

# Nursing perspectives from an Italian ICU

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**Abstract:** In Europe, the novel coronavirus outbreak started in the northern regions of Italy at the end of February 2020. Initially, resources were insufficient to deal with the abrupt influx of critically ill patients requiring respiratory support. This article recounts the authors' experiences caring for patients with COVID-19 in an Italian ICU during this period in order to help colleagues in the international critical care nursing community successfully manage similar circumstances in the ongoing pandemic.

**Keywords:** COVID-19, critical care nursing, ICU, novel coronavirus, pandemic, personal protective equipment, PPE, SARS-CoV-2

FROM THE BEGINNING of the COVID-19 pandemic until the end of March 2020, Italy was the most affected western country.<sup>1</sup> The novel coronavirus outbreak started in Italy at the end of February 2020 in the northern regions, mainly Lombardy, Veneto, and Emilia-Romagna. In the following weeks, ICU admissions for severe hypoxemic respiratory failure continued to increase. Italian hospitals comprise 5,200 ICU beds. The total ICU capacity of northern region hospitals was exceeded within a couple of weeks.<sup>2</sup>

To reduce transmission, on March 9 the Italian government applied a series of severe lockdown measures, closing schools, universities, non-essential shops, and businesses. In addition, the movement of the population was restricted except for buying food and other basic necessities,

working, and attending to health circumstances. Italian Health Services issued a recruitment notice for 20,000 more physicians and nurses and 5,000 more ventilators. Field hospitals were set up by the Italian Army and Civil Protection to support the most affected areas.<sup>3</sup>

At the end of March 2020, the number of total confirmed cases reported by the Italian Civil Protection Department was 86,498, with 29,761 patients hospitalized (4,013 in the ICU), 10,950 recovered, and 9,134 deaths. The reported percentage of daily ICU admissions from March 1 to March 11 was consistently between 9% and 11% of hospitalized patients.<sup>3</sup> On March 27, the Italian government reported the highest percentage of hospitalized patients admitted to ICUs: 14.3% (3,732 patients).<sup>4</sup>



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Health services in northern Italy, mainly Lombardy and Emilia-Romagna, are of excellent quality and include university hospitals with great experience. Yet resources were insufficient to deal with such a high number of critically ill patients requiring noninvasive ventilation or endotracheal intubation, mechanical ventilation, and subsequent ICU admission for invasive procedures. Hospitals with 10 to 15 ICU beds had to treat 30 to 40 more patients with respiratory failure in less than 24 hours.

Meanwhile, the flow of patients with COVID-19 entering the ED continued uninterrupted. For over 2 months, the situation in some hospitals in Lombardy, Veneto, and western Emilia-Romagna featured dozens and dozens of intubated patients and hundreds undergoing noninvasive ventilation. Such a massive influx of patients, including many requiring ICU admission and mechanical ventilation, forced Italian Health Services to launch an immense and revolutionary effort to increase both prehospital and hospital response. This article recounts the authors' experiences caring for patients with COVID-19 in an Italian ICU setting with the hope that it will help colleagues in the international critical care nursing community manage similar circumstances.

### **Increasing surge capacity**

One of the main strategies to guarantee an adequate response to the needs of critically ill patients with COVID-19 was to increase ICU surge capacity while also preserving ICU beds for patients with other serious disorders such as stroke, trauma, and post-cardiac arrest. Patients arriving at the ED with COVID-19 symptoms were quickly identified and admitted to dedicated wards, high-dependence care units (RHDCUs), or the ICU according to the severity of their conditions.



### **Adapting ICUs for patients with COVID-19 required a total rethinking of the structure and distribution of spaces.**

In Italy, RHDCUs provide a high level of nursing care to patients with acute-on-chronic respiratory failure who need noninvasive ventilation.<sup>5</sup> Hospitals also defined specific paths for patients with COVID-19, including dedicated elevators and diagnostic services.

Adapting ICUs for patients with COVID-19 required a total rethinking of the structure and distribution of spaces. Most ICUs with multiple patient rooms (open-space ICUs) have a limited number of isolation boxes (rooms) with negative pressure ventilation. Setting up a negative pressure system for an open-space ICU is much more complex than for a box-structured ICU and required major restructuring in a very short time—closing corridors, building new self-closing doors, establishing filter areas (entrance and exit areas

for staff and patients separating clean and dirty paths), and adapting ventilation systems. Adequate spaces for drug and device deposit and for storing and donning of personal protective equipment (PPE) also had to be considered.

