



City Research Online

City St George's, University of London

Citation: Ngo, M., Skelton, E., Ohene-Botwe, B., Papathanasiou, S., Amedu, C., Mannion, L., Ahmed, S., Vince, C., Stuart, D., Richards, C., et al (2025). The role of debriefing in supporting, retaining, and educating radiography students: An exploratory narrative review. *Journal of Medical Imaging and Radiation Sciences*, 56(5), 101971. doi: 10.1016/j.jmir.2025.101971

This is the published version of the paper.

This version of the publication may differ from the final published version. To cite this item please consult the publisher's version.

Permanent repository link: <https://openaccess.city.ac.uk/id/eprint/35178/>

Link to published version: <https://doi.org/10.1016/j.jmir.2025.101971>

Copyright and Reuse: Copyright and Moral Rights remain with the author(s) and/or copyright holders. Copies of full items can be used for personal research or study, educational, or not-for-profit purposes without prior permission or charge, unless otherwise indicated, provided that the authors, title and full bibliographic details are credited, a hyperlink and/or URL is given for the original metadata page and the content is not changed in any way. For full details of reuse please refer to [City Research Online policy](#).



ELSEVIER



Journal of Medical Imaging and Radiation Sciences 56 (2025) 101971

Journal of Medical Imaging
and Radiation Sciences

Journal de l'imagerie médicale
et des sciences de la radiation

www.elsevier.com/locate/jmir

Review Article

The role of debriefing in supporting, retaining, and educating radiography students: An exploratory narrative review

Mark Ngo^{a,*}, Emily Skelton^a, Benard Ohene-Botwe^a, Stamatia Papathanasiou^a, Cletus Amedu^a, Liam Mannion^a, Shafq Ahmed^a, Caroline Vince^a, David Stuart^b, Claire Richards^b, Leah Untisz-Sly^c, Judy Brook^d, Emma Hyde^b, Chris O'Sullivan^a and Christina Malamateniou^a

^a City St George's, University of London, Northampton Square, London EC1V 0HB, United Kingdom

^b University of Derby, Kedleston Road, Derby DE22 1GB, United Kingdom

^c Sheffield Hallam University, Collegiate Crescent, Sheffield, S10 2BP, United Kingdom

^d Manchester Metropolitan University, Lower Ormond Street, Manchester, M15 6BX, United Kingdom

ABSTRACT

Introduction: Clinical placements are essential for the development of practical and professional skills for radiography students. However, they can also be a substantial source of stress. The shift from theoretical learning within the safety of the classroom environment to the unforeseen realities of clinical practice can be challenging. This narrative review aims to explore the role of debriefing in the context of simulation-based education (SBE) and clinical debriefing (CD), highlighting their relevance in supporting, retaining, and educating radiography students by improving their experiences during clinical placements.

Method: The literature search utilised databases including PubMed, Scopus, Cochrane Library, CINAHL, and MEDLINE. Key search terms included radiography, student, debriefing, resilience, retention, support, and emotional well-being. Due to limited radiography-specific research, the search was expanded to include broader health-care literature, prioritising papers from the past decade.

Results: Debriefing following SBE allows students to process emotions, reactions, and mentally prepare for similar situations in clinical placements. Incorporating SBE debriefing into radiography programmes may help familiarise students with the structure and purpose of debriefs. The benefits of CD in radiography are not as well studied or established. Broader research from other health professions

highlights the potential of CD to promote resilience and support the emotional and psychological well-being of individuals. Routine CD can provide a supportive, safe space for reflections and to express emotions. Prompted CD, performed after challenging events, should be conducted in a psychologically safe environment by well-trained facilitators. Where multiple students are involved, group debriefing may be more effective than individual sessions. Facilitators should create a safe space for emotional expression, avoid pressuring students to disclose detailed accounts of the traumatic experience, and provide follow-up support where necessary.

Conclusion: Establishing debriefing frameworks to the unique challenges faced by radiography professionals could better equip students to navigate the emotional demands of clinical placements. Future research could explore radiography students' and educators' perspectives on clinical debriefing, and evaluate the feasibility and effectiveness of specific debriefing models to support students before, during, and after practice placements. This knowledge can inform the development of formal guidelines to better educate and retain radiography students.

RÉSUMÉ

Introduction: Les stages cliniques sont essentiels au développement des compétences pratiques et professionnelles des étudiants en radiographie. Cependant, ils peuvent également être une source importante

Declaration of Competing Interest: All authors declare no conflict of interest.

Contributors: All authors contributed to the conception or design of the work, the acquisition, analysis, or interpretation of the data. All authors were involved in drafting and commenting on the paper and have approved the final version.

Funding: This narrative review was conducted as part of a project funded by the College of Radiographers Industry Partnership Scheme (CoRIPS) Research Grant 242.

Ethical approval: Not required for this article type.

* Corresponding author at: MLG02, Myddelton Street Building, 1 Myddelton Street, City St George's, University of London, London, EC1R 1UW, United Kingdom.

E-mail address: Mark.Ngo@citystgeorges.ac.uk (M. Ngo).

de stress. Le passage de l'apprentissage théorique dans le cadre sécurisé de la salle de classe aux réalités imprévues de la pratique clinique peut être difficile. Cette revue narrative vise à explorer le rôle du débriefing dans le contexte de l'enseignement basé sur la simulation (EBS) et du débriefing clinique (DC), en soulignant leur pertinence pour soutenir, retenir et éduquer les étudiants en radiographie en améliorant leurs expériences pendant les stages cliniques.

Méthodologie: La recherche documentaire a été effectuée dans des bases de données telles que PubMed, Scopus, Cochrane Library, CINAHL et MEDLINE. Les principaux termes de recherche étaient les suivants : radiographie, étudiant, débriefing, résilience, rétention, soutien et bien-être émotionnel. En raison du nombre limité de recherches spécifiques à la radiographie, la recherche a été élargie pour inclure une documentation plus large sur les soins de santé, en donnant la priorité aux articles de la dernière décennie.

Résultats: Le débriefing après l'EBS permet aux étudiants de gérer leurs émotions et leurs réactions, et de se préparer mentalement à des situations similaires lors de stages cliniques. L'intégration du débriefing de l'EBS dans les programmes de radiographie peut aider les étudiants à se familiariser avec la structure et l'objectif des débriefings. Les avantages du DC en radiographie ne sont pas aussi bien étudiés

ou établis. Des recherches plus larges menées dans d'autres professions de santé mettent en évidence le potentiel du DC pour favoriser la résilience et soutenir le bien-être émotionnel et psychologique des individus. Le débriefing de routine peut fournir un espace de soutien et de sécurité pour réfléchir et exprimer ses émotions. Le débriefing dirigé, effectué après des événements difficiles, doit être mené dans un environnement psychologiquement sûr par des animateurs bien formés. Lorsque plusieurs étudiants sont concernés, le débriefing de groupe peut être plus efficace que les séances individuelles. Les animateurs doivent créer un espace sûr pour l'expression émotionnelle, éviter de faire pression sur les étudiants pour qu'ils révèlent des détails de l'expérience traumatisante et fournir un soutien de suivi si nécessaire.

