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EDITORIAL

Simulation training as a response to the demand of critical patients with COVID-19: safety and quality of care

Luís Manuel Mota de Sousa[1,2,*], **Maria do Céu Mendes Pinto Marques**[1,2]
[1]*Comprehensive Health Research Centre (CHRC);* [2]*Nursing Department of Universidade de Évora, Évora, Portugal.*

Coronavirus disease (COVID-19), also known as *severe acute respiratory syndrome coronavirus 2* (SARS-CoV-2), was first described in December 2019, in Wuhan, China[1]. It spread across all continents, having been declared by the World Health Organization (WHO), on March 11, 2020, as a global pandemic.

On June 24, 2020, 9,129,146 cases and 473,797 deaths caused by SARS-CoV-2/COVID-19 were reported by the WHO[2].

The virus is transmitted through droplets, although it has also been found in feces and blood, admitting other means of potential transmission. The symptoms associated with SARS-CoV-2 infection include fever, myalgia or fatigue, productive cough and/or non-productive cough dyspnea, fatigue or myalgia in most cases. There are also reports of headaches, sore throat, hemoptysis and gastrointestinal symptoms such as diarrhea, nausea and abdominal pain, but with a lower incidence[3].

Although most patients infected with SARS-CoV-2 have a mild illness (about 80%), it is estimated that between 6 and 10% of infected patients require hospitalization, particularly in Intensive Care Units (ICU)[1]. From patients with SARS-CoV-2 who are admitted to the ICU due to respiratory failure, about 88% require invasive mechanical ventilation. Given the severity, mortality rates between 26% and 61.5% have been reported [4].

Current recommendations suggest early intubation of patients with SARS-CoV-2/COVID-19, mainly for two reasons: (1) severe hypoxemia with PaO_2/FiO_2 usually < 200mmHg, meeting the Berlin criteria for moderate to severe acute respiratory distress syndrome (ARDS); and (2) to protect health professionals from viral transmission[5].

Airway management of patients with COVID-19 /and patients under study exposes healthcare professionals to significant risk due to the aerosolizing nature of airway interventions, especially in severe cases of COVID-19, which have an average load viral 60 times higher than in mild cases[6]. It is believed that aerosolization occurs during ventilation of the face mask, intubation and cardiopulmonary resuscitation. To this extent, precautionary measures must be implemented to deal with aerosols in order to obtain the necessary protection[7].

Simulation training allows health professionals to develop clinical, technical and communicational skills, inherent in complex clinical contexts such as COVID-19. Learning in a clinical context requires systematic training that promotes the transformation of theoretical and practical knowledge into clinical skills, consequently decreases the error and increases patient safety. In a simulation, it is possible to identify and correct several high priority problems immediately. The health team, based on knowledge gaps and flaws found, can calculate risk profiles, prioritize types of failure and execute action plans to mitigate risks[8].

Careful planning, careful allocation of resources and training of health professionals in the provision of care involving complex therapeutic interventions, while ensuring the safety of care, by adhering to strict infection control measures, allows for more efficient use and effective equipment and therapeutic intervention (e.g., *Extracorporeal membrane oxygenation* - ECMO, invasive ventilation, among others).

Taking into account the patient with COVID-19 who gets worse clinically and requires tracheal intubation and mechanical ventilation[10], it is essential to understand how health teams have been preparing to respond to the challenges that the pandemic has brought and what is the role of simulation in this preparation to serve COVID-19 patients with mechanical ventilation needs.

Given the context of a pandemic that has spread so quickly worldwide, health professionals found it difficult to adapt the simulation in *situ* to this context synchronously and physically, which is fundamental in the success of the results achieved in the provision of care in adverse contexts, such as a COVID ward or a COVID ICU.

Simulation training in this pandemic context can prepare health professionals for this new challenge with minimal risk of infection by COVID-19, thus ensuring the acquisition and development of clinical, technical and

***Correspondence:**
Escola Superior de Enfermagem S. João de Deus.
Largo do Sr. da Pobreza, 7000-811 | Évora, Portugal
e-mail: luismmsousa@gmail.com

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communicational skills, in a safe, trustworthy, which will improve the performance of these professionals, with positive consequences in terms of quality and patient safety.

In short, simulation training can be an important way to ensure quality care, as well as safety for both the patient and health professionals, thus contributing to reducing the occurrence of adverse events, and consequently, the morbidity, mortality and health expenditures.

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