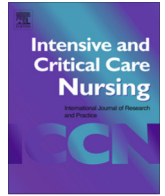




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## Letter to the Editor

## Nursing Activities Score is increased in COVID-19 patients



Dear Editor,

On February 20th 2020, our mobile Extracorporeal Membrane Oxygenation service retrieved a 66-year-old male with severe acute respiratory distress syndrome (ARDS) from a hospital in northern Italy (Giani et al., 2020). The Sars-CoV-2 cluster in the North of Italy was not yet identified. Two days later, after reports of patients with COVID-19 from the local area, bronchoalveolar lavage was sent for SARS-CoV-2 testing and was found to be positive. Since then, our 10-bed intensive care unit (ICU) has been transformed in a COVID unit. The other ICU patients were tested for SARS-CoV-2 and were found negative, thus they were transferred to an alternative “clean” ICU. After one month, we have treated a total of 25 patients with SARS-Cov-2 in our ICU. Meanwhile, four other COVID-ICUs were created in the hospital.

Since 2005, in our ICU we have been recording the Nursing Activities Score (NAS) of all admitted patients daily, to measure the nursing workload. The NAS of every patient is recorded at 6 a.m. by the nurse, reporting the previous 24 hours (Miranda et al, 2003; Lucchini et al., 2019a). The NAS filling criteria were the same as those published by Padilha et al. (2015).

We performed a retrospective case review of NAS of the first 15 COVID-19 patients, and we compared them with the NAS of patients admitted to our ICU in 2019. Table 1 shows patient characteristics and average NAS. The score increased from 63 to 84, indicating a 33% increase of nursing workload.

This NAS increase may be due to several clinical and environmental factors. First of all, we used prone positioning (PP) in all COVID-19 patients. This technique requires at least five health-care workers to be performed safely (Lucchini et al., 2019b). In this period, with COVID-19 patients, we managed up to seven patients simultaneously in the prone position. For mechanically ventilated adults with moderate to severe ARDS due to COVID-19, guidelines suggest prone positioning sessions of 12–16 hours (Alhazzani et al., 2020).

Furthermore, with COVID-19 patients, health-care workers have an elevated risk of exposure and the use of personal protective equipment (PPE) is mandatory. Negative pressure rooms are recommended for performing aerosol-generating procedures on ICU patients with COVID-19 (Alhazzani et al., 2020). Unfortunately, our ICU does not feature negative pressure rooms. For this reason, the whole ICU clinical area (bed unit, nurses' station, meeting area, etc.) has been considered as a “contaminated area”. Two separate areas have been created for donning (putting on) and doffing (taking off) health care workers' PPE. The need for PPE dramatically increases nursing workload and fatigue. Use of protective devices

**Table 1**

NAS score according to clinical characteristics. Data are expressed as mean  $\pm$  SD (range) or absolute (relative) frequency. \*Student's *T*-test, #Chi square test.

	COVID-19 patients n = 15 MD $\pm$ SD (range)	2019 ICU patients n = 474 MD $\pm$ SD (range)	p.value
Age, years	65 $\pm$ 9 (49–81)	60 $\pm$ 20 (1–91)	0.810*
Gender, females n=(%)	5 (33%)	132 (38%)	0.001#
ICU length of stay, days	8 $\pm$ 6 (2–17)	6 $\pm$ 9 (1–69)	<0.001*
Pts with ECMO support n=(%)	2 (13%)	26 (5%)	<0.001#
NAS	84 $\pm$ 10 (67–99)	63 $\pm$ 15 (28–117)	<0.001*
Alive n=(%)	10 (66%)	444 (94%)	<0.001#

increases body temperature and is tolerable only for a few hours. Thus, we re-organised shifts to allow resting for one nurse at a time outside the “contaminated area”, in order to guarantee a rotation every 2–3 hours for operators dedicated to isolated patients.

In a few days, the growing demand for COVID-19 patients ICU beds in our region, forced us to realise 11 new beds in the operating theatre contingent on our 10 bed ECMO unit. A door was opened connecting the two areas. The original ICU staff were divided between the new and the old ICU beds. Nurses from the operating theatre were also recruited as new ICU staff. More complex procedures, as intubation, haemofiltration and Extracorporeal membrane oxygenation (ECMO) were managed only by a team of Critical Care Nurses, while the nurses from the operating theatre managed stable patients with lower nursing complexity. In order to guarantee a safe PP procedure, at least three experienced operators (critical care nurses and/or Intensivist physicians) were present during each prone position manoeuvre. Finally, some activities related to the humanisation of care in ICU, have been maintained, even in these dramatic conditions. The Italian Government has banned relatives from COVID-19 intensive care units. For this reason, we implemented video calls between patients and relatives to restore a visual contact. Furthermore, our experience with the use of an ICU diary, was interrupted in the first two weeks. In the last days of March, we reactivated this project in digital format (Scruth et al., 2017), so we could send an ICU diary, without infectious risks, to the patient and his family upon discharge from the hospital. In this phase all the diary notes were written only by nurses and physicians.

In conclusion, these early data show that the nursing workload in COVID-19 patients is dramatically increased. The ideal nurse-to-patient ratio for these patients should be around 1:1.5. Unfortunately, the need to provide an enormous amount of new ICU beds makes it impossible to guarantee this nurse-to-patient ratio.

Therefore, we suggest to colleagues worldwide to make an effort to increase the ICU nursing staff, starting to train registered nurses from general wards to perform basic ICU procedures and to dedicate intensive care nurses to manage more complex procedures, in order to be prepared to face the epidemic.

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#### Conflict of interest statement

The authors declare they have no conflict of interest.

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