Conclusion: La mise en place de cadres de débriefing pourrait mieux préparer les étudiants à gérer les exigences émotionnelles des stages cliniques. De futures recherches pourraient explorer les points de vue des étudiants et des enseignants en radiographie sur le débriefing clinique, et évaluer la faisabilité et l'efficacité de modèles de débriefing spécifiques pour soutenir les étudiants avant, pendant et après les stages cliniques. Ces connaissances peuvent servir à l'élaboration de lignes directrices formelles pour mieux former et retenir les étudiants en radiographie.

Keywords: Attrition; Clinical Placement; Debriefing; Radiography; Retention; Student

Introduction

Radiography currently faces significant challenges, including a rise in student attrition due to factors such as financial stress, poor physical and mental health, demanding workloads, and negative clinical placement experiences [1-3]. This trend poses a serious threat to the quality and safety of clinical services, as the loss of student radiographers will translate into a shortage of qualified professionals in a field demanding high levels of precision and care, exacerbating current staffing shortages [4].

For radiography students, clinical placements are essential for the development of practical and professional skills, providing an opportunity to apply theoretical knowledge in real-world settings. However, placements can also be a substantial source of stress for radiography students [5-7]. The transition from theoretical learning within the safety of the classroom environment to the unforeseen realities of clinical practice can be challenging, as radiography students may be exposed for the first time to situations involving acute and chronic illness, death, critical injury, and violence in the clinical setting [2,8-10]. Moreover, experiences of intimidation, bullying, and harassment by peers or supervising radiographers can severely impact a student's mental health [5,8,11-13]. Radiographers are also vulnerable to moral distress [14-16] and compassion fatigue [17,18], which can contribute to occupational burnout and potentially prompt individuals to leave the profession.

To foster an emotionally safe and educationally conducive environment, students value certain stress-reducing factors [8]: (1) the availability and presence of facilitators, (2) opportunities to practice skills and learn from mistakes, as a normal

part of the learning process (3) regular performance feedback, (4) preparation and support towards and after potentially traumatic, untoward events experienced in clinical placements. Evidence, particularly from the field of nursing, indicates that debriefing principles may potentially address these needs [19-24]. Fundamentally, debriefing is a reflective process, allowing participants to review and process their experiences, express their thoughts or emotions and identify areas for potential improvement and support [25-28].

Support can be provided a) prospectively through simulation-based education (SBE) in a controlled environment followed by debriefing to prepare students for challenging situations [29-32] or b) retrospectively through clinical debriefing (CD) which can be performed routinely, or prompted by a specific unanticipated, challenging, or traumatic experience in the clinical setting [26-28]. In emergency imaging environments, newly qualified diagnostic radiographers have reported positive experiences following informal debriefing to help alleviate stress and highlighted the need for radiography-specific debriefing sessions to support the emotional and physical demands of trauma imaging [10]. Although confronting deaths in emergency contexts is challenging, debriefing offers psychological support and can help alleviate feelings of isolation [16]. Radiographers who have transitioned from emergency to non-emergency imaging settings, have emphasised the benefits of debriefing in emergency environments, noting how it fosters camaraderie and a strong sense of belonging within a multidisciplinary team [16]. Recent studies on radiographers' experiences during the COVID-19 pandemic reported a lack of

CD provided by management teams [33,34], with recommendations to further explore this potentially supportive tool [34].

This exploratory narrative review aimed to address the following question: How are debriefing approaches currently used within radiography education, and what is their potential to support, retain, and educate radiography students before and during clinical placements? It seeks to contribute to ongoing discussions on improving psychological support and educational experiences of radiography students [5,6,13,30,35-37] through these specific objectives:

- (1) Investigate debriefing methods, both SBE and CD, that may be used to support, retain, and educate radiography students before, during, and after clinical placements
- (2) Outline the potential benefits and challenges of implementing these debriefing interventions in the radiography setting
- (3) Provide recommendations for future applications of clinical debrief in the radiography context

Method

The literature search for this review used databases including PubMed, Scopus, Cochrane Library, CINAHL, and MEDLINE due to their comprehensive coverage of healthcare and allied health research. The population, exposure and outcome (PEO) model [38,39] was utilised to guide the search, with primary search terms including:

- (1) Population: “radiography”, “student”, “learners”, “placement”
- (2) Exposure: “debrief”, “clinical debriefing”, “simulation education debriefing”, and “healthcare debriefing”
- (3) Outcome: “resilience”, “compassion fatigue”, “emotional wellbeing”, “retention”, “mental wellbeing”, “support”.

Boolean operators such as “AND”, and “NOT” were used to refine the search. For example, “debrief AND radiography”, was used to specifically identify studies related to debriefing practices within radiography. Searches were conducted by two research team members and the department’s dedicated librarian. Initially focused on radiography-specific debriefing, the search was broadened to include other healthcare disciplines to increase available sources and address the limited papers specific to radiographers [29,32,34,35,40-60]. This adjustment allowed for a greater evidence base to explore debriefing’s effectiveness in supporting students. Articles relating to military debriefing were excluded from the review. English-language studies published in the past 10 years were prioritised, although seminal papers older than a decade were included due to their influence on debriefing practices. Eligible articles were categorised into those focused on SBE, CD, or both. This approach provided a broad yet relevant overview of current debriefing practices in healthcare training.

The synthesis of data followed a more flexible and iterative approach, consistent with the recursive process described by Mateos and Solé [61]. This involved reading source texts, identifying relevant information, taking notes, drafting initial summaries, revisiting the texts, revising content, and refining the synthesis into its final form [61].

Results and Discussion

In the broader healthcare setting, debriefing models and approaches are becoming more prevalent, with prior reviews highlighting a diverse array of purposes, methodological differences, and outcomes [22-24,28]. The use of SBE debriefing will be examined first, exploring its potential benefits, implementation challenges, and other considerations.

Debriefing following simulation-based education (SBE) to prepare students for practice placements

Simulations, including moulage exercises, help reduce cognitive load and prepare students for real-life scenarios, such as trauma imaging with open wounds [40,50]. Debriefing following SBE is essential, offering students a chance to reflect on the simulation, gain insights from peers, and receive guidance from instructors [29,30,32]. This reflective process allows students to process their experiences in a supportive setting and derive meaning from the simulation that can be applied for similar future scenarios [22,62]. It also offers students a space to process emotions and reactions, allowing them to mentally prepare for similar situations in clinical settings [29,63]. This preparation empowers students to respond with greater confidence and resilience when encountering a similar situation [64-66].

