RESEARCH PROTOCOL

STUDY TITLE

COMPETENCIES REQUIRED BY ANESTHESIOLOGISTS MANAGING CRITICALLY ILL MEDICAL AND SURGICAL PATIENTS IN AN INTENSIVE CARE UNIT: EXPERT CONSENSUS USING A DELPHI METHOD

INVESTIGATORS

Dr. Sheila Nainan Myatra (Principal Investigator)

Dr. Prashant Nasa

Dr. Ravi Jain

Dr. Carolina Haylock- Loor

Dr. Michael Lipnick

Dr. Adrian Gelb

DOCUMENT DATED 09 August 2021

BACKGROUND

Critical Care Medicine (CCM) has emerged as an independent specialty over the last few decades. Anesthesiologists being perioperative physicians are an integral part of this progress, with many of them opting for CCM as a full-time career. [1] The coronavirus disease 2019 (COVID-19) pandemic has brought unprecedented challenges in the health care system. Anesthesiologists working in the operating room (OR) and those working in the Intensive Care Unit (ICU) have been the frontline workers along with other Critical Care professionals in the management of critically ill patients with COVID-19.

Though a few countries have recognized CCM as a separate specialty of medicine, in most countries, it is considered as a sub-specialty of broad specialties like Anesthesiology, Pulmonary Medicine or Internal Medicine. Some professional bodies have developed formal curriculum for training in CCM. [2, 3] The Competency-Based Training programme in Intensive Care Medicine (CoBaTrICE) from the European Society of Intensive Care Medicine (ESICM) is a widely accepted formal structured training curriculum in CCM. [3] Most curricula are designed only for high-income, well-resourced training and practice environments and do not account for additional skills and competencies that may be required to practice in resource variable settings, something the COVID-19 pandemic has demonstrated needs to be universal.
.

The transition of Anesthesiologists working in OR, or managing critically ill surgical/ polytrauma patients, into working in ICU has largely been smooth. Nevertheless, deficiencies have been noted by experts in the Anesthesiology training in certain competencies required for the management of critically ill medical and surgical patients in the ICU. [4, 5] This is often compounded by considerable variation in the training curriculum of the Anesthesiologists based on the geographical region and type of institution.

There is a need to identify these competencies, so that Anesthesiologists who wish to practice full time or part time Critical Care, can acquire these competencies to improve

their ability to manage critically ill patients in ICU, in different WHO defined healthcare facilities levels. [6] This may also help provide guidance to educators worldwide regarding the competencies to be included in Anesthesiology training that may help Anesthesiologists work better with critically ill patients in ICU. These competencies have never been formally identified or published. We plan to review the existing competencies for CCM in the Anesthesiology curriculum across the globe through a preliminary survey. Thereafter, we plan to identify the additional competencies required through consensus among Experts, using a Delphi method. These additional competencies, classified as *mandatory, desirable,* and *optional* may serve as a guide for Anesthesiologists to practice Critical Care in ICU in different levels of health care facilities worldwide.

OBJECTIVES

1. To review / identify the existing competencies for CCM in the Anesthesiology curriculum across the globe.
2. To generate expert consensus on the additional competencies (mandatory desirable and optional) required for Anesthesiologists to practice Critical Care in ICU.
3. Provide guidance to educators worldwide regarding the competencies to be included in the Anesthesiology curriculum that may help Anesthesiologists work better with critically ill patients in ICU.

METHODOLOGY

Steering Committee

A Steering Committee comprising of Anesthesiologists with experience in CCM will be formed under the auspices of the Intensive and Critical Care Medicine Committee (ICCCM) of the World Federation of Societies of Anaesthesiologists (WFSA).

Selection of Experts

The Steering Committee will select global experts to participate in a Delphi process.
The selection criteria will include 1. Anesthesiologist (a medical graduate who has completed a nationally recognized Anesthesiology training programme) 2. Involved in the management of critically ill patients in ICU 3. More than ten years of experience in teaching and training in Critical Care. We aim for a total sample size of 30 experts for the Delphi rounds. Invitations to various global experts will be sent by email along with the study details and objectives of the Delphi process.

Preliminary survey

The Steering Committee will develop a preliminary survey to assess the knowledge and skills acquired by Anesthesiologists across the globe following Anesthesiology training, that is required to achieve the various Critical Care competencies. A literature review on the existing Critical Care competencies from various professional bodies will be conducted to develop a list of Critical Care competencies, using CoBaTrICE as a base.

Anesthesiologists who have completed their training within the last three years will be surveyed. The preliminary survey will be sent to approximately 500 Anesthesiologists across the globe by the Experts. Their competencies in CCM will be assessed under six domains in the survey. (*Disease diagnosis and management, Procedures, Monitoring and therapeutic interventions, Resuscitation, Communication and End-of-life care, Patient safety and Crisis Resource Management)* using a 5-point Likert scale (*never seen, have observed, can manage under supervision, can manage with minimal assistance,* and *can manage independently*). The first section of this survey will include the participant demographics, country of origin and training, year of completing training, and a few

training characteristics. The results of the survey will be used to draft competencies for inclusion in Round one of the Delphi.

