Psychological safety in an ECMO retrieval team: a qualitative study to inform improvement

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ABSTRACT

Introduction In healthcare teams, psychological safety is associated with improved performance, communication, collaboration and patient safety. Extracorporeal membrane oxygenation (ECMO) retrieval teams are multidisciplinary teams that initiate ECMO therapy for patients with severe acute respiratory failure in referring hospitals and transfer patients to regional specialised centres for ongoing care. The present study aimed to explore an ECMO team's experience of psychological safety and generate recommendations to strengthen psychological safety.

Methods The study was conducted in the Royal Brompton Hospital (RBH), part of Guy's and St Thomas' NHS Foundation Trust in London. RBH is one of six centres commissioned to provide ECMO therapy in the UK. 10 participants were recruited: 2 consultants, 5 nurses and 3 perfusionists. Semistructured interviews were used to explore the team members' views on teamwork, their perceived ability to discuss concerns within the team and the interaction between speaking up, teamwork and hierarchy. A Reflexive Thematic Analysis approach was used to explore the interview data.

Results The analysis of the interview dataset identified structural and team factors shaping psychological safety in the specific context of the ECMO team. The high-risk environment in which the team operates, the clearly defined process and functions and the structured opportunities that provide legitimate moments to reflect together influence how psychological safety is experienced. Furthermore, speaking up is shaped by the familiarity among team members, the interdependent work, which requires boundary spanning across different roles, and leadership behaviour. A hierarchy of expertise is privileged over traditional institutional ranking.

Conclusion This study surfaced the structural and team factors that influence speaking up in the specific context of an ECMO retrieval team. Such information is used to suggest interventions to improve and strengthen psychological safety.

INTRODUCTION

Psychological safety has been defined as a 'shared belief among team members that the team is safe for interpersonal risk-taking'.[1] In psychologically safe teams, members are willing to suggest ideas, ask questions, voice concerns and discuss failures without fear of retaliation or social consequences. Psychological safety has been found to have many

WHAT IS ALREADY KNOWN ON THIS TOPIC
⇒ Psychological safety in healthcare teams has numerous positive outcomes, like improved performance, patient safety, collaboration and communication.
⇒ Psychological safety is particularly important in teams operating in highly uncertain and changeable environments with high interdependency (ie, the job depends on collaboration and member input), such as critical care retrieval teams.
⇒ Psychological safety has not been studied in critical care retrieval teams.

WHAT THIS STUDY ADDS
⇒ This qualitative study explores factors impacting on psychological safety in an extracorporeal membrane oxygenation (ECMO) retrieval team.

HOW THIS STUDY MIGHT AFFECT RESEARCH, PRACTICE OR POLICY
⇒ The results of this study have value for informing interventions aimed at reinforcing and strengthening psychological safety in ECMO teams.
⇒ Further research is needed to understand whether these findings are transferable to other critical care retrieval teams.

positive outcomes for healthcare teams, including improved performance and effectiveness,[1] and patient safety.[2] Furthermore, psychological safety has been found to facilitate incident reporting,[3] enhance collaboration[4] and promote quality improvement[5] and staff engagement.[6]

Psychological safety is crucial in teams operating in highly uncertain and changeable environments and where the job depends on collaboration and member input.[7] Research describes generic conditions for psychological safety, but to inform improvement, it is valuable to understand the context-specific factors that shape psychological safety within a specific healthcare setting.[8] The conditions and practices that generate or reinforce psychological safety may differ depending on the unique features of healthcare teams working in different organisational contexts.[9] Little is known about the conditions that

help create psychological safety in critical care retrieval and transfer teams,[10 11] such as extracorporeal membrane oxygenation (ECMO) retrieval teams.

ECMO retrieval teams are multidisciplinary teams that initiate ECMO therapy in distant referring hospitals and transfer those critically ill patients with severe acute respiratory failure to regional hubs for ongoing care.[12] Commissioned centres receive referrals from hospitals in England and provide a retrieval service for this cohort of patients. Specialised teams commonly transfer critically ill patients in the UK.[13] However, research has thus far focused on outcomes of critical care transfers rather than exploring how retrieval teams' communication and interactions may affect their performance.[14] To our knowledge, psychological safety has not been investigated in ECMO retrieval teams. The present study, conducted at the Royal Brompton Hospital (RBH), aims to explore the ECMO team's experience of psychological safety and understand how contextual factors may shape communication and collaboration among team members. The results of this study were used to generate recommendations for improving the ECMO team's psychological safety.

