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Radiographers' Knowledge, Clinical Expertise, and Application of Pain Management Strategies in the Radiology Department Results from a Qualitative Focus Group

ABSTRACT

Background: Radiographers are frequently involved in imaging patients in pain thus requiring a heightened awareness and focus on this crucial issue.

Purpose: To explore the challenges radiographers encounter when imaging patients in pain and to identify strategies that could be implemented to improve overall patient-centered care.

METHODS: A qualitative research study with a single focus group (FG) was conducted using six radiographers working within Irish hospitals. The research questions focused on pain management challenges in the radiology department, particularly identifying radiographers' current practices and strategies to address these challenges. The FG was moderated and video-recorded to facilitate comprehensive analysis. The audio obtained from the FG was transcribed and then analyzed thematically.

Results: Data from the FG identified four main themes: *1) consequences of pain management*, *2) communication*, *3) professional experience*, and *4) barriers*. In addition, the study highlighted the absence of current protocols, policies, and guidelines in practice for the effective management of challenges associated with imaging patients in pain within the radiology department.

Conclusion: The primary challenges identified include the stress experienced by both staff and patients, the potential for obtaining suboptimal images, concerns regarding patient safety, and adverse effects on image quality. This study elucidates the manner in which patient discomfort

adversely impacts the imaging process and delineates the potential implications for radiographers aiming to achieve optimal image quality. At present, there are no established policies or procedures within the radiology department to direct the imaging of patients in pain.

Keywords: Radiographers; Pain management; Challenges; Radiology Department; Consequences.

Introduction

In 2018, the International Association for the Study of Pain (IASP) established a task force to reevaluate the definition of pain. Following a two-year review, the task force recommended an updated definition: "an unpleasant sensory and emotional experience associated with actual or potential tissue damage," along with revisions to accompanying notes. These proposed changes received unanimous approval *(1). Pain is typically categorized into two primary classifications: chronic and acute. Nevertheless, there exists a significant gap in the literature regarding the differentiation of various types of* pain (2). The prevailing consensus defines chronic pain as pain that persists for longer than six months (3), whereas acute pain is typically characterized by its duration of three months or less (4). A further distinction between these two categories is that acute pain generally has a clear and treatable etiology (5). Pain serves as a biological mechanism to alert the human body to potential health compromises. In contrast, chronic pain may arise from underlying and often unidentified causes, which complicates diagnosis and management (6).

However, the consensus is that chronic pain is ongoing pain that lasts longer than six months (3). In comparison, acute pain is regarded as pain typically lasting for three months or less (4). A further distinction between the two is that acute pain generally has a definite and treatable cause (5). Pain is considered a mechanism to warn the human body that its health is compromised. In comparison, chronic pain may have underlying, unknown causes, making diagnosis and management more complex (6).

Imaging plays a crucial role in both diagnosing and managing pain by providing precise anatomical details that guide therapeutic decisions. Techniques like MRI, CT, and ultrasound are essential for identifying the source of pain and are critical in safely performing interventions. While the evidence on improved safety is still evolving, imaging greatly enhances precision, minimizing risks, making it an integral component of modern pain management (7).

Although pain symptoms are widely prevalent in the general population, there remains a significant gap in comprehensive research exploring the various facets of pain diagnosis and management (8). Pain management aims to reduce pain to tolerable levels; however, this often constitutes a complex aspect of patient care (9). Research statistics indicate that nearly one in five individuals suffer from moderate to severe chronic pain, while one in three are hindered from leading an independent life (10). Consequently, pain imposes a substantial economic burden globally. For instance, within the emergency department (ED), pain ranks among the most prevalent presenting complaints, accounting for up to 20% to 40% of attendance (11). Despite extensive research, inadequate pain management and persistently high reports of pain levels remain evident. There have been minimal advancements in understanding how pain management can be enhanced within healthcare departments. A study conducted by Sampson and colleagues (2019) (12) in the United Kingdom revealed that pain management is often not "well aligned with the core priorities" and does not appear to be prioritized among staff

members. Radiographers frequently image patients experiencing pain, underscoring the necessity for them to possess solid knowledge and awareness of pain (9). However, despite their expertise, patients continued to experience pain during their hospital stay. This issue arose partly because radiology departments often lacked comprehensive pain assessment tools, policies, procedures, and guidelines (PPGs) that would have enabled radiographers to address these challenges effectively. Therefore, there is a clear need to improve current practices and care (13).

