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The experience of patients participating in a small randomised control trial that explored two different interventions to reduce anxiety prior to an MRI scan

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ABSTRACT

Introduction: This paper reports qualitative findings from within a larger randomised control trial where a video clip or telephone conversation with a radiographer was compared to routine appointment letter and information sheet to help alleviate anxiety prior to their MRI scan.
Methods: Questionnaires consisting of three free-text response questions were administered to all of the 74 patients recruited to the MRI anxiety clinical trial. The questionnaire was designed to establish patients' experiences of the intervention they had received. These questionnaires were administered post-scan. Two participants from each trial arm were also interviewed. A thematic approach was utilised for identifying recurrent categories emerging from the qualitative data which are supported by direct quotations.
Results: Participants in the interventional groups commented positively about the provision of pre-MRI scan information they received and this was contrastable with the relatively indifferent responses observed among those who received the standard information letter. Many important themes were identified including the patients needs for clear and simplified information, the experience of anticipation when waiting for the scan, and also the informally acquired information about having an MRI scan i.e. the shared experiences of friends and family. All themes highlighted the need for an inclusive and individually tailored approach to pre-scan information provision.
Conclusion: Qualitative data collected throughout the trial is supportive of the statistical findings, where it is asserted that the use of a short video clip or a radiographer having a short conversation with patients before their scan reduces pre-scan anxiety.

Introduction

Severe anxiety has been reported in patients undergoing magnetic resonance imaging (MRI) even in individuals who do not consider themselves to be generally anxious or affected by claustrophobia.[1,2] Invariably, such anxiety makes for an unpleasant experience and one of clinical significance since it may result in considerable delay to the scan or in extreme cases, refusal to have an MRI scan. This can have adverse clinical consequences when MRI scans are required for important diagnostic purposes. Physiologically, motion artifacts and an increase in respiration, fluid flow and pronounced swallowing are all associated with acute anxiety and may potentially impede MRI image quality.[3] According to Tischler and colleagues, 71.6% of radiographers believe anxiety to be a common issue in MRI.[4]

A variety of interventions have been trialled by researchers in order to clinically ameliorate anxiety before radiological procedures. These include psychological and pharmacological interventions such as hypnosis, mock MRI and in more severe cases, the availability of sedation.[5–9] Alternative approaches have focused on the offer of additional written information which clearly describes what to expect when having an MRI scan.[1,10,11] Mathers et al. reports on the diverse informational needs of patients and recognises that a single approach to pre-MRI

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counselling is unlikely to be universally effective.[12] It is a generalisation, though a reasonable one, to assert that most patients undergoing MRI scanning will have a relatively limited knowledge of this diagnostic procedure beforehand and are likely to have sourced their knowledge through informal social networks such as family and friends.[12,13] Moreover, Chesson et al. observe that over half of those patients enrolled in their study were found not to have been aware of the type of radiological investigation they were to receive.[13] Possessing such limited information about the procedure could impede on an individuals' perceived level of control and as such increases the sense of fear and uncertainty regarding undergoing a scan.[10]

This paper reports qualitative findings from within a larger randomised control trial. The primary objective of this study was to explore the use of two contrasting interventions for informing patients prior to their MRI scan. The trial contained three arms. The control arm consisted of usual practice, with patients receiving an MRI scan appointment letter and a standard information leaflet. There were two interventional arms. The first intervention comprised of a short video clip which describes in lay term the entire MRI scanning process. The second intervention comprised of a telephone call with a radiographer before having an MRI scan. It was the aim of this study's qualitative component to elicit an understanding of patients' experience of receiving one of the study interventions and whether or not such intervention was perceived to be of benefit in terms of alleviating any fears, concerns or informational needs pre-MRI scan.

Methodology

This qualitative study used a grounded theory approach which formed an adjuvant component of the overall trial.[14] Questionnaires consisting of three free-text response questions were administered to all of the 74 patients recruited to the MRI anxiety trial. The questionnaire was designed to establish patients' experiences of the intervention they had received and their reflections pertaining to the information they had received about their MRI scan. These questionnaires were administered post-scan. Of those who completed and returned the questionnaires, a small subsample were interviewed ($n = 6$). In-depth interviews with patients were informed by questionnaire results and explored in considerable depth, how patients had felt about the information they had received prior to their scan and how/if at all this had helped prepare them for their MRI and ameliorate any pre-procedural anxieties.