METHODS
Setting
The study was conducted at the the RBH, part of Guy's and St Thomas' NHS Foundation Trust in London. The RBH has provided specialist care for patients with severe acute respiratory failure in the west of England and the Peninsula since 2009. Retrieval teams are formed on a shift-by-shift basis by a consultant intensivist, a senior perfusionist and a specialist nurse; they travel to the referring hospital, initiate ECMO therapy if indicated and transfer the patients to RBH for ongoing care. Figure 1 is a map that illustrates the ECMO retrieval process.

Semistructured interviews were conducted with 10 participants, including all professional groups that form an ECMO team. Participants were sampled purposively to include members with diverse roles, and recruited via local contacts and snowball sampling.[15] Each participant was approached individually, and informed consent obtained. Before participating in an interview, all respondents completed the Psychological Safety Questionnaire (PSQ)[1] to gauge their perceptions of, degree of shared agreement about and levels of psychological safety within the team (box 1).

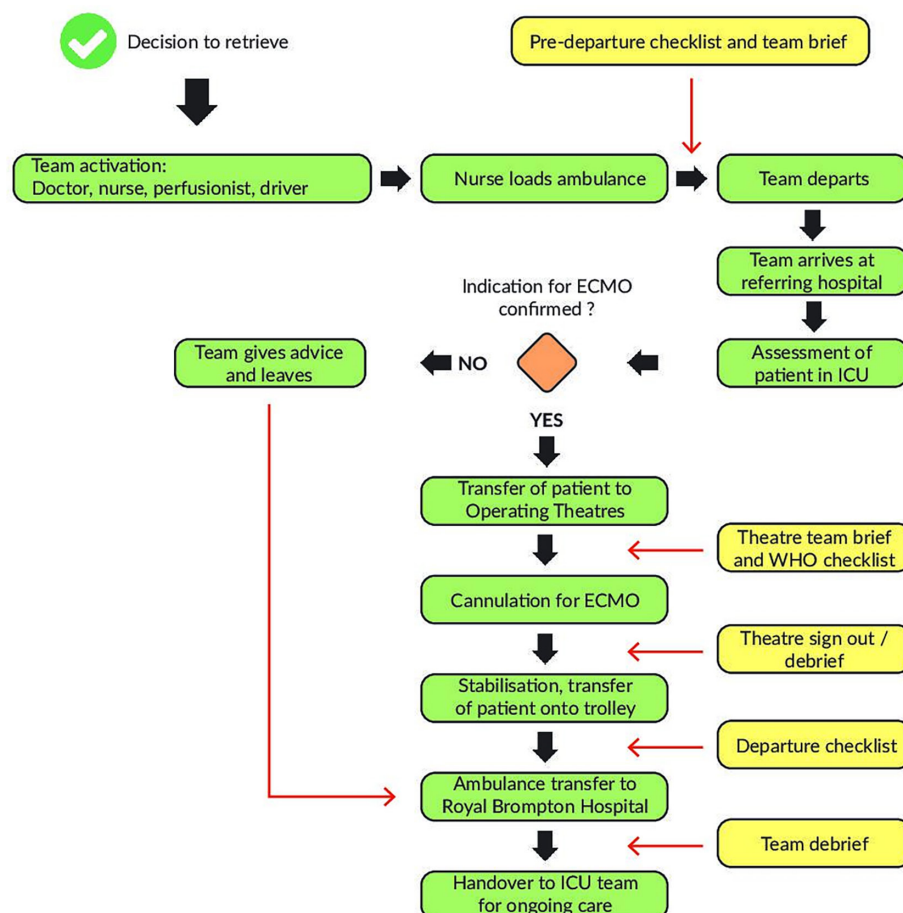Interviews explored participants' views on teamwork and their perceived ability to discuss concerns within

Figure 1 Process map of an extracorporeal membrane oxygenation (ECMO) retrieval. ICU, intensive care unit.

