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Qualitative study exploring stakeholder perspectives on the use of early MRI in wrist injury pathways in the UK NHS

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ABSTRACT

Objectives Early MRI use varies in the management of acute wrist injuries in the UK, with only a minority of National Health Service (NHS) centres being able to offer this to patients. In this study, we aim to explore the perspectives of staff and patients on the use of early MRI in the management of wrist injuries.

Design This is a cross-sectional qualitative study using semistructured, face-to-face and remote interviews. Interviews were audio recorded, transcribed verbatim and analysed using thematic analysis.

Setting 10 NHS Trusts in the UK.

Participants We interviewed a sample consisting of 37 NHS staff members and 21 patients.

Results We analysed the data into three overarching themes. The first theme described the negative impact of wrist injuries on both staff and patients. Staff reported an uncomfortable feeling that they had 'short-changed' patients with older non-MRI based pathways, and that the consequences of missing a scaphoid fracture could be a 'horrible thing' for patients. The second theme described how early MRI was perceived as a 'win for everyone'. For patients, the win encompassed the relief of a speedy diagnosis which helped them to get better. Staff saw early MRI as a win because it 'revolutionised care' and 'reduced the clinic footprint'. The final theme defined the key ingredients of delivering an early MRI pathway: a simple pathway with clear accountability, timely access to MRI and prompt reporting of results, a safe pathway with safety nets to avoid patients being lost, data and audit of the time to MRI and definitive treatment, bottom-up engagement, clear communication and looking after your team.

Conclusions Our findings contribute to a better understanding of stakeholders' perspectives on wrist injury pathways in the UK NHS.

STRENGTHS AND LIMITATIONS OF THIS STUDY

⇒ This study involved stakeholder interviews in order to better understand their perspectives on wrist injuries.
⇒ Patients were interviewed to explore what was most important to them when being treated for a wrist injury.
⇒ Staff were interviewed to better understand the challenges in delivering wrist injury pathways and in using early MRI.
⇒ A strength of this study is that a wide variety of stakeholders were interviewed.
⇒ A weakness of this study is that interviews were conducted at 10 National Health Service sites, and there may be perspectives not fully captured by this study.

INTRODUCTION

Around 70 000 patients per year in the UK attend hospital with serious wrist pain after an injury, which although painful on examination, looks normal on X-rays. The National Institute for Health and Care Excellence (NICE) advises that this large group of patients who have pain, but normal X-rays, should be given MRI scans early on. Early MRI after the first initial clinical assessment represents best care as serious injuries requiring early treatment are identified. Early MRI also allows reassurance for those without serious injuries to get back to usual activities quickly. It also potentially saves National Health Service (NHS) resources by reducing unnecessary and costly clinic attendances.[1] Although only a minority of scaphoid fractures detected on MRI go onto not heal (non-union), the negative consequences of non-union for patients can be very significant in terms of wrist pain and dysfunction, as well as the morbidity of non-union surgery which also has a considerable risk of failure.[2 3] The litigation costs relating to missed scaphoid fractures are quite considerable for the NHS.[4]

Although NICE guidance recommendations and benefits of early MRI scans are clear, we know from our recent national (UK) survey that only 13% (11 of 87) of centres are currently able to follow the NICE guidance for early MRI.[5] This implementation gap between best evidence recommendations and what happens in clinical practice is complex and requires further investigation.

This qualitative study was, therefore, designed to explore stakeholder perspectives relating to wrist injury pathways in the

Table 1 NHS Trust characteristics

Site	Catchment population (k)	Tertiary referral or DGH	ED (n)+MIU (n)	Pathway type
1	700	Tertiary	2+2	Early MRI
2	900	Tertiary	3+0	Early MRI
3	550	DGH	1+5	Delayed MRI
4	750	Tertiary	1+2	Early MRI
5	1000	Tertiary	1+1	Delayed MRI
6	500	DGH	1+1	Delayed MRI
7	400	DGH	1+1	Delayed MRI
8	390	DGH	1+0	Delayed MRI
9	600	DGH	1+1	Early MRI
10	500	DGH	1+1	Delayed CT/MRI

DGH, district general hospital; ED, emergency department; MIU, minor injuries unit; NHS, National Health Service.

