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Implementing debriefing after cardiac arrest: benefits and challenges

Abstract

Healthcare professionals may be involved in the care and management of a patient in cardiac arrest. This highly stressful and demanding situation can lead to communication failures, difficulty in decision-making, and emotional distress for team members. Debriefing is a tool used for members of a team to acknowledge what went well, what could be improved, and areas for learning and development. Debriefing is recommended by Resuscitation Council UK however pressure in clinical practice often means that debriefing is not prioritised. This article argues that by recognising the significance of debriefs after cardiac arrest in the hospital setting, and committing to best practices, healthcare professionals can better prepare for the challenges of resuscitation and improve patient outcomes.

Introduction

Cardiac arrest is a sudden state of circulatory failure due to a loss of cardiac systolic function (NICE, 2018; Resuscitation Council UK (RCUK), 2021). In-hospital cardiac arrests (IHCA) have a survival rate to discharge of 23.6% (RCUK, 2021). Decisions need to be made quickly, as part of a team, and using evidence-based practice (RCUK, 2021). Throughout this article the importance of debrief following cardiac arrest will be discussed. Most of the associated literature on debriefing after cardiac arrest is focused within the hospital, or secondary care setting, therefore this will be the primary focus of this article.

A study by Milonas et al (2017) which looked retrospectively at medical records of patients who had survived initial resuscitation considered adherence to evidence-based practice (EBP) during, and after, cardiac arrest, found that there were often inadequacies and inconsistencies with adhering to guidelines which led to a finding of a clear association with increased likelihood of in-hospital death. Similar results were found in other studies, McEvoy et al (2014) found that adherence to EBP and

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the use of protocols improves patient outcomes, the study suggested that the more accurately the steps within protocols were followed by the medical team the higher the likelihood of return of spontaneous circulation (ROSC). Similarly, a study using the Swedish Registry for CPR (Hessulf et al, 2020) found that adherence according to guidelines meant that 30-day survival after IHCA was 66.1%, however poor adherence to guidelines meant that 30-day survival dropped to 46.5%. In a study by Couper et al (2016) which looked at the delivery of educational debriefing after cardiac arrest the debrief did not lead to an improvement in CPR quality or patient outcomes. Furthermore, Phillips et al (2023) argue that although debriefing tools often address points for improvement or adherence to EBP, there was often little discussion around how improvements could be made and change could be implemented.

The concept of debriefing after critical incidents appears to have originated from high-risk industries such as aviation and the military. Debriefing in these industries is used daily to reflect, learn from, and improve performance (Hansen et al, 2018). Debriefing is defined as communication between team members that took part in a clinical case (Gilmartin et al, 2020). Debriefs after a resuscitation attempt are recommended by the Resuscitation Council (2020), although evidence suggests that often debriefs are not made a priority (Chuiki et al, 2020). Despite this recommendation, a study in 2017 of 73 NHS trusts found that only 5% had debriefs after all cardiac arrests (Carberry et al, 2017). The Royal College of Nursing (RCN) (2017) suggests that the process of debriefing allows the multidisciplinary team (MDT) to analyse their performance within the clinical setting, talk about potential improvements the team could make, and minimise the risk of any future adverse patient outcomes. As such, this article will review the evidence related to the benefits of post-resuscitation debrief, share some of the most encountered debriefing tools from practice, consider barriers to debrief, and make recommendations for future practice.

The importance of debriefing

Debriefing provides an opportunity to reflect on an individual, as well as a team's actions during cardiac arrest response. It allows the team to examine what went well and what could have been done differently (Anderson et al, 2021). Post-resuscitation debriefing (PRD) is an important element of emergency medicine, Wolfe et al (2014) conducted an interventional study where structured debriefs took place after all paediatric cardiac arrests, this study was over 4 years, there were 119 chest resuscitation events (60 control and 59 interventional). It found that after the implementation of PRD patient survival to discharge rate increased, compared to the control group, even after controlling for confounders. The research also found an improvement in survival with favourable neurological outcomes. A study by Couper and Perkins (2013) examined cohorts of healthcare professionals both before and after the implementation of debriefing after cardiac arrest and discovered that performance improvement is linked to both group verbal debriefing and individual written feedback.