Box 1 Edmondson's Psychological Safety Questionnaire

⇒ If you make a mistake on this team, it is often held against you.
⇒ Members of this team are able to bring up problems and tough issues.
⇒ Members of this team sometimes reject others for being different.
⇒ It is safe to take a risk on this team.
⇒ It is difficult to ask other members of this team for help.
⇒ No one on this team would deliberately act in a way that undermines my efforts.
⇒ Working with this team, my unique skills and talents are valued and used.

the team; further questions aimed to elicit participants' opinions around the interaction between speaking up, teamwork and hierarchy. A topic guide was developed drawing on literature on psychological safety[16 17] and was amended iteratively during interviews; the topic guide is available in the online supplemental material. Interviews ranged from 37 to 66 min, with an average length of 51 min. The interviews were conducted by one of the authors (MP), a consultant in critical care at the RBH and part of the ECMO team. MP has more than 20 years of experience in critical care services and regularly undertakes clinical sessions in ECMO retrieval. Interviews were audio recorded, transcribed verbatim and anonymised before analysis.

A reflexive thematic analytic (RTA) approach[18 19] was used to explore the interview data. RTA is a method to systematically explore, develop and interpret patterns across interview data. Analysis involved, initially, listening to audio recordings of interviews and reading through interview transcripts to provide familiarisation with the data. Subsequently, relevant text segments from interview transcripts were coded using labels derived from the content of the text. Codes were organised in a coding frame, a list of key codes, which was developed iteratively during coding. The final set of codes was clustered together to identify common patterns in the data around broader concepts and themes. Analysis was informed by discussion between MP and CT (an expert in qualitative methods). Themes were interpreted and refined using visual displays and narrative summaries. NVivo software[20] was used to aid the management of the qualitative dataset and assist in the coding process. As the author (MP) was part of the ECMO retrieval team, RTA offered an approach for MP to reflexively incorporate the experience of working in this team into the analysis.

Patients and/or the public were not involved in the design, or conduct, or reporting or dissemination plans of this research.

RESULTS

10 participants were recruited in the study: 5 nurses, 3 perfusionists and 2 consultants. The response rate to the PSQ was 100%. Overall, the PSQ suggests that the perceived psychological safety within this team is high, with >80% positive responses for all statements, and this was a consensus view.

The analysis of the interview dataset identified structural and team conditions shaping psychological safety in the specific context of the ECMO team. Figure 2 is a thematic map that summarises the findings.

Structural factors impacting on psychological safety in the ECMO retrieval team

Changeable high-risk environment

The ECMO team work in a changeable environment with high-risk and unstable patients; consequently, team members are exposed to a high potential for error and unexpected situations. The team is small and often needs to make decisions 'on the fly' in a highly charged environment. The nature of their work means that the team must discuss problems as they arise and find solutions quickly to keep the patient safe. The overall safety culture influences how ECMO team members communicate with each
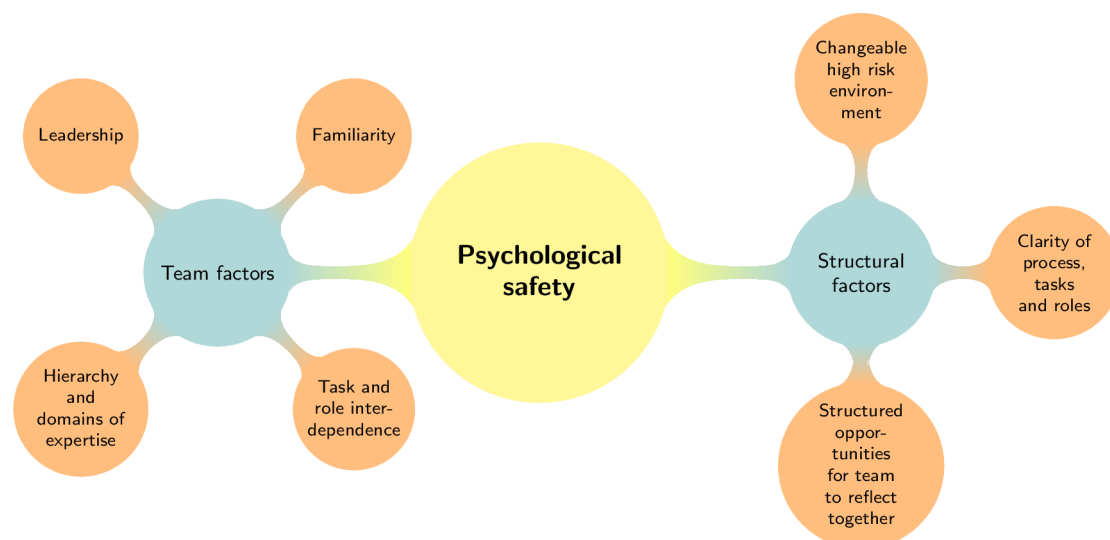