There is currently insufficient evidence to determine whether specific debriefing models in SBE lead to better educational and clinical outcomes in radiography [67]. While SBE is well-documented in medical and nursing education, it has only recently gained attention in radiography [41]. The integration of SBE into radiography education requires a comprehensive approach, ensuring alignment with curriculum content, appropriate use of available resources, effective feedback and debriefing mechanisms, close collaboration with clinical placement partners and clearly defined learning outcomes [41,63]. There is a need for further research into radiography teaching staff and clinical supervisors’ perceptions of SBE debriefing.

Moreover, SBE debriefing frameworks are generally based on educational frameworks and psychological or emotional outcomes can be neglected at times [22]. Emotionally or psychologically challenging scenarios, such as managing a violent or abusive service user or facing a patient’s death, necessitate addressing and processing emotions before focusing on the learning outcomes [68]. Trauma-informed Psychologically Safe (TiPS) is an example of an SBE debriefing framework developed to assist learners with normalising their feelings and processing emotional reactions to simulations involving patient death [68]. It comprises five phases (see Harder et al., 2021) [68] designed to equip learners with strategies to manage emo-

tions when faced with similar challenging clinical scenarios in the future. Further research may benefit from adapting similar debriefing frameworks to radiography education. Establishing evidence based frameworks to the unique challenges faced by radiography professionals could better equip students to navigate the emotional demands of clinical radiography.

Consideration is also needed on whether to perform a hot or cold debrief. Hot debriefing is conducted immediately after simulations, allowing participants to receive immediate feedback from instructors or peers [69-71]. This immediacy facilitates active discussion, enabling students to address their performance while the experience is still fresh in their minds [27,71]. A disadvantage of hot debriefing is that students may not be emotionally prepared to process the feedback right after a simulation, particularly if the scenario was intense or stressful [71]. This lack of emotional readiness can undermine the effectiveness of the debriefing session, as students may struggle to fully engage with the feedback and discussion [27,71].

Cold debriefing occurs after a delay, ranging from several hours to even months following the simulation. This approach provides students with time to reflect on the simulation, allowing them to thoughtfully consider what went well and identify areas for improvement [27,71,72]. It can also be more practical when dealing with large groups of students, as it allows for better scheduling flexibility [71]. The need to reconvene students after a significant time lapse can, however, be difficult, and there is a risk that students may forget key details of the simulation, diminishing the effectiveness of the debrief [71].

Debriefing for Meaningful Learning (DML) is a commonly utilised framework for structured debriefing following SBE [73]. DML involves a facilitator guiding students through a reflective process, enabling them to comprehend the reasoning and knowledge underpinning their actions. This structured method has been shown to significantly enhance students' clinical reasoning skills [73]. In contrast, self or peer-led debriefing, conducted without a facilitator, offers a more cost-effective alternative [74,75]. Self-guided debriefing allows the student to control the pace of debriefing [76]. However, students participating in self or peer-led written debriefs often report lower levels of self-confidence and the potential for disseminating inaccurate information [73,74]. This could impede learning outcomes, indicating that peer-led debriefs may be better suited to students with a solid foundation of knowledge and reflective ability [73].

A combined approach, where self-debriefing is followed by a facilitated group debriefing session, may draw on the strengths of each method, leading to a more comprehensive learning experience [73]. Table 1 summarises the benefits and challenges associated with the different debriefing styles following SBE.

Clinical Debriefing (CD) to support students during and after clinical placements

The benefits and role of CD in supporting, retaining, and educating radiography students are not as well explored compared to SBE debriefing [22-24]. What is known from broader

research from other health professions, is that CD has the potential to not only enhance patient care but also to promote resilience and support the emotional and psychological well-being of individuals [22,77-81]. However, unlike SBE debriefs which occur in controlled environments after planned scenarios, CD takes place in response to real clinical events, often filled with complex emotions. This makes CD more nuanced, as it requires the individual to process actual encounters which can carry a much heavier emotional impact. Variations in definitions and terms have resulted in discrepancies in how CD is structured and delivered, also hindering its implementation [24,28]. A systematic review by Phillips and colleagues [81] identified 21 tools for CD in acute care settings including DISCERN, STOP5, Hot debrief tool, PEARLS, and REFLECT (see Phillips et al., 2024) [81]. Similar to SBE debriefing, CD may be conducted in groups or individually and classified as hot or cold debriefs [24]. Furthermore, they can be performed routinely or be performed only in response to a challenging clinical event, which is known as a prompted CD.

Routine CDs: Routine debriefs can be used to offer radiography students a consistent supportive space to express emotions and reflect on their recent clinical experiences. These debriefs could be held during placement, at the end of each week, or after a block of placement, as a form of morale maintenance, ensuring students feel adequately supported [24]. The Plus/Delta Method is a simple method of performing a routine debrief, asking participants three core questions: "What went well?", "What did not go well?", and "What could have been done differently?" [82]. While the phrasing of these questions may slightly vary, the core focus of the Plus/Delta method remains consistent across different settings [22].

An example of a routine CD designed to address the emotional impact of working in intensive care units is "Death Rounds" [22]. These sessions involve reviewing all patient deaths from the previous month, with participants reflecting on three open-ended questions: "Did you have any concerns about how care was provided to this patient?", "What could we have done differently?", and "How did it feel?" [22]. In radiography, embedding CD into routine practice and making debriefing proactive rather than reactive, could offer significant learning benefits.

Prompted CDs: Unlike routine CDs, prompted debriefs occur after a specific challenging or traumatic event in the workplace. In the 1980s and 1990s, prompted debriefing became common practice in organisations, requiring workers exposed to workplace trauma to attend group sessions to discuss their experiences [83]. Benefits of prompted CD may include facilitating mutual support for affected workers, providing an opportunity to identify workers requiring additional clinical support, increasing levels of social cohesion, reducing levels of sick leave, and improving workplace performance [84].

Previous reviews into the use of psychologically-focused debriefing have shown mixed results [83-85]. In 2005, the United Kingdom's National Institute for Health and Care Excellence (NICE) [86] advised against providing psychologically-focused

Table 1

Summary of the benefits and challenges associated with the different debriefing styles following SBE.