The reaction to cardiac arrest needs to be fast to initiate CPR as quickly as possible, as such, responding to cardiac arrest can be highly stressful. Nurses need to make quick decisions (Mitchell et al, 2019) and initiate complex interventions such as cannulation, taking arterial blood gases, and use of automated mechanical CPR devices (mCPR). Evidence suggests that the use of advanced resuscitation techniques improves patient outcomes, particularly return of spontaneous circulation (ROSC) with proper use of evidence-based technologies (Obermaier, et al 2022). However, it is important to acknowledge that timely decision-making can be hindered by other factors. Tonna et al (2022) using a small qualitative study looked at how factors such as skill mix and staffing, technical factors such as functioning equipment, and situational factors, such as where the patient is, have an impact on the overall care of the patient. This is supported by the Resuscitation Council UK (2023) which includes human factors, team management, task management, and identification of resources as important factors to consider when in a cardiac arrest situation in their Advanced Life Support

(ALS) training which is a course designed for doctors, nurses in acute settings and paramedics. Cheng et al (2023) found that debriefing after simulated training, such as those in ALS, improved CPR quality. In a systematic review of literature Dewolf et al (2021) found that non-technical skills such as teamwork, stress and situational awareness improved after debriefs within a simulation. However the review acknowledges that this does not necessarily improve patient outcomes and further research in this area is needed.

Learning from experience is an important reason to debrief (Tannenbaum and Greilich, 2022). It is important to note that debriefing is not to look for blame if resuscitation is unsuccessful but to help the team improve moving forward (Kessler, Cheng, and Mullan, 2015).

Difficulties nurses may find during, and after, cardiac arrest situations include emotional distress, feelings of inadequate knowledge, and frustrations with organisational factors such as staffing levels, skill mix, and team conflicts (Kozelj et al, 2021). This is supported by a recent integrative review of nurse's experiences during resuscitation attempts (Riley et al, 2021). The review indicated that feelings of chaos, ethical dilemmas, and levels of clinical confidence were frequently problematic for nurses during, and soon after cardiac arrests.

Examples of structured debriefs will be offered in the section Methods of Debrief.

Within the emergency environment errors can occur and there may be breakdowns in communication (Yuerek and Naim, 2023). Reflecting on the team's communication during a cardiac arrest is an important reason to debrief (Kessler et al, 2015). Better communication between the MDT leads to better patient outcomes (O'Daniel and Rosenstein 2008, Propp et al 2010, Gabr, 2019). Debriefing has the potential to highlight breakdowns in communication and help to improve information exchange within the team (Diaz-Navarro et al, 2021). McCoy et al (2023) found a direct link between improved communication and rapid bedside care in the care of patients on telemetry. It established that after the introduction of an intervention designed to improve communication between the MDT, there was a 74% reduction in death during IHCA and a 55% reduction in death

prior to discharge. While the study was small (75 patients in one hospital) it highlights the potential benefits of enhanced communication strategies.

Staff support

Schuster and Dwyer (2020) state that nurses are at risk of post-traumatic stress disorder (PTSD) due to being frequently exposed, directly, or indirectly, to traumatic events. While not specifically linked to the experience of resuscitation, statistics from NHS Digital (2023) suggest that anxiety, stress, depression, and other mental health illnesses were the most frequently reported reasons for sickness, accounting for 25.5% of total sickness absence.

A study by Spencer et al (2019) found that junior members of staff were more likely to find cardiac arrests stressful and 10% of staff working in an acute area screened positively for symptoms of PTSD following IHCAs. The study also found that 16% of staff surveyed have considered leaving the NHS due to the traumatic nature of in-hospital cardiac arrests. Burrman et al (2011) found that 98% of nurses within their study reported traumatic stress following a 'serious event', in this study a serious event was defined as an event were death is imminent, there is a serious wound, or the physical integrity of person may be threatened.

There is some disagreement in the literature about the benefits of debriefing. A study by Tuckey and Scott (2013) found there was no evidence to suggest debriefing helped with psychological distress in emergency workers but did lead to greater reports of quality of life from the group surveyed.

