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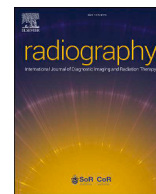
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Involved, interrupted or ignored? Triadic communication in children's non-urgent X-ray procedures

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ABSTRACT

Introduction: X-rays are among the most common healthcare procedure carried out on children¹. Despite most X-ray procedures being non-invasive, some children report feeling anxious, fearful, unprepared and excluded from communication between radiographers and their parents. This study explored the triadic communication, that occurred between children, parents and radiographers, during children's non-urgent X-ray procedures.

Methods: A qualitative constructivist Grounded Theory approach was used. Non-participant observations were conducted during 45 non-urgent X-ray procedures conducted at one hospital in the UK involving children aged 4–11 years. Semi-structured interviews were conducted after the procedure with children (n = 17) and their parents (n = 9). Data were analysed using constant comparison techniques.

Results: Three non-hierarchical categories of triadic communication were identified: Involved (children's voices were actively sought and listened to); Interrupted (adult voices overshadowed children's); and Ignored (children's voices were not sought or were overlooked).

Conclusion: Triadic communication in children's X-ray procedures is complex and influences how children experience their procedure. Children can express preferences for how, when and with whom they communicate. When communication is authentic, individually tailored, child-led and focusses on developing rapport, children feel more confident and involved. In contrast, heavily scripted and adult-led instructional communication can leave children marginalised and feeling ignored within their procedure. These findings emphasise the need for individualised communication practices in radiography settings.

Implications for practice: Radiographers should prioritise child-centred, flexible communication based on children's preferences for participation over the use of overly scripted or adult-dominated instructional talk.

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Introduction

X-rays are among the most common healthcare procedure carried out on children.¹ Although some radiological procedures involve invasive techniques, the focus of this study is on plain x-ray procedures, which do not involve contrast agents, are often performed in less than 15 minutes, and are described by the NHS² as quick and painless. However, despite being quick, painless and

non-invasive, they can still cause anxiety and/or upset.³ Children's experiences during these procedures are shaped by various factors, including preparation, the environment, the people involved,⁴ as well as the communication that occurs.⁵ The unfamiliar, dimly lit X-ray room can increase anxiety when children are unsure of what to expect.⁶ Children have reported being unprepared and can have misconceptions about the X-ray machinery "crushing them".⁷ Children can feel vulnerable, and this can be exacerbated by them experiencing pain, having waited a while not knowing what to expect⁸ or due to sensory or specific needs. Despite interventions such as leaflets, models, and apps designed to prepare, familiarise and educate children about what to expect when they are having radiological procedures, these interventions are not used consistently in practice, and they tend to focus on

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children having MRI and CT scans.⁹ Despite X-ray procedures often being perceived by adults as minor, they are still important experiences for many children.

Communication during radiological procedures influences children's experiences and outcomes at the time, as well as their longer-term well-being and engagement with healthcare services.⁶ Communication in paediatric radiological procedures is often triadic, involving the child, their parent, and the radiographer, with this often being a complicated dynamic that influences children's involvement.¹⁰ There is increasing evidence about children's experiences in healthcare settings and their communication with health professionals^{11,12}. Despite growing recognition of children's right to participate in healthcare decisions^{13,14}, children's own reports about communication and their experiences during non-urgent procedures, particularly X-rays, are seldom heard. Researchers often remain focussed on collecting proxy data from adults about children's procedures.^{3,15}

Previous research has highlighted that radiographers can dominate communication during a child's X-ray, accounting for approximately 80% of verbal interaction, with child and parent communication accounting for 17% and 3%, respectively.¹⁶ This communication from radiographers was typically task-focused which, while functional, left children feeling excluded from decision-making.¹⁶ In the limited research that has included children's accounts, children have reported distress, discomfort and fear during their X-ray, with negative experiences exacerbated by radiographers who were perceived to be "rough"¹⁷ or dismissed their feelings when they felt "frightened"⁸ or "uncomfortable".¹⁶ More positive experiences were linked to radiographers who engaged children in informative and supportive communication. However, there is a lack of evidence that has specifically explored radiographers' communication with children during an X-ray procedure.

This study aimed to explore the triadic communication that occurred during children's X-ray procedures, observing the communication and seeking the perceptions and experiences of children and parents through interviews.

