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Research Article

A qualitative analysis of the role of the diagnostic radiographer in child safeguarding

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ABSTRACT

Background: The role of medical imaging in the investigation of suspected child abuse is well documented. However, the role of the radiographer as an instigator of such concerns is less well understood. The fast-paced development of related technology and the evolution of the profession into new areas of work is argued to have impacted upon the traditional interaction between patient and professional; thus requiring a contemporary analysis of current practice.

Objective: As part of a wider multimethod thesis, this qualitative study sought to fill a gap in the literature with regard the role of the radiographer in child safeguarding by exploring their knowledge of, attitude towards and practical experience of the phenomenon.

Participants and setting: Online, semi-structured interviews were conducted with $n=12$ radiographers from across England between 2020 and 2021. Recruitment occurred via an initial survey and interviews were conducted online.

Methods: Verbatim transcripts were analysed using a framework analysis approach to create initial codes which led to themes for discussion.

Results: The framework analysis approach resulted in the identification of three constituent themes: (1) Patient, (2) Examination and (3) Radiographer. Each constituent themes were built from a comprehensive coding of the data. Analysis of these themes are presented in terms of quotes and diagrammatic depiction.

Conclusion: For radiographers to be able to identify child safeguarding concerns, alignment of these constituent themes is necessary with the radiographer being the theme that can be greater controlled in

terms of knowledge and attitude. Conceptually, this analysis could be extended to other professionals.

Contemporary practice within medical imaging has made it more challenging to assess some physical and social signs of child safeguarding concern, and thus for the alignment to occur, as compared with previous generations.

To maximise the contribution, education needs to account for wider paediatric practice and the imaging modality utilised by the radiographer. A case study approach demonstrating the potential that exists for the profession to contribute would be beneficial. Interprofessionally, greater involvement of radiographers in the assessment and escalation of any concerns could provide benefit to the patient.

RÉSUMÉ

Contexte: Le rôle de l'imagerie médicale dans les enquêtes sur les suspicions de maltraitance d'enfants est bien documenté. Cependant, le rôle du radiographe en tant qu'instigateur de telles préoccupations est moins bien compris. Le développement rapide des technologies connexes et l'évolution de la profession vers de nouveaux domaines de travail auraient eu une incidence sur l'interaction traditionnelle entre le patient et le professionnel, ce qui nécessite une analyse contemporaine de la pratique actuelle.

Objectif de l'étude: Dans le cadre d'une thèse multiméthode plus large, cette étude qualitative a cherché à combler une lacune dans la littérature concernant le rôle des radiographes dans la protection des enfants en explorant leurs connaissances, leur attitude et leur expérience pratique du phénomène

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Participants et contexte: Des entretiens semi-structurés en ligne ont été menés avec n=12 radiographes de toute l'Angleterre entre 2020 et 2021. Le recrutement s'est fait au moyen d'une enquête initiale et les entretiens ont été menés en ligne.

Méthodologie: Les transcriptions verbatim ont été analysées à l'aide d'une approche d'analyse de cadre pour créer des codes initiaux qui ont conduit à des thèmes de discussion.

Résultats: L'approche de l'analyse du cadre a permis d'identifier trois thèmes constitutifs: (1) le patient, (2) l'examen et (3) le radiographe.

Keywords: Qualitative; Radiographer; Child; Safeguarding; Interviews

Introduction

Radiological involvement in the investigation of child safeguarding concerns is well documented [1–5]. What is less well understood is the role of the individual acquiring the images in identifying and formally reporting the concerns themselves. In most of Europe this role is a diagnostic radiographer, although the terminology varies internationally and is referred to as radiologic technologist or medical radiation technologist, this article will use the term radiographer to reflect this staff group.

A review of existing literature on the profession's potential role identified “pockets” of published literature related to child safeguarding that begin in the 1990s and extend to the present day [6–15]. The first identifiable pocket of evidence arose in the late 1990's. Hogg et al established the notion that radiographers were in a position to observe physical, social and/or radiographic signs that could represent child safeguarding concerns either in isolation or in combination [13]. Whilst their work was predominantly theoretical in nature, it proposed that radiographers were more than just on the periphery of paediatric patient care or a secondary responder but had the potential to be the instigator of child safeguarding concerns.

The published literature from the mid-2000s took a qualitative approach to data collection [9–11]. The research highlighted the belief that radiographers have a role to play but there was conjecture as to what that role was and the lines of communication that needed to be followed. In addition, an inconsistent knowledge base and the importance of education in child safeguarding were also identified as influencing perceptions. These themes around lines of communication were again reported as recently as 2023 [16].