UK NHS. Specifically, we aimed to understand (1) what is important to patients when being treated with a wrist injury and (2) to explore the challenges faced in delivering wrist injury pathways and in using early MRI.

METHODS

Study design

We conducted a qualitative study at 10 NHS sites (table 1) using semistructured face-to-face and remote interviews with 21 patients and 37 staff stakeholders.

Our qualitative study team included a hand surgeon (BJFD) with over 10 years clinical experience and qualitative research training, an anthropologist qualified as a physiotherapist (FT), and two researchers with experience in qualitative research (AG and TS). BJFD conducted all the interviews and led the data analysis. FT and AG played a collaborative role in analysis. We followed the Consolidated criteria for Reporting Qualitative research guidance and used this checklist (online supplemental appendix 1).[6]

Sampling and data collection

Sites were selected purposively to ensure a mix of hospitals based on their current pathway type (early MRI vs delayed MRI vs other, as detailed by our previous work[7]) and to reflect a diversity in the types of hospital within the NHS (eg, differences in patient volume, the setup of emergency services (emergency departments (EDs) and minor injuries units (MIUs)) and type of hospital (district general or tertiary referral hand trauma unit).

Staff participants were sampled purposively in collaboration with the local principal investigator (PI). This was an appropriate sampling method as there are only a small number of key stakeholders at each site: this collaborative approach enabled the capture of key views from all stakeholders in relevant departments. The local PIs as key stakeholders were generally interviewed first, to inform snowball sampling. After this first site visit and interview, further key stakeholders were identified and interviewed.

The sampling strategy was purposive and provided information power appropriate for the aims of this study.[8] Sampling for qualitative research is based on reaching a point where robust and useful ideas develop from the data.[9 10] The issue of data saturation is contested, and the point of saturation (judged as no new information) is rarely operationalised.[11] Most recently, Braun and Clarke argue that the concept of saturation is incompatible with thematic analysis.[10]

Between October 2023 and October 2024, BJFD conducted interviews with patients and staff stakeholders either face-to-face or remotely, according to participant preference. The interview schedules were developed with the research team including our patient representative (LB) (online supplemental appendices 2 and 3). The patient interview schedule included questions that explored the patient's story of their injury, their treatment, what they felt was good and not so good, what they valued in the process, and what they felt could be improved. The staff stakeholder interview schedule included questions that explored the current local wrist injury pathway, views on early MRI, what works well, who is key in running the wrist injury pathways, team communication, the use of data and challenges to the service.

All participants were given a study participant information sheet, followed by the opportunity to ask questions, before agreeing to participate and completing the consent form. BJFD audio-recorded and made field notes. The interviews were transcribed by a professional transcription company and BJFD checked the transcripts for accuracy by reviewing the transcripts against the audio recordings. The transcripts were then uploaded as Microsoft Word documents and organised onto NVivo qualitative data analysis software, V.12.[12] All audio recordings and transcripts were deidentified by removing data that might be used to identify them, and by using non-identifiable study identification numbers in place of participant names.[7–10 10–12]

Data analysis

This qualitative study used thematic analysis as described by Braun and Clarke.[10] This method is widely used and well recognised within the field of qualitative research and involves the researchers immersing themselves in the research topic and acknowledging their subjectivity. This involved the following stages: (1) familiarising with the data set, (2) preliminary coding, (3) further development of codes, (4) provisional development of themes, (5) refinement of themes and (6) writing up. One member of the research team was involved in all six stages (BJFD), while another member (FT) repeated stages 1 and 2 for a small number of transcripts, before participating in stages 3–6. The researchers work independently and reflected together on analytic ideas, challenging each other's subjectivity in a way that allows themes to develop dialectically. The trustworthiness of our findings hinged

on a collaborative approach to research rigour, involving members of the research team and our PPI (patient and public involvement) representative.[13] Data were analysed by BJFD and FT and reviewed by the third researcher (AG). Data collection and analysis occurred simultaneously. The data for the patients and staff stakeholders were analysed separately to allow comparison. We then explored differences and similarities and integrated the themes from patients and staff stakeholders in data meetings. This process involved collaborative discussion in several research meetings to develop and finalise the themes. The commonality in certain themes meant that it was decided to combine the staff and patient components of the analysis.