Methods

Patient and public involvement and engagement

Patient and public involvement and engagement (PPIE) is reported in accordance with the GRIPP2 short form guidelines,¹⁸ which provide a structured framework for reporting PPIE in health and social care research. GRIPP2 has been used in this paper to ensure transparent reporting of how children and young people contributed to the development of study materials, the design of recruitment approaches, and the refinement of the data collection tools and demonstrates how children and parent perspectives were incorporated from the outset. The research team consulted with children and young people (aged 7–17 years) with hospital experience, who were members of an established group at the study hospital, to ensure that the research design and recruitment strategies were appropriate. Two team members attended a Children and Young People's Forum meeting, using creative activities to gather feedback. Children provided valuable insights and offered general study feedback (see Table 1) and all suggestions were incorporated to improve the study.

Table 1

Summary of PPIE feedback and revisions.

Information and assent forms
Write "X-ray" rather than provide a blank space for children to fill in the procedure they were having as this was seen to be less confusing to several children
Be clear and explain what the project is about on the front page rather than asking if they would like to be involved in 'a project'
Remove the word "harmful" from the information sheet and be replaced with something such as "worry about your safety"
Study participation should be detailed as not taking very long rather than taking "15 min"
Make clear that children have an option to be recorded or notes taken on what they say rather than saying they <i>will</i> be recorded
Interview and activity booklet
"Emoji" style symbols and stickers would help children to articulate how they feel rather than asking them to draw on yellow face outlines
The booklet layout would be better if I asked what the good things were and what could have been made better on the same page
The speech bubbles and space to write should be made larger
Care needed to be made with the use of colours and different accessible forms of the booklet need to be created for those who may have difficulty viewing certain colours or smaller text
General feedback
The size of the children's eyes on the logo should be reduced
Do not approach a child who made it obvious they do not want to speak to me, or who was very poorly
A completely new information booklet and assent form should be created for younger children (4–7 years old) as the consensus was that younger children would not understand some elements of the materials presented to the group
Speak to the child and acknowledge them as equally important as adults in deciding to take part, rather than speaking over them to their parent/health professional

Study design

A qualitative approach was adopted underpinned by constructivist Grounded Theory (CGT).¹⁹ The Consolidated Criteria for Reporting Qualitative Research (COREQ)²⁰ have been adhered to (Supplementary File 1).

Setting and participants

The target population consisted of children aged 4–11 years, their parents, and the radiographers performing X-ray procedures. All participants were attending appointments at a Radiology Department of a tertiary children's hospital in the UK.

Recruitment

Recruitment was conducted face-to-face by the first author. Radiographers checked children met the eligibility criteria. Parents and children were approached in the waiting room and invited to be part of the study. Data collection was scheduled on specific days to allow radiographers to consent for the observation of procedures. All participants were informed of the aims of the study; children were provided with age-appropriate information sheets. Following a CGT approach,¹⁹ recruitment began with convenience sampling and progressed to theoretical sampling.

Data collection

Non-participant observations

Non-participant observations were conducted of non-invasive, non-urgent x-ray procedures involving children. All observed procedures were carried out within the same imaging department

across four radiology rooms. All rooms contained similar equipment and aesthetics; one room contained an EOS machine (X-rays with a low-dose slot-scanning system). Communication between children, parents and radiographers was observed. Non-participant observation²¹ was used to capture detailed information on 'what was going on' during the X-ray procedure. To avoid the pressure of video recording,²² handwritten field notes were recorded on structured sheets. This approach aimed to minimise the risk of children reacting or performing to video cameras²³ or influencing healthcare professionals' behaviour, creating discomfort or disrupting clinical care.²⁴ Field notes recorded key communication, directional arrows for communication flow, and key responses or quotations. All observations were conducted by the first author, a white female with a non-clinical, social science background. Observations began when the child entered the radiology room and ended upon exit. Observations varied in length (4–18 min).