Type	Benefits	Challenges
Hot Debriefing	Immediate feedback from the instructor and peers after the simulation Can be more practical for a large group as it may be harder to reconvene students for the debrief	Limited time for students to process emotions and reflect on the simulation
Cold Debriefing	Allows students more time to process emotions, particularly if the simulation was intense or stressful. Lack of emotional readiness can lead to failure to engage with feedback and discussion	There is a risk of students forgetting key details of the simulation which can diminish the effectiveness of the debrief May be harder to reconvene students for the debrief
Facilitator Led Debriefing	Facilitators can guide students to reflect and understand the reasoning and knowledge behind their actions, enhancing their clinical reasoning skills	Can be costly to implement and requires facilitators with training and expertise
Self /Peer Led Debriefing	Can be cost effective for more experienced or advanced students with a solid foundation of knowledge and reflective ability Allows the student to control the pace of debriefing	May be less suitable for students who are still developing foundational knowledge and reflective skills
Combined Approach: Self-debrief followed by a facilitated group debrief	Enhances the benefits of multiple debriefing methods and may lead to a more comprehensive learning experience	Can be more time consuming, costly to implement, and requires facilitators with training and expertise

debriefing following traumatic workplace incidents, as requiring individuals to share detailed descriptions of the traumatic event could potentially exacerbate Post Traumatic Stress Syndrome (PTSD) symptoms [83]. However, the NICE analysis has faced criticism as many of the reviewed studies focused only on one-to-one rather than group CD or involved individuals who experienced personal physical trauma rather than work-related trauma [85]. Critics have highlighted methodological flaws in the review, suggesting that certain aspects of psychologically-focused debriefing could provide potential benefits [83-85]. While single session debriefs without follow-ups are known to be detrimental to the wellbeing of healthcare workers [23,87], regular group debriefs may help normalise reactions, alleviate anxiety, reduce substance and medication abuse, and more effectively support recovery following a traumatic work event [84,85,88].

Critical incident stress debriefing (CISD) is an example of a group intervention consisting of seven phases. These phases are summarised in Fig. 1. Trauma Risk Management (TRiM) consists of peer support for those experiencing a traumatic event [84]. It has been suggested to be more favourable than CISD as it does not require participants to talk through the details of the event [23,89]. Further research is required to evaluate the feasibility and efficacy of these models to support, retain, and educate radiography students.

Recommendations for implementing effective CD in radiography education and directions for future research.

Although no universally effective method for CD exists [28], best practice can be guided by the FIVE Es Framework: (1) an educated and experienced facilitator to lead the debrief; (2) a supportive environment with appropriate physical space and psychologically safe atmosphere; (3) a focus on education with the debrief enhancing performance, skills, and knowledge; (4) evaluation to ensure the debrief identifies areas for improvement; and (5) attention to emotions to ensure psychological

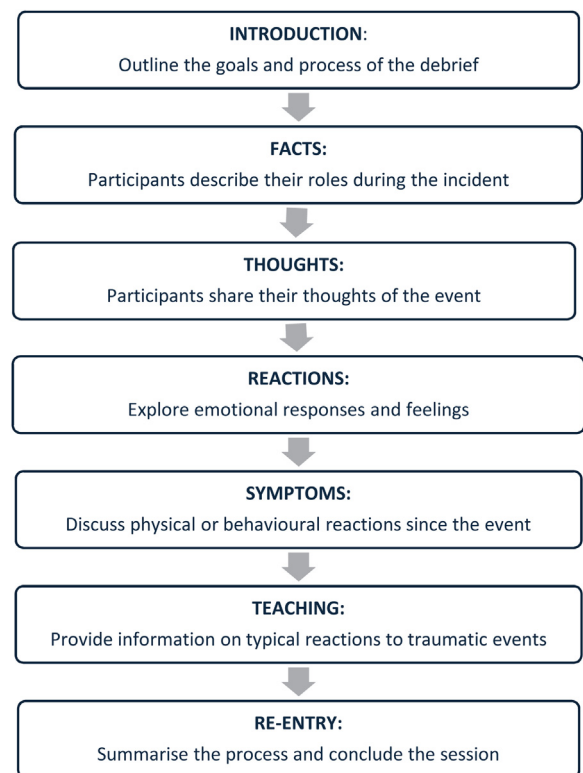


Fig. 1. Steps involved in Critical Incident Stress Debriefing (CISD) [83,88].

wellbeing is not only addressed but proper follow up support is provided [28,81]. The following recommendations for implementing effective clinical debriefing in radiography education, along with future research directions, have been developed based on the Five E's framework and the literature gaps identified in this review.

Recommendation 1- Provide training and ongoing support for debrief facilitators: An experienced facilitator plays a crucial role in the success of CD. Effective debriefing relies on facilitators who are well-prepared, with formal education in debriefing techniques as CD sessions may involve sensitive and emotionally charged discussions [28]. In some institutions, link lecturers, or personal tutors responsible for debriefing radiography students following traumatic clinical incidents may lack specialised training in addressing emotional and psychological issues. This gap in training can undermine their ability to support students effectively, potentially leading to less productive sessions and inadequate support for students following challenging or traumatic experiences [28]. The lack of a trained facilitator is a key reason why CD is often not implemented [28,90].

The absence of targeted training can also negatively impact the well-being of facilitators [24]. Managing emotionally intense discussions without adequate preparation can be overwhelming and stressful, potentially leading to burnout or compassion fatigue. This will not only affect the facilitator's personal health but also reduces their effectiveness in supporting students [24]. To ensure successful implementation of CD, future research is required to develop comprehensive training programs that cover both technical and emotional aspects. This training is a crucial first step and will equip facilitators with the skills necessary to handle challenging conversations, improve their ability to support radiography students, and safeguard their own mental health.

Recommendation 2- Implementing group CD sessions for prompted debriefs rather than individual sessions: Creating a supportive and safe physical space is crucial [81,91]. A psychologically safe environment encourages participants to share their thoughts and feelings more freely and the chosen physical space must ensure confidentiality and respect for all involved [28,69]. In a group setting, students may benefit from shared experiences and collective reflection, which can alleviate feelings of isolation, fostering a sense of community, and mutual support [68,92]. This collaborative environment may allow individuals to process emotions together, reducing the intensity of personal exposure to the traumatic details. Furthermore, group debriefing can encourage peer support and improve compassion fatigue [93-95].

Recommendation 3- Integrating SBE and routine CDs into radiography programmes to better prepare students for prompted CDs following a traumatic incident: Incorporating SBE debriefing and routine CD into radiography programmes may better prepare students for prompted CDs following challenging or traumatic clinical incidents [96]. These practices may help normalise the discussion of clinical experiences, allowing students to engage more openly with their peers and facilitators. Familiarity with the structure and objectives of routine debriefing has the potential to help build confidence so students feel less intimidated by prompted CDs, viewing them as opportunities for learning and growth rather than responses to failure or adverse events [96]. This proactive approach also helps to reduce the stigma around discussing mistakes or vulnerabilities,

reframing them as essential components of professional development [96]. Additionally, the learning opportunities provided by CD have the potential to positively impact future patient outcomes [27,28,69]. Future research should explore the integration of SBE and CD and how this can build resilience in radiography students and potentially support retention in the profession. Fig. 2 summarises the potential roles of SBE and CD in supporting, retaining, and educating radiography students.