Figure 2 Thematic map of findings.

other and address concerns collectively. The team identified that a shared understanding of the high-pressured nature of the situation and the recognition that complications often arise could support a positive culture that avoided blame. This was vital for enabling them to speak up quickly when concerns arose and work together to identify solutions rapidly. Openness and honesty were seen as being respected and valued in this team, as a doctor pointed out:

> I think we know that it's a high-pressured situation. I think complications are common. … I think actually the team works well together, in terms of being open and honest, but also non-judgmental in their assessments… I don't think there are there's blame and judgment. I don't think that's the culture that's developed in that team.

Clarity of processes, tasks and roles

The specialist nature of the ECMO team's work means that participants have received extensive supervised training before they can work independently. The work they do has order and structure, in terms of the tasks that have to be safely achieved to transfer a patient. Participants described having a shared understanding of how the work is done, with the processes, tasks and roles during an ECMO retrieval being clearly defined and standardised. This clarity about the nature and order of the work to be done helped team members identify when deviations occur from the 'usual' course of action. Issues that arose from unexpected or unplanned events were more easily identified as voiceable concerns.[21]

> I think everything's like, very nicely planned. And because we're very routined with what we do, it's very easy to notice if there's going to be a problem in delivering the service to the patient along the way. (Nurse)

Structured opportunities for teams to reflect together

The ordered work of the ECMO team includes structured opportunities for the team to come together during and after the cannulation and transfer—time outs, checklists and debriefs. These parts of the retrieval routine were seen as valued moments where the team came together. These opportunities supported psychological safety by providing recognised and legitimate opportunities to speak up and discuss the challenges as the work unfolded as a perfusionist explains:

> I think… that set debrief, whether you do that after an ECMO [cannulation] […] maybe somebody that ordinarily wouldn't say something that's giving them that moment.

Participants also felt that formal departmental meetings that fed into clinical governance provided opportunities to discuss concerns and helped the team to reflect, learn and improve the quality of their service delivery:

There are, I think fora, in which we can discuss this in an open fashion. And I think that is something that also helps the team debrief. And I think we would all hope we would all be open and honest about our…if something went wrong, why it went wrong, and to take responsibility for it, and also to take responsibility for it not happening again, as much as possible mitigating risks around that. (Doctor)

Participants expressed the desire to have more opportunities, away from the retrieval itself, to discuss the challenges of the work with the wider team, as a nurse explained:

> I think if we have meetings, you know, regular meetings, then we can discuss our own issues in a team […] And we can bring up our issues, they can bring up their issues […] So, yeah, regular meetings will be very helpful.

Team factors impacting on psychological safety in the ECMO retrieval/transfer team
Team familiarity

A typical retrieval team comprises a consultant, a specialised nurse and a perfusionist. As such, ECMO teams comprised small numbers of people from different professional groups working closely together with specific roles. Although retrieval teams are formed and dissolved on a shift-by-shift basis, with time, team members get to know each other well and become familiar with each other at a personal level. This continuity over time, along with small talk in the ambulance or during periods of inactivity, was seen as promoting familiarity among team members.

