



## A qualitative exploration of the experiences of post-mortem forensic imaging in Malta: A psychological perspective



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### ABSTRACT

**Introduction:** This study aimed to qualitatively explore the experiences of post-mortem forensic imaging on theatre and trauma radiographers from a psychological perspective at a general hospital in Malta.

**Methodology:** The study utilised purposive sampling to recruit five radiographers undertaking forensic post-mortem imaging in a general hospital in Malta. Individual face-to-face semi-structured interviews were held. Interpretative phenomenological principles and reflexivity were applied throughout the transcription and analysis phases.

**Results:** Four themes were developed from the interpretive phenomenological analysis of semi-structured interviews: 'The impact of the imaging process,' 'Psychological distancing,' 'Finding meaning in work,' and 'Resource needs,' the latter comprising three subordinate themes: 'Protocols,' 'Physical resources,' and 'Psychological training.'

**Conclusion:** Forensic radiography is a rewarding area of practice yet one that can be complex and have a lasting psychological impact. Many factors including working close to the cadaver, a lack of appropriate training and staffing levels and a lack of evidence-based protocols were identified by participants as contributing to potential psychological stress and emotional distress.

**Implications for practice:** Exploration and evaluation of the psychological experiences of radiographers undertaking post-mortem imaging will inform the development of appropriate psychological services and reinforce the need for the appropriate application of best practice guidelines and protocols to support radiographers working on traumatic cases within forensic and general radiographic practice.

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### Introduction

Post-mortem imaging is a non or minimally invasive method of imaging pathology, foreign bodies, and anatomy within deceased persons via the use of radiographic imaging modalities.<sup>1</sup> This role extension of forensic radiography to diagnostic radiography practice can be applied to searches for pathology and cause of death in perinatal, children, adults and for person identification as well as suspicious deaths. This is widely recognised as an effective method of gathering physical evidence without disrupting the source as compared to other, more traditional, methods of forensics.<sup>2,3</sup> Forensic radiography alone is seldom the sole method for gathering evidence but is often used in conjunction with other

investigations such as external examination and traditional autopsy, which make up for the shortcomings of imaging.<sup>4,5</sup>

The term "forensic" implies that any evidence gathering should be carried out with the understanding that any data obtained has the potential to be used in the court of law.<sup>3,6</sup> The demanding nature of the work and the high rigour required to carry out forensic cases can increase the stress on the investigator.<sup>7</sup> This is further compounded by the operator working with cadavers. These factors can result in investigating radiography staff experiencing stress and emotional distress.<sup>8–11</sup> Adverse connections are also noted between radiographers who are parents and the post-mortem imaging of perinatal, neonate, infant and child deaths.<sup>9</sup>

International guidelines state that radiographers carrying out forensic investigations should be postgraduate qualified, have maintained their continuing professional development (CPD) in this setting and, above all, be willing.<sup>12–14</sup> In Malta, no formal protocols are currently in place and the system requires that the

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orders for these procedures come directly from the office of the magistrate,<sup>15</sup> resulting in the secretariat and other judicial staff often requesting outdated imaging protocols for forensic investigations.<sup>9</sup> The forensic imaging investigations requested in Malta are typically conventional radiography or fluoroscopic x-rays, largely due to their ready availability and specific indications that justify their application.<sup>1</sup> This is acceptable in some current imaging protocols such as in cases of suspected physical abuse in children, although it is essential that recognition is given to the increasing role of cross-sectional imaging using Computed Tomography (CT) and Magnetic Resonance Imaging (MRI) in this and other imaging protocols, such as identification of cause of death in adults.<sup>14</sup> Application of conventional radiography and fluoroscopy has been found to have the unintentional side effect of having the radiographers come into close physical contact with the cadavers to manipulate positioning and manual handling for prolonged periods of time. Such tasks are reported to be stressful and have unintended adverse effects on the practitioners.<sup>8,16</sup>

Due to the need for high proficiency in the medico-legal aspects of forensic imaging, trained and postgraduate qualified radiographers are essential for performing these investigations.<sup>14,17</sup> Those who have completed formal training have been found to be more able to manage the stresses of post-mortem forensic imaging as opposed to those who are untrained.<sup>18</sup> Competent persons are more likely to realise their own psychological limitations and be more aware of support services that can provide mental aid.<sup>18</sup> Whilst psychological services are available to healthcare professionals in Malta, help-seeking for mental health support is often not undertaken until professionals reach a breaking point.<sup>9</sup> Cultural factors and perceived role responsibilities may play a role and research indicates trends describing that Maltese populations are more likely to reach out when a crisis point has been reached.<sup>19</sup>

