; at what point first introduced; when in relation to actually going for scan; what investigations you've had; at what stage of treatment were you when you were referred for the scan?*

3 Could you tell me what your thoughts were about being referred for investigations?

 *Probes: what its purpose was; what hopes were, perceptions of spouse; family friends about scan; any concerns*

4 Could you tell me about the results of MRI?

 *Probes: what it showed; how felt about the results; how it compared with expectations; how they were given; report; visual impact*

5 What information were you given about your condition following receiving investigation results?

 *Probes: nature; prognosis; management; any differences from information given previously; where at with regards to treatment now*

6 What do you feel you gained from having investigations for sciatica?

 *Probes: have there been any negative aspects to having undergone investigations?*

Is there anything else that’s been important to you through this process that I’ve not asked about?

At the start of data collection, CR conducted pilot interviews with two participants to evaluate if the interview questions produced rich, detailed answers and to provide face validity for the topic guide. As the content and key wording of questions were substantially unchanged, the data from these participants were included in the study.

Data Analysis

Data were analysed manually, thematically and iteratively, guided by the principles of IPA (Smith et al., 2009). For each transcript, CR undertook noting (descriptive, linguistic and conceptual) and coding. Data from the codes were managed in a framework format, to facilitate transparent and comprehensive intra-and inter-case analysis, and to ensure that analysis remained rooted in the data (Ritchie et al., 2014). Deviances and complexities were sought within and across cases (Bazeley, 2009) and analytical and reflexive memos used to facilitate a deeper understanding (Smith et al., 2009). From this process, CR identified categories and themes, which LR interrogated to determine their relevance and scope. Interim analyses were then discussed with a group of 28 local musculoskeletal physiotherapists, to verify the coding schema and interpretation of the data.

FINDINGS

The sample consisted of fourteen participants; aged 34-81 years (median 61 years); with a 3-month to 9-year (median 13 months) duration of symptoms; eight participants were female. Seven participants had radiological findings that concurred with their clinical diagnosis, five had potentially relevant findings, and two had no relevant findings. All participants had been investigated using MRI. Participants for whom this was the first spinal investigation (for this episode of radiculopathy) had a median duration of symptoms of 9.5 months (range 2 months - 7 years). Four additional people were identified but not included as: they did not meet inclusion criteria (n=1); did not wish to participate (n=1); attended on the wrong day (n=1); or could not be contacted (n=1). Interviews occurred within two weeks of the person receiving their investigation results and ranged in length from 38-117 minutes (median 82.6 minutes). All participants attended for interview unaccompanied. Participant characteristics are detailed in Table 1.

Table 1: Participant characteristics

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Participant | Male/ female | Age(years) | Results Category\* | Duration of symptoms at the time of MRI | Employment Status | Investigations for this episode of radiculopathy |
| Julia | F | 63yrs | 1 | 3 years | Employed | X-ray hip and knee, MRI |
| Catherine | F | 60yrs | 2 | 11.5 months | Unemployed | MRI |
| David | M | 74yrs | 1 | 3 months | Retired | MRI |
| John | M | 34yrs | 3 | 9 months | Unemployed | MRI |
| Daniel | M | 37yrs | 2 | 1 year 9 months | Sick leave | MRI x3 |
| Janet | F | 73yrs | 1 | 7 months | Retired | MRI |
| Bill | M | 61yrs | 1 | 10 months | Employed | MRI(+MRI previously for LBP) |
| Claire | F | 45yrs | 2 | 1 year 3 months | Unemployed | MRI(+MRI previously for radiculopathy) |
| Ruth | F | 74yrs | 1 | 3 months | Retired | MRI |
| Henry | M | 81yrs | 3 | 8 months | Retired | MRIBone scan |
| Frances | F | 72yrs | 1 | 18 months-2 years | Retired | MRI x2 |
| Aisha | F | 35yrs | 1 | 6 years | Sick leave | MRI |
| Gareth | M | 45yrs | 2 | 7 years | Employed | MRI |
| Joanne | F | 46yrs | 2 | 9 years | House wife | MRI x2 |
| \*Investigation results categories: 1: concordant with radiculopathy 2: potentially relevant to symptoms of radiculopathy 3: non-concordant with radiculopathy (Lurie et al., 2008) |

Summary

Three key themes were identified, which together represent the fundamental elements of peoples’ experience of undergoing investigations for radiculopathy: (i) why investigations were wanted; (ii) accessing investigations; and (iii) the effect of investigations.

Theme 1: Why investigations were wanted

Frustrated by the vagueness of their clinical diagnosis, participants wanted investigations to legitimise their symptoms, establish the cause and to gain an accurate, definitive diagnosis. They thought that this information would help them to cope with symptoms and end rumination about a serious cause.