Patients suffering from acute or chronic pain encounter obstacles daily throughout various facets of the healthcare system, including the Radiology Department. Research indicates that patient discomfort can vary based on a range of individual factors, the specific radiographic technique employed, and the anatomical region being imaged. Discomfort is influenced by variables such as pain tolerance, levels of anxiety, and prior medical experiences. Moreover, the characteristics of the imaging modality and technique utilized can significantly impact patient comfort. Additionally, the anatomical area under examination is crucial, as regions that are more sensitive or necessitate prolonged immobilization may exacerbate discomfort.

Numerous approaches have been proposed to minimize pain associated with radiographic procedures, including the use of immobilization devices such as foam pads and sandbags, as well as adaptations in technique (14). Nevertheless, pain management during these procedures remains frequently inadequate, with many patients reporting unmanageable levels of pain.

This underscores the necessity for an enhanced pain management protocol tailored to patients undergoing radiographic examinations (15).

Radiographers frequently confront the challenge of positioning patients to obtain the requisite diagnostic images, even when such positions may induce discomfort, pain, or distress. The equilibrium between managing pain and ensuring optimal image quality emerges as a critical component of patient care. Radiographers are tasked with assessing each patient's pain levels and mobility on an individual basis, endeavouring to achieve a delicate balance between delivering compassionate cares and fulfilling the necessary physical requirements to attain accurate imaging (16).

The study aimed to explore the knowledge, clinical expertise, and challenges radiographers encounter when imaging patients in pain in the radiology department and to identify strategies that could be implemented to improve overall patient-centered care.

Methods

Research design and materials:

This qualitative study examined radiographers' knowledge, clinical expertise, and associated challenges of pain management when imaging patients in the radiology department. The study presents several specific objectives aimed at enhancing pain management practices within the field of radiology. First, it aims to assess the existing knowledge of radiographers concerning pain management and its implications for patients undergoing imaging procedures. Furthermore, the study intends to investigate the clinical expertise of radiographers in addressing the needs of patients who experience pain during imaging. It will also identify the challenges faced by radiographers in managing pain in these patients. Ultimately, the study seeks to propose strategies that could be implemented to improve patient-centered care within radiological settings.

A focus group (FG) comprising qualified and clinically practicing diagnostic radiographers was conducted to facilitate a group discussion. To ensure the clarity and relevance of the questions, four questions were peer reviewed by the research team, enabling FG participants to provide a comprehensive account of their experiences and viewpoints. This process involved evaluating the questions for their appropriateness in eliciting detailed and insightful responses related to the participants' experiences and perspectives. Feedback from team members resulted in refinements in wording, structure, and content, ensuring that the questions were not only comprehensible but also effectively targeted the phenomena under investigation. This rigorous review aimed to enhance the overall quality of the data collected during the focus group.

Ethical approval for this study was obtained from the XXX

Study population:

Participants were qualified state-registered radiographers working within Irish hospitals. A total of 12 departments were contacted, and Radiography Service Managers (RSMs) in each department were contacted through email, and a study flyer was disseminated to recruit participants. The recruitment period lasted six weeks. To ensure voluntary participation, the flyer clearly stated that involvement in the study was entirely optional and that participants could withdraw at any time without any repercussions. Additionally, RSMs were instructed to communicate that participation was not mandatory and that their support in sharing the flyer was solely to facilitate recruitment. A FG is most effective with a group of 6–12 participants. This number is the optimal size to promote discussion and is feasible for the facilitator to keep the group engaged (19). Six participants from various Irish hospitals agreed to partake in the study.

Data collection

The focus group (FG) was conducted in person, with written consent obtained for audio and video recording. The primary researcher, a female Bachelor's qualified student radiographer, manually transcribed the 55-minute session into Microsoft Word (Microsoft Corp, Redmond, WA). To ensure the accuracy of the transcription, each participant reviewed their transcript for verification, and a second researcher independently assessed a sample against the original recordings. Any discrepancies were discussed among the research team to reach a consensus, and each participant was assigned an identifying number to maintain confidentiality and facilitate data analysis.