The lack of local protocols, the limited professional pool, and insufficient staff training have led to staff dissatisfaction amongst forensic radiographers in Malta.<sup>9</sup> A scoping search of published literature identified that the psychological impact of working in this role is under-researched. An understanding of radiographers' experiences may inform the development of psychological services to support this group of healthcare professionals. This study is the first of its kind to qualitatively explore the experiences and psychological impacts and effects of post-mortem forensic imaging on theatre and casualty radiographers at a general hospital in Malta.

### Aims

- To qualitatively explore the experiences of radiographers undertaking post-mortem imaging in Malta.
- To identify the psychological impacts and effects of undertaking post-mortem imaging in radiographers in a Maltese general hospital.

### Methodology

Examining the experiences of radiographers undertaking forensic post-mortem imaging from a psychological standpoint was central to this study. Interpretative phenomenological approach (IPA)<sup>20</sup> enabled in-depth exploration of these lived experiences and examination of the complexities and personal realities of working in the mortuary environment. IPA facilitates reflections on a phenomenon and its significance within their lives<sup>21</sup> and was considered an appropriate methodology with which to gain insight into the experiences of radiographers.<sup>22</sup>

Purposive sampling was employed among radiographers working in a primary general hospital in Malta, resulting in the recruitment of five radiographers who met the inclusion criterion.

Whilst radiographers across all departments can technically perform post-mortem imaging within this hospital setting, the task was primarily performed by theatre and trauma radiographers, who should be familiar with international forensic imaging guidelines.<sup>14</sup> Therefore, only those radiographers within this setting were approached. All participants had experience of undertaking post-mortem imaging investigations, defined as having undertaken a minimum of four forensic imaging investigations in the previous 12-month period. Thereby enabling an exploration of the psychological impacts of this work with radiographers who understand this aspect of the healthcare system. Whilst the sample size is small this enabled original meanings to be retained from participants' narratives<sup>23</sup> and is reflective of this highly specialised group of healthcare professionals within Malta. All participants were bilingual English Maltese speaking predominantly in English during the interview process. The lead researcher is also bilingual and was able to provide a translation into English if required. Ethical approval was granted by the hospital ethics committee and the co-researchers academic facility.

A radiography departmental manager from within the hospital emailed a study invitation letter and recruitment poster to the theatre and casualty radiography teams. Participants were provided with an online study information sheet and provided consent online. Individual face-to-face interviews using a semi-structured format were conducted at the hospital adhering to all infection control measures in place due to Covid-19. Face masks were worn by both interviewer and interviewee.

During the interviews, participants were encouraged to reflect on their experiences at length and to consider any psychological impacts and effects of undertaking post-mortem radiography, training needs and support mechanisms. All interviews were audio-recorded and transcribed verbatim. Participants were able to withdraw their data up to two weeks post-interview to enable analysis to be undertaken. Data was stored on a university secure server.

Reflexivity was considered throughout the research process in accordance with IPA principles.<sup>24</sup> The lead researcher who conducted the interviews is a radiographer working in Malta and has lived experience of post-mortem imaging. The other members of the research team are a forensic radiographer and a health psychologist both working within the UK. A reflexive diary was kept by the lead researcher and critical reflection on the researcher influence, particularly during data generation and analysis stages, was discussed during supervision and team meetings.

An idiographic approach was taken throughout transcription and analysis to ensure themes were grounded in participants' narratives, considering the uniqueness and wholeness of their individual experiences.<sup>25,26</sup> Analysis was undertaken step-by-step beginning with the reading of each transcript on several occasions. Phrases relevant to the lived experience were highlighted within the text and notes were made of interesting concepts, interpretations, and potential themes. The process was repeated for each transcript which was considered as a "whole" and in "parts" Developing themes were clustered together incorporating psychologically informed descriptions and interpretations and notes were made of any divergences. All members of the research team contributed to data analysis bringing together their differing specialities to support the analysis process and interpretation of data.

### Results

The focus of this research was psychological, however as demonstrated within the results the participants also focussed their discussions on physical resources. This was in the context of how issues with such resources elicited stress and impacted upon

their psychological wellbeing. Four superordinate themes were developed: the impact of the imaging process, psychological distancing, finding meaning in work, and resource needs. The latter theme of resource needs comprises three subordinate themes: protocols, physical resources, and psychological training.