The RCN however suggests debriefing can reduce the incidence of psychological harm after cardiac arrest by allowing healthcare professionals to discuss the situation and any feelings they may have (2017).

Methods of debriefing.

Debriefing needs to be structured to review the response to the cardiac arrest, identify areas for improvement, any need for further educational training, and the general team's performance (Wolfe et al, 2020).

Clinical debriefs occur in a range of formats, two formats frequently discussed in the literature are hot and cold. Hot (immediately after the event) relies on participant experiences, memories, and decision-making, hot debriefing is primarily qualitative. Hot debriefing can be used to address urgent issues promptly. Cold debriefing can happen further after the fact (days to weeks after). Cold debriefing uses quantitative data and follow-up patient information to enhance the discussion around the clinical case (Abulebda et al, 2022). There is a range of debriefing approaches that are appropriate for use in healthcare (Hale et al 2020). The RCUK (2021) recommend data-driven briefing which focuses on performance to improve patient outcomes and quality of CPR. The RCUK (2020) also suggest that a root cause analysis (RCA) should be undertaken and an action plan be put in place to improve performance. Edwards and Nichols (2021) however suggest that it is important to acknowledge that root cause analysis and debriefing are not the same thing. Although debriefing can help to identify barriers and inform an RCA, a debrief can also be used as a therapeutic intervention and to facilitate education.

Hot Debrief Example

Image 1, A hot debriefing tool called STOP5. (Walker et al, 2020)

Hot debriefs are particularly useful in emergency departments or intensive care units where traumatic events occur frequently (Kessler, et al, 2015) however Walker et al (2020) did find that premature dispersal of the team after resuscitation, awaiting other specialty teams involved in the arrest, and departmental workload hindered debriefs taking place promptly. STOP5 is one example of a framework designed for use in busy clinical areas, it requires 5 minutes as soon as possible after the situation - it has four main aims; Summarise the case, Things that went well, Opportunities to improve, and Points to action (Walker et al 2020). On evaluation, 90% of doctors and nurses found STOP5 good or excellent in terms of usefulness (Walker et al, 2020), and at an 18-month review after implementing STOP5 within an Emergency department 97.5% of staff felt that STOP5 should be used more frequently.

Cold Debrief Example

Cold debriefs are a debrief that may occur days to weeks after the event, they often include other members of the MDT and give an opportunity to review more comprehensive data associated with

the event, such as clinical decisions, CPR quality, medication administration and other quantitative data (Wolfe et al, 2020).

PEARLS was developed as a structured tool to guide the facilitator of the debrief. PEARLS can be used as a cool or hot debrief tool, however due to the fact the PEARLS tool is longer and more detailed than that of the STOP5 it could be argued it is more suited for use during a cold debrief (Wolfe et al, 2020). Meguerduchian et al. (2022) conducted a study where fourteen clinical fellows were randomised into two groups, one group used the PEARLS tool and the control didn't, the study found that the use of the PEARLS debriefing model did decrease the anxiety of the debrief facilitator, however, it didn't find a difference in the quality of the debrief overall. This was a small study, and the researcher acknowledges that a large data set would be advantageous for further exploration. Cheng et al (2013) with a larger data set of 97 participants found that having structured, or even scripted, debriefs can help novice facilitators to improve the quality of debriefing compared to those without a structure/script, the study also concluded that although the was no improvement in the clinical performance of those who had a structured debrief there was an improvement in leadership and team knowledge.

Table 1 shows an example of the PEARLs debriefing tool, adapted from Eppich and Cheng (2015)

Table 1 – an adapted PEARLs debriefing tool (Eppich, & Cheng, 2015)

	Aim	Task	Suggested Phrase
Set the Scene	Create a safe environment for discussion	State the reason for debriefing	"Let's spend some time debriefing, The goal is to improve how we work as a team and improve patient outcomes"
Reactions	Explore the feelings of the team	Ask for initial reactions and emotions	"How are you feeling?"
Description	Clarify the facts	Understand what has happened	"Can we summarise the situation? Does everyone agree?"
Analysis	Explore Performance	Could discuss – Decision making, communication, technical skills, leadership, or teamwork	"Let's spend some time talking about [insert topic here] because [reason]"

Barriers to debriefing.