The most recent research published in the 2020s explored radiographer's beliefs in terms of child safeguarding in Ghana [6–8,17]. Whilst acknowledging that imaging practice between the UK and Ghana is different, application of their research could still be relevant. In reviewing Antwi et al's findings, the notions of radiographers assessing the physical, social and radiographic signs to inform their decisions with respect to child safeguarding concerns again became apparent [6–8]. However, the accuracy and suitability of these assessments requires further scrutiny. Alzahrani et al. [16] made reference to a “good level” of

Chaque thème constitutif a été construit à partir d'un codage complet des données. L'analyse de ces thèmes est présentée sous forme de citations et de diagrammes.

Conclusion: Pour que les radiographes soient en mesure d'identifier les problèmes de protection des enfants, il est nécessaire d'aligner ces thèmes constitutifs, le radiographe étant le thème qui peut être le mieux contrôlé en termes de connaissances et d'attitude. D'un point de vue conceptuel, cette analyse pourrait être étendue à d'autres professionnels.

knowledge of child safeguarding which contrasts slightly with Beck et al's [2] reference to an inconsistent knowledge base. The underpinning reasons behind this is argued to be the result of differing levels of interest within the profession and the radiographic findings being more of a niche area applicable more to imaging professionals which could be potentially overlooked by more generic safeguarding training. Regardless, the importance of an underpinning knowledge base in terms of recognising and responding cannot be underestimated.

The consequence of error with respect to child safeguarding, either false positive or negative is not strongly acknowledged in the existing pockets of evidence but cases can be found within the media and when historical cases are examined, the prime example in the UK being that of Victoria Climbié [18]. Within the UK, there exists an argument that radiographers are required by the standards of the statutory regulatory body to escalate any concern they may have. Although the underpinning knowledge base of what informs the assessment has yet to be tested in contemporary practice [19]. Escalating concerns for incorrect reasons may have unintended medicolegal consequences and undermine confidence in the individual or the profession and cause wider familial distress [20].

The professional standards for radiographers in the UK have been updated in September 2023. They continue to refer to safeguarding but also place emphasis on the need to ‘justify decisions’. This places the emphasis on the radiographer to be aware of the existing evidence base with regard what does, and does not constitute a child safeguarding concern [19,21–26]. What is also maintained in the updated standard is the scope of practice and the limits to this scope which need to be reflected on when evaluating the role of the diagnosis radiographer whose interaction will be different from other professions. Whilst these standards are applicable to the UK only, child safeguarding is acknowledged as a global phenomenon that requires vigilance regardless of country. The work of Antwi et al in Ghana and, most recently, Alzahrani et al in Saudi Arabia emphasises this global nature.

Radiological practices have evolved dramatically over recent decades in terms of technology and role development for radiographers; both these have impacted on the interaction between patient and radiographer [27]. This impact, whilst providing

considerable benefit in terms of timeliness for patients and diagnostic value, potentially reduces the scope to identify child safeguarding concerns compared with previous generations of radiographers. As such, this may render publications from previous generations obsolete. For example, the physical barrier of a lead glass screen between radiographer and patient during a CT scan may always have existed but increasing use of CT scanning in first line imaging could make this barrier more significant. Similar observations can be made in relation to interactions between different professionals and their patients through developments such as virtual or remote consultations [28]. Whilst the technology provides similar benefits to that occurring in radiology, the scope provided by virtual interactions could be argued to limit the lens placed on suspected child safeguarding concerns which makes this research potentially applicable beyond the confines of radiology.

By exploring the role of the radiographer in contemporary practice, an improved understanding of how the radiographers practically assess child safeguarding and contribute to appropriate escalation can be achieved with a view to improving that contribution in future.

The study aims and objectives are:

- To explore the knowledge base possessed by the diagnostic radiographer commensurate with the patient-radiographer interaction.
- To provide a qualitative analysis of their attitude towards child safeguarding in terms of the influence of both internal and external factors and to evaluate their attitude towards their own role.
- To document and explore the pragmatic reality of experiences of child safeguarding and/or how they perceive their actions would be in such circumstances.

Methods

The research was undertaken as part of a wider doctoral study using a multimethod approach to explore the role of the radiographer in child safeguarding. The first phase comprised a Knowledge, Attitude and Practice (KAP) survey to explore the phenomenon quantitatively [2]. The results of the survey were used to help structure the qualitative approach through the construct of the semi-structured interview guide which was piloted in advance.