#### *The impact of the imaging process*

Participants discussed several points pertaining to the impact of the imaging process including manual handling, the imaging of infants, and cultural/system considerations when working in Malta. Manual handling of cadavers as part of the radiography process elicited a range of physical and psychological emotions.

*There were cases, I handled the cadaver without any problem at all, but there were cadavers which were full of blood oozing, and you feel a bit... nauseated, feel a bit sick. P3*

*Handling a cold corpse is not a good feeling. Usually, when you touch someone, they are warm. It's always a bit of a shock, touching a cold body. P4*

The psychological impact of imaging deceased children, perinates and neonates was noted. Whilst some participants described this as routine, radiographers who were parents considered this to be one of the most emotionally difficult aspects of forensic radiography.

*If it's a baby post-mortem, it's different... It hits hard. P2*

*Sometimes they are children, sometimes foetuses, sometimes they are people involved in criminal gangs so for every person involved during the post-mortem, you'll have different thoughts passing through your mind. When it's children, you'll start imagining your own children there. P3*

Radiographers feared repercussions resulting from the forensic process in Malta regarding murder cases. This compounded the psychological challenges such cases present.

*When murders are involved, there are criminal gangs involved, you start of thinking, who might be these people? Who are their relatives? If they know you? Sometimes there might be relatives in the gallery watching you, looking at what you are doing. P3*

It was noted that some participants ruminated on cases, but this was often dependent on the circumstances of the death.

*Depends on the manner of death. For example, about a year ago, I went to the mortuary to do a babygram of a child who drowned. And that was very different from other babygrams. P1*

*Sometimes you stay up thinking about what you saw. Because what you see there is sometimes not nice. P4*

#### *Psychological distancing*

To manage feelings of discomfort participants psychologically distanced themselves from some of the challenges of their role. Focusing on radiography techniques and protocols to ensure proficiency and engaging in avoidance were strategies used.

*Streamlining thoughts and putting them in their own pockets. P1*

*You need to go home thinking like it's a normal day at work, thinking it won't affect you. If it's somebody close to you or you went through a similar experience, you might avoid doing it and maybe somebody else can step up and do it. P5*

*I concentrate on my work. I concentrate about what I am going to do with the best technique I can and that sort of alienates me from thinking and feeling sorry for the dead person and thinking too much. One thing that helps as well, is handling them with respect, which helps me. P4*

Some participants actively avoided sharing their experiences with others.

*I don't go into details, because I don't want to share, what I see, with people who are not used to the environment. P2*

This has similarities with the concept of protective buffering, with radiographers in this study avoiding discussion about their work to protect others from upset, worries and burdens.

#### *Finding meaning in work*

Participants found meaning in their work and felt pride in undertaking forensic radiography cases and in playing a role in potentially uncovering cause of death leading to the solving of legal cases.

*There is an element of pride because the work we do helps uncover more details. P1*

*The positive effect I feel is that through work in mortuary maybe there a forensic case and you help solve an issue, a case. P4*

All participants reported satisfaction from providing high-quality images in cases for which they perceived they were providing a positive service to other healthcare professionals and as part of the investigative and juridical process. Interest in the speciality was also paramount.

*Providing the best quality images to help the pathologist or the expert in charge to solve whatever they are looking to answer. I am curious sometimes about how the case will turn out. Or if there is something maybe that wouldn't be obvious on the outside but then when you start imaging, boom! It would be a surprise. P5*

*There are cases which you feel proud that you are participating in these cases, and you might be giving some information which could lead to the case being solved. You feel satisfied helping the forensic unit doing their work. There was a case for example and with the help of the x-ray imaging, we managed to solve how the patient was killed. P3*

#### *Resource needs*

All participants described resources that would support their work in forensic radiography. These were related to the implementation of protocols, technological tools as well as designated physical space for their work, resources to enhance greater team working and to embed psychological training and resources into training and practice.

#### *Protocols*

Resources that would facilitate greater implementation of international guidelines on forensic radiography were reported to be beneficial, enabling appropriate levels of training and standardisation of imaging processes involved. Whilst international guidelines recommend two radiographers are present during the management of forensic cases participants in this study discussed that this was not always possible.