Patient and public involvement

The study was designed, analysed and written up with contributions from our patient representative (LB). Contribution included developing the interview schedule and providing feedback on the interim themes and manuscript.

RESULTS

Site and stakeholder characteristics

The study was carried out at 10 NHS sites (table 1). Early MRI was defined as that arranged from the first clinical assessment in the ED or MIU, while delayed MRI was defined as that arranged after a minimum of one further clinical assessment.

The stakeholders included managers, ED clinicians and practitioners, radiologists, radiographers, administrative staff and surgeons (22 consultants (12 orthopaedic, 7 radiology and 3 emergency medicine), 6 nurses including advanced nurse practitioners, 5 extended scope physiotherapists, 2 clinic practitioners, 1 radiographer and 1 administrative team member). Patients were recruited after being treated for wrist injury with normal X-rays. Patients were sampled purposively to include men and women of different ages, including 10 males and 11 females with a median decade of age of 40–49 years. The median decile of social deprivation in the sample, as indicated by the Index for Multiple Deprivation, was 6 (range 1–9). A decile of 1 means the postcode is in the bottom 10% of the deprivation index, a decile of 2 means the postcode is in the bottom 20%, and so on.

Overall results of analysis

We organised the data into three overarching themes. The first theme described the negative impact of scaphoid fractures. The second theme described how early MRI was a win for everyone. The final theme defined the key ingredients to delivering a streamlined pathway with early MRI which consisted of seven key ingredients: Simple pathway with clear accountability, access to MRI and prompt reporting, a safe pathway with safety nets, data and audit, bottom-up change, clear communication and

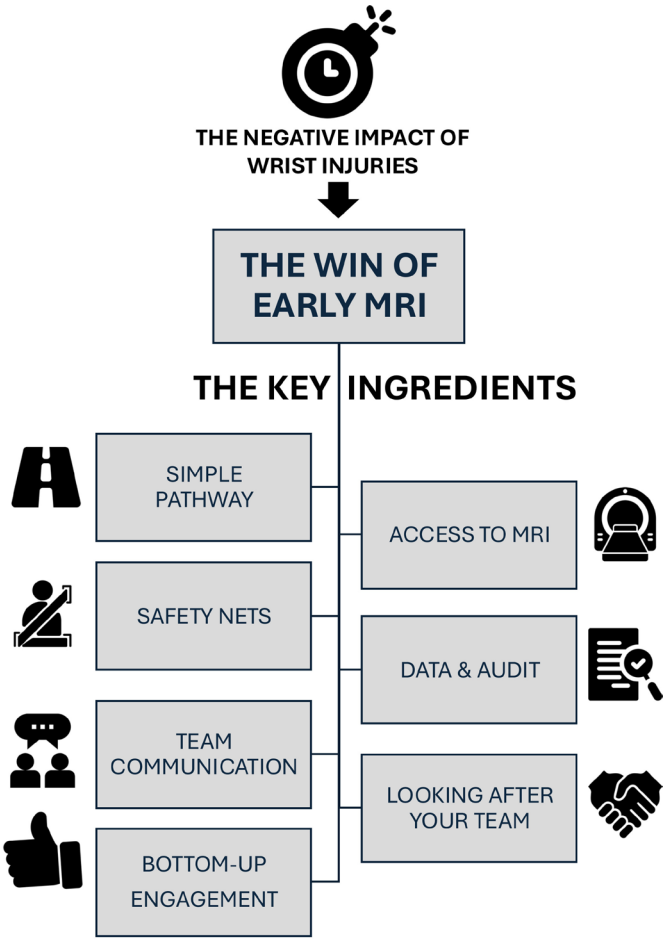

Figure 1 A conceptual storyline.

care within the healthcare team. A conceptual storyline of themes is shown in figure 1.