In our hospital, a 520-bed tertiary trauma center, the major reorganization process started on March 6, 2020, with medical staff and management fully involved for a couple of weeks. Hospital capacity increased by 10% in the first days and increased subsequently. The most important modifications in the ICU setting required dedicating a 10-bed ICU for treating COVID-19, building a negative-pressure ventilation system in a 220 square meter open space, and preserving another 10-bed ICU for patients with critical conditions other than COVID-19. Surgical patients usually admitted to the ICU were diverted to a postanesthesia care unit for which the hours of operation were extended from 12 to 24 hours daily.

A new COVID-19 ICU with 14 beds was set up in 5 days in a surgical unit, thanks to beds, monitors, and mechanical ventilators borrowed from postanesthesia care units, with a further increase to 28 beds in the next weeks. Entire units were redesigned as RHDCUs for patients undergoing noninvasive ventilation. In addition, small local hospitals were entirely reallocated as COVID-19 hospitals where patients were transferred for postacute care and weaning.

Our facility aimed to keep COVID-19 patients admitted from the ED in three units: high-risk patients in an RHDCU, intubated patients without organ failure in a new ICU, and the most critically ill patients in another ICU. Patients were constantly followed by a dedicated team of intensivists and quickly transferred to a higher level of care as needed.

### **Nurse staffing and workload**

To meet the patient demand, nursing staff had to be increased. In the first days of massive admissions, ICU nurses worked for 12 to 16 consecutive hours to help colleagues and guarantee assistance for the influx of critical patients. In the next days, nursing staff from ORs that had been closed for elective and minor surgery were reallocated to support ICU staff.

The employment of so many nurses with no previous ICU experience, working in an unfamiliar setting, and performing or assisting with complex procedures, required a reorganization of nurse staffing. Two or three skilled ICU nurses were assigned to each shift to perform or assist with the more complex and high-risk procedures, such as endotracheal intubations, percutaneous tracheostomies, and continuous renal replacement therapy. Meanwhile, experienced nurses supervised other nurses, educating and training them on basic critical care nursing activities while maintaining the standard 1:2 nurse-patient ratio. During pauses, when possible, skilled ICU nurses performed small-groups training sessions on prone positioning, rapid-sequence intubation, and donning and doffing PPE, dedicated to less-experienced nurses.

A briefing at the beginning of each shift was essential to define roles and priorities but also to avoid assigning less-skilled nurses to care for extremely complex patients, which would expose both nurses and patients to unnecessary risks. In these situations, experienced ICU nurses had the increased responsibility of guaranteeing a high level of care while supporting less experienced nursing colleagues.

To limit the time spent in the isolation area wearing PPE, one or two nurses were identified as “runners”: nurses who prepared I.V. infusions and other medications and provided equipment for col-

leagues in the isolation area. Kits for specific procedures (such as arterial and central venous cannulation and lab testing) were preassembled so everything would be ready at patient admission or in case of need. To reduce risk during aerosol-generating procedures, such as discontinuing noninvasive ventilation and endotracheal intubation, the set of advanced maneuvers at patient admission (endotracheal intubation, arterial line and central line placement) was standardized as an “all-in-one” package to be performed, when possible, by a small team of one intensivist and one nurse.<sup>6</sup> As recommended by Xie and colleagues, multidisciplinary standard protocols for management of ICU patients can be useful to optimize workload, particularly in the case of multiple admissions at the same time.<sup>7</sup>

Considering that most patients with COVID-19 require the same medications and I.V. solutions, most dilutions were modified and standardized in collaboration with intensivists to reduce nurses' workload and to avoid errors. For example, midazolam infusions for patients with COVID-19 were administered at double the standard concentration. In addition, medication administrations were scheduled at fixed times, two or three times a day; for example, 0800 and 2000, or 0800, 1600, and 2400. This kind of organization, which was more focused on tasks than personalized care, was spearheaded by one or two runner nurses outside the isolation area, helping to reduce the workload for nurses in the isolation area.

Typically, nurses who worked in the isolation area wore PPE for a maximum of 2 or 3 hours and then were replaced by other colleagues. PPE use restricts people's ability to hear clearly and creates a situation where staff must raise their voices in order to be heard, increasing the level of work difficulty and stress. Staff

in the isolation area used walkie-talkies to communicate with external nurses, runners, and intensivists.

### **The buddy check and other strategies**

One of the main difficulties reported by all healthcare staff concerned the correct sequence of donning and doffing PPE. Educational videos and checklists posted in the wearing area were described as useful, but the most effective method was based on a “buddy check,” a method used by scuba divers. One colleague helps another one who is donning and doffing PPE; for example, by suggesting what to wear or remove in the correct sequence, helping to cover all the hair under a scrub hat, or securing gloves to the sleeves of the gown with tape. The buddy check system was one of the most effective elements for reinforcing team dynamics in this difficult situation.