There may be some barriers to successful debriefing after cardiac arrest. Sandu et al (2014) argue a common inhibitor of debriefing is a lack of time and no structure in the debrief. Gathering members of the team together after a busy medical emergency can be difficult to achieve (Shore, 2014), Nadir et al (2017) research found that staff felt there wasn't enough time on shift to enable a successful debrief. Clark and McLean (2018) found that time restraints often left people unable or unwilling to debrief.

Often you don t get time for a debrief, or no one wants to stay behind (Clark and McLean, 2018, Pg 82)

This is echoed by Spencer et al (2019) who found that 43.3% of those surveyed acknowledged lack of time as the reason debriefs did not take place following cardiac arrest.

Another barrier to debriefing may be the lack of someone who feels adequately trained to facilitate debriefs (Kessler et al, 2015). A study by Ugwu et al (2020) explored debriefing techniques and it was found that 90% of participants felt that they needed additional training to facilitate debriefing more effectively and only 39% of them had ever had any formal debrief training.

Kolbe et al (2021) argue that if when debriefing a healthcare professional appears to be distressed it is important to switch the intentions of the debrief from learning to listening and acknowledging a person's distress, it is also vital to signpost to appropriately trained professionals who can guide therapeutic interventions.

Recommendations moving forward.

To maximise the benefits of debriefing healthcare organisations should aim to implement the following:

- Make debriefs a standard practice throughout healthcare organisations. This ensures it becomes part of the post-cardiac arrest process.

- Provide training for healthcare professionals around debriefing techniques. This may negate poorly facilitated debriefs. NHS England (2023b) has a Patient Safety Learning Response toolkit which can be used to educate staff on debriefing. NHS England's site E-learning for health (2023c) also has a debriefing course which is available for healthcare professionals.

- Recognise that time needs to be allocated for teams to debrief.

- Encourage healthcare organisations to evaluate the impact of debriefing on staff, decision-making, and patient outcomes.

- There is currently little evidence around debriefing in primary care, further research in this area could be beneficial.

Conclusion

Healthcare professionals involved in cardiac arrest responses face immense pressure, and debriefing provides them with a structured opportunity to learn from their experiences, improve their skills, and enhance patient care. Moreover, it can serve as a vital tool for maintaining the emotional well-being of healthcare providers by allowing them to process the intense stress associated with cardiac arrest.

As healthcare organisations continue to prioritise patient outcomes and the well-being of their staff, the implementation of effective debriefing practices should be seen as a cornerstone of continuous improvement and support. By recognising the significance of debriefs after cardiac arrest and

committing to best practices, healthcare professionals can better prepare for the challenges of resuscitation and hopefully improve patient outcomes.

It is a requirement of the NMC (2023) for nurses to be continuously learning so it could be argued that debriefing and learning from debriefing, can help nurses meet this requirement.

References

Anderson TM, Secrest K, Krein SL et al (2021) Best Practices for Education and Training of Resuscitation Teams for In-Hospital Cardiac Arrest. Circulation: Cardiovascular Quality and Outcomes. 14 (12) DOI 10.1161/CIRCOUTCOMES.121.008587

Abulebda K, et al (2022) Debriefing Techniques Utilized in Medical Simulation. StatPearls. Florida.

Brazil V, Purdy E, Alexander C et al (2019). Improving the relational aspects of trauma care through translational simulation. Advances in Simulation. 4. DOI:10.1186/s41077-019-0100-2

Burrman, B, Mank, A, Oldff, M. (2011) Coping with serious events at work: A study of Traumatic Stress Among Nurses. Journal of American Psyciatric Nurses Association. 17 (5). https://doi.org/10.1177/1078390311418

Carberry, J, Couper, K, Yeung, J. (2017) The implementation of cardiac arrest treatment recommendations in English acute NHS trusts: a national survey. Postgraduate medical journal. 93. 1105. 653-659. https://doi.org/10.1136/postgradmedj-2016-134732

Care Quality Commission (2021). Staff shortages and the impact on patients. https://www.cqc.org.uk/publications/monitoring-mental-health-act/2021-2022/staff-shortages#:~:text=These%20factors%20can%20increase%20the,and%20patients'%20leave%20being%20cancelled. (Last accessed 30th September 2023)

Cheng, A, Davidson, J, Wan, B, et al (2023) Data-informed debriefing for cardiopulmonary arrest: a randomized controlled trial. Resusc Plus. doi: 10.1016/j.resplu.2023.100401.