*Sometimes, because of the work levels, you'd have to go alone. It's best if you go in pairs of course. If they can wait, they should wait for two radiographers so they can back each other up. P5*

A dedicated team consisting of members with specific training in forensic and post-mortem examinations was highlighted as a resource need, a reflection of international guideline recommendations.

*I think there should be a specific group of well-trained people who do post-mortem examinations and not who is available. P2*

The need for explicit written protocols whereby standardisation of imaging and process are clearly defined was identified by participants. This was seen as important when undertaking medico-legal cases, whereby continuity and integrity of evidence are essential. Standard operating procedures (SOPs) detailing the chain of command and technique were noted as of importance to outline the order of operations and regulations as well as provide legal indemnity to those involved.

*Standard operating procedures should be written up because they provide a set guideline, so that everyone knows to follow them. So, if someone was to do a case, and they're not really experienced, they can follow the guidelines and they'll know what they have to do and it's also a legal cover for us. P1*

#### Physical resources

Post-mortem Computed Tomography (PMCT) is widely recognised as an integral part of forensic imaging practice.<sup>27</sup> Access to CT scanning equipment was identified as a resource need by participants who stated this would convey multiple benefits including providing higher quality digital images. CT was viewed as reducing the amount of manual handling required. Whilst having physical benefits in reducing manual handling and examination time, the primary benefit was one of minimising direct contact with the body and as such the psychological stressors that participants identified with this. Despite these advantages and CT equipment being available at this hospital, it appears not to be utilised.

*CT would provide higher diagnostic quality images. Whole body reconstructions, measure lengths of bones. It would be a much more accurate projection rather than planar, which you're not sure if the projection is a true AP or true lateral. Finding foreign bodies, a whole-body CT would provide a much more accurate projection as to where the object is located. Imaging of the whole-body vs CT of the whole body takes less time and less manual handling. And more details, cross-sectional imaging of the body. Depending on the case, you might not need to do an autopsy. P1*

The continued use of paper requests was identified to be troublesome by participants. These requests were often incomplete, illegible and at risk of being lost leading to increased stress and anxiety in ensuring the correct imaging is performed.

*They still fill in paper requests for the mortuary. That's a bit old-fashioned... Online is more comfortable. The chances of losing paper requests are greater. It's all a hassle... P1*

#### Psychological training

Psychological training was identified as a potentially valuable resource as this has the benefit of increasing mental resilience thus safeguarding mental health.

*I think that when you start working, there should be some formal training, including psychological training and technique training. P4*

A difference was observed in psychological training at the undergraduate level and all participants agreed that formal training for working radiographers was lacking.

*The [radiography] technique, we learn it through experience, but formal psychological training or preparation for these things... I think it's a bit missing. They seem to only think about the psychological care you can get afterwards. P4*

Psychological support was considered an afterthought rather than part of professional preparations for undertaking the role. Learning psychological strategies for coping and managing traumatic situations during training could be beneficial.

*Speaking to someone that is trained in psychology or something like that? To help you come up with these tools and tips and stuff like that. P5*

All participants stated that there are psychological services available within the hospital but that these were not particularly visible and there was limited awareness about accessing these services.

*If there are specific psychological services after such things, I don't know about them. But I know that, I can contact my team leader and he can direct me to a psychologist. P2*

One participant commented on how this should include psychological preparations for working with foetal and neonatal cases.

*I believe a couple lectures, not hands on, would have been better rather than for the first time you go do some babygram, I think babygrams are worse. Some babygrams ... boom, it hits you there and then. P2*

#### Discussion

This study aimed to explore the experiences of radiographers undertaking post-mortem imaging in Malta. The psychological impact of the imaging process was apparent and participants in this study reported distancing and protective buffering behaviours. The need for psychologically and trauma-informed protocols and training was evident to enable and support radiographers in undertaking this essential and highly valued area of radiographic practice.

A paucity of research is noted regarding the psychological impact of post-mortem procedures upon radiographers. Healthcare professionals who are parents are expected to face more negative effects of post-mortem procedures<sup>28</sup> however further research is needed to examine the psychological impacts and effects of undertaking this work. Similarly, a fear of repercussions when being non-anonymised while involved in radiographic examinations surrounding murder cases, causes psychological impact.<sup>29</sup> This hinders the imaging process as those involved are fearful of repercussions from third parties outside the hospital environment.