Sampling strategy

A purposive sampling approach was undertaken which involved the collation of KAP survey respondents (n=188) who expressed interest in participating in related interviews as the survey provided an opportunity to give an email address for future involvement. These were analysed in relation to survey responses to ensure, when possible, variation in sample. The survey was unavoidably conducted during the COVID 19 pandemic and was advertised using various social media platforms.

Online interviews were organised at the convenience of both participants. Participants were contacted by email in advance and an information leaflet was provided to ensure individuals were fully informed of this phase of the study and were able to provide written consent, supplemented by verbal confirmation at commencement of the interview. On completion of the interview, a debrief document was provided to ensure the participants were both informed and supported. The interviews were conducted by a single male interviewer who is the lead author. No conflict of relationship between participants and interviewer existed and no repeat interviews were necessary.

Sample

Twelve (n=12) semi-structured interviews (approximately one hour each) were undertaken online using Microsoft Teams™ (audio and visual) and subsequently transcribed using Otter AI™ software. The sample is acknowledged as relatively small, but should be seen in conjunction with the results of the KAP survey [2]. By engaging in reflexivity and the taking of field notes during the interview process, the researcher was able to gain a greater heterogeneity of sample, (notably in the inclusion of those in the early stages of their career) thus permitting greater objectivity and transferability [29].

Variation according to sex (three identifying as male), geographical location and radiological area worked in (including projectional radiography, cross-sectional imaging and ultrasound) was thus achieved within the sample. The potential for sampling bias is acknowledged, in that those with stronger interests in the field are likely to be more inclined to participate. No participants dropped out after initial confirmation of interest.

Data analysis

As the single researcher possessed a priori knowledge, framework analysis was used to generate initial codes which were then grouped into themes for discussion [30]. Regarded as similar to conventional thematic analysis, this analytical approach is considered appropriate in circumstances when objectives are known but provides the flexibility to be used both inductively or deductively [29]. The interview transcripts, after downloading and transcribing, were analysed alongside the recordings to ensure accuracy. Transcripts were continually reviewed from the onset of the interviews alongside the reflexive diary to ensure the conduct of interviews was optimal and the production of the rich data was maximised and saturation reached, justifying the sample size. Interview transcripts were broken down and read for initial coding which was applied inductively across all transcripts. Microsoft Excel™ was used to house initial coding which permitted data to be reviewed systematically in order to create themes from the categorisation of codes. Results have been organised based on thematic presentation of the data supplemented by anonymised quotes.

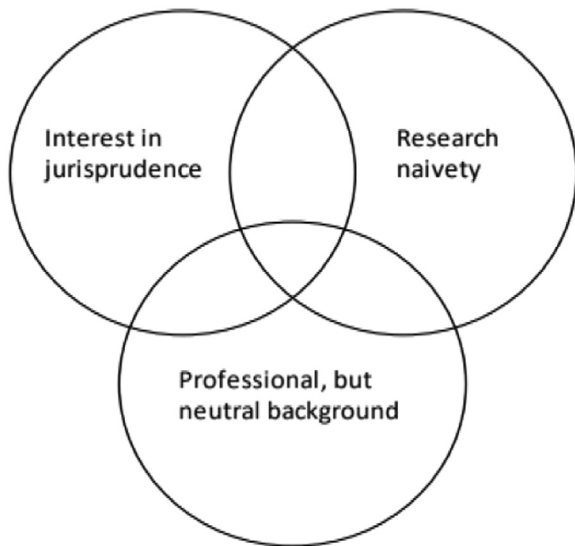


Fig. 1. Personal reflexive position.

Furthermore, to increase credibility, participants were asked to review transcripts for accuracy and ensure there was no potential misunderstanding within the conversations.

Reflexivity

During the interview process, a bespoke reflexive approach was documented that accounted for not just the interview process but the technological interface that was being used to assess any impact on the data collection process.

In addition, the researcher needed to acknowledge his own position with regard the research itself and this is expressed in Fig. 1. Using Wilkinson's [31] breakdown of reflexivity, personal, functional and disciplinary categories were used to analyse the position. Personally, the researcher acknowledges his interest in jurisprudence could shape his position from a prosecutive perspective. In addition, the researcher acknowledges that functionally he does not subscribe strongly to any research paradigm which acts to keep an open mind with regard methodological approaches. (termed "research naivety"). Training on conducting interviews had been undertaken in advance. Finally, whilst the researcher is a radiographer by background his longer career in education provides a professional insight and ability to approach the professional aspects neutrally.