Cheng A, Hunt EA, Donoghue A, et al (2013) EXPRESS Investigators. Examining pediatric resuscitation education using simulation and scripted debriefing: a multicenter randomized trial. JAMA Pediatrics. 167(6):528-36. doi: 10.1001/jamapediatrics.2013.1389

Chuiki, J, Charan, M, Edan, P et al (2022). Introducing debriefing post-cardiac arrest at University Hospitals Dorset NHS Foundation Trust: a QI project. Future Health Journal. 9. 89-90. DOI 10.7861/fhj.9-2-s89.

Clark, R & Mclean, C (2018). The professional and personal debriefing needs of ward-based nurses after involvement in a cardiac arrest: An explorative qualitative pilot study. Intensive and critical care nursing. 47. 78-84. DOI https://doi.org/10.1016/j.iccn.2018.03.009

Couper, K, Kimani, P, Davies, R et al (2016). An evaluation of three methods of in-hospital cardiac arrest educational debriefing: The cardiopulmonary resuscitation debriefing study. Resuscitation. 105.

https://doi.org/10.1016/j.resuscitation.2016.05.005

Couper, K & Perkins, G. (2013) Briefing after resuscitation. Current Opinion in Critical Care. 19 (3). 188-194. DOI 10.1097/MCC.0b013e32835f58aa

Dewolf, P, Clarebout, G, Wauters, L et al (2021) The Effect of Teaching Nontechincal skills in Advanced Life Support: A systematic Review. AEM Educ Train. doi: 10.1002/aet2.10522.

Diaz-Navarro C, Leon-Cateloa E, Hadfeild A, et al (2021). Clinical debriefing: TALK© to learn and improve together in healthcare environments. Trends in Anaesthesia and Critical Care. 40. 4-6 DOI 10.1016/j.tacc.2021.07.004

Dine C, Gersh E, Leary M et al (2008) Improving cardiopulmonary resuscitation quality and resuscitation training by combining audiovisual feedback and debriefing. Critical Care Medicine 36: 2817–22. *DOI:* 10.1097/CCM.0b013e318186fe37

Edelson D, Litzinger B, Arora V, et al. (2008) Improving in-hospital cardiac arrest process and outcomes with performance debriefing. Archives of Internal Medicine 168: 1063–1069. https://doi.org/10.1001/archinte.168.10.1063

Edwards, J, Nichols, A (2021) Debriefing for clinical learning. https://psnet.ahrq.gov/primer/debriefing-clinical-learning (Last accessed 15th February 2024)

Eppich W, and Cheng A. (2015) Promoting Excellence and Reflective Learning in simulation (PEARLS): development and rationale for a blended approach to health care simulation debriefing. Simulation in Healthcare. 10(2) 106-15. doi: 10.1097/SIH.0000000000000072.

Fetherston, T. (2015). The importance of critical incident reporting - and how to do it. Community Eye Health. 28, 90. 26-7. PMID: 26692643; PMCID: PMC4675258.

Gabr, A. (2019). The importance of nontechnical skills in leading cardiopulmonary resuscitation teams. The Journal of the Royal College of Physicians of Edinburgh. 49, 112–116. doi: 10.4997/JRCPE.2019.205

Gilmartin, S., Martin, L., Kenny, S., Callanan, I. & Salter, N. (2020) Promoting hot debriefing in an emergency department. British Medical Journal. 49: 112–6 | doi: 10.4997/JRCPE.2019.205