Semi-structured interviews

All children and parents were invited to take part in an interview which would take place after the procedure. All interviews were conducted by the first author. Radiographers were not interviewed as part of this study. While the perceptions of radiographers are important, this study was centred on the voices and experiences of children and their parents. This study complements other literature where radiographer's perceptions and experiences are featured.³ Interviews focused on children and parents' overall experience as well as their perceptions of communication during the procedure (Supplementary File 2). Points noted in the researcher's observations acted as prompts within the interview. The interviews with children were augmented using a 3-page activity booklet. Parents were present during their child's interview. Children's interviews were conducted in a quiet area of the department, away from the waiting room and radiographers. Parent interviews were conducted either face-to-face after the child's interview or by phone within 48h of the procedure.

Interviews were audio-recorded with consent, or notes taken and transcribed. The research team purposefully decided not to return transcripts to the participants for comments and/or corrections to avoid additional research-related burden. However, whilst transcript validation (member checking) was not part of the research design, this decision was carefully considered. Other researchers have indicated that member checking should not be viewed as a universal indicator of rigour but assessed in relation to the epistemological stance and ethical context of the study^{25,26}. Although families were keen to contribute, they were also time pressured. Handwritten observation notes were digitally converted.

Ethics

Ethical approval was obtained from the University Ethics Committee (Project Ref: FOHS172) and the Integrated Research Approval System (IRAS ID: 228773). Informed written consent was obtained from parents and radiographers and written assent sought from children. Consent and assent were reaffirmed throughout each data collection stage (e.g., before the procedure, before a child's interview and before a parent's interview). All participants were assured of their right to withdraw at any time without consequence. Confidentiality and anonymity were maintained throughout. There were action plans in place to address any observations of poor practice, disclosures related to safeguarding,

or instances of children or parents becoming upset during interviews. However, these were not required.

Analysis

Data collection, analysis and conceptualisation were iterative, following constant comparison methods central to constructivist Grounded Theory (CGT)¹⁹. As part of this approach, line-by-line analysis was conducted for each interaction to closely explore the styles and patterns of communication between children, parents and professionals. For example, "I didn't know what to say" became 'silence as a coping strategy'. Focused coding then refined these into broader categories, exploring themes such as 'supportive interruptions' versus 'adult driven agendas'. Theoretical coding explained overarching processes across the data, leading to the final categories: 'involved', 'interrupted' and 'ignored', which described the dominant communication styles observed and reported during procedural interactions. Throughout all coding phases, team discussions ensured a shared and reflexive interpretation. Data collection concluded once no new theoretical insights, properties or dimensions emerged, and the research team agreed that the categories were fully developed, and theoretical completeness had been achieved. This indicated that the categories were conceptually rich, dense and well supported by both interview and observation data.¹⁹

Results

Forty-five children were observed (22 boys, 23 girls; 4–11 years, mean age 7.2 years). They were accompanied to their X-ray appointment by their mother ($n = 25$), their father ($n = 5$), both their mother and father ($n = 12$), or by their mother and their grandmother ($n = 3$).

Seventeen children were involved in face-to-face interviews at the hospital. Parents (7 mothers and 2 fathers) were interviewed face-to-face in the radiology department ($n = 5$) or via telephone ($n = 4$). Not all children or parents observed agreed to be interviewed; some children were upset and keen to leave the radiology department.

Categories of communication

Three distinct and different ways communication occurred with children during their X-ray procedure were identified. The three categories identified communication in which a child was involved, interrupted or ignored.

Each category is delineated into two sub-categories (refer to Table 2), highlighting how various communication approaches during a child's X-ray procedure were either facilitated or hindered by the adults present.

The findings are not presented in a hierarchy of good to bad practice, nor are they ordered in a way to represent children's positive or negative experiences. To ensure anonymity while conveying key characteristics, each participant was assigned a code indicating whether they were the mother (M) or father (F) of the child, the child's gender (B = boy, G = girl), a numerical identifier (e.g., 1), their age in years, and the data source (Obs = observation, Int = interview).

Table 2

Communication in a Child's X-ray procedure: Summary of the categories of communication.