When handling the deceased, staff are actively encouraged to handle the remains with dignity and respect, always maintaining professionalism. The ability to be able to work with care, respect, and professionalism is found to provide significant satisfaction within the role.<sup>30</sup> Although it is advised that the practitioner should aim to distance themselves from the body as a person, which can prove emotionally challenging.<sup>31</sup>



There may be different motivations behind this distancing; the need to maintain the perceived perception of the professional norm,<sup>32</sup> but also as a means of emotional management.<sup>33</sup> Goffman (1959)<sup>34</sup> highlighted such strategies for coping with the emotions involved, identifying the 'frontstage' as living up to the expectations of the professional role with colleagues and family members of the deceased and a 'backstage' when at home.<sup>32</sup> There are however problems with this form of emotional and psychological management.<sup>30</sup> Whilst participants in this study appeared to implement this protective buffering effectively, some cases made this more challenging particularly those involving infants and given the cultural context of working in Malta.

Protocols are widely recognised as an aid in supporting radiographers in ensuring a standardised approach to post-mortem imaging.<sup>35,36</sup> Although these can only be effective if implemented, staff are aware of them, and they are readily accessible. The implementation of some protocols such as working in pairs and standardisation of working practices was reported to be difficult by participants, due to staffing provision and availability of appropriately trained staff. Such issues are not unique to this setting as identified in the literature,<sup>36,37</sup> can result in workplace stress and have a negative impact on psychological wellbeing.

Cross-sectional imaging is internationally regarded as the gold standard form of non and minimally invasive imaging in post-mortem cases.<sup>38</sup> The speed at which the procedure is conducted and imaging through a leakproof, radio-opaque body bag result in reduced contact time in terms of manual handling. In line with international guidelines,<sup>39</sup> this reduces the risk of infection<sup>40</sup> and potential psychological harm<sup>41</sup> upon the practitioners.

The hospital Radiology Information System (RIS) is a system implemented across the globe, improving the efficiency of departments.<sup>42</sup> The continued use of paper requests as described by our study participants was reported to create pitfalls which are not present in RIS<sup>43</sup> and can lead to miscommunication between departments. The illegibility and incompleteness of these requests were identified by the participants in this study.

Current international and UK guidelines outline the need to safeguard the well-being of radiographers, whereby employers have a responsibility to protect staff's psychological and physical wellbeing.<sup>14,17</sup> However, these refer primarily to PTSD and awareness of its presentation, without acknowledging that this is not an inevitable outcome from exposure to traumatic and or distressing experiences<sup>44</sup> but rather a final point of many potential causes.<sup>45</sup>

The current guidelines recognise the importance of prevention, with training and education being integral to this, although, there is no definitive guidance on what format this should take, other than to follow relevant protocols and to have debriefs facilitated by appropriately qualified personnel. How training should be delivered, how debriefing should take place, and in what form requires further clarification. This is an area in need of further exploration, particularly for radiographers working in post-mortem imaging, for whom specific training<sup>46</sup> and adherence to international guidelines are required.

## Conclusion

This study was the first to qualitatively explore the impacts of post-mortem forensic work from the psychological perspectives of the radiographers involved within a Maltese general hospital. This highlighted the complex multifaceted nature of forensic post-mortem imaging and the impacts that these may have individually and in combination upon the psychological well-being of the radiographers involved.

## Limitations

The study population was limited to those participants who undertook a minimum of four forensic post-mortem examinations in the past year, however, expanding the study to those with lesser experience only recently embarking upon forensic imaging would be valuable as differing support needs may emerge. As the researcher is a colleague of the participants, this may have had an impact on the information obtained. An independent interviewer may reduce any interviewer bias<sup>47</sup> however having knowledge and experience of forensic radiography was advantageous in this study particularly when technological and medical discourse was used.

## Recommendations

This exploration of radiographers' experiences working in this field indicates some recommendations for training, practice, and further research.

- Minimising radiographers' anxiety and uncertainty, through support to work within international guidelines (e.g., development and application of evidence-based protocols, appropriately trained and sufficient radiographers for forensic practice)
- Support the increased application of cross-sectional imaging equipment (CT) for post-mortem imaging within Maltese radiographic practice thereby minimising the need for direct bodily contact and potential for psychological distress associated with this. This would be in addition to the other established forensic imaging benefits.
- Further exploration of psychological support needs from diverse cultural contexts, i.e., the professional culture of radiographers and application of this within different nations.

## Conflict of interest statement

None.

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