Data collection

Opened-ended questionnaire responses

All 74 participants from the main trial completed the post-scan satisfaction questionnaire. This questionnaire addressed specific aspects of having an MRI scan in order to extract the views and preferences of patients concerning the interactional delivery of the MRI service, with a particular focus on pre-scan preparation. For ease of completion, the questionnaires were short in length and simplistically formatted, consisting of three open-ended questions, all of which addressed topics which had been asked about in earlier binary 'closed-questions' which are reported in the quantitative paper.[14] Open-ended questions enabled respondents to share thoughts on the MRI experience and how they felt about the pre-scan information. Before dissemination, the questionnaires were piloted by a small group of patients ($n = 4$) and radiographers ($n = 2$) in order to quality assure the design, layout and the clarity of questions.

Post-MRI scan in-depth qualitative interviews

In order to establish a more detailed and in-depth appreciation of patients' experiences of the MRI scanning procedure and pre-scan information, a small sample of patients were interviewed. Interviews were semi-structured in design (see Appendix 1) and undertaken with a small sample ($n = 6$) of those who had responded to the questionnaire. Participants were strategically selected according to their characteristics and appropriateness,[15] with consideration of selecting two participants from the three different arms of the trial. Interviews were conducted by the same research radiographer with prior experience and training in undertaking interviews, on a one-to-one basis over the telephone at a scheduled time of up to three weeks following their MRI scan. The researcher followed a semi-structured interviewing format whilst remaining neutral throughout. This ensured that key matters were addressed whilst also allowing participants to share, openly, their entire experience. This interview format was informed by current literature on semi-structured research interview design in health.[16,17]

Data analysis

A thematic approach was utilised for identifying recurrent categories emerging from the qualitative data using systematic steps of data condensing, coding, categorisation and theme identification.[18] This process was guided by the principles of inductive thematic analysis.[19] As such, themes were identified and grouped into categories and then subcategories. Interview transcripts were read on three occasions by the research radiographer in order to re-verify those themes recurrently identified. Anonymous verbatim excerpts of recorded data were extracted where they underlined or highlighted particular themes or concerns of prominence across the data set. A second member of the research team read through the lead researcher's preliminary data analysis (inter-coder reliability). The role of the second researcher was not to lead on data analysis, rather to peer-review the analytic process of coding in order to guard against unintended researcher bias or misinterpretations. Themes were identified as responses were reviewed, thus, emergent from the data in-keeping with a grounded theoretical approach. Given the small size of the qualitative data set within this larger trial, all coding was undertaken by hand without necessity for computerised qualitative data analysis software.

Thematic analysis is supported by a concept map (Fig. 1) and direct quotations which are reported in the results using italicised text.

Results

Questionnaires were completed by all 74 participants who were part of the clinical trial. This included completion of the free-text responses. Six participants (two from each arm of the trial) partook in in-depth one-to-one interviews with the research radiographer. Interviewee characteristics are listed in Table 1.

Free-text responses on the satisfaction questionnaire

Questions seven to nine of the post-scan satisfaction questionnaires were open-ended in design and were therefore invitations for free-text response from participants. Overwhelmingly, participants in the interventional groups commented positively about the provision of pre-MRI scan information they received and this was contrastable with the relatively indifferent responses observed among those who received the standard information letter (Table 2).