Recommendation 4- Ensure debriefs highlight areas for improvement and establish actionable goals for students: This recommendation is also applicable to SBE. To maximise the benefits of debriefing, it is essential to identify clear areas for improvement [22,28]. Facilitators should work collaboratively with students to establish actionable goals tailored to their professional development. This approach ensures that debriefs contribute to skill-building and competency enhancement [22,24,28]. Translating reflections into concrete objectives helps students apply lessons to future clinical scenarios while learning from their experiences [64,66]. Setting clear, achievable goals can reinforce progress, foster accountability, and boost confidence and motivation for improvement. This supports learning and potentially improves retention, as students would be better equipped to handle real-world traumatic experiences.

Recommendation 5- Allowing emotions to be addressed during debriefs and ensuring they are followed up appropriately: This recommendation is also applicable to SBE. Debriefs should provide a safe space for participants to express and process their emotions [23,28,77]. Addressing emotional responses is important following challenging or traumatic incidents to support students' mental health and emotional well-being. Facilitators should be trained to guide these discussions sensitively, recognising the potential for distress while ensuring that participants feel heard and supported [23,28]. Follow-up is a critical component of this process. Emotional concerns raised during debriefs should not be left unresolved. Facilitators should ensure that appropriate support mechanisms, such as counselling services or peer support groups are in place for the student if required. The key recommendations for implementing effective clinical debriefing and best practices for implementation are summarised in Table 2.

Conclusion

This narrative review explored the role of debriefing in supporting, retaining, and educating radiography students. Establishing evidence based frameworks to the unique challenges faced by radiography professionals could better equip students to navigate the emotional demands of clinical placements. In relation to simulation-based education, the debriefing session that follows is essential, providing students with opportunities to reflect on their performance, gain insights from their peers, and receive instructor feedback. This preparation empowers students to respond with greater confidence and resilience when encountering a similar challenging situation in

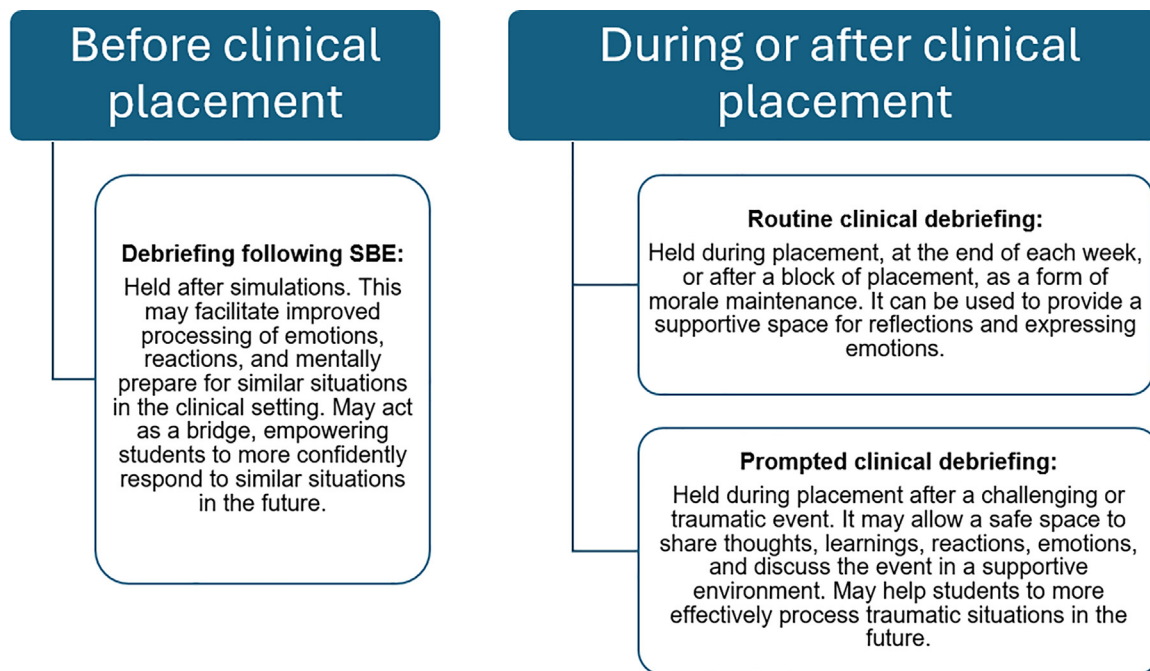


Fig. 2. The potential role of debriefing following SBE, routine clinical debriefing, and prompted clinical debriefing in supporting, retaining, and educating radiography students.

Table 2
Key recommendations for effective CD and best practices for implementation.

Recommendation	Key Actions	Expected Outcome
1. Provide training and ongoing support for debrief facilitators	<ul style="list-style-type: none"> - Offer formal education in debriefing techniques - Training on handling emotional and psychological issues 	<ul style="list-style-type: none"> - Facilitators are well prepared for sensitive discussions - Increased support for students after traumatic incidents - Reduced burnout for facilitators
2. Consider implementing group CD sessions for prompted debriefs	<ul style="list-style-type: none"> - Create a supportive and confidential physical space - Use group sessions to promote shared experiences and avoid pressuring students to recount detailed traumatic events 	<ul style="list-style-type: none"> - Can encourage peer support, promote resilience and improve compassion fatigue - Reduces isolation and enhances emotional processing
3. Integrating SBE and routine debriefs into radiography programmes	<ul style="list-style-type: none"> - Incorporate routine debriefs as part of training - Familiarise students with debriefing structure and objectives 	<ul style="list-style-type: none"> - Reduces stigma around discussing mistakes - Builds confidence in students - Improves professional development
4. Ensure debriefs highlight areas for improvement and establish actionable goals	<ul style="list-style-type: none"> - Identify specific areas for improvement - Set clear achievable goals 	<ul style="list-style-type: none"> - Boosts student motivation and accountability - Enhances skill building and professional competency
5. Allow emotions to be addressed during debriefs and ensure follow-up	<ul style="list-style-type: none"> - Create a safe space for emotional expression - Provide follow up support where necessary 	<ul style="list-style-type: none"> - Supports mental health and emotional wellbeing - Ensures emotional concerns are addressed appropriately

the clinical setting. Incorporating SBE debriefing into radiography programmes may help students become familiar with the structure and purpose of debriefs. To consolidate existing literature, future research should explore whether certain debriefing models, such as TiPS and DML contribute to improved educational and clinical outcomes in radiography. The feasibility and efficacy of these models should also be evaluated.

The benefits of clinical debriefing in radiography are not as well studied or established. Routine CD may provide students with a supportive space to share emotions and reflect on their experiences during and after clinical placements. They can help normalise discussions about challenging clinical ex-

periences and support students in building resilience to more effectively process traumatic situations in the future. Prompted CD may be beneficial to students, provided the debriefs occur in supportive environments and are facilitated by skilled professionals who can address the emotional needs of participants. Facilitators should refrain from pressuring students to recount specific details of the incident, as this could worsen PTSD symptoms. For situations involving more than one student, conducting prompted CDs in a group setting may be more effective than one-to-one sessions.

