

ORIGINAL ARTICLE

How medical students in a COVID-19 command centre improve communication and decrease physician workload

E.B. Nieswaag, M.J.C. van Hoek, J. Janson, J. van Paassen, C. Elzo Kraemer, E. de Jonge, D. van Westerloo

Department of Intensive Care Medicine, Leiden University Medical Centre, Leiden, the Netherlands

Correspondence

D. van Westerloo - djvanwesterloo@lumc.nl

Keywords - COVID-19, communication, workload, efficiency, command centre

Abstract

Last year the global community was confronted with COVID-19, a rapidly spreading pandemic disease. Hospitals had to cope with an increasing number of infectious patients, at times overwhelming their capacity. To prevent further transmission of the coronavirus, several protective measures had to be taken, such as the setup of large quarantine admission cohorts in hospitals, including in intensive care units (ICUs), and the use of personal protective equipment (PPE). The shear load of patients as well as these protective measures brought along certain difficulties for the staff working on the ICUs. Healthcare workers experienced problems in communication due to the mandatory strict use of PPE precluding easy access to cell phones and computers. Also, the increased workload restricted time for individual patient care. Hence, a different approach to the way we delivered our care was required. In this short report we describe the implementation of a student-managed command centre at Leiden University Medical Centre, which was designed to reduce the workload of our clinical staff and to increase the quality and ease of communication.

Introduction

Since the outbreak of COVID-19 in Wuhan in late December 2019, the coronavirus rapidly spread to over 200 countries around the world.^[1] We were globally confronted with a new, unknown disease. The presentation and severity of COVID-19 seemed to vary greatly between individuals, which has mainly been explained by the presence of comorbidities, including diabetes mellitus, hypertension, asthma/COPD and acute respiratory distress syndrome. Recent studies have also shown that the risk of unfavourable outcomes increases with age >60 years and that severe disease is more common in patients with male gender and a history of smoking or substance abuse.^[2-5] Studies have reported ICU admission rates for hospitalised patients with COVID-19 ranging from 15 to 26%.^[6-8] The care

of critically ill COVID-19 patients is not without considerable challenges and requires a different approach to care. In this article, we provide an effective strategy to tackle some of these challenges in the ICU, which was designed to improve work efficiency and communication of ICU healthcare workers.

Problems: communication and workload

To prevent transmission of the Sars-Cov2 virus, ICUs with COVID-19 patients are allocated to quarantine cohorts. Accordingly, healthcare workers entering these zones must wear PPE, including an FFP2 face mask, eye protection, and a gown to protect themselves from contagion. These protective measures, however, lead to certain difficulties of which communication is the most important one. Due to potential transmission and principles of infection prevention, the use of pagers and cell phones is not allowed on the cohorts. Hence, communication on the ward, for example a nurse looking for a doctor or residents wanting to consult their supervisors, is difficult and may lead to a delayed response. In addition, communication from the quarantine zone with the rest of the hospital is hampered. Consultants cannot easily reach the doctors on the cohort and vice versa. In our experience, even arranging a CT scan became an obstacle, since doctors on the cohorts may have difficulty in interacting with the radiology department or using the computer workstation. Besides the difficulty in communication, the rising workload for ICU staff also became exceedingly problematic. The large number of patients admitted with COVID-19 necessitated a decrease in the staff versus patient ratio. To allow doctors and nurses to completely focus on their patients, a reduction in the overall workload was required.

Solution and implementation of a command centre

To increase the ease of communication and lower the workload, an ICU command centre was set up. The command centre is

a room located about 30 metres from the ICUs from where medical students execute a plethora of practical tasks by order of ICU staff (*figure 1*). A former coffee room was made available, two computer desks were created, and >20 two-way radios with accessory materials were rented from a rental company (Bink Portofoons, Leiden). Signal magnifiers were used to ensure that two-way communication was possible between the cohorts and the rest of the hospital. Next to this hardware, ten medical students were hired to run the command centre. Medical students were a logical choice of personnel since various departments in our hospital already delegated administrative or supportive work to medical students. They have sufficient medical knowledge and are relatively cheap to employ. The students were trained and received access to our

hospital's patient data management systems. The training of new employees was carried out by 'walking' with more experienced students for the first few working shifts. In addition, a file containing all the protocols and procedures was available for reference. After a trial period, working hours were set from 8 am until 8 pm, divided into two shifts of 6 hours with two students per shift, 7 days a week.