Findings

The stringent KAP (Knowledge, Attitude and Practice) structure that had been used in a previously conducted survey [2] and in the creation of the interview guide was replaced by an emergent strategy that allowed the rich data to provide its own themes for consideration. Three conceptual themes were identified as: (1) "patient", (2) "examination" and (3) "radiographer". These were produced through analysis of the produced data, as opposed to attempting to shoehorn that data

into pre-ordained categories. The relationship that exists between these three overarching concepts and the need for them to align is subsequently discussed and used to formulate the conclusion.

Theme One: Patient

The initial theme obtained was that of the patient themselves. Within medical imaging, the patient represents the focus of the procedure and is directly observable to the radiographer for at least part of the examination, dependent on modality. In addition, radiographers receive information about the patient from the image referral process and, potentially, the interpretation of any produced image.

Prior to presenting the results it is necessary to acknowledge that the patient is only observed in the confines of the clinical environment which inevitably restricts the context of assessment for safeguarding concerns and questions exist as to how far the scope of the radiographer's practice should extend.

Physical findings

With respect to physically visible findings, appearances of external signs of both abuse and neglect were discussed. Bruising in particular was referred to:

"They sort of go bright confluence of bluish and purple, they should start and then gradually fade and go, yellowish greenish" (p4)

More infrequently, other manifestations such as burning and scratching was also identified as cause for concern:

"They're obviously the size of a cigarette end. And whereas a burn from say, a hot pan, or an iron or something like that would be more linear, perhaps more widespread scalds" (p8)

"And if it was like two or three scratches in a row, like nail scratches" (p4).

Notably, due to their link with intracranial trauma which has a particular association with cross-sectional imaging, retinal haemorrhages were also referred to:

"another red flag would also be retinal haemorrhages, things like that, which are highly associated with abusive head trauma." (p3)

Reflexivity assisted in the identification of varying degrees of uncertainty with regard the assessment of physical findings with some respondents claiming greater certainty with the assessment of bruising in particular. It is of note that complexity exists with regard to how specific bruising is to child safeguarding, even for those with experience in that assessment [24].

Social observations

Socially, the communication between patient, radiographer and any parent/guardian present was identified as a potential source of concern:

“I suppose, anything that is other than what the normal Parent-Child interaction. So, a child that is showing fear, a child that is recoiling ... or a child that is actually not showing much expression to the interaction with the parent” (p8)

NICE guidelines in the UK on child safeguarding that identify behaviour that is concerning do suggest that signs of concern could be observable by healthcare professionals.

Image findings

Radiographically, the findings identified by participants as concerning centred around long bone and rib fractures but also intracranial haemorrhage:

“So any femur fractures because very high impact spiral fractures would made me think of twisting injuries” (p9)

I’ve been looking at corner fractures, bucket [handle] fractures. Any skull fractures that are unexplained (p2)

“we would worry about rib fractures at the costochondral junctions. Because costochondral junctions and lateral, lateral rib fractures are the ones that are most sort of associated with like adult hands gripping and squeezing” (p3)

“someone like a subarachnoid haemorrhage would really be a red flag that something’s gone on here”. (p11)

Similar to physical findings, different levels of confidence between participants was identified and what is seen as more significant with images is the importance of the semantics of language. For example, contrast the appropriate description of “corner fractures” and “fractures at the costochondral junctions” that demonstrate an informed evidence base whereas “subarachnoid haemorrhage” does not have the significant association with child abuse that subdural haemorrhage does, but was perceived as having a link.

Differential diagnosis

In discussing the theme of patient there existed appreciation of differential diagnoses for findings suggestive of child safeguarding concern, both in terms of accidental causation and mimics and across physical and radiographic signs:

“if we have random bruises on the legs and arms in a toddler, [it could be] essentially normal” (p8).

“So metabolic bone diseases osteogenesis imperfecta. And though, you know, children, and we have had some cases where there was an achondroplasia” (p7)

Within pre-existing literature on the role of the radiographer in child safeguarding, the relative consequence of error is seldom referred to either in terms of false positive or false negative. Whilst there exists currently no legal requirement for healthcare professionals in the UK to formally respond, the unintended consequence of an ill-informed rationale for that response can be unappreciated [20].