Data Analysis

The focus group (FG) data underwent a rigorous thematic analysis following the framework established by Braun and Clarke (2006) to identify codes and themes. The primary researcher utilized a six-step process, commencing with familiarization with the raw data, which facilitated an in-depth understanding of the content. Initial codes were generated during this familiarization phase, leading to the development of sub-themes and overarching themes that encapsulated the key findings.

To enhance the credibility of the analysis, a second researcher conducted an independent thematic analysis. Following this analysis, the two researchers convened to engage in a detailed discussion of their findings. They compared the themes and sub-themes identified, addressing any discrepancies and refining their interpretations. This collaborative discussion was essential in verifying the themes, ensuring that the final analysis was robust and reflective of the data. Ultimately, this iterative process strengthened the validity of the results and provided a more comprehensive understanding of the underlying patterns within the data.

Results

Four of these main themes were identified from the FG study, along with ten sub-themes. The themes identified in this study encompass pain management consequences, focusing on outcomes related to patient safety and implications for radiographers; communication, highlighting the importance of effective communication with the patient and enhancing communication with the multidisciplinary team; professional experience, emphasizing the expertise and skills of radiographers in managing pain; and barriers, which include obstacles like insufficient protocols and policies that impede optimal patient care and imaging outcomes within the radiology department.

The various themes reflected concerns and challenges concerning radiographers aspiring to perform high-quality standard imaging for patients experiencing pain. These themes and subthemes are illustrated thematically in a mind map (**Table 1**).

Table 1: Thematic Analysis Mind Map: Main Themes and Subthemes

Themes	Subthemes
Pain Management Consequence Theme	Patient safety
	Implications for radiographers
Communication	Effective communication with the patient
	Enhancing communication with the multidisciplinary team
Professional experience	Staff expertise

	Lack of experience
Barriers	Equipment
	Demanding clinical environment
	Insufficient protocols and policies

Pain Management Consequence Theme

The context of the Pain Management Consequence theme and associated sub-themes, including patient safety and implications for radiographers, are outlined in **Table 2.**

Table 2: Theme 1: -Pain Management Consequences— Participant Quotes

Sub-theme	*Participant Quote*
Patient safety	'You could actually **physically do more damage** to them as well. **Physically make fractures worse** or yeah, C-spine fracture, **you could potentially paralyse** someone if you don't move them properly and they're a pain or something like that.' (Participant 7) 'You might have gotten a sub-diagnostic **image,** and you also might have inflicted more pain and trauma on the patient, which would lead to them being **unsure about coming for an x-ray again or coming for another procedure**.' (Participant 8) '**Distress to the patient** that could now hate coming down to x-ray and cause a mental block against x-ray future episodes.' (Participant 6) 'You'd have the fear of coming back. I think you mentioned that as well. Have the fear of coming back again. They **associate their first time there with the pain**.' (Participant 7) 'And they'll tell all their family and friends as well "that it's a dreadful place; don't go to it".' (Participant 6)"

	'**Suboptimal images or undiagnostic need for repeats.**' (Participant 6) 'Trying to keep them on the table, that can be like a **safety** thing too.' (Participant 7)
Implications for Radiographers	'**Patients are less cooperative** from a patient point of view. Their cooperation is very **difficult** and makes it longer, the case if you have to have them longer in the room. It's more stressful. **Stressful for both parties**, yeah and **undiagnostic imaging.'** (Participant 5) '**Manual handling** would be a lot more difficult, yeah, when someone's in pain.' (Participant 7) 'The **risk of injury to staff** is a big one as well, especially A&E. When you'd be rushing someone to go to CT before things are managed and things like that. You're not trying to pat slide; an aggressive patient isn't going to benefit anyone.' (Participant 6) '**Delays for other patients as well, inefficient uses of the resources** because we're spending so much longer with this patient. Things could be **delayed,** or other things could get pushed off till tomorrow. They could have been outpatient slots. You're taking a member of staff off the ward as well.' (Participant 6). 'So it's from a staffing point of view, **you need more staff when people are in pain** because you need if they're assisted by two or assist by three.' (Participant 5) 'You're right, the **more stressful** the situation is, the easier it is to make them easier to make mistakes.' (Participant 5)

Communication Theme

Within the communication theme, **Table 3** delineates associated sub-themes, such as effective communication with the patient and enhancing communication with the multidisciplinary team.