Categories	Communication in which a child was involved		Communication in which a child was interrupted		Communication in which a child was ignored	
Description	Involvement was characterised by an abundance of communication between children, parents and radiographers and children's opinions and perspectives were sought with the expectation they could change or influence what happened in the X-ray procedure.		Interruption was characterised by children's communication that was incomplete due to adults interrupting them. Interruption halted communication and either confirmed a child's wishes or adults changed the meaning of what children were communicating.		The ignored category is characterised by a lack of communication by the child or to the child. Instead, children's communication was overlooked, silenced, or not sought by adults. Children had very little power to change or influence what happened in the X-ray procedure.	
Participants	Observations n = 12 Child interviews n = 3 Parent interviews n = 2		Observations n = 18 Child interviews n = 8 Parent interviews n = 5		Observations n = 15 Child interviews n = 6 Parent interviews n = 2	
Sub-categories	Involvement in communication led by a child	Involvement in communication led by an adult	Communication interrupted for the benefit of a child	Communication interrupted for the benefit of an adult	Communication ignored by a child's choice	Communication ignored by an adult's choice
Description of sub-category	Children wanted to be involved in communication & looked to the different adults to meet their needs. They reported feeling confident & supported.	Adults tried to involve children. Communication was often not about the procedure. Children felt talked at and communication was reported as not always meaningful.	Some children had their communication halted to correct their misconceptions. Sometimes parents would repeat what their child was saying, perceiving to relay this in a more understandable way.	Adults sometimes had their own agenda and would interrupt children so that the procedure could be completed as quickly as possible. Adults would skew a child's wishes.	Some children felt relieved when adults did not speak to them. They reported that they felt that too much talking would mean the procedure lasted longer.	Some children reported feeling frustrated when adults talked <i>about</i> them. Children would communicate but would be silenced and their voices would go unheard.

Communication in which a child was involved

Twelve X-ray procedures (5 boys, 7 girls, aged 4–10 years (mean age 6.9 years) were categorised as children being 'involved' in communication in their X-ray procedure. Three children and two mothers (M) participated in interviews (Table 3).

Children's involvement in communication was sometimes led by children themselves and sometimes by adults. Although there was an abundance of communication, children did not necessarily always discuss this as a positive thing. Children spoke often and were often spoken to and were, at times, included in communication about them or the procedure. Children's opinions and perspectives were sought with the expectation they could change or influence what happened in the X-ray procedure.

Table 3

Demographic details for 'involved' category.

Participants in the 'communication in which a child was involved' category				
Age	Gender	Procedure description	Child Interview	Parent Interview
6	Boy	Elbow	-	-
4	Girl	Chest	✓	✓
8	Girl	Elbow	✓	-
5	Girl	Dental	-	-
6	Girl	Forearm	-	-
7	Boy	Hand	-	-
7	Boy	Arm	✓	✓
9	Boy	Arm	-	-
10	Girl	Spinal	-	-
6	Girl	Arm	-	-
10	Boy	Leg EOS ^a	-	-
5	Girl	Feet	-	-

Key.

✓ means participation in interview.

- means no interview took place.

^a EOS: X-rays with a low-dose slot-scanning system that produces detailed images of patients usually of the whole spine or lower limbs.

Involvement in communication led by a child. Some children responded directly and independently to the radiographer's initial

communication of the routine 3-point identity check (name, date of birth, address), before their parents and without adult prompting.

Some children entered the room confidently for instance, one child entered the room and went straight towards the radiographer, asking if they could lie on the bed: "*I lie here?*" (G11-5yrs-Obs). Other children appeared excited on entering the room. For example, a six-year-old boy exclaimed: "*This is SO cool, lasers, lasers, lasers!*" (B2-6yrs-Obs). Although not all children indicated that they felt at ease talking to the radiographer, some were relaxed and sought information or voiced their needs. One girl explained:

"I just asked her if it was happening so that I knew when the machine was moving. I was asking if it was happening now or later" (G9-8yrs-Int).

Parents also appreciated it when radiographers engaged directly with their child, for example:

"They were good with him weren't they, they didn't bother with me, and I just stood and watched. They let him take the lead and he did ... I liked that" (M-B22-7yrs-Int).

Involvement in communication led by an adult. In some procedures, radiographers adopted a questioning approach, where children were observed to be 'bombarded with questions' and communication occurred 'to' the child rather than 'with' them. One radiographer asked a child questions without allowing time for a response:

"Is your Mum taking you back to school?"

"Are you going straight back in?" (B22-7yrs-Obs).