> It's almost like a strange sort of intimacy, which sounds quite strange, but you go for long journeys in small spaces, for a lot of it, you'll be chatting or like, you know, waiting and things like that. And I think it leads to conversations […] I think that is that kind of like camaraderie that comes with going far away […] there's an opportunity to kind of get to know people in a different way. (Perfusionist)

Social conversations made team members comfortable with each other at a personal rather than a professional level, helping to facilitate conversations across professional boundaries. Also, when factors like tiredness or stress affected communication at work, team members were more likely to forgive these mishaps. This meant that staff felt safe to be their authentic selves at work and felt supported by their team members. A nurse explained that familiarity allowed:

> a background understanding of why they react in a way, but even if it's in a way, it's not predictable, you might have an understanding of that, they've been working a lot of shifts, and they're very tired. So the reaction is a tired, kind of more cranky response than you would normally get if this is a person who's well rested.

In summary, familiarity within the team helped flatten the hierarchy among members and promoted understanding and acceptance of each other challenges at work. Furthermore, familiarity helped team members monitor each other's mental health and pick up frustrations and dissatisfaction early to prevent conflicts.

Task and role interdependence

Once ECMO retrieval teams arrive to take care of a patient, the responsibility for that patient gradually transfers from the hospital team to the retrieval team. Hospital teams show variable engagement with the ECMO team, and occasionally, they may disengage early, leaving this transition to be managed by the ECMO team. ECMO team members each bring distinct skills needed in the handover and transfer process to keep the patient safe. Participants recognised this interdependence. They acknowledged that they had a shared goal of keeping the patient safe during cannulation and transfer and were highly reliant on each other's skills and support to keep the patient safe. Given the team's small size, help-seeking behaviours occurred between different professions and tended to cross the boundaries of each role. Helping each other across the different professions was valued within the team, rooted in a climate of respect and justified by getting the work done. Participants described how team members would ask for and offer help by understanding and anticipating each other's skills, challenges and needs. As a perfusionist explained:

> Teamwork is like looking at having your specific roles, but also being aware of, especially on retrievals, when you're that unit, being aware of what other people have to do, and helping them with it. So sometimes, maybe crossing over to do something that isn't technically your job, but that needs doing […] I think that is good teamwork because you're very aware of what everyone else in your team is doing.

However, this necessary flexibility in role and task came with a potentially blurred understanding of 'who should do what'. This could threaten team members' sense of psychological safety, grounded in an understanding of the scope of their role and their ability to perform this role optimally to keep the patient safe.

> I think there's a bit of confusion between the role of the perfusionist and the retrieval nurses sometimes. I know, when we go out with like [a perfusionist] likes to scrub. And I like to scrub because I feel like that's my main role. And I have to be specialist with my role. (Nurse)

Hierarchy and domains of expertise

Hierarchy is traditionally considered a barrier to speaking up,[22–24] and ECMO team members were aware of hierarchical differences among its members. However, in this team, the confidence to speak up was not affected by the institutional role but by their domain of knowledge and the remit of their professional role.

> I do a technical thing, I run a machine… if someone says what cannulas should we use, what equipment should we use? That's, I'm trying to do that. I know I have that knowledge. And I'm very happy to make a very firm decision about it. (Perfusionist)

Individuals were confident to raise concerns that fell within their domain of expertise but less so in raising a concern that fell within the domain of expertise, skill set or scope of practice of a different professional role with different skill set, scope of practice, due to the anxiety about uncovering a knowledge gap.

> If I had to speak up to a nurse, and they were doing something like drawing drugs, or doing a dose calculating, or whatever, that I don't do very often …if I noticed something with a nurse or drug, I was like, Oh, I'm not sure about that. I do. I double-guess myself more before speaking up. Because I don't know. (Perfusionist)

Decisions around ECMO candidacy are mainly made by medical professionals. Nurses did not feel comfortable challenging these decisions despite having an opinion. However, rather than being a reflection of reticence to challenge a more senior member of the team, they described their reluctance as arising from an awareness of the boundaries of their role and a lack of knowledge and training to question these decisions.

> I feel I should not distract when doctors are discussing serious cases, because in the end of the day, they make decision who is suitable for ECMO […] [Some] things are not able to discuss because of my skill levels. Not because I'm not comfortable to discuss […but] I don't feel is [my] role. […] We do different jobs. […] I need to respect that level and that knowledge. (Nurse)

A learning orientation, and confidence in one's own expertise, facilitated speaking up across role boundaries.