Guerrero, J, Ahmed Ali, S, Attallah, D (2022) The Acquired Critical Thinking Skills, Satisfaction, and Self Confidence of Nursing Students and Staff Nurses through High-fidelity Simulation Experience. Clinical simulation nursing. 64. 24-30. https://doi.org/10.1016/j.ecns.2021.11.008

Guerrero, J, Tungpalan-Castro, G. & Pingue-Raguini, M. (2022) Impact of simulation debriefing structure on knowledge and skill acquisition for postgraduate critical care nursing students: three-phase vs. multiphase. BMC Nursing. 21. 318. DOI https://doi.org/10.1186/s12912-022-01100-z

Hale, S, Parker, M, Cupido, C, et al (2020) Applications of Postresuscitation Debriefing Frameworks in Emergency Settings: A Systematic Review. AEM Education and Training. 4. 3. 223-230. https://doi.org/10.1002/aet2.10444

Hansen C, Lauridsen KG, Schmidt AS, et al (2018). Decision-making in cardiac arrest: physicians' and nurses' knowledge and views on terminating resuscitation. Emergency Medicine. 2018 20. 11. 1-8. doi: 10.2147/OAEM.S183248.

Harrison, JM, Aiken LH, Sloane DM, et al (2019) In Hospitals With More Nurses Who Have Baccalaureate Degrees, Better Outcomes For Patients After Cardiac Arrest. Health Affairs, 38, 7, 1087-1094. DOI:10.1377/hlthaff.2018.05064

Hayes C, Rhee A, Detsky M, et al. (2007) Residents feel unprepared and unsupervised as leaders of cardiac arrest teams in teaching hospitals: a survey of internal medicine residents. Critical Care Medicine. 35. 1668–72. DOI: 10.1097/01.CCM.0000268059.42429.39

Hessulf F, Herlitz J, Rawshani A, et al. (2020) Adherence to guidelines I associated with improved survival following in-hospital cardiac arrest. Resuscitation. 155. 13-21. DOI 10.1016/j.resuscitation.2020.07.009

Kessler, D., Cheng, A. and Mullan, P. (2015). Debriefing in the Emergency Department After Clinical Events: A Practical Guide. Annals of emergency medicine. 65, 6, 690-698 DOI 10.1016/j.annemergmed.2014.10.019

Koželj A, Šikić Pogačar M, Fijan S. et al (2021) Exploring the Feelings of Nurses during Resuscitation-A Cross-Sectional Study. Healthcare. 21.10. doi: 10.3390/healthcare10010005.

Kolbe, M,. Schmutz, S. Seelandt, J,. Eppich, W. & Schmutz J B. (2021) Team debriefings in healthcare: aligning intention and impact. British Medical Journal 374, 2042. DOI 10.1136/bmj.n2042

Phillips, E, Smith, S Tallentire, V et al (2023) Systematic review of clinical debriefing tools: attributes and evidence for use. BMJ Quality & Safety. doi: 10.1136/bmjqs-2022-015464

Propp K, Apker J, Zabava Ford W, et al (2010) Meeting the complex needs of the health care team: identification of nurse-team communication practices perceived to enhance patient outcomes. Qualitative Health Research. 15, 28. doi: 10.1177/1049732309355289

The British Heart Foundation (2023) Cardiac arrest. [Online] https://www.bhf.org.uk/informationsupport/conditions/cardiac-arrest (Last accessed: 1st October 2023)

The Health Foundation (2021) Our aging population. How ageing affects health and care needs in England. https://www.health.org.uk/publications/our-ageing-

population#:~:text=England's%20population%20is%20ageing.,health%20and%20social%20care%20s

ervices. (Last accessed: 1st October 2023)

The Resuscitation Council (2021). Epidemiology of Cardiac Arrest Guidelines.

https://www.resus.org.uk/library/2021-resuscitation-guidelines/epidemiology-cardiac-arrest-

guidelines#:~:text=A%20quarter%20(23.6%25)%20of,Performance%20Category%201%20or%202

(Last accessed: 30th September 2023)

The Resuscitation Council (2023) ALS: 2 Day Course. https://www.resus.org.uk/training-

courses/adult-life-support/als-2-day-course-advanced-life-support

(Last accessed: 29th December 2023)

The Resuscitation Council (2020) Quality Standards: Community Hospitals care.

https://www.resus.org.uk/library/quality-standards-cpr/quality-standards-community-hospitals-care

(Last accessed 15th February 2024)

Levett-Jones T. & Lapkin S. (2014). A systematic review of the effectiveness of simulation debriefing

in health professional education. Nurse education today. 30, 6, 58-64 DOI

10.1016/j.nedt.2013.09.020

Lubbers, J & Rossman, C (2016). The effects of pediatric community simulation experience on the

self-confidence and satisfaction of baccalaureate nursing students: A quasi-experimental study.