Theme Two: Examination

Within medical imaging, examinations of patients naturally vary dependent on anatomical area under review and imaging modality. The latter in particular is now more varied than in previous generations with increased use of ultrasound and cross-sectional modalities. The interviews identified concepts related to the information provided in advance of the examination, the conduct of the examination itself and any follow-up action taken.

Clinical history

In considering the examination as the scope through which the radiographers view the patient, different concepts were identified. The importance of clinical history, both in terms of that provided by the referrer for imaging and any oral testimony received was identified as significant:

“it would be so injuries that would, or say a child that presents with injuries but with a story that is not measuring up to either the type of injury or the seriousness of the injury” (p8)

“Are they trying to sound like they want to convince you because there’s a difference between stating facts that happened” (p10).

In the UK, the Society of Radiographer’s policy on “paused and checked” may have been intended to reduce clinical error but what it also does is legitimise the radiographer seeking clarification from the patient and/or parent/guardian as to the veracity of the clinical history [32]. It is acknowledged that this may not be universal practice. The importance of clinical history to the radiographer in terms of assessing child safeguarding concern is seen as significant [33].

Parent/guardian interaction

Aligned with the notion of oral testimony was the behaviour of any parent/guardian present and the observation of any signs that could be seen as concerning:

“they can be quite aggressive, and protective of them” (p1)

“If you’re not letting this child speak for themselves, like even to say their own name” (p11)

Similar to the actions of the patient, it is argued that assessment of the behaviour of the parent/guardian needs to be seen in context of the clinical setting. However, the responses were consistent with the NICE guidelines in the UK [34].

A further element to the examination that was identified which was the additional scope provided by the undressing of the patient:

“radiographers can often be the very first professionals that will remove the patient clothing for imaging” (p1)

Reflexively, the frequency to which undressing the patient was mentioned was surprising to the researcher as the practice only occurs when the examination actively requires it and often the patients are provided with covering gowns, notably with increasing age. There is no doubt that undressing provides greater

surface area to observe physical signs but, particularly in contemporary imaging practice, undressing would be the exception rather than the rule.

Limitations of interaction

Similar to the acknowledgement of differential diagnosis, the limitations of the examination through which child safeguarding concerns could be identified were discussed:

“I think sometimes diagnose that you’re seeing that that patient for a very short amount of time, it’s sometimes difficult to build interactions and the rapport with anybody” (p6)

Advances in technology, such as the advent of digital imaging, have naturally reduced the already limited interaction between patient and radiographer.

Responding to concerns

Participants discussed the escalation process with relative clarity in terms of accessing support both within imaging and then further afield, particularly in terms of electronic methods of communication:

“So my first action is just to move a yard to my left and look up on the electronic patient record whether anything has been recorded in the notes” (p8)

“We have the “safeguarding (location redacted)”, safeguarding reporting system and you would report that online.” (p7)

Lack of awareness of processes, which had been identified in literature elsewhere, was not demonstrated in the interviews. This suggests that there is less ambiguity as to what radiographers know they should do in such circumstances.

Theme Three: Radiographer

The radiographer themselves represents a constant presence and the shaping of the radiographer in terms of knowledge and attitude was reflected in the interview discourse.

Level of experience

The relative levels of experience (both professionally and personally) that naturally exists within imaging departments was identified as a factor influential in their ability to assess child safeguarding concerns:

“Did about 1000 hours of volunteering in yeah, just under two years. So that was a really nice experience. It gave me a nice break from radiography, I picked up a bunch of new skills” (p3)

“Since I’ve got my own child it’s a little bit different. It definitely does hit a bit more home” (p9)

Beck et al. [2] did not identify a statistically significant relationship between parenthood and increased knowledge. The interview discourse suggests that experience of children, regardless of context or relationship, is beneficial in assessing safeguarding concerns but this need not be as a parent.

Non-discriminatory practice

Whilst participants were keen to ensure they would not be discriminatory in their assessment of any concerns, the subjective nature of what might constitute child safeguarding was again acknowledged:

“Parenting preferences and parenting skills come from different backgrounds” (p6)

It has been established that child safeguarding is a global phenomenon and within that there exists differing assessments as to what does, and does not represent a safeguarding concern. It is argued that within the context of an interview respondents are unlikely to admit to prejudice but there is evidence that awareness of different interpretations does exist.