Table 3 Theme 2: Communication - Participant Quotes

Sub-theme	*Participant Quote*
Effective communication with the patient	'I think communication **with the patient** is sort of most important and maybe with the nurse in the ward that's minding them if they are an inpatient.' (Participant 7) 'It falls down to communication, sometimes just **validating their frustrations.'** (Participant 6) 'It always goes **back to communication**, but it's literally trying to tie all that in when they get their scan done based **on their pain meds.**' (Participant 7) 'And **their age as well**, if they're young or old, then obviously you might need to involve parents. And then **communication is going to be very important** and also to **mind your dosage** and prepare the room correctly.' (Participant 8) 'And **communicating the different options to the patients** as well sometimes. Even though you know they come down in a chair, and they go, I'm unsteady on your feet. And when you explain to them what a PA chest even involves, they go, Oh, I could do that. That's fine. They can come in with a **mental block** against it as well.' (Participant 6) '**Communication** with the patient is sort of most important' (Participant 7)

	'Are you going to be able to tolerate it? **Do we need more help? just keeping them involved**.' (Participant 6) 'I suppose the **dementia patients when they're severe dementia or Alzheimer's,** they don't know a lot of the time. Yeah, it can be a bit ***more difficult***.' (Participant 7).
Enhancing communication within the multidisciplinary team	'It's just **poor communication between all the multidisciplinary** teams to send them in **without proper pain relief**.' (Participant 9) 'But again, it's t**he breakdown of communication, and they can't see what's the issue.**' (Participant 6) it's t**he breakdown of communication and they can't see what's the issue.**' (Participant 6) 'But when you're going in blind, you don't know anything. They could be in severe pain with RIF pain, or they could be absolutely fine; somebody that's coming, walking up from A&E, maybe they could be fine. You don't know, like, and they don't put that down, **so you're walking into a situation blind at all times,** and you're having to ask the patient.' (Participant 7) **so you're walking into a situation blind at all times** and you're having to ask the patient.' (Participant 7) **'Even if they could give us their pain score at the moment, would that even help?** Do you know what I mean? Yeah, we all know what 0 to 10 is. Yeah, it's universal**. So even if they gave you that, it would be a starting point at least.'** (Participant 7) '**Communicatio**n again, yeah, literally, **if we had a bit more information** on if there was a pain score or something on it or whether they need sedation for it like they know best because they have assessed the patient first off.' (Participant 7)

Professional Experience Theme

For the professional experience theme, Table 4 outlines related sub-themes, such as staff expertise and lack of experience.

Table 4: Theme 3: Professional Experience — Participant Quotes

Sub-theme	*Participant Quote*
Staff expertise	'What I found, as well as a little bit more senior **experienced radiographers,** they seem to have a better ability when they're just starting out to try and convince a patient to undergo, you know. T**hey're very good at judging those situations better, more experienced, more experience.**' (Participant 8) 'I think it comes back to **gauging** the patient.' (Participant 7) 'And you're right, you probably tailor your communication, don't you? To the scenario. **I suppose it comes a good bit with experience as well.** You can judge how far you can.' (Participant 5) 'Because you're as a **newly qualified, probably more likely less likely to push the patient'** (Participant 5) ''Then you're bringing it in as communication, and you're reading your patient. **How far can I encourage them to go, or what are their limits?**' (Participant 5). 'So, you have to **sort of gauge the patient,** and if it's required, perhaps **sometimes family members** can help.' (Participant 7). 'I think a big thing **is justification** as well, isn't it? It's justified because you often get those A&E patients, and its shoulder, elbow, wrist, and actually, it's a focal point. So it's, if they're in the point of pain where you can't do much, it's **what is justified at this point.** And are there more things we can do after the fact if we can do them at a later stage? Justification.' (Participant 5) 'So I think what you said, like assessing from the patient, we all have **different pain thresholds as well**.' (Participant 6)