 *It's easier to deal with something if you know what's going wrong with it… second-guessing, well I've got some pain here that hurts, isn't any good to anybody.* [Gareth]

 *She* [spinal specialist] *showed me ...what she thought the problem was but not exactly.… an MRI scan would show up exactly.* [Frances]

 *Your brain just ticks over and you think there could be some growth there … it’s so severe and it’s so constant.* [Claire]

In the context of unresolving symptoms and failed treatment, participants were desperate for pain relief and for their situation to progress. They believed that effective treatment would be easier to achieve if the cause of symptoms was known.

*But it* [treatment] *was just trial and error all the way through…with having the MRI scan, …there’s a diagnosis…you know what to treat.* [Julia]

*He* [General Practitioner (GP)] *asked me if they’d arranged an MRI scan… ‘ you know I think you’ve had this long enough, they should be doing it’.* [Janet]

Some participants wanted investigations to meet the needs of employers or family, to determine long-term prognosis.

 *My wife thought ... that she would be at ease if there was an MRI scan that did not show cancer.* [David]

Theme 2: Accessing investigations

Participants found accessing investigations was difficult and protracted. They expressed frustration that investigations were not offered early in the management process and that it was necessary to attend and fail (often lengthy or recurrent) courses of treatment before investigations were offered.

 *I’d already told them I had physiotherapy for four months and privately. I told him it was about nearly eight months now, I told him I need to go to scan now*. [John]

 *They referred me to physio without doing any scans or anything, without knowing what the problem was.* [Catherine]

Over half of participants attended physiotherapy solely to gain access to investigations.

[I was] *told by my GP that we’re going to send you for physio… I said ‘Awww God’ so he said….‘If we don’t send you through there then you can’t get on to the* [specialist]*’.* [Ruth]

Participants experienced difficulty in contributing to decision-making regarding investigations, as this decision was usually made by their clinician.

[A colleague] *said to me …‘ You need to go to your GP… to ask for an MRI scan. And I said ‘It doesn’t work like that’.* [Julia]

*In six years I've never demanded an MRI. And I … called* [her] *bluff and even threatened… she said 'Okay, I'll send you for an MRI'. [Aisha]*

Theme 3: The effect of undergoing investigations

This theme includes times when a cause is found and a subset of times when it is not.

*(i) When a cause is found*

When concordant or potentially relevant radiological findings were identified, participants were relieved that a cause had been found and that it was not serious. They could make sense of their symptoms, which they now considered to be legitimate.

*So, it was a big relief. I know it sounds stupid; it was a big relief to know that it wasn’t in my mind.* [Julia]

 *I was just glad to get a confirmation…of what was causing the problem... I could see… where this nerve is trapped, so that just made sense of everything.* [Janet]

Gaining knowledge of the cause and validity of their symptoms empowered participants to be confident and proactive in their approach to managing radiculopathy. Participants felt better able to contribute to decision-making, ask for help in managing symptoms and that they could expect a positive response.

 *I’m more aware of actually where the problem is… I’m not stopping myself doing things but I’m doing it more carefully. As opposed to when I was angry and I thought ‘I’m making it up, nobody believes me, just get on with It’ and I’d just hammer myself.* [Catherine]

Receiving investigation results acted as a ‘turning point’ in management, enabling decisive treatment decision-making, and, for some, access to new options such as a consultant opinion.

 *I feel that without the MRI I would have been carrying on like this…. so it was an absolute turning point.* [Catherine]

 *She's [specialist] gotten a… meeting to take it forward… she's suggesting that I have some sort of* [nerve] *block.* [Frances]

A sense of disappointment emerged however, for some people, as they reflected on their management options, as neither a ‘quick-fix’ nor a long-term solution appeared likely.

 *They are sending me to the pain clinic but I’m told there’s an 18-week list waiting list… so I’m not looking at any quick-fix.* [Janet]

*(ii) When no cause is found*

When investigations failed to identify relevant findings, participants were unable to make sense of their symptoms, to relinquish the search for the cause, or to move forward in their management.

 *Now if you’ve got sciatica, it’s a slipped disc and if you haven’t got any slipped discs on the report … [the specialist] cut my wires on that one.* [Henry]

 *I will try* [to] *find some doctor* privately, what they going to say [John]

DISCUSSION

This study explored the lived experience of people undergoing investigations for radiculopathy. To our knowledge, this is the first such study in this population. It has identified three key themes that together reveal the essential elements of the investigation experience: (i) why investigations are wanted; (ii) accessing investigations; and (iii) the effect of investigations.