The negative impact of wrist injuries

Patients described the negative impact of their wrist injury on their lives, and the 'agony' of waiting and worrying without a diagnosis. Patients felt the waiting was 'awful' and worried about worst-case scenarios.

> It was pretty awful because I didn't really know what was wrong (Patient)

Some imagined the worst cases and how these might impact on their future. This worry persisted while waiting for scan results and was a key reason that they felt speed of diagnosis and treatment mattered:

> I was so worried. I was thinking all sorts of things like, 'Oh gosh, if it's a fracture I could be out for like—it'll be months before I have full range movement with my hands and I wanted to do clinical work and I had lab work I had to get done and I was under huge pressure with deadlines. (Patient)

Staff and patients described their concerns about missing a scaphoid fracture in terms of the consequent 'bad wrist'.

There is the horrible thing about people who have bad wrists as a result of the missed scaphoid. [Staff]

Staff shared their concerns about the inadequate nature of older non-MRI based pathways which could lead to patients feeling 'short-changed'.

They're basically told there's nothing wrong, call us if there's a problem and then down the line, they feel they've been told there's nothing wrong with them, and then ifsomething is a problem, they feel pretty short changed by the health service. [Staff]

Patients worried that they might never fully recover after a 'life-changing' scaphoid non-union, and that they would have to make long-term adjustments such as. Patients felt that not pursuing a diagnosis meant that nothing was being done to help them. Some felt resigned to a poor outcome several months after scaphoid surgery to address a non-union.

So I'm quite open minded about the fact that the hand might not ever be the same.' 'Now I'm just left with this wrist which I need to adjust to that now so. [Patient]

Staff were dissatisfied with older pathways of wrist care which did not necessarily benefit staff or patients. They described repeated clinical attendances, prolonged cast immobilisation and delayed (sometimes absent) diagnosis, all leaving patients feeling pretty 'short-changed by the health service'.

I think there was a lot of x-raying at two weeks—and a lot of prolonged casting—a lot of not really know—and then fobbing off into the next person's clinic.' [Staff]

It makes the patient feel as though they're not just, here I am, I've come in, I'm telling you that I've hurt myself and I'm sore and nobody's really doing anything (Staff)

Staff described the repercussions of a missed scaphoid as a 'medicolegal minefield'. Medicolegal concerns and significant payouts were cited as reasons for wanting to improve pathways of care.

A sort of counter argument showing that the Trust has paid out £5 million in the last few years to scaphoid claims' [Staff]

Early MRI is a win for everyone

This theme describes how early MRI was a win for everyone, providing benefits to patients, staff and the care system. Patients described getting a diagnosis as a 'huge relief' and were reassured by knowing what was going on.

It works for the pushers because you're going to have an answer and it works for the pullers, the receiving people, because you're going to get someone packaged when they come through your door. [Staff]

The perceived relief and reassurance of an early diagnosis was of great value to patients.

[getting a diagnosis] was like putting a polo in a can of coke and watching It explode [Patient]

The diagnosis supported having a clear plan of medical treatment and a sense of finality.

I think by having that diagnosis it's reassuring in terms of you can then have the medical treatment that is required to make it better. [Patient]

Patients valued the speed at which things happened in terms of getting MRI scans and clear treatment plans. This was important for getting back to things and one's daily business.

If they can get that scan then everyone is just reassured and they can get on with things better and everyone's lives move forward quicker, don't they? [Patient]

I mean the whole thing is—if there's nothing wrong with it then you can go ahead and go about your daily business knowing that you're not gonna make it worse.' [Patient]

Patients also felt that having the reassurance of a diagnosis was positive for mental health and contributed to a good recovery.