	‘I suppose immobilisation **if going to be your problem. You could alter your technique**. As well in terms of dosage, you know. If there's a lot of movement involved.’ (Participant 8). As well in terms of dosage, you know. If there's a lot of movement involved.’ (Participant 8) ‘Being able to **adapt our technique** as well as that would be experienced. If the patient isn't able to turn, can we do a shoot through elbow or things that if you've had your experience in A&E, it'll come naturally’ (Participant 8) ‘If you're **confident with the equipment** or just **knowing your limitations** that, go get someone more senior or go get someone to prep so that you can aid the patient until the last moment.’ (Participant 6) ‘I suppose there's **professional consequences** if there's something that goes wrong, you know, you know your fitness to practice, you always have to be mindful of that.’ (Participant 8) You see it where people go, oh, no, that's fine, we'll manage the pat slide. If you don't have the right amount of people, you're **breaching your own hospital policy**. You go to court; you've gone out with your policy. They don't have to cover you.’ (Participant 6)
Lack of experience	‘Between the interdisciplinary teams between the teams in the hospital. **They don't understand that X-rays take a bit of at a time. For the movement involved to the patient.** Yeah, a lot of times they don't understand what it is that you do or how you're going to actually get them scanned.’ (Participant 5). ‘Pat sliding them over like it's a couple of rolls to get them over. They forget that bit like we would have a lot of time you'd ring up to the ward to find out when they last got pain meds for spinal fractures or hip fractures or something. **And they're screaming in pain, and they wouldn't have had it in hours, and they would be just doing it.** And why did you send them down without it? **Like, but a lack of understanding.'** (Participant 7)

	'If they had a better **understanding of what the X-ray entailed, they might have better ability to give pain meds**. (Participant 5) 'Even when you do bleep the referrer like the **interns are under such pressure**... You bleep at them, and they go, I have no idea who that patient is, and they go, I know, I've put up the request, it's my code. It's my duty, I was told to do it, and they go, yeah, what was I meant to do? Like, you can hear the **panic in their voices, and again, that's them being understaffed**, being pulled from ward to ward, or doing some horrendous night shifts and then being pulled into clinics and like that, they're in a haze as well.' (Participant 6), '**I don't know anything about pain meds**, so I suppose if you spoke to the ward,' (Participant 4) So I think, like from multidisciplinary teams, people who are, I suppose doctors and nursing staff or wards **would be better if they had an understanding of what was going on in x-ray and even if they rotated even for a day to get an understanding**. So I think that would make a huge difference because **they see this plain X-ray, and they have no perception,** perhaps unless it's portable as what it takes to get as you take them. **So training for other disciplines**.' (Participant 5)

Barriers Theme

Within the barriers theme, **Table 5** delineates associated sub-themes, including equipment, demanding clinical environments, and insufficient protocols and policies.

Table 5: Theme 4 - Barriers - Participant Quotes

Sub-theme	*Participant Quote*
Equipment	**'Or sending query fractures and chairs.** Oh, it's absolute. And it would be some poor soul. Yeah. And there's no understanding.

	They went, “Oh, we managed to get them on a chair”. Well, I know we need to get them on a table, yeah. And the amount of times where you've got them on to the table and then you go, oh there is a lovely hip fracture, and the whole room is blocked, you're getting a trolley. **The patient is now spooked completely because a trolley is being wheeled in when the ward told them a chair was fine.**’ (Participant 6) ‘Or even the **hospital's putting proper funding into X-ray compatible trolleys. Like I've worked in two hospitals now where they had no X-ray involvement, ordered all the trolleys, and they weren't X-ray compatible, and you spent thousands on these trolleys that are redundant.’** ‘Sides won't go down, and you're using clamps to try and get the sides. It's hilarious. It's really causing them more pain than whether you're jerking off the trolley and, yeah, equipment. **Defective equipment can prove harmful.’** (Participant 6) ‘And again, going back to the **possible hospital funding and having radiographers represented in those meetings**, like if you had the x-ray trolley and that's avoiding all of that movement, it's avoiding the extra staff’. (Participant 6)
Demanding clinical environment	‘I suppose **hospitals are getting busier**. **Staff shortages**. Everything is timely; get moving, get moving, get moving, get moving. So, if you had quieter lists, more staff in an ideal world. It would make things easier to have adequate time for patients. **Then you have time to talk to them, communicate and figure out the level of pain.’** (Participant 6) ‘**Staffing is a huge thing,** isn't it? ... It's a real just get them out culture in the hospitals and move them on**. Get the beds free.** Keep going.’ (Participant 5)