Although this approach aimed to be involving, some children showed reluctance to engage, and the conversation became one-sided with adults persisting with more questions. Some children confirmed that they found such dialogue unhelpful:

"She kept talking about school and football ... like she thought she was my mate" (B22-7yrs-Int).

Communication observed during these procedures followed a repetitive script with the same questions focusing on 'school', 'post-visit activities' or 'hobbies' being asked.

Communication in which a child was interrupted

Eighteen X-ray procedures (10 boys, 8 girls, aged 4–11 years, mean 7.4 years) were categorised as consisting of a child's communication that was 'interrupted'. Eight children, four mothers (M) and one father (F) participated in an interview (Table 4).

In these procedures, children's communication was halted, interrupted or 'closed down' by adults. Some adults cut short children's communication to repeat what a child had just said and so to some degree, children's thoughts and questions were still communicated, just not by themselves.

Table 4
Demographic details for 'interrupted' category.

Participants in the 'communication in which a child was interrupted' category				
Age	Gender	Procedure description	Child Interview	Parent Interview
10	Boy	Foot	-	-
4	Boy	Pelvis	-	-
9	Girl	Spinal EOS	✓	✓
6	Girl	Chest	✓	✓
7	Boy	Forearm	-	-
10	Girl	Knee	-	-
4	Boy	Pelvis	✓	✓
11	Boy	Knee	-	-
7	Girl	Chest	-	-
7	Boy	Right foot	✓	-
4	Boy	Chest	-	-
9	Girl	Hand	✓	-
10	Girl	Spinal EOS	-	-
5	Girl	Dental	-	-
5	Boy	Ankle	✓	✓
9	Girl	Leg	✓	✓
6	Boy	Hand	-	-
9	Boy	Chest	✓	-

Interruption that benefits a child. Interruptions, primarily by parents, were used to clarify or relay their child's views, especially when the child seemed "flustered" and "began wriggling" (B5-4yrs-Obs), became "restless" (B36-5yrs-Obs), or was "fidgeting" (B25-7yrs-Obs). For instance, when one child said, "I want ... because my cast ... it's straight" (B10-7yrs-Obs), the parent clarified: "Since his cast has come off, he's a bit scared that he can't move it" (M-B10-7yrs-Int), ensuring the radiographer understood their child's concerns. Parents described these adult interruptions as "supportive" (M-B10-7yrs-Int) or "helpful" for their children.

Other examples include children redirecting communication saying, "Mummy knows" (B25-7yrs-Obs) or "Mum just says it better than me" (G37-9yrs-Int). Children discussed these interruptions positively, feeling relieved or thankful for the guidance provided by their parents in an uncertain situation. For example, one child expressed gratitude:

"I felt glad, I wasn't really sure what the nurse was asking me to do and I kept doing it wrong. Mum just said what I was doing, then she told me what to do better and it was good because I didn't want to do it wrong, so Mum helped me do it right" (B25-7yrs-Int).

Interruption that benefits an adult. In some cases, adults interrupted children's communication to prioritise their own agendas and reinforce perceived 'good' behaviour. Parents interrupted their child to instruct their child what to do or to ensure efficient completion of the procedure, as one mother explained:

"She was messing about, not listening and I told her to pack it in. She's had these before so they should be quick, but she thinks she can get away with murder ... it's embarrassing" (M-G37-9yrs-Int).

However, her child was frustrated by these interruptions and motives for wanting a quick procedure, saying:

"She [mother] is always butting in, she answered everything. Just so she can make me go back to school" (G37-9yrs-Int).

Radiographers were also observed interrupting children talking, by asking them to "hush 1 second" (G35-5yrs-Obs) whilst they provided instruction and focussed on the procedure noting that "I can do it quicker when you're not talking so much" (G35-5yrs-Obs).

Communication in which a child was ignored

Fifteen X-ray procedures (7 boys, 8 girls, aged 4–11 yrs, mean 7.1yrs) were characterised as a child being 'ignored'. Six children, 1 mother and 1 father participated in interviews (Table 5).

This category was characterised by a lack of communication 'by' the child or 'to' the child. Children's communication, to varying degrees, was overlooked or not sought by adults and children had very little power to change or influence what happened to them during their X-ray procedure.

Table 5
Demographic details for 'ignored' category.