> I think, earlier on in my career… in the past, that has been the case sometimes, whereby you don't ask a question or, or speak, speak an opinion because you're you're fearful of exposing a hole in your knowledge. But that as someone who is now fairly experienced, I in my career, I've reached a point where I don't fear that in the same way that I might have done five or 10 years ago. I'm much more comfortable with myself. I know what I do know, and I have a fair idea of what I don't know. And I can reason with that according to my professional role. (Perfusionist)

Team members reflected on how they could express opinion when speaking up directly felt less comfortable—indicating alternative strategies to voicing their concerns, like framing the concern as a question.

I think the way in which I bring something up would change depending on how comfortable I feel about bringing that particular idea or opinion up. […] according to my own nature, and how I see myself within the team, it's most likely that I would challenge a point of view, challenge a point of view by raising a question rather than forcefully delivering an opinion. (Perfusionist)

Leadership

Team leadership is necessary for a team to function, and the nature of the approach to leadership was seen as consequential for psychological safety within the team and willingness to speak up. Although the intensivist is usually considered the ECMO team leader, an ECMO retrieval is a complex process filled with uncertainty; in such environments, the leadership may be delegated to other team members. During cannulation, for example, the intensivist is task focused and the nurse or the perfusionists may have a better global awareness of what is happening. In this team, leadership was articulated through expertise, knowledge and clinical experience rather than assigned by an individual's position in the organisation.

There can also be hierarchies based upon clinical expertise and experience, which is necessary in terms of team leadership. (Perfusionist)

Irrespective of their institutional role, team leaders were seen to have a crucial role in setting the right tone for communication and promoting voice within the team. A coaching leadership style was preferred by staff as a way of facilitating sharing of opinions, ideas and concerns.

[Asking] What do you think? you know, this question makes us really feel better. […] That question is very important. (Nurse)

DISCUSSION

This is the first qualitative study to explore how psychological safety is experienced in an ECMO retrieval team. The study identifies contextual factors that shape psychological safety in this specific healthcare team and are likely to account for the high levels of perceived psychological safety in this team. The results of this study have been used to identify interventions for quality improvement initiatives.

Most of our findings are in line with previous research. Several studies have identified contextual factors that facilitate or hinder speaking up in healthcare teams. O'Donovan and McAuliffe[25] identified from a systematic review that familiarity, safety culture, higher hierarchical status, leadership and peer support and inclusiveness were enablers of psychological safety. Remtulla et al[26] found in their qualitative study of primary care teams that hierarchy and dictatorial leadership represented barriers to psychological safety. In contrast, the small size of the team, open culture, strong interpersonal relationships and senior support were facilitators of speaking up. Grailey et al[27] conducted a similar study among critical care staff. Contextual factors at individual, team and organisational levels can, depending on the clinical situation, promote or impede psychological safety. Leadership, hierarchy, culture, support and role clarity were again identified as influencing speaking-up behaviours in critical care staff. However, the present study also provides some distinctive findings: the concept of a hierarchy of expertise as a facilitator of psychological safety and psychological safety as a promoter of teamwork.

While considered a barrier to speaking up in the literature, hierarchy is conceptualised differently in this study than in previous research: fixed and traditional institutional power differences are replaced by the helpful construct of a hierarchy of knowledge and expertise. Modern multidisciplinary healthcare teams face growing tensions over power and control of the care process, which may hinder effective teamwork.[28] A hierarchy of expertise may be instrumental to teamwork and collaboration as it implies mutual respect, status mobility and distributed leadership. This is likely to be particularly relevant in situations such as ECMO retrieval that involve knotworking[29 30]—in which individuals come together and collaborate to achieve very specific objectives, requiring collaborators to understand each other's expertise and share control fluidly. Previous research has found that communication and shared understanding is more straightforward when teams are small,[31 32] when task interdependence is high and when team members are familiar with each other.[33] As the ECMO team comprises one individual for each profession (ie, one nurse, one consultant and one perfusionist), diverse forms of knowledge and expertise redress any power imbalance inherent to hierarchy and mitigate the negative influence of institutional power on speaking up; they promote confidence in speaking up and taking on a leadership stance when required.