Nurse Education Today. 36. 93-98. https://doi.org/10.1016/j.nedt.2016.01.013

Marsch, Stephan C U, et al. "Human factors affect the quality of cardiopulmonary resuscitation in

simulated cardiac arrests." *Resuscitation* vol. 60,1 (2004): 51-6.

doi:10.1016/j.resuscitation.2003.08.004

McCoy, C, Keshvani, N, Warsi, M, et al (2023) Empowering telemetry technicians and enhancing communication to improve in-hospital cardiac arrest survival. British Medical Journal. 12. doi: 10.1136/bmjoq-2022-002220

McKitterick D., Jayasekara R., Parker B. (2023) Effectiveness of simulation in undergraduate nursing programs: Systematic review. Science talks. 6. DOI https10.1016/j.sctalk.2023.100186

Meguerdichian M, Bajaj K, Ivanhoe R, (2022) Impact of the PEARLS Healthcare Debriefing cognitive aid on facilitator cognitive load, workload, and debriefing quality: a pilot study. Advances in Simulation. 7, 40. DOI 10.1186/s41077-022-00236-x

Milonas, A, Hutchinson, A, Charlesworth, D, et al (2017). Post resuscitation management of cardiac arrest patients in the critical care environment: A retrospective audit of compliance with evidence-based guidelines. Australian Critical Care. 30. 6. 299-305.

https://doi.org/10.1016/j.aucc.2016.12.001

Mitchell O, Motschwiller C, Horowitz J,(2019) Rapid Response and Cardiac Arrest Teams: A Descriptive Analysis of 103 American Hospitals. Critical Care Explorations. 1, 8. DOI: 10.1097/CCE.0000000000000031

Nadir N, Bentley, S, Papanagnou, D, et al (2017) Characteristics of Real-Time, Non-Critical Incident Debriefing Practices in the Emergency Department. The Western Journal of Emergency Medicine. 18, 1, 146-151. doi: 10.5811/westjem.2016.10.31467

NHS Digital (2023) NHS sickness Absence Rates, April 2023. https://digital.nhs.uk/data-and-information/publications/statistical/nhs-sickness-absence-rates/april-2023-provisional-statistics (Last accessed 29th September 2023)

NHS England (2023). Report a patient safety incident. https://www.england.nhs.uk/patient-safety/report-patient-safety-incident/#:~:text=safe%20web%20pages.-

,For%20the%20general%20public,the%20patient%20and%20public%20eform (Last accessed 6th

October 2023)

NHS England (2023b). Governance, patient safety, and quality. https://www.england.nhs.uk/mat-

transformation/matrons-handbook/governance-patient-safety-and-quality/ (Last accessed 6th

October 2023)

NHS England (2023c). E-learning for health Programmes. https://www.e-lfh.org.uk/programmes/

(Last accessed 4th October 2023)

NICE (2018). Cardiac arrest – Out of-hospital arrest. https://cks.nice.org.uk/topics/cardiac-arrest-

out-of-hospital-care/ (Last accessed 29th September 2023)

NMC (2023) Simulated practice learning. https://www.nmc.org.uk/standards/guidance/supporting-

information-for-our-education-and-training-standards/simulated-practice-learning/ (last accessed

6th October 2023)

Obermaier, M, Katzenschlager, S, Kofley, O, et al (2022). Advanced and Invasive Cardiopulmonary

Resuscitation (CPR) Techniques as an Adjunct to Advanced Cardiac Life Support. Journal of clinical

