From Fear to Confidence: The Impact of Structured ECMO Specialist Training on Self-Perceived Safety and Clinical Confidence

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Background: Extracorporeal membrane oxygenation (ECMO) management demands rapid decision-making, advanced technical expertise, and high emotional resilience in complex and often unpredictable clinical scenarios. Lack of confidence and perceived insecurity when managing ECMO patients may increase professional stress, impair team communication, and negatively impact patient safety and clinical performance. Despite the growing adoption of ECMO across critical care settings worldwide, standardized training frameworks for ECMO specialists remain inconsistently implemented, and the educational needs of multidisciplinary bedside teams are frequently underaddressed. We hypothesized that a structured ECMO specialist training program combining theoretical education and high-fidelity simulation-based learning would significantly improve healthcare professionals' self-perceived safety, confidence, and clinical readiness across key management domains.

Methods: A validated pre- and post-training self-perception survey was applied to assess perceived safety, confidence, and readiness across nine ECMO management domains. The training program included didactic content, hands-on simulation with structured bundle assessment and debriefing sessions, and video-based step-by-step technical instruction for circuit and cannula management. Participants included nurses, physical therapists, physicians, perfusionists, and nursing technicians from our institution's ECMO program, representing diverse professional backgrounds and a wide range of baseline experience levels. All responses were collected anonymously and analyzed descriptively by domain and professional category, enabling systematic and reproducible cross-disciplinary performance comparisons before and after the educational intervention.

Results: Ninety participants completed the pre-training survey and 99 the post-training survey. Mean self-perceived competency score increased from 3.2 to 8.6 out of 9 points, representing an overall improvement from 36% to 96% — a remarkable 169% gain. Pre-training, competency was critically low across most domains, including hand crank management (26.7%), circuit air removal (26.7%), and cannula whip identification (25.6%). Following training, all nine domains exceeded 87%, with hand crank management reaching 100% and six additional domains surpassing 94%. Gains were consistent and substantial across all professional categories and baseline performance levels, underscoring the program's broad and truly inclusive effectiveness regardless of prior ECMO experience or professional role.

Conclusions: Structured ECMO specialist training integrating simulation and technical education produced near-universal and clinically meaningful gains in self-perceived safety and confidence across all professional categories. These findings highlight the critical role of formalized, multidisciplinary training programs in building individual competency and team preparedness in high-acuity clinical environments. Strengthening ECMO-specific education may reduce professional stress, enhance inter-professional communication, and broadly optimize bedside performance in high-stakes situations — ultimately contributing to improved patient safety and better clinical outcomes across this complex, demanding, and rapidly evolving field.