The benefits of prompted clinical debriefing in radiography require further investigation, particularly considering the

emotional impact of real traumatic clinical incidents. Future research could (1) explore the perspectives of radiography students and educators on clinical debriefing, (2) assess the feasibility and effectiveness of different debriefing models in improving educational and clinical outcomes in radiography, and (3) develop effective training programs for debriefing facilitators, ensuring they are adequately prepared to take on the responsibilities of debriefing. This knowledge can inform the development of formal guidelines to better support, retain, and educate radiography students, potentially enhancing retention rates and contributing positively to the wider healthcare system.

Acknowledgements

The team would like to thank librarian Endang Scanlon for assisting with the literature search. This narrative review was conducted as part of a project funded by the College of Radiographers Industry Partnership Scheme (CoRIPS) Research Grant 242. The views expressed are those of the authors and not necessarily those of the College of Radiographers.

References

- [1] McAnulla SJ, Ball SE, Knapp KM. Understanding student radiographer attrition: risk factors and strategies. *Radiography*. 2020;26(3):198–204.
- [2] Shah KA, Ng C. Workplace violence in medical radiation science: a systematic review. *Radiography*. 2024;30(2):440–447.
- [3] Flinton D, Cherry P, Thorne R, Mannion L, O’Sullivan C, Khine R. Compassion satisfaction and fatigue: an investigation into levels being reported by radiotherapy students. *J Radiother Pract*. 2018;17(4):364–367.
- [4] Konstantinidis K. The shortage of radiographers: a global crisis in healthcare. *J Med Imaging Radiat Sci*. 2024;55(4):101333.
- [5] Chamunyonga C, Singh A, Gunn T, Edwards C. Strategies to develop student support mechanisms in medical radiation sciences clinical education. *J Med Imaging Radiat Sci*. 2020;51(4):512–517.
- [6] Girn R, Punch A, Jimenez YA. Diagnostic radiography students’ perceptions of working in the clinical environment: a focus on emotional challenges. *Radiography*. 2022;28(2):492–498.
- [7] Jeyandrabalan M, Punch A, Rogers JM, Jimenez YA. Insights into Diagnostic Radiography students’ perception of clinical stressors. *Radiography*. 2022;28(2):499–505.
- [8] Mason SL. Radiography student perceptions of clinical stressors. *Radiol Technol*. 2006;77(6):437–450.
- [9] Roden-Foreman JW, Bennett MM, Rainey EE, Garrett JS, Powers MB, Warren AM. Secondary traumatic stress in emergency medicine clinicians. *Cogn Behav Ther*. 2017;46(6):522–532.
- [10] Tran M, Lin L, Cowell H, Makanjee C, Hayre CM, Lewis S. An exploratory study on recently qualified Australian radiographers’ expectations and experiences in emergency and trauma imaging. *J Med Imaging Radiat Sci*. 2023;54(1):97–103.
- [11] Walsh C, England A, Young R, et al. The prevalence of harassment of diagnostic radiography and radiation therapy students whilst on clinical placement in the Republic of Ireland. *Med Teach*. 2024;46(8):1077–1083.
- [12] Ngo M, Schneider-Kolsky M, Baird M. The attitudes of Australian radiography students towards the use of assistive transfer devices to reduce biomechanical stress in the clinical setting. *Radiography*. 2013;19(2):125–129.
- [13] Ago JL, Kilgour A, Smith C. Understanding the current situation of challenging clinical interactions for medical radiation undergraduates: an integrative literature review. *Radiography*. 2024;30:104–113.
- [14] Hale T, Wright C. Unprofessional practice and student professionalism dilemmas: what can radiography learn from the other health professions? *Radiography*. 2021;27(4):1211–1218.
- [15] Ohene-Botwe B, Antwi WK, Ohene-Gyimah S, Akudjedu TN. Examining moral distress and injury resulting from the COVID-19 pandemic: insights from the Ghanaian radiography workforce. *J Med Imaging Radiat Sci*. 2024;55(4):101448.
- [16] Ngo M, Thorburn K, Naama A, Skelton E. Exploring the lived experiences of diagnostic radiographers after transitioning to non-emergency imaging settings. *Radiography*. 2025:102871.
- [17] Robertson S, England A, Khodabakhshi D. Compassion fatigue and the effectiveness of support structures for diagnostic radiographers in oncology. *J Med Imaging Radiat Sci*. 2021;52(1):22–28.
- [18] Robertson S, Olanloye EE, Hon Y, England A, McNair H, Cruickshank S. Are radiographers suffering from symptoms of compassion fatigue due to occupational stress: a systematic review. *Radiography*. 2022;28(3):857–864.
- [19] Healy S, Tyrrell M. Importance of debriefing following critical incidents. *Emergency nurse*. 2013;20(10).
- [20] Sjöberg F, Schönning E, Salzmänn-Erikson M. Nurses’ experiences of performing cardiopulmonary resuscitation in intensive care units: a qualitative study. *J Clin Nurs*. 2015;24(17-18):2522–2528.
- [21] Gilmartin S, Martin L, Kenny S, Callanan I, Salter N. Promoting hot debriefing in an emergency department. *BMJ Open Qual*. 2020;9(3):e000913.
- [22] Harder N, Lemoine J, Harwood R. Psychological outcomes of debriefing healthcare providers who experience expected and unexpected patient death in clinical or simulation experiences: a scoping review. *J Clin Nurs*. 2020;29(3-4):330–346.
- [23] Evans TR, Burns C, Essex R, et al. A systematic scoping review on the evidence behind debriefing practices for the wellbeing/emotional outcomes of healthcare workers. *Front Psychiatry*. 2023;14:1078797.
- [24] Paxino J, Szabo RA, Marshall S, Story D, Molloy E. What and when to debrief: a scoping review examining interprofessional clinical debriefing. *BMJ Qual Saf*. 2024;33(5):314–327.
- [25] Carvalho-Filho MA, Schaafsma ES, Tio RA. Debriefing as an opportunity to develop emotional competence in health profession students: faculty, be prepared!. *Sci Med (Porto Alegre)*. 2018;28(1):28805.
- [26] Coggins A, Santos ADL, Zaklama R, Murphy M. Interdisciplinary clinical debriefing in the emergency department: an observational study of learning topics and outcomes. *BMC Emerg Med*. 2020;20:1–10.
- [27] Kessler DO, Cheng A, Mullan PC. Debriefing in the emergency department after clinical events: a practical guide. *Ann Emerg Med*. 2015;65(6):690–698.
- [28] Toews AJ, Martin DE, Chernomas WM. Clinical debriefing: a concept analysis. *J Clin Nurs*. 2021;30(11-12):1491–1501.
- [29] Shiner N, Howard ML. The use of simulation and moulage in undergraduate diagnostic radiography education: a burns scenario. *Radiography*. 2019;25(3):194–201.
- [30] Partner A, Shiner N, Hyde E, Errett S. First year student radiographers’ perceptions of a one-week simulation-based education package designed to increase clinical placement capacity. *Radiography*. 2022;28(3):577–585.
- [31] Gardner R. *Seminars in Perinatology*. Introduction to debriefing. Elsevier; 2013.
- [32] Wallace C. An exploration of simulation-based education from other health professionals, to create an informed and effective simulation delivery in a new diagnostic radiography programme. *Radiography*. 2023;29(5):886–891.
- [33] Foley SJ, O’Loughlin A, Creedon J. Early experiences of radiographers in Ireland during the COVID-19 crisis. *Insights Imaging*. 2020;11:1–8.
- [34] Naylor S, Booth S, Harvey-Lloyd J, Strudwick R. Experiences of diagnostic radiographers through the Covid-19 pandemic. *Radiography*. 2022;28(1):187–192.
- [35] Bwanga O, Lidster J. Radiography students’ perceptions and experiences