Before doctors start their working shift, they pick up a radio and leave their pagers at the command centre. The radio can be worn underneath the PPE gown, attached to the belt or a pocket, while the microphone is efficiently clipped to the collar (*figure 1*). In that way, the microphone can easily be reached to send messages. To receive messages, an earpiece is connected to the



Figure 1. The command centre was located close to the ICU cohorts (A: end of the hall). At the command centre (B) students coordinated communication, using two-way radios (C) and performed a variety of supportive tasks to decrease workload of ICU workers. ICU workers wore ear pieces and talk buttons (D) to enable communication with the command centre

radio. For the communication either one or more (up to three in the first COVID-19 wave) channels may be used, depending on the number of COVID-19 patients admitted to the ICU and the available staff. To ensure effective communication, radio etiquette is applied, which includes the use of affirmative language and general code words, such as 'over' and 'out'.

The medical students at the command centre take care of cleaning and recharging the radios. Altogether, the radios lead to an effective, easy to use, hygienic and fast way of communication.

Reduction of workload for ICU workers

The command centre functions as a communicational intermediary for the ICUs. At first, the main tasks of the medical students were to assist ICU doctors by carrying out practical requests and answering the doctors' pagers. When a doctor is paged, for example to discuss medical results, the medical student answering the phone triages all the information and then chooses to either directly convey the message over the radio or to write it down for a more suitable moment. Additionally, the doctor uses the radio to request scans, feeding tubes, packed cells and for other actions or procedures that can be managed by medical students. The execution of these tasks significantly reduces the time spent on administration and decreases the workload of ICU physicians.

Since the implementation of the command centre, the medical students have gradually taken over many more important and time-consuming tasks, data registration for the National Intensive Care Evaluation (which reports on all hospitalised COVID-19 patients in the Netherlands) and collection of clinical information from other hospitals about transferred patients. The command centre was closely involved in the planning of family visits and functioned as the primary base for families to call upon for all their practical and logistical queries, allowing medical staff on the cohorts to continue their work undisturbed. In addition, during the pandemic they started to perform the screening of new patients for risk factors for MRSA carriage, approach patients' families for information on allergies, call outside pharmacies for information and assist, if needed and time permitting, in turning patients towards supine or prone positions. On top of these tasks, in specific situations doctors can ask the medical students to, for example, call the medical microbiologist to discuss the best antibiotic treatment for a patient with a suspected super infection, consult a vascular doctor about a patient with a coagulation disorder or request the radiology department to reassess external imaging. The progression of tasks performed by the command centre has significantly increased our work efficiency over the last year.

Finally, the command centre has shown to be valuable to our new ICU workers as well as patients' family members. Since

the students at the command centre are so well acquainted with all the hospital procedures, the command centre functions as a reliable base for new ICU residents to call upon for many of their queries. Also, patients' families have expressed their gratitude for being able to contact the command centre for all the information they need, rather than having to try to find the right person within a large hospital or having to bother the nurses.

This efficiency has not been without cost. We estimate that over the past year, the command centre has cost us approximately €125,000. These costs are mainly made up of salaries for the two students who are present 12 hours a day, 7 days a week, and the rent of the two-way radios and the costs of associated disposables such as earpieces.

Discussion

The command centre has proven to be of great added value to our ICU. Owing to the use of the two-way radios, doctors are easier to reach, for each other, the nursing staff and colleagues outside the ICU. Furthermore, not having to carry out many administrative duties, such as requests for imaging or medical procedures and a variety of other tasks, truly allows the doctors to have more time available for patient care.

The main downside of the command centre is its financial burden. Furthermore, it is usually more efficient to hold discussions with other specialists about a patient's condition directly, rather than via the command centre. The command centre has therefore mainly been deployed for more practical and time-consuming tasks.

For the future, we are considering maintaining the command centre for non-COVID-19 patient care. If this plan is implemented, not many modifications will be required since the main tasks would remain similar. Doctors are now fully accustomed to the benefits of the command centre, including the effortless communication with colleagues, but mainly and most effectively medical students taking over general and mostly time-consuming tasks as described above. Retaining the support of the command centre after the pandemic, albeit in a slightly adapted and leaner form, may still lead to significant efficiency gains, which might very well prove to be not only very practical and pleasant, but also feasible and cost effective.

Acknowledgement

We would like to thank all medical students who have participated in the command centre project. These students are: Maayke de Koning, Sophie ter Haar, Joëlle de Ruijter, Mees Bruin, Ilse de Smit, Dagmar Brouwer, Milou Buijk, Inge van Gool, Imara Vliegen, Wouter Pijper, Lieke ter Welle, Anne Leerling, Loes Derkink, Amber-Sarai Stalman, Lisa van der

Velde, Elvira Hollander, Fleur Trimpert, Eva Wassenberg, Kim Jochems, Veerle Roukens, Thessa Hofman, Vera van Huisstede and Elise Roeleveld.

Disclosure

None of the authors declare a conflict of interest. No funding or financial support was received.

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