Educational experience

Differing experience of education in terms of child safeguarding was reported:

“Undergraduate [education]? hardly anything” (p8)

“As a radiography student, I had, you know, safeguarding lectures, and it was very drilled into us” (p12)

A distinct contrast in testimony between those who felt that their education had prepared them and those who did not is indicative of inconsistency in the delivery of safeguarding training. The presence of someone in the teaching team with an interest seemed to be the deciding factor.

Professional intuition

In contrast with formal education, the notion of radiographer’s own intuition was identified in the discourse:

“you get that sort of Sixth Sense, don’t you, that something’s not right” (p3)

Given the restrictions and challenges that exist in assessing safeguarding concerns which have been identified in the interview discourse, it could be argued to be surprising that this apparent “sixth sense” exists. However, contextually the long-term association of the profession and the detection of physical abuse in particular represents a continuum that could make practitioners more in tune with identifying the phenomenon than those from other professional backgrounds.

Impact of extreme case

An additional factor, related to the radiographer themselves, was the impact of extreme cases on their own concepts of child safeguarding concern. Extreme cases did not always have to be fatal but the involvement of radiography also seemed to be a factor in making cases memorable:

“The girl was starved to death. And she came in at a weekend. And it’s one of two skeletal surveys that I’ve had to perform at the weekend” (p2)

“He will forever stick in my mind and he came back lots of lots of times because he had limb fractures and things like that. So

we saw him in outpatients with a foster carer and he was a completely different child. He was wonderful” (p3)

Extreme of outcome did not always mean a negative. The contribution of the radiographer and radiography to successfully protecting a child has the potential to be as significant to the professional and this could be factored into education.

Discussion

In discussing these results, it is beneficial to summarise and reflect on the three conceptual themes identified and consider them in terms of the need for these to align. They are summarised as follows:

- The **patient** represents the focus of the examination and must present with physical, social and/or radiographic signs suspicious of child safeguarding concerns in such a way that they are detectable.
- The **examination** represents the scope through which the patient is viewed. The nature of that scope must provide to the radiographer an opportunity to view the physical, social and/or radiographic signs of child safeguarding concern for them to escalate accordingly.
- The **radiographer** themselves represent the conduit. They must possess the knowledge of physical, social and/or radiographic signs to permit appropriate identification. In addition, they must possess an attitude that is conducive to escalation and be practically able to escalate any concerns appropriately in a timely manner.

For radiographers to be able to contribute to the identification of child safeguarding concerns, alignment of patient, examination and radiographer is necessary. The alignment is summarised diagrammatically in Fig. 2 and could also be extended into the analysis of the role of other professionals in the evaluation of their assessment of child safeguarding concerns. The central overlapping area demonstrates the window of alignment that is needed for the profession to be able to appropriately assess and escalate concerns.

Evaluating the theme of patient, the interview participants were able to show awareness of the signs that represent child safeguarding concerns across physical, social and radiographic albeit inconsistently and with differing levels of knowledge. The notions of physical, social and radiographic represent a diverse continuum with degrees of both subjectivity and objectivity [13]. Identification of physical signs is fraught with challenges and the evidence base suggests that assessment of factors such as colour of bruising is challenging, even for those professions who have a natural link with skin conditions [24]. The results suggest that radiographers could somewhat over-estimate their ability to associate bruises with child safeguarding concerns. In relation to burns, the narrative can be argued to be more straight forward and less generic in nature. Cigarette style burns, as an example represent an injury that many would be able to associate with child safeguarding without the need for comprehensive training.

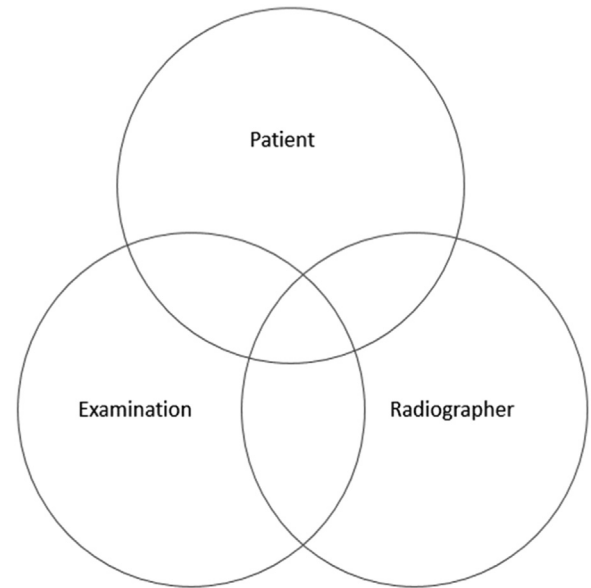


Fig. 2. Concept alignment diagram.