- of their clinical placements: a qualitative systematic review. *East African Sch J Med Sci.* 2019;2(7):367–380.
- [36] Clarkson M, Heads G, Hodgson D, Probst H. Does the intervention of mindfulness reduce levels of burnout and compassion fatigue and increase resilience in pre-registration students? A pilot study. *Radiography.* 2019;25(1):4–9.
- [37] Probst H, Boylan M, Nelson P, Martin R. Early career resilience: interdisciplinary insights to support professional education of radiation therapists. *J Med Imaging Radiat Sci.* 2014;45(4):390–398.
- [38] Polit D, Beck C. *Study Guide for Essentials of Nursing Research: Appraising Evidence for Nursing Practice.* Lippincott Williams & Wilkins; 2020.
- [39] Hosseini M, Jahanshahloo F, Akbarzadeh MA, Zarei M, Vaez-Gharamaleki Y. Formulating research questions for evidence-based studies. *J Med Surg Public Health.* 2024;2:100046.
- [40] Shiner N. Can simulation impact on first year diagnostic radiography students' emotional preparedness to encounter open wounds on their first clinical placement: a pilot study. *Radiography.* 2019;25(4):294–300.
- [41] Wilkinson E, Cadogan E. Radiographers' perceptions of first year diagnostic radiography students' performance following implementation of a simulation-based education model. *Radiography.* 2023;29(4):721–728.
- [42] Adamson HK, Chaka B, Hizzett K, Williment J, Hargan J. An exploration of communication skills development for student diagnostic radiographers using simulation-based training with a standardised patient: UK-based focus-group study. *J Med Imaging Radiat Sci.* 2023;54(3):465–472.
- [43] Bäckström M, Leijon-Sundqvist K, Lundvall L, Jonsson K, Engström Å. On the edge of decision-making in trauma care: a focus group study on radiographers' experiences of interprofessional collaboration. *Radiography.* 2023;29(6):1123–1129.
- [44] Kay M, Brogan K. The perceptions and experiences of final year undergraduate diagnostic imaging students when facilitating peer-assisted learning within the simulated learning environment. *Radiography.* 2024;30:138–142.
- [45] Mussmann B, List H, Hardy M, ZS Al-Rikabi, Vinter H, Jensen J. Radiographers' emotional reactions to suspected child abuse. *Radiography.* 2025;31(1):306–312.
- [46] Naylor S, Foulkes D. Diagnostic radiographers working in the operating theatre: an action research project. *Radiography.* 2018;24(1):9–14.
- [47] Vestbøstad M, Karlgren K, Olsen NR. Research on simulation in radiography education: a scoping review protocol. *Syst Rev.* 2020;9:1–6.
- [48] Aura S, Jordan S, Saano S, Tossavainen K, Turunen H. Transfer of learning: radiographers' perceptions of simulation-based educational intervention. *Radiography.* 2016;22(3):228–236.
- [49] Mouser AL, Wallace L, Whitmore B, Sebastian H. Bridging understanding in nursing and radiography students: an interprofessional experience. *Nurs Forum.* 2018.
- [50] Louw A. Cognitive load theory in simulations to facilitate critical thinking in radiography students. *Afr J Health Prof Educ.* 2021;13(1):41–46.
- [51] Strudwick R, Harvey-Lloyd J. Preparation for practice through service user involvement in the diagnostic radiography curriculum at University Campus Suffolk. *Int J Pract-Based Learn Health Soc Care.* 2013;1(2):37–46.
- [52] Palmaria C, Bolderston A, Fawcett S. A scoping review of patients as partners in undergraduate allied health curriculum: how are they involved? *J Med Imaging Radiat Sci.* 2024;55(4):101724.
- [53] Scaramelli E, Roletto A, Bonfitto GR, Fasulo SV, Catania D. How to run successful tutor-training programs for radiographers: a systematic review and considerations for future perspectives. *J Med Imaging Radiat Sci.* 2024.
- [54] Scott R, Monaghan E, Chebsey D, Meighan-Davies S, Gebbett C. Simulation-based education at level 4: the role of multidisciplinary team input in the design and facilitation of a simulated radiographic placement. *Radiography.* 2024;30:158–165.
- [55] Tay YX, Ng G, Xue M, et al. 'Gear up and get ready': collaborative curriculum for radiographers supporting percutaneous nephrolithotomy in the operating theatre. *Radiography.* 2024;30(1):178–184.
- [56] Power L, O'Connor M. Radiographers' experiences and educational needs in relation to caring for suicidal patients during radiology examinations. *Radiography.* 2023;29(6):1011–1020.
- [57] Berry E, Mc Nally CS, Barbosa A, Mason C, Jones D. Dementia education for Diagnostic Radiography students: impact on confidence, knowledge, and attitudes towards dementia. *Radiography.* 2024;30:51–55.
- [58] Coleman G, Hyde E, Strudwick R. Exploring UK sonographers' views on the use of professional supervision in clinical practice—Stage one findings of a mixed method study. *Radiography.* 2024;30(1):252–256.
- [59] Kelly T, Thompson JD, Surjan Y, Rinks M, Warren-Forward H. Lived experiences of first-year radiation therapy students communicating with patients and radiation therapists—a qualitative review using interpretative phenomenological analysis. *Radiography.* 2022;28(1):168–173.
- [60] Scaramelli E, Bonfitto GR, Roletto A, Bombelli L, Fasulo SV, Catania D. A tutor training framework for radiographers: basic concepts to effectively train future generations of professionals. *Radiography.* 2024;30:96–103.
- [61] Mateos M, Solé I. Synthesising information from various texts: a study of procedures and products at different educational levels. *Eur J Psychol Educ.* 2009;24:435–451.
- [62] Grant VJ, Robinson T, Catena H, Eppich W, Cheng A. Difficult debriefing situations: a toolbox for simulation educators. *Med Teach.* 2018;40(7):703–712.
- [63] Husebø SE, Reiersen IÅ, Hansen A, Solli H. Post-simulation debriefing as a stepping stone to self-reflection and increased awareness—a qualitative study. *Adv Simulat.* 2024;9(1):33.
- [64] Decker S, Alinier G, Crawford SB, Gordon RM, Jenkins D, Wilson C. Healthcare simulation standards of best practice™ The debriefing process. *Clin Simul Nurs.* 2021;58:27–32.
- [65] Sabei SDA, Lasater K. Simulation debriefing for clinical judgment development: a concept analysis. *Nurse Educ Today.* 2016;45:42–47.
- [66] Hazell L, Lawrence H, Friedrich-Nel H. Simulation based learning to facilitate clinical readiness in diagnostic radiography. A meta-synthesis. *Radiography.* 2020;26(4):e238–e245.
- [67] Duff JP, Morse KJ, Seelandt J, et al. Debriefing methods for simulation in healthcare: a systematic review. *Simulat Healthc.* 2024;19(1S):S112–S121.
- [68] Harder N, Lemoine J, Chernomas W, Osachuk T. Developing a trauma-informed psychologically safe debriefing framework for emotionally stressful simulation events. *Clin Simul Nurs.* 2021;51:1–9.
- [69] Sawyer T, Loren D, Halamek LP. Post-event debriefings during neonatal care: why are we not doing them, and how can we start? *J Perinatol.* 2016;36(6):415–419.
- [70] Sweberg T, Sen AI, Mullan PC, et al. Description of hot debriefings after in-hospital cardiac arrests in an international pediatric quality improvement collaborative. *Resuscitation.* 2018;128:181–187.
- [71] Ha E. Effects of hot and cold debriefing in simulation with case-based learning. *Japan J Nurs Sci.* 2021;18(3):e12410.
- [72] Alanezi FZ, Miller E, Morrison CF, Kelcey B, Wagner R. Hot versus cold debriefing in a nursing context: an integrative review. *J Nurs Educ.* 2024;63(10):653–658.
- [73] Niu Y, Liu T, Li K, et al. Effectiveness of simulation debriefing methods in nursing education: a systematic review and meta-analysis. *Nurse Educ Today.* 2021;107:105113.
- [74] Ha E, Lim EJ. Peer-led written debriefing versus instructor-led oral debriefing: using multimode simulation. *Clin Simul Nurs.* 2018;18:38–46.
- [75] Roh YS, Kelly M, Ha EH. Comparison of instructor-led versus peer-led debriefing in nursing students. *Nurs Health Sci.* 2016;18(2):238–245.
- [76] Levett-Jones T, Lapkin S. A systematic review of the effectiveness of simulation debriefing in health professional education. *Nurse Educ Today.* 2014;34(6):e58–e63.
- [77] Osta AD, King MA, Serwint JR, Bostwick SB. Implementing emotional debriefing in pediatric clinical education. *Acad Pediatr.* 2019;19(3):278–282.
- [78] Morrison LE, Joy JP. Secondary traumatic stress in the emergency department. *J Adv Nurs.* 2016;72(11):2894–2906.