I think there's a huge …. like some psychogenic component to healing, because as soon as I had that news, I feel like my wrist healed so rapidly. I felt like it was getting better every day and it felt like it got better very quickly after that' [Patient]

It's brilliant on a mental health view as well because it gives you reassurance [Patient]

Staff described MRI as the 'gold standard' and explained how faster and more streamlined pathways had 'revolutionised care for patients with wrist injuries' by optimising the delivery of care. Staff felt that they would want to get an MRI and diagnosis early if they were in the patient's shoes because this would mean timely treatment and return to activities.

I suppose I come from a slightly different perspective because I know a little more than someone off the street, but I would be like, 'Hmm, I have an active lifestyle, I want to maintain it. I want the test, thank you [Staff]

Staff also described how early MRI could help support busy trauma clinics (which were sometimes described as 'drowning') and free up clinic space, thereby providing time and cost savings for the organisation as a whole.

In the clinic, I think there's a real understanding that early MRI reducing clinc footfall is good for everyone, and that means the elderly lady and the little child move through quicker. [Staff]

…for the institution in that then you are with confidence discharging at an early point, there is a significant cost saving to be made there [Staff]

The key ingredients to a wrist injury pathway with early MRI

The final theme describes the key ingredients staff felt were most important in delivering a streamlined pathway with early MRI. As the content of this theme was the most detailed, it is divided into seven ingredients.

Simple pathway with clear accountability

Staff emphasised how the pathway should be as simple as possible with clear accountability, as this meant that the process was easier to communicate and more likely to be followed. Staff felt it was important that roles and responsibilities were clear, and that shared digital resources were helpful.

> The simpler it is, the reality is a lot of people don't really do this very often so, 'Keep it simple [Staff]

> So, it's having that clear pathway of when the MRI's done, what happens to the result 'cause that's what I've found now is the result, who it goes to and who actions it. [Staff]

> 'hen you have got that common resource that everyone will be using and everyone can see, you've got visibility, you can see what's going on, it can be dipped into from anywhere within the organisation. *[Staff]*

Access to MRI and prompt reporting

Staff described how MRI capacity was a vital prerequisite to a streamlined pathway, and that once you have the MRI capacity, the rest would be relatively straightforward.

> Once you've got the scans, then making the pathway—and the education bit… That's actually quite easy [Staff]

Prompt reporting of MRI scans was also seen as vital for a pathway to function. Some felt that MRI capacity could be anticipated, discussed and planned for.

> It's a bit useless having an MRI without a report '/Staff]

Staff described MRI capacity as a frequent barrier to achieving a timely MRI scan and implementing an early MRI pathway. MRI scanning capacity was described as 'our biggest problem' and a 'struggle'.

> 'You speak to people in other centres and one of the barriers to implementation that they see is that they don't have spare time in their scanners' [Staff]

In centres which did not have early MRI available, concerns were expressed regarding direct ED access to MRI.

> Well particularly now that the guidance is suggesting that ED should have direct access which as far as I'm concerned, because I'm also the lead for the MRI service, I am very twitchy about that. [Staff]

Staff were concerned that opening the MRI service up to direct ED access may result in being 'overwhelmed' or an 'absolute deluge'. While it was felt that there was a lack of quality control in the ED referrals, then this could have significant negative consequences for the early MRI pathway.

> Particularly at the outset because sure, there will be the odd person that goes through inappropriately, but if you've got some nay sayers and they say well, 40% of these people should never have gone into the pathway, it's going to be dead in the water before it gets going. [Staff]

A safe pathway with safety nets

At times, staff were worried about patients getting lost in the care pathway and felt that safety nets were needed to avoid this.

> You wouldn't want patients to get missed and lost in that system do you know? That is a bit of a fear for us. [Staff]

Staff also felt that patient access, for example, providing a contact, was a key element to a safe pathway, and patients described the importance of access to them.