Participants in the children 'communication in which a child was ignored' category				
Age	Gender	Procedure description	Child Interview	Parent Interview
11	Boy	Dental	-	-
4	Girl	Fluoroscopy	-	-
5	Boy	Chest	-	-
4	Boy	Chest	-	-
11	Boy	Legs	✓	-
4	Girl	Dental	-	-
4	Boy	Pelvis	-	-
5	Girl	Dental	✓	✓
6	Girl	EOS	-	-
8	Boy	Knee	✓	-
11	Girl	EOS	-	-
5	Boy	Feet	✓	-
8	Girl	Chest	-	-
11	Girl	Ankle	✓	✓
10	Girl	Forearm	✓	-

Ignored by the child's choice. Communication observed during these procedures was minimal with very few interactions between children, parents and radiographers noted.

Some children described reasons for choosing to not get involved in communication during the procedure, being "scared of the machines" (G40-8yrs-Obs) or feeling "very, very frightened and scared" (B30-8yrs-Int). Others mentioned not knowing what to say in response to the radiographer's questions, such as one child who said, "I wouldn't know what to say" (B32-5yrs-Int). Others indicated a preference for silence, believing it would speed up the process. One child explained:

"I don't like it when they talk, it makes it go so slow" (B18-11yrs-Int).

This child wanted the X-ray to be finished as quickly as possible and appreciated radiographers who did not engage in what was seen to be unnecessary conversation; *"I liked her, she just did it, she knew what she was doing and then I could go"* (B18-11yrs-Int).

Ignored by the adult's choice. In contrast, despite talking, some children were observed to be ignored by the adults. One boy was observed saying, *"can you stop because it is hurting so badly"* (B11-11yrs-Obs) but there was no response from the adults and the procedure continued. This child then repeated *"STOP, it hurts!"* (B11-11yrs-Obs) and again there was no response, and the procedure continued. Another child who feared the machinery said *"I think it's coming too close to me, it's right there"* (G40-8 yrs-Obs); no response or attempt to reassure were noted.

In these cases, radiographers' communication was often directive and instructional, leaving little room for children to ask questions, express how they felt, or be actively involved in the procedure. Radiographers were observed simply saying, *"Right, we are ready to start!"* (G44-11yrs-Obs), *"hop on the bed and I'll take your X-ray"*, (B21-4yrs-Obs) or *"up you get"* (B32-5yrs-Obs) without checking in first with the child. This was noticeably different from the communication in the 'involved' category when the decision about when to begin the procedure was given to the child.

Children in these situations reported feeling "alone" and "lonely" (G44-11yrs-Int). Parents discussed how they ignored their child because they thought the radiographer would answer them instead:

"I just thought she [the radiographer] would answer her because to be honest I wasn't sure [what to say] but thought she'd know" (M-G44-11yrs-Int).

This expectation that radiographers would answer children's questions, reassure or provide support was evident, for example:

"I don't like interfering, I know they [the radiographers] have a job to do, they don't need me sticking my nose in do they?" (F-G26-5yrs-Int).

Discussion

We believe this is the first UK-based study to explore triadic communication during children's X-ray procedures, drawing on direct observations, children's own words, and parental perspectives. Findings address a gap in child-focussed evidence in radiography procedures.

In this study, some children actively directed conversations, asked and answered questions, and articulated their preferences, all of which are said to contribute to a sense of control and comfort during procedures.²⁷ These findings support existing literature that highlights the value of creating space for children to participate in communication on their own terms.²⁸ Notably, the first voice heard during procedures often sets the agenda for the rest of the procedure. When radiographers addressed children directly, from the outset, rather than talking about them to parents, child-led interaction was more likely to occur. Other evidence reinforces this perspective, suggesting that radiographers should talk to children first, and reminding radiographers that the child should remain "the focus of the consultation".²⁹ The 'three point check'^b

could act as useful starting point for communicating with a child. However, it is crucial to allow time for children to respond to such questions without parents and radiographers 'jumping in' to interrupt and fill any communication 'space'.