The Delphi process

The Delphi process is a well-established methodology to generate consensus on a particular topic using the "collective intelligence" of panel members. [7-9] The steering committee members will perform a literature search on the available evidence, draft the initial statements and conduct iterative Delphi rounds to generate consensus among the experts. The Steering Committee members will not participate in the Delphi surveys themselves.

Steps of the Delphi process

Step 1: Establishing a preliminary list of competencies

A literature review on the existing Critical Care competencies from various professional bodies will be conducted to develop a list of Critical Care competencies, using CoBaTrICE as a base and categorized under the six core domains (*disease diagnosis and management, procedures, monitoring and therapeutic interventions, resuscitation, communication and end-of-life care, patient safety and crisis resource management*). The results of the preliminary survey will be used to draft statements for Round one of Delphi.

Step 2: Preparation of the Delphi Round one survey

The list of the competencies will be sent to the Experts as a Delphi questionnaire. The anonymity of the experts will be maintained during the Delphi rounds. The participant will be asked to score each of the competencies listed on a 5-point Likert scale (*non-essential, optional, optional but desirable, desirable, and mandatory)*. The participating

expert will be invited to provide feedback regarding omission, addition, or modification of the items on the questionnaire. The response and feedback of experts will be collated during the analysis of results and shared in the following survey as controlled feedback.

Step 3: Subsequent Delphi Rounds

The steering committee will review the results of round one. The competencies listed will be modified, deleted, or added if found ambiguous based on the feedback and comments of the results. Competencies deemed *"non-essential"* by more than 50% of the respondents will be eliminated. The remaining competencies will be continued in the subsequent rounds until consensus is achieved (>80% of respondents). Lower-rated items identified for removal may be retained in the second round if they are considered *"mandatory"* by more than 20% respondents. The summary results of Round two will be presented to Experts, and the survey process will be repeated with the modified questionnaire. The Delphi rounds will be continued till desired consensus and stability is achieved for competencies.

Step 4: Final Consensus on Competencies to be included

The summary results of the last stable round will be used to issue the consensus on the additional competencies to be included. These competencies will also be classified as those *mandatory, desirable,* and *optional*, which may serve as a guide to decide which competencies are required for working in different levels of health care facilities worldwide. The results of the final survey, consensus competencies, and the manuscript will be circulated among the experts for approval before submission for publication.

Statistical analysis

A descriptive analysis of the preliminary survey will be performed. For the Delphi process, stability will be checked by non-parametric chi-square ($\chi2$) tests from round two onwards. A p-value <0.05 is considered as a significant variation or

unstable. *Consensus* will be considered as the competency that achieved >80% votes. A competency will be continued in the questionnaire round until the stability of the responses is achieved. Consensus competencies will be considered as those that generate both consensus and stability.

PROPOSED TIMELINE

Preliminary survey
30th September 2021
Preliminary survey development, dissemination, and analysis

Development and dissemination of the Round one Delphi survey
31st October 2021

Subsequent Delphi rounds
November-December 2021

Analysis of Delphi survey results and preparation of the list of competencies
31st January 2022

Manuscript writing and submission for publication
30th April 2022

REFERENCES

1. Hastie J. Anesthesiologists as perioperative leaders. Int Anesthesiol Clin. 2020 Fall;58(4):58-63.

2. Barrett H, Bion JF. An international survey of training in adult intensive care medicine. Intensive Care Med. 2005 Apr;31(4):553-61.

3. CoBaTrICE Collaboration. The educational environment for training in intensive care medicine: structures, processes, outcomes and challenges in the European region. Intensive Care Med. 2009 Sep;35(9):1575-83.

4. Kain ZN, Fitch JC, Kirsch JR, Mets B, Pearl RG. Future of anesthesiology is perioperative medicine: a call for action. Anesthesiology. 2015 Jun;122(6):1192-5.

5. Bhattacharya PK, Nair SG, Kumar N, Natarajan P, Chhanwal H. Critical care as a career for anaesthesiologists. Indian J Anaesth. 2021 Jan;65(1):48-53.

6. Gelb AW, Morriss WW, Johnson W et al. World Health Organization-World Federation of Societies of Anaesthesiologists (WHO-WFSA) International Standards for a Safe Practice of Anesthesia. Anesth Analg. 2018; 126(6):2047-55.

7. Diamond IR, Grant RC, Feldman BM, et al. Defining consensus: a systematic review recommends methodologic criteria for reporting of Delphi studies. J Clin Epidemiol. 2014; 67: 401–9.

8. Nasa P, Jain R, Juneja D. Delphi methodology in healthcare research: How to decide its appropriateness. World J Methodol. 2021; 11: 116-129.

9. Jünger S, Payne SA, Brine J, Radbruch L, Brearley SG. Guidance on Conducting and REporting DElphi Studies (CREDES) in palliative care: Recommendations based on a methodological systematic review. Palliat Med. 2017; 31: 684-706.