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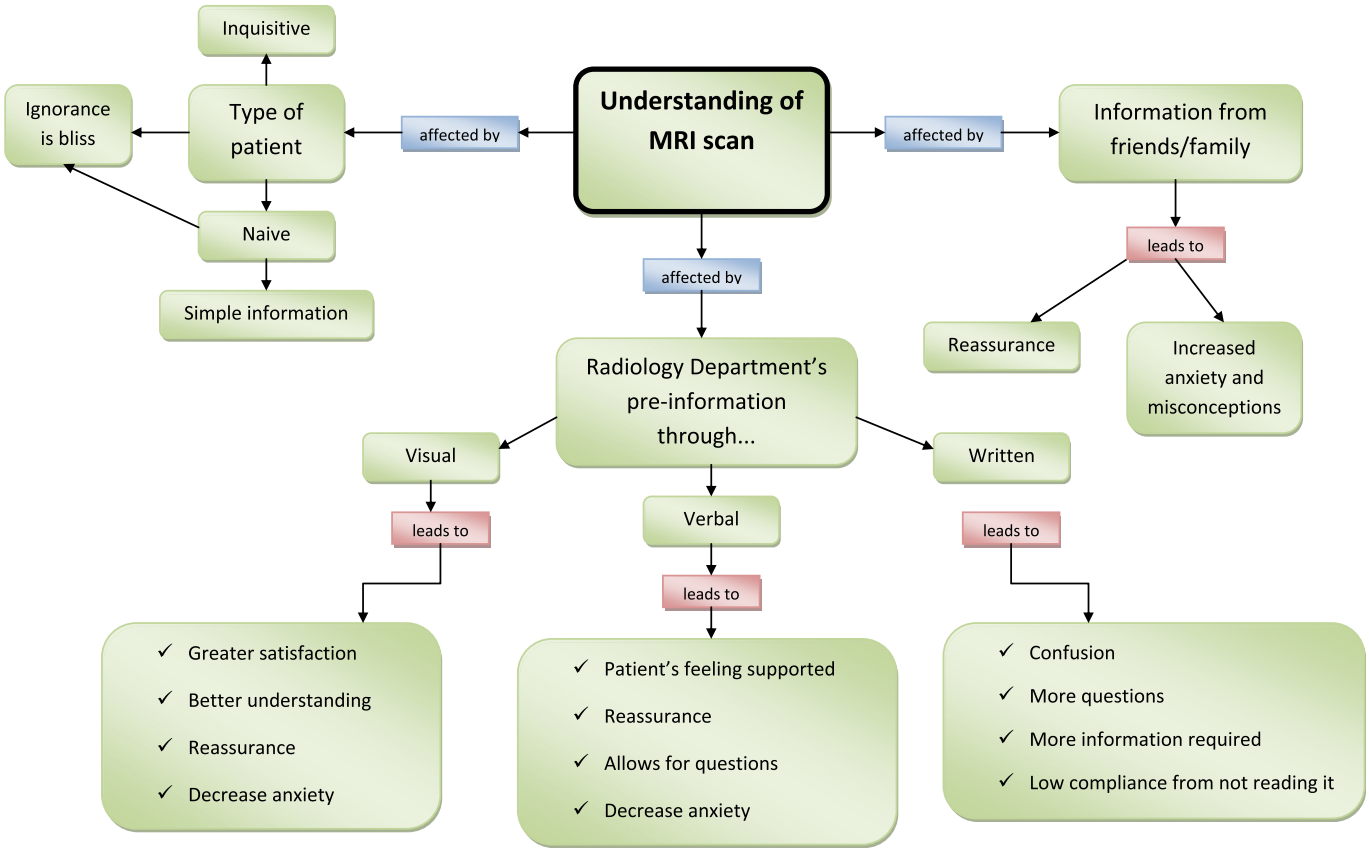

Figure 1. A concept map of the informational requirements of the participants.

Table 1
Interviewee characteristics.

Interviewee	Gender	Age	Intervention group	Area scanned	Key themes
1	Female	55	DVD	Head	• Simple and clear information • Individualised information • Awareness/expectations of scan
2	Female	36	Phone call	Spine	• Information from family and friends • Simple and clear information • Individualised information • Awareness/expectations of scan
3	Male	74	Control	Cardiac	• Anticipation: waiting for the MRI scan • Simple and clear information • Awareness/expectations of scan
4	Female	77	Phone call	Head	• Information from family and friends • Anticipation: waiting for the MRI scan • Individualised information • Awareness/expectations of scan
5	Female	28	Control	Spine	• Information from family and friends • Anticipation: waiting for the MRI scan • Simple and clear information
6	Male	49	DVD	Head	• Simple and clear information • Individualised information • Awareness/expectations of scan

Table 2
Comparative table of words and phrases used by patients to describe the information material they had received about their MRI scan prior to the procedure across interventional arms of the trial and usual protocol group.