This study highlights the importance of authentic child-led communication, in contrast to heavily scripted interactions and rehearsed questions. While well-intentioned, these scripted attempts to involve children were sometimes perceived by them as superficial chit-chat, lacking genuine interest or relevance. Prior research has also shown that children often dislike being "talked about" rather than "talked to," which can exacerbate feelings of exclusion.³⁰ Adults may appear skilled in asking questions, but less attuned to truly listening to children's responses.³¹

Existing literature provides recommendations for improving communication with children, including within paediatric radiography. This work emphasises the importance of speaking directly to the child, avoiding complex terminology, and using positive, action-based language.³² Notably, work advocates for rapport to be built and the importance of the initial engagement from the professional and the subsequent response from the child can determine the ongoing interactions.³³

In this study, communication and participation did not always rely on children's verbal expressions. Children demonstrated that they could be heard without speaking, and for some, choosing silence or engaging minimally was a deliberate and meaningful act. This challenges common assumptions that vocalisation is a prerequisite for meaningful involvement.³⁴ These findings align with more nuanced interpretations of participation, reflecting research that recognises the varied ways, including silence, that children can express autonomy³⁵ including in healthcare settings.²⁷ However, the present study did not directly address intentional silence during procedures.

Despite increasing recognition of the importance of involving children in their own healthcare^{36,37} as well as the role professionals have in effective and informative communication,³⁸ this study highlights that children continue to be ignored, sidelined or overshadowed during procedures. There is a need to avoid practice that prioritises children's inclusion in the more social, superficial conversations³⁹ and deals less with involving children in procedural decisions. Research shows that being ignored, or made to feel excluded from communication, can lead to distress, emotional upset, and a sense of powerlessness in children.¹⁴ This not only affects the child but can also heighten parental anxiety and compromise the quality of the image and the procedure.⁴⁰ This can, as evidenced in this study, lead to instances where things happen in the procedure that do not align with children's rights or goes against their wishes.⁴¹

Strengths and limitations

This study offers in-depth insights into triadic communication during children's X-ray procedures, drawing on both child and parent perspectives, and informed by observations. Despite a robust design, the study has limitations. It was conducted in a single radiography department. The number of interviews, particularly with parents, was smaller than the number of observations, potentially limiting the depth of data.

Recommendations

Based on our findings, we offer the following short- and longer-term recommendations to improve communication during children's X-ray procedures:

^b A way of ensuring accuracy by verifying the correct patient (name, date of birth, address), correct procedure and correct examination site.

Short-term practical steps for radiographers

- Initiate communication with the child first, using the 3-point identity check as a natural entry point, to set a participatory tone for the procedure.
- Allow time for children to respond, resisting the urge to interrupt or over-script interactions.
- Use child-friendly, age and developmentally appropriate language, avoiding superficial small talk unless it is child-initiated.
- Be attentive to non-verbal cues and preferences, including silence, as forms of valid participation.

Longer-term changes for departments

- Emphasise communication training focused on triadic interactions (child-parent-radiographer) into professional development for radiographers.
- Further develop and embed child-centred communication protocols into radiography standards, emphasising child voice and agency.
- Increase opportunities for children and families to be meaningfully involved in co-designing informational and preparatory materials tailored to X-ray procedures, not just MRI or CT.

Conclusion

The findings demonstrate the complexity of triadic communication during children's X-ray procedures and the importance of communication in shaping children's procedural and healthcare experiences. While child-led communication helps children feel involved and in control, superficial or overly scripted adult communication risks undermining children's ability to be active participants in their procedures. Importantly, meaningful participation can take many forms, including silence if that is the child's choice. Radiographers should not rely on children's verbalisations alone.

Ethics approval and consent to participate

Ethical approval was obtained from the University Ethics Committee (Project Ref: FOHS172) and the Integrated Research Approval System (IRAS ID: 228773). Informed written consent was obtained from parents and radiographers and written assent sought from children for anonymised patient information to be published in this article.

Availability of data

Data required for this study may be made available by the author(s) upon reasonable request.

Author contributions

LB,BC,CW: Conceptualisation.
 HS: Investigation/Data collection.
 HS, LB, BC, CW: Formal analysis.
 HS: Writing- Original Draft preparation.
 HS, LB, BC, CW: Writing - Review & Editing.
 LB, BC, CW: Supervision.

Declaration of Generative AI and AI-assisted technologies in the writing process

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Conflicts of interest

The authors declare that there are no conflicts of interest.

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Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.radi.2025.103165>.

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