> 1 mean, there's a safety netting system where we would give the patients a phone number, there's a patient information leaflet with general advice on and a phone number to ring if they haven't heard anything within seven days, to ring up. [Staff]

Data and audit

Staff described the change and evolution of pathways over time and felt that data and audit enabled the continual streamlining and improving of a pathway. Audit and data were also valuable to demonstrate the benefits of a streamlined pathway.

> Our process has been iterative, we've done it, we've spotted areas that remain weak or that become weak because of unforeseen issues and we've addressed them [Staff]

> For me it's all about data and it's not about doing sort of research projects. It's audit. /Staff]

However, staff also recognised that data gathering could be a burden in practice: "I *suppose data's always a problem isn't it?"*

Change should be bottom up

Staff felt that you needed every stakeholder to be engaged and on board from the off. Some thought that staff 'champions' should take the lead in each department and make the pathway work. These should be front-line clinicians from the team with the persistence and enthusiasm to drive it. There was a sense that the drive to change should be partly fuelled by 'a bottom-up drive rather than a top-down drive.'

So, because everybody was engaged—and everyone could see that it was gonna be beneficial—there were no barriers [Staff]

If your champion is somebody in a clinical management position, there's not going to be the same engagement by the people in the trenches, if it's coming from the trenches it's going to fly because everyone is engaged, everyone wants it to work. /Staff]

Clear communication

Staff felt that clear communication was vital by staff, and lack of intra and inter team communication was described as a 'nightmare'. Staff emphasised the value of dispersing clinical knowledge for engaging staff with change.

Communication is vital, just because there's so many areas that are involved. [Staff]

And also you can make it really visible in the department. So I've put like sheets up everywhere. I've put it on the shared drives [Staff]

Patients also valued clear communication of information so that they always knew what was going on in advance.

And I thought that was really nice 'cause they were like explaining everything pretty much from the very start. [Patient]

Looking after your team

Staff also felt that a key ingredient to an effective pathway was looking out for staff well-being. Some described short staffing, burn-out and stress from needing to do service development work in their free time. Consequently, staff emphasised how important it was that specific pathway roles have funded time allocated to them and that staff were not just expected to do this in their free time.

She burnt out—'cause she was trying to do exactly what you were just saying. She was trying to clinically work, do her Master's degree, and do extra Management stuff—and she just plummeted—she just hit rock bottom.' [Staff]

'There has to be some protection of the staff—to ensure that it continues—allocated admin-time to ensure that they can do all of that monitoring' [Staff]

DISCUSSION

We aimed to understand what is important to patients when being treated with a wrist injury and to explore the challenges faced in delivering wrist injury pathways. We present three themes relating to the perspectives of patient and staff stakeholders. First, the study highlights the significant problems that wrist injuries pose in terms of their negative impact on patients, staff and health services. Second, it supports the value of early MRI in addressing these problems. Third, the findings describe the seven key ingredients needed in order to introduce an effective wrist injury pathway with early MRI.

Leighton *et al*[14] describe both the practical limitations and the psychological impact of scaphoid fractures; Watson *et al* highlight the practical limitations associated with distal radius fractures that can lead to increased dependence on others.[15] Our findings also indicate that staff shared concerns about the poor outcomes of scaphoid non-union and potential medicolegal consequences: this is unsurprising given the clinical evidence in this area.[2 4]

The reasons why MRI is a win for everyone are centred on the benefits of a clear early diagnosis which then enables a prompt appropriate treatment plan. Our findings described the relief and reassurance experienced by patients by being given a clear diagnosis and treatment plan. A study exploring fracture triage reported similar patient perspectives in terms of the value of speeding up care and the benefits of a prompt diagnosis.[16] There is more qualitative evidence from the chronic musculoskeletal setting supporting the value of a diagnosis to patients.[17 18] In an acute trauma setting, the delivery of a speedy diagnosis allayed patients' fears about the potential negative impact of a scaphoid non-union, thus minimising a very unpleasant period of worrying and waiting.[16]