During interviews, team members reported that speaking up is integral to teamwork. Interprofessional support is essential to get the job done and overcome the challenges as the work unfolds. Communication and speaking up are the tools that team members use to help each other and cross the boundaries of each role. Previous research has identified psychological safety as a mediator between boundary-spanning activities and team performance.[34] While this study supports the view that psychological safety facilitates boundary-spanning activities, it can also be argued that in this specific context, boundary-spanning activities required to get the job done promote communication and psychological safety in this team. Establishing linear relationships between contextual team characteristics, speaking up, boundary-spanning behaviours and perceived quality of teamwork is problematic. Arguably, these factors are interlinked, influencing and reinforcing each other.

Limitations

The present small sample size study explores contextual factors that shape psychological safety in a single team. Further research is required to understand whether these findings are transferable in other settings. Furthermore, the interviews were conducted by MP, a consultant and part of the ECMO team that was studied. Positionality is a characteristic of any qualitative research, and being part of the population studied may have affected how participants engaged in the study.[35] As an insider researcher, some participants may have felt more comfortable sharing their experiences during interviews; but the interviewer's position of privilege (male, white, consultant grade) may have shaped the content of the interviews. The position of insider research did however provide a unique standpoint for analysis.

Implications for practice

The findings of this study highlight implications for local improvement initiatives to maintain and improve psychological safety in the ECMO team. The project surfaced the structural and team factors that promote psychological safety and enable participants to speak up. Actively supporting and reinforcing these factors will likely enhance psychological safety further in this team. The findings also identified some possibilities for strengthening psychological safety and supporting speaking up. The results of this qualitative study were used to identify the following recommendations for strengthening psychological safety in the ECMO team (box 2).

As ECMO provision is limited to a few commissioned centres in England, this study could be replicated in other ECMO centres and provide insight for quality improvement initiatives and a comparison between ECMO teams across the network. A similar approach could also explore whether these findings are transferable to other critical care retrieval teams.

CONCLUSION

This qualitative study identifies contextual factors that influence and shape psychological safety in an ECMO retrieval team. ECMO retrieval teams are small in size and multidisciplinary in nature; the interdependent work in high-risk and uncertain environments encourages their members to help each other across the boundaries of their functions despite their clearly defined roles. These contextual factors likely play a key role in shaping how psychological safety is perceived and may explain the high levels of perceived psychological safety in ECMO team members. The results of this qualitative study have been used to identify practical recommendations for quality improvement and may inform future research.

> **Box 2   Recommendations to strengthen psychological safety in the extracorporeal membrane oxygenation (ECMO) team**
>
> ⇒ Leaders play a crucial role in enabling staff to feel safe to speak up. Team leaders could look for opportunities to proactively ask for team members' opinions and invite speaking up. Asking 'What do you think?' is an easy way to initiate those discussions.
> ⇒ Knowledge and expertise, and a learning orientation, mitigate the negative effects of hierarchy on communication. Therefore, the team should nurture a learning climate, for example, through interdisciplinary teaching sessions and team participation in conferences or other educational opportunities.
> ⇒ Team members should embrace small talk during inactivity to foster familiarity among team members. Other initiatives outside work may also achieve this purpose (away days, social events, etc).
> ⇒ Team briefs, checklists, time outs and debriefs should be recognised explicitly as an opportunity for reflection and raising concerns. Dedicated multidisciplinary team meetings could be further opportunities to reflect after the event and discuss the challenges and aspirations of the wider team. The debriefing of a challenging case could be a starting point for discussing problems, but discussion and feedback around what goes well are equally crucial to achieving excellence.
> ⇒ While role clarity is vital for effective teamwork, this team must support each other, and task/role allocations may have to change as the work unfolds. Flexible task/role allocation is a challenge for teamwork as a blurring of roles can arise from boundary transitions and interprofessional support. Encouraging flexibility while maintaining role clarity can be achieved by discussing task allocation in advance, especially when deviating from the standard.

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