- [79] Clark R, McLean C. The professional and personal debriefing needs of ward based nurses after involvement in a cardiac arrest: an explorative qualitative pilot study. *Intens Critic Care Nurs.* 2018;47:78–84.
- [80] Berchtenbreiter K, Innes K, Watterson J, Nickson CP, Wong P. Intensive care unit nurses' perceptions of debriefing after critical incidents: a qualitative descriptive study. *Austral Crit Care.* 2024;37(2):288–294.
- [81] Phillips EC, Smith SE, Tallentire V, Blair S. Systematic review of clinical debriefing tools: attributes and evidence for use. *BMJ Qual Saf.* 2024;33(3):187–198.
- [82] Dismukes RK, Smith GM. *Facilitation and Debriefing in Aviation Training and Operations.* Routledge; 2017.
- [83] Billings J, Zhan Yuen Wong N, Nicholls H, et al. Post-incident psychosocial interventions after a traumatic incident in the workplace: a systematic review of current research evidence and clinical guidance. *Eur J Psychotraumatol.* 2023;14(2):2281751.
- [84] Richins MT, Gauntlett L, Tehrani N, et al. Early post-trauma interventions in organizations: a scoping review. *Front Psychol.* 2020;11:1176.
- [85] Johnson J, Pointon L, Keyworth C. Evaluation of a training programme for critical incident debrief facilitators. *Occup Med (Chic Ill).* 2023;73(2):103–108.
- [86] Post-Traumatic Stress Disorder. NICE guideline [NG116] [Internet]; 2018 [cited 22 September 2024]. Available from: <https://www.nice.org.uk/guidance/ng116/chapter/recommendations>.
- [87] Cooper S, Winton M, Farrington-Exley J. Fifteen-minute consultation: time out as an alternative to toxic debrief. *Arch Dis Childhood-Educ Pract.* 2020;105(5):270–275.
- [88] Vignaud P, Lavallé L, Brunelin J, Prieto N. Are psychological debriefing groups after a potential traumatic event suitable to prevent the symptoms of PTSD? *Psychiatry Res.* 2022;311:114503.
- [89] Palmer J, Ku M, Wang H, et al. Public health emergency and psychological distress among healthcare workers: a scoping review. *BMC Public Health.* 2022;22(1):1396.
- [90] Sandhu N, Eppich W, Mikrogianakis A, Grant V, Robinson T, Cheng A. Postresuscitation debriefing in the pediatric emergency department: a national needs assessment. *Canad J Emerg Med.* 2014;16(5):383–392.
- [91] Rose S, Cheng A. Charge nurse facilitated clinical debriefing in the emergency department. *Canad J Emerg Med.* 2018;20(5):781–785.
- [92] Eng J, Schulman E, Jhanwar SM, Shah MK. Patient death debriefing sessions to support residents' emotional reactions to patient deaths. *J Grad Med Educ.* 2015;7(3):430–436.
- [93] Martinchek M, Bird A, Pincavage AT. Building team resilience and debriefing after difficult clinical events: a resilience curriculum for team leaders. *MedEdPORTAL.* 2017;13:10601.
- [94] Schmidt M, Haglund K. Debrief in emergency departments to improve compassion fatigue and promote resiliency. *J Trauma Nurs.* 2017;24(5):317–322.
- [95] Plowe K. Increasing resiliency: a focus for clinical conferencing/group debriefing in nursing education. *Nurse Educ Pract.* 2020;49:102882.
- [96] Phillips EC, Tallentire V. Routine versus prompted clinical debriefing: aligning aims, mechanisms and implementation. *BMJ Qual Saf.* 2024;33(5):280–283.