The Donabedian model of quality assessment can be useful in interpreting key ingredients to delivering a streamlined pathway with early MRI.[19] This model proposes that any given outcome (in this case early MRI of the wrist) is the product of (a) process factors (the way care is organised or delivered) and (b) structural factors (the physical capacity of the service to deliver the target outcome). This study has highlighted the seven key ingredients (figure 1) which can be considered within this model as process factors (simple pathway with clear accountability, a safe pathway with safety nets, change should be bottom up, clear communication) and structural factors (access to MRI and prompt reporting, data and audit, looking after your team). Structural problems, such as insufficient capacity despite optimising MRI efficiency, may require the purchase of more scanners and recruitment of more staff. Structural problems are harder to influence with behaviour change interventions and generally need a different approach, for example, business case or funding.[20]

There is a relative lack of qualitative research exploring orthopaedic trauma pathway implementation. There is some qualitative evidence relating to hip fracture pathways which reinforces the importance of clear communication between clinicians, clear patient information, involving all team members in pathway development, having a simple standardised pathway, as well as providing the appropriate staffing resource.[16 21 22] The results of the Expert Recommendations for Implementing Change study describe how 73 implementation strategies were grouped into 9 clusters.[23] These clusters show distinct commonalities with our findings. For example, the use of 'evaluative and iterative strategies' is consistent with our

data and audit subtheme, while 'support clinicians' is very much along the same lines as 'supporting your team'.

A vital early task in ensuring evidence-based treatment of wrist injuries will be to develop a theoretical understanding of the drivers (or root causes) of the problem, which may then lead to the development of an evidence-based solution to address this problem. The seven ingredients identified in this study provide the valuable context necessary to develop a complex intervention to address this implementation gap. The updated NIHR/Medical Research Council guidance for the development of complex interventions defines understanding the context, as well as the development and refinement of the programme theory while engaging stakeholders, as core elements in this process.[24]

Strengths and limitations

We used a qualitative design to explore the experiences and perceptions about wrist injury pathways. Qualitative research findings offer an interpretation of data and, as such, the aim is not to be 'reliable' 'valid' or 'unbiased' in line with the expectation of quantitative methodologies. The interpretive epistemological position of qualitative research is its strength. We took several measures to increase our confidence in the 'trustworthiness' of the findings: first, we recruited a diverse, purposive and information-rich sample of key patient and staff stakeholders. This purposive sampling approach supports the 'transferability' of our findings to other contexts. Given the nature of qualitative research and that interviews were only conducted with stakeholders from sites which volunteered to take part, it is likely that clinicians from other sites might have alternative or additional views. However, we specifically recruited sites with and without current early-MRI pathways. Second, to support the 'credibility' of our findings, we invested regular research time in 'team debriefing' and data meetings, as well as the PPI consultation in order to challenge and build on our interpretations.

Conclusions

Our findings contribute to a better understanding of stakeholders' perspectives on wrist injury pathways in the UK NHS. These findings have identified the key ingredients for delivering an early MRI wrist injury pathway, and this can enable the development of an evidence-based solutuion to address this implementation gap.

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Contributors BJFD has contributed to the conception and design, the drafting and revising, the final approval and is the guarantor. LB has contributed to the data interpretation, drafting and revising, and final approval. FT and GL have contributed to the conception and design, the drafting and revising, and the final approval. TS and AG have contributed to the conception and design, the drafting and revising, and the final approval.

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Patient and public involvement Patients and/or the public were involved in the design, or conduct, or reporting, or dissemination plans of this research. Refer to the Methods section for further details.

Patient consent for publication Not applicable.

Ethics approval This study involves human participants and was approved by HRA and Health and Care Research Wales (HCRW) (REC 23/SC/0118). Participants gave informed consent to participate in the study before taking part.

Provenance and peer review Not commissioned; externally peer reviewed.

Data availability statement All data relevant to the study are included in the article or uploaded as supplementary information.

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