Intervention groups	Control group
'*Great*'; '*helpful*'; '*reassuring*'; '*excellent*'; '*reduced confusion*'; '*clear*', '*simple*'	'*Ok*'; '*sufficient*'; '*satisfactory*'; '*fine*'; '*complicated*'; '*aesthetically unpleasing*'; '*no comment*'

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Analysis & discussion

Identified themes

Expectations of having an MRI scan: awareness of the procedure

A key and recurrent theme across the data set was that of 'expectation' and a sense of awareness of and preparedness regarding what to expect, procedurally during an MRI scan. For those participants who had been randomised into the short video clip group, it was evident that such a visual resource assisted patients in terms of what to expect when they arrived for their scan. Of particular interest was that among those who did not receive this intervention, such a pre-scan resource was suggested;

> *"I would have liked a DVD or pictures of the scanner, I had no idea what to expect"*
>
> - Participant in the control group

Another participant shared;

> *"More visual information would be useful via perhaps an internet link"*
>
> - Participant in the control group

One of the participants who had undergone an MRI scan shared their perspective as a patient and healthcare professional;

> *"Although I'm a [names profession] who works at the hospital, being on the receiving end is a completely different experience. The DVD provided me with a nice simple explanation"*

Importantly, this participants' insight reminds us that when in receipt of diagnostic scanning, the anxieties universal to human experience are ones to which we may all be susceptible in such circumstances; irrespective of prior knowledge or awareness, reassuring and ingestible information about the MRI scan is welcomed. Another participant (also a healthcare professional) explained;

> *"It is scary how different being on the other side is; you get that feeling of vulnerability especially when you realise you don't know much about the procedure"*
>
> - Participant in the control group

One participant who had been randomised into the control group shared with the researcher that they had accessed online information available through the National Health Service (NHS) website which they described as having been helpful to them in understanding what an MRI scan was and what it would involve for them. Professionally, a concern here would be regarding the variation between hospitals in terms of the layout and organisation of scanning departments. On this basis, service specific information accessed online or elsewhere may not accurately reflect what the patient will experience. For instance, there may be some local variation in departmental protocols and procedures. The Department of Health has identified this concern and advocated for more standardised information across the NHS.[20]

Information tailored to meet individual needs

The diversity of peoples' needs in terms of how best they respond to different formats of information about having an MRI scan[1] was un-ignorable and when a resource which is accessible to a wide spectrum of information acquisition styles is available, the response of patients was clearly embracive of this, one patient told the researcher;

> *"I don't usually read the information within appointment letters, only the appointment date and time. Information doesn't sink in with me without images or pictures so I liked the DVD"*
>
> - Participant in short video group

Likewise, the opportunity to ask questions, directly, of an appropriately qualified and experienced radiographer about what the MRI scan would involve was welcomed and those participants who received this intervention disclosed the value of direct conversation as an unrestrictive and personalised source of information.

> *"Receiving a phone call was helpful, the person I spoke to was very understanding and supportive"*
>
> - Participant in the telephone conversation group
>
> *"I had many questions to ask which were clarified during the phone call. Even though my questions may have been silly, the person I spoke to was professional and friendly"*
>
> - Participant in the telephone conversation group

Generic, arguably, tokenistic provision of information was comparably associable with disengagement from patients;

> *"Didn't read much of the letter, thought it was another CT scan"*
>
> - Participant in the control group

And may lead to undue anxiety;

> *"I had a CT scan before so was expecting it to be similar, so after my MRI scan I was very anxious and shook up"*
>
> - Participant in the control group

Far better received was the notion of information which contained pictures of the MRI scanner or diagrams which better prepared patients for what to expect. Naturally some patients of a more inquisitive leaning wished to receive more comprehensive detail of MRI scanning than others. Caution should be exercised here however, since the data points clearly towards a need for accurate and comprehensive information about having an MRI scan and that this information is worded in an easily interpretable and visually appealing way. Patients in the control group generally expressed that they would have preferred more information about their scan. For example;

> *"How does the scan actually work? Any side effects?"*
>
> *"More details on how and what happens during and after scan e.g. results"*

In free-text responses to the post-intervention questionnaires, patients who received information by means of a telephone call before their MRI scan frequently commented on the value of speaking to a radiographer prior to their scan and its contribution to reducing their felt confusion about what an MRI scan was and fears they may have harboured about having the scan. A one-to-one conversation helped patients feel at ease before a scan and facilitated greater 'calmness' post-MRI. Crucially, a phone call openly invited patients to ask questions which may have otherwise been worrying them until the day of their scan.