In assessing responses to identifying social concerns, there was evidence that radiographers could appropriately associate factors such as patients being quiet and withdrawn [34]. However, and this was acknowledged by the participants, assessment of factors such as behaviour needs to consider the setting. The interaction between patient and radiographer is a clinically based one and the impact of the unfamiliar setting in conjunction with possible significant trauma is argued to inevitably impact on natural behaviour. This is further exacerbated by the lack of familiarity that inevitable exists between the patient and radiographer and their limited knowledge of a child's usual behaviour [35]. Whilst not impossible for a radiographer to identify concerns from patient behaviour, it remains improbable that they are in a position to do so accurately and within their scope of practice which does not lend itself naturally to assessment of child behaviour [36].

Radiographic signs represent a more niche element of child safeguarding concerns in terms of its application within the distinct sphere of imaging practice [33]. The level of detail provided in terms of suspicious injury was varied. Those radiographers more engaged with paediatrics and those trained in image reporting were able to offer greater detail. The semantics of language is significant when discussing child safeguarding concerns as factors such as the location of rib fractures are important in terms of differentiating between accidentally and deliberately inflicted injury [3]. Similarly, and potentially more catastrophically, intracranial haemorrhages in different locations have differing associations with child safeguarding concerns and there exists a clear need to be able to associate these appropriately [24].

One fundamental question that remains is not the identification of what injuries are associated with child safeguarding, but what injuries are not, and across both physical and radiological signs, mimics can exist. Participants were able to identify

some of those mimics. It is of note that one mimic frequently cited was osteogenesis imperfecta which represents a finding that does have associations with the mimicking of child safeguarding concerns but is extremely rare [3]. In a broader epidemiological context, child safeguarding concerns can be regarded as a more common explanation for injury than rarely encountered diseases [4]. However, what is highlighted in this context is the importance of effective interprofessional working to ensure that imaging is not seen in isolation but as part of a continuity of evidence that leads to scientifically supported conclusions.

In considering the imaging examination, acknowledgement is needed that the scope of contemporary practice is varied. In an imaging department multiple different imaging modalities are used and these influence the level of, and scope for, interaction with the patient [27]. A more unpredictable element represents the involvement of a parent or guardian [35]. The participants descriptions of signs of concern were in line with the current evidence base; including refusal to allow the patient to speak for themselves [21]. However, as with assessing patient behaviour within a clinical setting, conjecture must exist in assessing behaviour of the accompanying adult for similar reasons. The ability of radiographers to accurately recognise concerning behaviour is therefore regarded as improbable, but not impossible.

The undressing of patients for radiographic examinations may be regarded as necessary on occasions to preserve image quality without the presence of clothing artefacts. In addition, the act also widens the scope for observation of physical signs. However, undressing of patients is dependent on whether the examination requires it. Undressing of a patient without clinical need would be regarded as inappropriate and unprofessional, and with many examinations this act would tend to be the exception rather than the rule. Thus, the expectation that undressing will increase the potential for identifying child safeguarding concerns in terms of widening the lens for observing physical signs needs to be seen in context of its infrequency.

The radiographers themselves represent the identified theme that can be manipulated to a greater level to provide an effective conduit for identifying and escalating concerns. Equipping radiographers with the appropriate knowledge of what does and does not represent a child safeguarding concern and an ability to escalate such concerns appropriately represents the cornerstone of the profession's role. With respect to knowledge, account needs to be taken of the diversity that exist within the profession in terms of patient interaction and overall working practice.

The different radiological modalities need to be considered in terms of educating radiographers at both pre and post registration levels. Computed Tomography as an example presents anatomy differently to X-rays and thus, teaching those radiographers who operate in CT to recognise child safeguarding concerns commensurate with that imaging modality represents a way forward. The increasing use of cross-sectional imaging also provides a further physical barrier in terms of patient-radiographer interaction [27]. Participants reported inconsis-

tency in the teaching they had received and a more focussed pre-registration education that considers contemporary practice would seem to be necessary. Reflecting the results, the inclusion of wider paediatric content within academic radiography programmes may provide further benefit in giving radiographers a more holistic view of children. Furthermore, the impact of cases with positive and negative outcomes particularly those involving the input of radiography (to include when radiographers have made tangible contributions) was demonstrable in making education more meaningful [37]. The use of simulation represents a potential way forward however, it would be challenging to represent the diverse field of child safeguarding within a simulated environment alone [38].