Mirrors were placed in the dressing areas to help staff correctly don masks, goggles, and isolation gowns. Writing names or nicknames on aprons or coveralls so staff could readily identify each other represented the final step of donning PPE. Wearing protective goggles and masks for hours can cause pressure wounds on healthcare professionals' faces; hydrocolloids or polyurethane dressings were a valuable resource to protect the skin.<sup>8</sup>

In this period, the organization had an adequate supply of PPE, including respirator masks (such as FFP2/FFP3 or N95 masks), on hand. Respirator masks were covered with a supplemental surgical mask for use during an entire shift. Later, powered air purifying respirators were supplied, guaranteeing up to 4 hours of operating time. These were much more comfortable and helped prevent PPE-related pressure injuries.

The risk of occupational exposure to SARS-CoV-2 continued to be an issue: Healthcare workers were rec-

ognized as a group at high risk of acquiring this infection and spreading it to their close family members.<sup>9</sup> Full PPE (respirators, goggles, gowns, and gloves) should always be available to ensure the safety of healthcare professionals, especially those treating subclinical patients in the initial stages of any outbreak when the infective power of a virus is not well known.<sup>10</sup> To date, many Italian healthcare professionals have been infected, representing 12% of over 232,269 total confirmed cases during the first wave of COVID-19. As of November 2020, the number of cases among healthcare workers was over 52,100. At least 188 physicians and 47 nurses had died, although it is not clear how many of these deaths were work-related.<sup>11,12</sup>

### Dehumanization of care

Another issue to consider is how COVID-19 has dehumanized the provision of critical care. In recent years, clinicians have made a great effort to open ICUs to family members and engage them in the care process. Pre-COVID, the family visiting policy in our ICU was fairly permissive and family visits were permitted from 1400 to 2400. During this period of the pandemic, however, no family members were permitted to visit patients with COVID-19, and the visiting policy for other patients limited visitors to one person a day. This imposed a huge step backward in patient care. We could never have foreseen how difficult and painful it would be for patients, families, and hospital staff alike.

Apart from the clinical features, the worst aspects of COVID-19 experienced by our patients were loneliness and awareness of their vulnerability. Because hospital visits for patients with COVID-19 were forbidden by the government lockdown for safety reasons, patients' only link with their families was a mobile phone or a tablet. Sometimes



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the last dramatic act of humanity was to allow patients to make a phone call to their loved ones before being intubated.

For patients admitted to the ICU, a daily phone call from nurses or intensivists was often the only contact for families praying for good news. Physicians and psychologists started to use videocalls to inform families about their loved ones' clinical conditions and they reported that communicating that way was more effective than a phone call. Consequently, a couple of tablets normally used for other purposes in the ICU were made available to patients in the isolation area. The tablets were placed inside disposable plastic protective cases; after use, tablets were cleaned with chlorine towels. The use of video calls between patients and their relatives during the

postacute phase helped in reducing anxiety for both.

### Staff well-being

The burden for healthcare professionals was not only physical as they cared for critically ill patients for long shifts while wearing PPE, but also psychological. A study of a mental health program for medical workers in China reported that during the COVID-19 outbreak, many nurses experienced signs of psychological distress but refused any psychological support.<sup>13</sup> Similarly, in the first days of the COVID-19 outbreak in our hospital, some nurses and intensivists experienced irritability, probably related to an increased workload in a confused setting, and were unwilling to rest or to go home in order to help their colleagues.

One of the greatest positive aspects of working in such critical conditions was the enhancing and reinforcing of interpersonal dynamics in the whole team. An incredible form of support came from our citizens: Every day we received great gestures of affection—food, sweets, letters, and drawings. A local volunteer association provided hotel rooms near the hospital so healthcare personnel did not have to go home. These unexpected thanks gave us the strength and energy to continue in our daily work.

### Going forward

This pandemic and the need to assist such a large number of critically ill patients forced us to face a situation that we never could have imagined, forcing us to struggle with a highly increased workload, the need to reorganize hospital services, and the burden of assisting critical patients in a dehumanized context due to infection prevention measures and quarantine. Hospitals are still reorganizing day by day to guarantee an adequate response and a great effort has been made to increase the number of ICU beds and trained healthcare professionals.

Nurses, physicians, and other hospital staff, who represent the first line of defense in a war against an invisible enemy, have made the greatest of efforts to respond to patients' needs, in some cases paying the price with their own lives. Healthcare workers' professionalism and their great sense of responsibility have led to a renewed and reinforced pact of trust with citizens.

Four months after the arrival of our first patient with COVID-19, we had the opportunity to catch our breath and reflect. Those 4 months, which seemed like an eternity, carry an incredible wealth of human and professional experiences. Even when everyone is physically and emotionally tired, adaptations, reinterpretations, and attempts to optimize the work in intensive care made us

stronger and more responsive. But we are surely aware that intensive care nursing will never be the same again. ■

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