Medicine. 11, 24. DOI 10.3390/jcm11247315

O'Daniel M, and Rosenstein A, (2008) Professional Communication and Team Collaboration. In:

Hughes RG, editor. Patient Safety and Quality: An Evidence-Based Handbook for Nurses. Agency for

Healthcare Research and Quality., 271-284

Panesar, S, Ignatowicz, A & Donaldson, I. (2014) Errors in the management of cardiac arrest: An

observational study of patient safety incidents in England. Resuscitation. 85.

https://doi.org/10.1016/j.resuscitation.2014.09.027

RCN (2017) Debate: Nurse Debriefing https://www.rcn.org.uk/congress/congress-events/nurse-

debriefing#:~:text=Debriefing%20can%20reduce%20the%20possibility,help%20prevent%20further%

20untoward%20incidents. (Last accessed: September 28th 2023)

Riley, K, Middleton, R, et al. "Voices from the 'resus room': An integrative review of the resuscitation experiences of nurses." *Journal of Clinical Nursing* vol. 31,9-10 (2022): 1164-1173. doi:10.1111/jocn.16048

Salas E, Klein C, King, H, et al (2008) Debriefing medical teams: 12 evidence-based best practices and tips. The Joint Commission Journal on Quality and Patient Safety. 34, 9, 518-527. DOI: 10.1016/S1553-7250(08)34066-5

Sandhu, N., Eppich, W., Mikrogianakis, A. et al (2014) Post resuscitation debriefing in the pediatric emergency department: a national needs assessment. Canadian Journal id emergency medicine. 16, 5, 383-392. DOI: 10.1017/s1481803500003432

Schuster, M,. & Dwyer, P. (2020). Post-traumatic stress disorder in nurses: An integrative review. Journal of Clinical Nursing. 29, 15, 2769-2787. doi: 10.1111/jocn.15288

Shore, H. (2014) After compression, time for decompression: debriefing after significant clinical events. Infant. 10, 4, 117-119.

Siversten, N. & McNeill, L. (2016) Re-do stations after high-fidelity simulation debrief. Australian Nursing and Midwifery Federation. 80, 4, 34.

Snowdon, K. (2021). Exploring the clinical debrief: benefits and barriers. Journal of paramedic practice. 13,1. DOI: 10.12968/jpar.2021.13.CPD1

Spencer, S, Nolan, J, Osborn, M, et al (2019). The presence of psychological trauma symptoms in resuscitation providers and an exploration of debriefing practices. Resuscitation. 142. 175-181. https://doi.org/10.1016/j.resuscitation.2019.06.280

Tannenbaum, S.I. & Greilich, P.E. (2022). The debrief imperative: building teaming competencies and team effectiveness. BMJ Quality & Safety. O, 1-4. doi:10.1136/bmjqs-2022-015259

Tonna, J, Keenan, H & Weir, Charlene (2022) A qualitative analysis of physician decision making in the use of extracorporeal cardiopulmonary resuscitation for refractory cardiac arrest. Resuscitation Plus. 11. https://doi.org/10.1016/j.resplu.2022.100278

Tuckey, M & Scott, J (2013). Group critical incident stress debriefing with emergency services personnel: a randomized controlled trial. Anxiety, stress, and coping. https://doi.org/10.1080/10615806.2013.809421

Ugwu, C, Medows, M, Don-pedro. Et al (2020) Critical event debriefing in a community hospital. Cureus. 12, 6. DOI 10.7759/cureus.8822

Yuerek, M. & Naim, M. (2023) Communication breakdown, its always the same. Resuscitation Journal. 189, 1-2. DOI: 10.1016/j.resuscitation.2023.109878

Walker C,. McGregor L. Taylor C. et al (2020) STOP5: a hot debrief model for resuscitation cases in the emergency department. Clinical and Experimental Emergency Medicine. 7, 4, 259–266. doi: 10.15441/ceem.19.086

Wolfe HA, Wenger J, Sutton R et al (2020) Cold Debriefings after In-hospital Cardiac Arrest in an International Paediatric Resuscitation Quality Improvement Collaborative. Paediatric Quality and safety. 5,4, 319 DOI:10.1097/pq9.0000000000000319