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In the final free-text question of the post-scan questionnaire, patients were asked to share thoughts on how the overall experience of having an MRI scan might be improved. Typically, responses, in concordance with those views expressed above, concerned aspects of pre-scan preparation. This included practical aspects of having a scan, including a suggestion from one patient pertaining to the claustrophobic or enclosing nature of MRI scanning;

"I have seen pictures of scanners with mirrors allowing you to see out at all times – that would be useful and make it more comfortable experience"

Informally acquired information about having an MRI scan: the shared experiences of friends and family

"I knew someone who had an MRI three months before me so they had told me all about it, so the DVD was useful and re-assuring in confirming everything they had told me"

- Participant in the short video group

Patients across all trial arms who were interviewed shared that much of the information they had obtained about what to expect from their MRI scan came from informal conversations with friends and family. Naturally, this influenced their perceptions of having an MRI scan and it was noted that these participants had felt reassured by what family members or friends who had previously undergone MRI themselves had said to them. These experiences were positive ones and ones from which patients had derived great comfort (though it is accepted that given the small sample size, such disclosures are limited in their representativeness beyond those participating):

"My friend had a scan a couple of weeks back and told me to keep my eyes shut and relax and that I would be fine"

- Participant in the telephone conversation group

"I was well prepared for my MRI scan as many family members of mine has had multiple scans, they had told me it is very noisy and can be scary when you first go in but you soon relax"

- Participant in the control group

The prominence of family and friends as a supportive network and providers of informal information and reassurance before an MRI scan was further evidenced by a participant who was randomised to the short video group in one of their free-text questionnaire responses, and inferably, the video clip for this participant could be seen as a supplementary resource which clarified any perceptions of what an MRI scan would involve;

"My grandson and sister have had MRI scans and told me all about it so the DVD was great in clarifying what I already knew. I did find it useful for giving me some new information too"

- Participant in the short video group

Anticipation: waiting for the scan

Waiting is inherently anxiety inducing in any healthcare context, whether for patients on the waiting list for a diagnostic or a treatment procedure,[21] or in the waiting room prior to a procedure.[22,23] There has also been one reported study within the context of waiting for an MRI scan.[24] This theme was therefore not a surprising one. Whilst being on the waiting list for an MRI scan was a shared anxiety-inducing experience, as described by one participant below;

"I did feel that the wait for the MRI was long, several weeks on the waiting list not knowing what was wrong with me was the most distressing for me"

- Participant in the control group

Of particular and repeated note across the qualitative data, was the acute anxiety of waiting to be called in for the actual scan. This might be described as 'waiting room' anxiety and associated with the build up of tension.

The MRI department's appointment letters request for patients to arrive early for their appointment within the department. This provides time for completion of the requisite safety questionnaire. In some cases, patients had arrived early for their scans, which combined with a delay in the days scanning schedule, led to regrettably long waits for them. In these cases, participants shared that this was a critical contributor to their anxiety;

"I was waiting for a good hour before I got called in. I was quite early yet it tells you on the letter to come 20 minutes before your appointment time. Sitting in the waiting room for that long, you start collecting unpleasant thoughts"

- Participant in the control group

One patient experienced a similarly discomforting delay, though this occurred not in the waiting room but within the scanning changing room. Though they had been called in for their scan, an unforeseen delay occurred whilst a previous patient needed additional images.

"I didn't like sitting in the MRI changing area undressed and listening to the noise of the scanner. If I knew there was such a wait, I would have asked my husband to come in with me"

- Participant in the telephone conversation group

This theme and the qualitative data presented, highlight that both information and incidents that occur pre-scan, may have an adverse effect on the patient during and after the scan. This was similar to the findings of Powell et al. where patients who received a DVD pre-scan reported lower anxiety during the scan and lower post-scan distress.[25] This emphasises on the importance of the preparatory phase prior to patient investigations as it can directly affect patients during and after the investigation.

The value of clear and simplified information

A cross-cutting theme and one already cited which applied to all groups (irrespective of randomisation) was that pertaining to the clarity of information provided, regardless of its modality. This is consistent with previous research findings on information which was perceived as difficult to interpret prior to MRI.[26] In the free-text questionnaire responses, patients willingly shared that when worded or presented in a perceivably complicated way, they did not engage fully with the content of pre-appointment material. In fact, Carlsson and Carlsson report that patients receiving information prior to a scan, often, had not had an opportunity to read or adequately ingest the information provided to them.[27]

Whilst it is not verifiable on the basis of the data available, preparing the patient for noise intensity is a valuable point of discussion. Indeed this may account for some discordance within qualitative data where irrespective of whether information about the noise involved in an MRI scan featured in the information provided, patients did not feel satisfactorily prepared for the noise level and the intensity present during an MRI scan. Patients from all three groups commented upon this despite pre-warning in the