	'Like staffing on the wards and everything, it all has a knock-on effect.' (Participant 6) 'They just **don't have time** to be given all this information.' (Participant 7) 'Interns are under such **pressure'** (Participant 6) 'They're so **short staffed** as well that they haven't some of them **haven't seen and been properly triaged** before coming in' (Participant 9)
Insufficient protocols and policies	'communicate what we're going to do**, but we don't go; what's your level of pain?**' (Participant 9) 'I suppose we **don't actually have steps though to follow,** so it's kind of making it up yourself…. Just a more **informal approach** more than anything.' (Participant 9) 'But we don't go, are you in pain **or we actually don't have a sequence** of that, it's kind of straight into it, we're going to do this or this'. (Participant 9)

To offer insight and evidence, quotes from participants in the FG have been incorporated into **Tables 2-5**.

Discussion

Radiographers often face the challenge of positioning patients for imaging, which can cause discomfort or pain. Balancing patient comfort with the need for high-quality images is crucial.

By assessing pain levels and mobility, radiographers aim to provide compassionate care while ensuring accurate imaging. Recent studies examined their knowledge, expertise, and challenges in imaging patients in pain to improve patient-centered care in radiology.

Pain Management Consequence Theme

.One of the most significant challenges in healthcare today is to deliver safe care in a complex, fast-paced, and demanding environment. The FG revealed that patient safety was a primary concern for radiographers when attending the radiology department. A study by Kyei (9) revealed that radiographers face various challenges when managing patients in pain; some of the challenges noted in the findings of this study were associated with imaging equipment and inadequate immobilizing devices. The study revealed that having appropriate and modern radiographic equipment would help 'enable staff to produce quality images for good diagnosis and treatment.' Similarly, the findings in the FG discussion revealed that a lack of resources and equipment posed significant barriers to achieving diagnostic images, particularly exacerbating encounters where patients are in pain. Participant Seven emphasized the detrimental impact of defective equipment on effective pain management, stressing the potential 'harm' it can cause patients. This finding aligns with a study by Wallin et al. (17) which identified that improper equipment can potentially contribute to increased discomfort and amplify patient distress. This, in turn, can negatively impact patient cooperation and compliance during imaging, making it more challenging for radiographers to obtain diagnostic images. Such instances could also result in examination anxiety and reluctance to attend for future investigations.

Patient safety is crucial throughout the radiological examination, as incidents with potential risks can occur. Healthcare professionals need to learn about preventive measures to protect patients from harm associated with healthcare effectively (18). A strategic approach must be implemented in healthcare to safeguard patients from harm. This entails identifying,

quantifying, and evaluating potential risks, followed by devising measures to reduce or mitigate these risks (19). Furthermore, studies on reported adverse events have demonstrated that incidents can be attributed to technical equipment within the radiology department (20). This highlights the significance of ensuring that radiological equipment is appropriately maintained, frequently inspected, and operating effectively to minimize the risk and occurrence of adverse events. Addressing these challenges requires a multifaceted approach, including investment in modern and well-maintained radiographic equipment, ensuring the availability of adequate immobilizing devices, and providing ongoing training and support for radiographers. By addressing these issues, radiology can enhance its ability to manage patients in pain and produce high-quality diagnostic images, ultimately improving patient care and outcomes.

Communication theme

Pain is a significant public health burden and a major cause of suffering, disability, and healthcare utilization globally (21). Effective pain management necessitates productive communication between patients and healthcare professionals. Therefore, communication plays a fundamental role in various aspects of pain management. However, due to the subjective nature of pain and unknown etiology, this uncertainty and lack of definitive cause may adversely affect patient-clinician communication (22).

Our FG study highlighted that effective communication with both the multidisciplinary team and patients significantly influences the capacity of radiographers to manage and address pain during imaging procedures. This finding underscores the importance of collaborative communication in enhancing patient-centered care, which aligns with the aim of our study to explore the knowledge, clinical expertise, and challenges faced by radiographers when imaging patients in pain.