Aligning with Rhodes et al., (1999) and Espeland et al., (2001), this study found that participants wanted to undergo investigations, perceiving they would provide an accurate, definite diagnosis, thereby enabling them to make sense of their symptoms and inform treatment decisions. This study revealed that this was important to people because both their clinical diagnosis and cause of symptoms were uncertain. The findings also reveal that people value the MRI as an opportunity to gain any potentially useful information about their condition and its management. What was missing from the data was recognition, by participants, of the limitations of investigations, and therefore there is a need, in practice, for clinicians to share this information. However, in the context of the limitations of other methods of assessment and the positive effect that investigation findings can have (when they align with clinical assessment), we suggest that future policy includes the informative role of investigations within accepted referral criteria for radiculopathy.

Consistent with Rhodes et al., (1999), this study found that participants experienced access to investigations as difficult and protracted. This study identified that decisions about investigations were usually made by the clinician and that people struggled to contribute. Participants were unable to access investigations early in treatment, and were required to undergo lengthy or recurrent courses of physiotherapy before investigations were offered, with a median wait of 9.5 months (from the onset of symptoms). These findings are important, suggesting that current practice does not align with recently released guidelines that recommend a shared-decision-making approach and access to a specialist opinion (including consideration of investigations) at 6-8 weeks (NHS England, 2017). Furthermore, guidelines no longer *require* people to undergo physiotherapy before investigations are offered. These recommendations represent a change from previous referral guidance (RCR, 2012), which may account for the discrepancy between clinical practice (in this study) and the guidelines. Together these findings highlight the importance of reconciling any tension between shared-decision-making and clinical guidelines (both in policy and clinical practice), and of aligning clinical practice with current evidence.

Consistent with the findings of Rhodes et al., (1999), this study reported the positive effect of undergoing investigations when potentially relevant findings were identified. People reported feeling reassured; able to make sense of their condition and that their symptoms had been validated. In these circumstances, people felt empowered to optimise self-management and, because decisive decisions were made, their treatment progressed. However, this study also found that disappointment could emerge if investigations failed to change peoples’ prognosis or when delays were experienced accessing the next step in their management (such as nerve root injection or surgery), due to long waiting lists. These findings are important in revealing the positive effect of investigations when they align with clinical findings and of the need to optimise timely access to treatment throughout the radiculopathy pathway. They also suggest the importance of managing peoples’ expectations about the potential outcomes of undergoing investigations. Future research evaluating the efficacy of investigations might consider including patient empowerment and partnership during shared-decision-making as a relevant measures of effect.

Finally, along with Rhodes et al., (1999), this study found that when investigations revealed non-concordant findings, people were unable to make sense of their symptoms, relinquish their search to identify the cause, or move forward in their management. Further exploratory study of the experiences and needs of this subgroup is indicated as, in this study, only two people had non-concordant findings. However, the findings suggest that there is a need in practice to support this important and vulnerable subgroup, through helping them to make sense of negative scans; to legitimise their symptoms; and to provide a structured pathway of on-going care so that these patients are not left in limbo.

Limitations

The limitations of the study include recruiting from a single site (limiting the transferability of findings) and recall bias, as participants’ reasons for wanting to undergo investigations were gained retrospectively. Furthermore, as data were collected at a single time-point, the longer-term effect of investigations is unknown. The influence of the researchers’ position and the use of a single data coder were mitigated by the joint approach to identification of the themes and verification of the findings and their interpretation with 28 clinicians.

Implications for policy, practice and research

Future policy should address the potentially conflicting demands of guideline-based care and shared-decision-making, and recognise the importance that people attribute to the informative role of investigations.

Likewise, in clinical practice, consideration should be given to managing any tension between guideline-based care and shared-decision-making, along with: educating people about the limitations of investigations in radiculopathy diagnosis; managing peoples’ expectations and disappointment about the potential outcomes of investigations; and ensuring that practice aligns with current recommendations.

Finally, further research is required to understand the role investigations may have in empowering people to optimise their self-management and the longer-term effect of undergoing investigations.

CONCLUSION

This study found that although people sought investigations to help understand the cause of symptoms and to inform their symptom management, in reality they found these difficult to access. When investigations identified potentially relevant findings, people felt reassured and able to make sense of symptoms, experiencing validation and a sense of empowerment. Although investigations aided decisive decision-making and enabled management to move forwards, disappointment emerged regarding treatment options and long-term prognosis. When investigations failed to identify relevant findings, participants were unable to make sense of their symptoms, relinquish their search to identify the cause, or move forward in their management. Important implications for policy and practice have been identified for referral criteria; shared decision-making; information sharing; aligning expectations; and managing disappointment.

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2. Including CINAHL plus, AMED, MEDLINE, Psychinfo and Psycharticles (from inception - October 2016), grey literature and contact with prominent researchers of radiculopathy [↑](#footnote-ref-2)