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telephone intervention and in the video clip which provides a noise demonstration. This was further supported through the in-depth interviews with a sub-sample of questionnaire respondents who expressed a dislike of the scanners noise level and in one case adding that the music headphones in fact contributed to a more claustrophobic experience;

> *"I refused the headphones to listen to music as they were making me feel more claustrophobic; I preferred the option of having ear plugs; they didn't suffocate me quite so much"*
>
> - Participant in the control group

Further implications of unclear or incomplete preparation were particularly marked for one patient who did not feel adequately informed regards what would be expected of them when attending for an MRI scan;

> *"I didn't realise I has to get totally undressed into my underpants, was expecting only to take off metallic stuff"*
>
> - Participant in the control group

This type of personal information from patients is important, as it highlights how poor communication and inadequate information have been one of the most common causes of complaints and patient dissatisfaction in the health service.[28]

Quantitative data in this trial suggested that both video clip and a telephone conversation with a radiographer significantly reduced patients' pre-scan anxiety when compared with routine preparation of an appointment letter and information sheet.[14] Qualitative findings better uncover those factors which account for this from patients' own standpoint. To date, only a few qualitative studies have been undertaken which explore patient experiences of undergoing an MRI examination,[26,27,29] with no qualitative data found in conjunction with a MRI clinical trial. The effectiveness of different intervention used in previous studies have predominantly been assessed by quantitative approaches[3,25,30,31] which do not clearly reflect patients' feelings towards and experiences of differing approaches to anxiety reduction.

Limitations of this study

There are, as with all smaller scale studies, limitations in what can be asserted as transferable from this work. Aside from the widely recognised limitations of questionnaire data,[32] it is also recognised that variation exists between hospitals in terms of patient information material for those awaiting an MRI scan. This makes it difficult to assert that the interventions trialled are universally better at preparing patients and alleviating levels of anxiety before a scan as compared with current usual practice.

In the analysis process, researchers engaged reflexively with the data, recognising that though respondents referred anecdotally to their own particular experiences of having an MRI scan, responses were universally consistent and revealed a positive reflection on pre-scan preparation to help reduce potential for anxiety. Isolated deviation from the overall consensus is attributable to individual circumstances, though with reflection, would warrant further exploration.

Conclusion

The MRI scan can be a daunting experience for patients. However the availability and provision of clear and well-presented information which meets different individual needs can address patient concerns and misconceptions. Qualitative data collected throughout the trial is supportive of statistical findings, where it is asserted that use of a short video clip or indeed a radiographer making time to have a short conversation with patients before their scan reduces both measurable[14] and subjective disclosures of uncertainty and associated fear. Unsurprisingly, long complexly presented and visually unappealing informational resources do little to alleviate pre-MRI scan anxiety and leave patients dissatisfied, irrespective of the quality of its content. The visually interesting nature of a short video clip is often a reassuring and relatable portrayal of the process of having an MRI scan, though the opportunity to engage interactional with a radiographer and where there is an active opportunity to ask questions is furthermore reassuring. The qualitative findings in this study may have important implications for MRI radiographers in daily practice; informing the need for an inclusive and individually tailored approach to pre-scan information.

Ethical approval

Ethical approval was approved by the Wales Research Ethics Committee 5 (REF 14/WA/1233) as part of a larger clinical trial study.[14] The potential risk of participation in the interviews was considered as reflecting on the MRI experience may trigger negative emotional responses. Nevertheless all participants were provided with detailed information which stated that they have the right to withdraw participation at any state during the study. In conclusion, the benefits of this study were considered greater than the potential risk.

Conflict of interest

There were no conflicts of interest.

Appendix 1. Topic guide – qualitative interviews*

Semi-structured format: key question/conversation points

- Interviewee asked to describe how satisfied they felt with their preparation for having an MRI.
- Interviewee asked whether they felt the information which they received better informed them about their MRI scan.
- Interviewee asked whether the information you received helped alleviate your worries or any misconceptions you may have had about the MRI scan.
- Interviewee asked to briefly describe your entire MRI experience.
- Discussed whether or not nervousness was greater during a particular period (e.g. before or during the scan).
- Interviewer asked if there was anything that would have made the participant's experience better and whether they had any suggestions for general service improvement.
- Interviewee asked if there was any aspect of the MRI scanning process which surprised them/they felt unprepared for.

*Interviews were conducted in Welsh with two participants.

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