Participant Seven reported that the request cards often do not incorporate sufficient information regarding the patient's pain status; thus, communication is disrupted 'if we had a bit more information or if there was a pain score.' This lack of information can lead to communication breakdown between radiographers and patients, hindering their ability to address and manage pain during imaging examinations effectively. When radiographers are not adequately informed about a patient's pain status, they may encounter situations where patients are in severe pain. Still, this crucial information is not available before starting the direct patient interaction. Therefore, participants in the FG agreed that improved and accurate information sharing within the interdisciplinary team may enhance this aspect of patient care. Moreover, *Participant Five* raised concerns about a lack of understanding among the interdisciplinary team regarding the examination process in the radiology department. The participants in the discussion agreed that there were instances where colleagues involved in patient care did not have a comprehensive understanding of the imaging process. Consequently, patients often attend the radiology department without adequate pain management measures; 'doctors and nursing staff or wards would be better if they had an understanding of what was going on in X-rays. This further reiterates the need for a more multidisciplinary approach and highlights the importance of involving a range of professions.

Poor communication can contribute to difficulties in coordination between the interdisciplinary team. *Participant Three* said they felt ''it's just poor communication between all the... team to send them in without proper pain relief.' The study group agreed that this deficiency can often result in fragmented care and suboptimal pain management for patients. Promoting interdisciplinary teamwork and communication within the radiology department is crucial to ensuring comprehensive and efficient pain relief for patients. By fostering a collaborative environment, healthcare professionals can enhance the overall quality of pain management, thus promoting the well-being and comfort of individuals in need. A study by

Shrestha and Poulos (23) stated that effective communication between HCPs and patients could reduce pain levels. In addition, Wein and Baider (18) determined that poor communication between patients and healthcare professionals could lead to underassessment by radiographers, which was unanimously agreed upon within the FG study. Addressing these communication barriers and promoting interdisciplinary collaboration is essential to improving pain management and ensuring optimal patient care. The FG suggested one way this may be achieved is by promoting standardized pain assessment protocols, providing comprehensive and accurate documentation of pain status, and promoting a multidisciplinary approach to care when attending radiology.

Professional Experience Theme

Participants within the FG expressed that professional experience often influenced their judgment and thus, in certain situations, led to compromised patient care and inadequate pain management. One participant highlighted that a senior radiographer with clinical experience can more effectively evaluate and assess a patient's pain status. In comparison, a junior radiographer must gain experience, confidence, and clinical experience in developing this skill. Hence, the junior radiographer benefits from being mentored by a senior colleague with such experience, as they can provide guidance and enhanced learning. Additionally, a lack of understanding of how to manage patient cohorts, such as the elderly, cognitively impaired patients, and pediatrics, resulted in undertreatment or even no treatment of pain in some circumstances (24). There appears to be limited research surrounding patients' pain experiences in these settings. The FG discussed implementing strategies from other allied healthcare professionals for guidance to minimize pain further and improve patients' experience in the department (25). One way to achieve this is by adapting the pain scale. The scale rates pain on a scale of 0–10, with zero being no pain and ten being the worst possible pain (26). This aids the radiographer in gaining insight into the patient's pain status at the time

of the encounter. This further allows the radiographer to make a clinical decision based on a clinical judgment that the patient will tolerate the examination. However, pain is a subjective matter; therefore, it is difficult to measure. Therefore, there are limitations to be recognized as the ratings are influenced by various factors, such as a person’s pain threshold and how likely the individual is to minimize or catastrophize their pain (26).

The radiographer is responsible for the examination procedure and, as a healthcare professional, must be the patient's advocate. Therefore, the radiographers' ability to alleviate pain should be highly prioritized during their professional education, which may result in optimal patient outcomes and thus lead to enhanced patient satisfaction. Training, education, and evaluation of pain management regarding pain awareness could improve image quality. A patient with well-controlled pain aids the radiographer when instructing the individual to maintain a particular position for each examination. In turn, this may also help alleviate any stress or fears the patient may have and ensure their cooperation. An essential aspect of patient care is to consider and incorporate pain management per the standards of proficiency as part of the department's induction and education to ensure staff are competent and confident in managing patients experiencing pain. In addition, radiographers can also pursue pain management-focused training programs, incorporating advanced assessment techniques, evidence-based approaches, and the most up-to-date literature. Additionally, interdisciplinary collaboration with pain management specialists and other HCPs provides valuable insights to enhance radiographers' understanding (18). By integrating pain management training into standards and utilizing additional resources, radiographers can provide optimal pain management for patients.