The notions of apparent intuition and a "sixth sense" was referred to within the interview discourse. Scientifically, this is challenging to account for, and the participants were unable to offer an explanation. It is suggested that this notion (along with the over-estimation of sensitivity) is a by-product of a profession with a strong historical association with child safeguarding [4]. Whilst that association is chiefly as a diagnostic service rather than an instigator, child safeguarding is argued to be etched into the DNA of the profession and as a result radiography sees itself having a significant role to play. The radiographer's natural curiosity and knowledge of radiographic pathology in particular can be utilised by the wider team. The evidence from the interviews is that radiographers are now well aware of the escalation processes. However, their ability to contribute may be diminished by a growing physical separation between them, the patient and other clinical colleagues. This concept of separation was highlighted during the COVID-19 pandemic in relation to general practice and the move towards remote consultations [39] and with regard effective multiagency working and the loss of a physically present peer support unit [40]. Developments such as electronic referral and dispersed image viewing practices act to reduce the requirement for the wider team to work interprofessionally with radiographers. A suggested method of achieving this would be involvement of radiographers in case reviews and audits undertaken within organisations.

Fig. 3 represents an extension of the conceptual alignment to demonstrate on a practical level the significance of the radiographer's background knowledge, attitude to escalation and practical ability to escalate appropriately. This diagram can be applied to other professions who have similar interactions with patients and has the potential to be used retrospectively to assess professional contributions to identification of safeguarding concerns.

Limitations

The restriction of the purposive sampling to one constituent country of the UK is justified by difference between English and Scottish Law and potential differences in terms of national guidance between England, Wales, Scotland and Northern Ireland. However, in doing so the pool of research participants is naturally reduced.

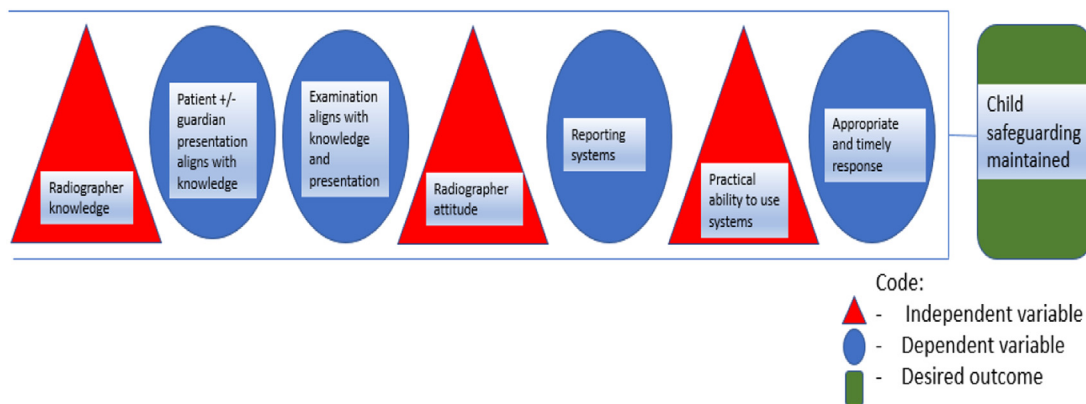


Fig. 3. Conceptual alignment of knowledge, attitude and practical ability of the radiographers to deliver effective child safeguarding.

Areas for future research

Further research on the role of the radiographer could be focussed on establishing effective interprofessional working practices between radiographers and the wider child safeguarding team, taking into account the evolution that has occurred in terms of imaging practice and the impact this could have in terms of the relative remoteness of the profession compared with previous generations.

Conclusion

Contemporary changes have impacted upon radiological practice in such a way to make assessment within the scope of a radiographic examination of factors such as physical and social signs of child safeguarding concerns more challenging than in previous generations. However, radiologically the opportunity to contribute remains as likely and represents the cornerstone of the potential contribution. For this to provide maximum yield, education of radiographers at pre- and post-registration levels needs to account for paediatrics in general to provide a more holistic understanding of children but most also now account for the different radiological modalities (such as CT and sonography) that the radiographers operate within. This should include pathognomonic findings and those occasions when injury and aetiology are in disagreement; within the scope of the modality worked in. The use of relevant cases to highlight radiographic involvement specifically would be beneficial.

Interprofessionally, child safeguarding teams should look to include radiographers in discussions and formal escalations of child safeguarding concerns.

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