Conducting an FG study from the patient's perspective may be beneficial to gather their experiences and insights regarding pain management in the radiology department, thus providing a more patient-centered approach. Additionally, the FG methodology has limitations

due to its small sample size; therefore, the participants' views and experiences do not represent the entire radiographer population. Hence, it would be valuable to conduct larger-scale studies involving an increased sample size of radiographers to obtain a more comprehensive understanding of their perspectives on pain management.

Radiographers are responsible for capturing images during various procedures, and their understanding of pain management plays a crucial role in ensuring patient comfort and well-being. However, a lack of knowledge regarding pain management additionally raised uncertainties within the FG. Radiographers primarily focus on obtaining high-quality images and ensuring accurate diagnoses. While these technical skills are essential, the emphasis on technical proficiency may overshadow the importance of pain management. Consequently, radiographers may not possess the necessary knowledge to identify and manage pain during imaging procedures adequately. Andersson and colleagues (27) conducted a study of radiographers self-assessing their level of competencies within the clinical setting using a national survey. A component of this survey was dedicated to pain management. The radiographers in the study considered that they had low competence in *'identifying pain and pain reactions*.' Several radiographic examinations are associated with pain. The radiographer plays a crucial role in pain management by ensuring that pain is first identified and managed before and during the examination. One participant voiced that she had a '*very little understanding of pain medication,'* which concurs with the result of this study. However, from the patient's perspective, despite a radiological examination only taking a few minutes, one should not endure severe pain. As radiographic imaging procedures are typically brief, a radiographer must rapidly build rapport with a patient to achieve procedural cooperation, which can be challenging in a demanding clinical setting.

During the FG discussion, the potential impact of negative experiences in the Radiology Department on future imaging was a prominent topic. The group expressed unanimous

concerns about the lasting effects of such negative experiences on patients' willingness to undergo imaging procedures again and their concerns for causing *'distress'* to patients. These concerns align with a study by Lo Re and colleagues (28), which revealed that approximately 91% of patients awaiting a radiological exam experienced high anxiety. Participant Eight highlighted the possibility of obtaining 'sub-diagnostic images' and 'inflicting more pain and trauma on the patient,' thereby exacerbating the patients' discomfort and distress during the procedure. The FG emphasized that such experiences could significantly contribute to patients' uncertainty and reluctance to undergo future X-rays or other imaging procedures. These negative experiences can potentially increase patient apprehension, thus affecting their overall healthcare management. Unpleasant experiences can compromise patients' confidence in the radiology department and the healthcare system. If patient concerns are not adequately addressed, it can undermine patients' trust in the quality and accuracy of imaging services. Compliance with recommended imaging protocols may also negatively affect patients' decisions regarding future imaging examinations. Patients who associate negative experiences with the radiology department may be less likely to comply with scheduled appointments or screenings. This can result in delayed or missed diagnoses or inaccurate treatment, resulting in compromised outcomes.

Barriers Theme

Coinciding with this, the World Health Organization (WHO) first introduced pain management guidelines referred to as the WHO Analgesic Ladder for Cancer Pain Management as a benchmark for healthcare professionals to manage pain (29). This was further developed for patients experiencing chronic pain. Despite these advancements in pain management, there is still a lack of local PPGs for radiographers within the department. Therefore, to advance practice, departments must first identify and implement strategies to make the patient's examination painless and effective to provide optimal patient-centered care.

The most recent comprehensive guidelines around pain management occurred in an intervention radiology department; however, this study focuses more on cancer-related pain and spine pain and does not apply to the general departments (30). All HCPs must strive to ensure that patients have equal access and opportunity in the healthcare setting regarding their pain status. The studies mentioned above have demonstrated that HCPs are often unaware of the extent of the needs of patients they encounter in pain, and there are limited resources to support radiographers in aiding these cohorts of patients. It is only by addressing the barriers and associated limitations of pain management within radiography that solutions can be implemented to overcome these challenges.

In conclusion, pain management presents significant challenges for radiographers when carrying out imaging examinations. This study illustrates that these concerns can negatively affect staff and patients. Therefore, the findings of this study emphasize the importance of developing PPGs for pain management within radiology departments to provide optimal care to patients undergoing imaging procedures. Further research is needed to develop effective pain management strategies and to improve the overall patient experience during radiographic examinations.

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