Just-in-Time Training in a Tertiary Referral Hospital During the COVID-19 Pandemic in Italy

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Abstract

The COVID-19 pandemic is threatening health systems worldwide, requiring extraordinary efforts to contain the virus and prepare health care systems for unprecedented situations. In this context, the entire health care workforce must be properly trained to guarantee an effective response. Just-in-time training has been an efficient solution for rapidly equipping health care workers with new knowledge, skills, and attitudes during emergencies; thus, it could also be an effective training technique in the context of the response to the COVID-19 pandemic. Because of the unexpected magnitude of this health crisis, the health care workforce must be trained in 2 areas: (1) basic infection prevention and control, including public health skills that are the core of population-based health management and (2) disaster medicine principles, such as surge capacity, allocation of scarce resources, triage, and the ethical dilemmas of rationing medical care. This Perspective reports how just-in-time training concepts and methods were applied in a tertiary referral hospital in March 2020, during the COVID-19 pandemic in Northern Italy, one of the hardest hit places in the world.

The COVID-19 just-in-time training was designed to provide hospital staff with the competencies they need to work proficiently and safely inside the hospital, including an understanding of the working principles and standard operating procedures in place and the correct use of personal protective equipment. Moreover, this training was intended to address the basic principles of disaster medicine applied to the COVID-19 pandemic. Such training was essential in enabling staff to rapidly attain competencies that most of them lacked because disaster medicine and global health are not included in the curricula of Italian medical and nursing schools. Although a formal evaluation was not performed, this is a useful example of how to create just-in-time training in a large hospital during a crisis of an unprecedented scale.

In this brief Perspective, we describe the just-in-time training implemented in the Maggiore della Carità University Hospital (MCUH) in Novara, Italy, during the COVID-19 pandemic.

Training Needs

The MCUH is the second largest tertiary referral hospital in the Piedmont region, one of the most affected regions in Northwest Italy. Before the admission of the first COVID-19-positive patients, we designed and delivered an initial just-in-time training for emergency and intensive care staff to improve their technical skills in the use of appropriate personal protective equipment (PPE). While COVID-19 was rapidly spreading in the...
region, the activation of the hospital contingency plan for a massive influx of patients resulted in the progressive transformation of hospital wards into intensive and non-intensive care units for COVID-19–positive patients, each with their own cohorts. At the peak of admissions, the emergency department and the intensive care unit expanded their operational capacity, and more than 200 COVID-19 beds were made available by converting orthopedic and cardiac surgery, internal medicine, cardiology, neurology, and otorhinolaryngology wards into COVID-19 treatment units. More than 300 health care workers were asked to change roles and tasks to staff these newly opened hospital units. Moreover, since the MCUH is a tertiary referral center, emergency procedures, nondeferrable oncological interventions, and maternal and child health services were maintained and the staff involved in managing non-COVID-19 patients were required to apply the same basic infection prevention and control (IPC) principles as those working with COVID-19 patients to prevent the dissemination of the disease.

In this scenario, we recognized that a more comprehensive COVID-19 just-in-time training was essential to enable the entire MCUH staff to rapidly attain competencies in areas in which most had no experience. Furthermore, we strongly believed that the unexpected magnitude of the crisis generated by the pandemic required not only teaching our staff IPC and public health skills that are the core of population-based health management but also familiarizing them with disaster medicine principles, such as surge capacity, and allocation of scarce resources, triage, and the ethical dilemmas of rationing medical care.

Learning Objectives and Training Program

We designed the COVID-19 just-in-time training to provide the entire hospital staff with a common background, the competencies, and the proper attitude needed to (1) proficiently and safely work inside the MCUH during the COVID-19 pandemic, (2) understand the working principles and the standard operating procedures in place at the MCUH, (3) accurately apply and safely remove PPE, and (4) understand basic principles of disaster medicine and public health emergencies applied to the COVID-19 pandemic. At the end of the training, participants met the needs of the MCUH for qualified hospital-based health care personnel: They had basic IPC competencies, an awareness of disaster medicine, and were ready to respond to the COVID-19 pandemic.

The most important learning objective was to deliver practical information to improve the trainees’ awareness of public health management, their technical performance, and their attitude with respect to working safely and effectively in a public health emergency, rather than to deliver mere theoretical knowledge on the subject matter.

In Chart 1, we report the curriculum for the COVID-19 just-in-time training delivered at the MCUH. We ran this 4-hour training every afternoon for 3 weeks starting on March 9, 2020, and we trained approximately 200 hospital staff. Every training session was open to a maximum of 30 participants and took place in the main hospital conference hall (around 100 seats) to ensure social distancing.

Lessons Learned

Just-in-time training has already proved to be an efficient technique during sudden-onset disasters, when it is essential that information, instructions, and guidelines specific to the event be provided exactly when needed, in other words immediately before the deployment of first responders. This technique also serves to refresh and update responders’ capability and to address specific training needs relevant to the operational context. Weiner and Rosman have emphasized that just-in-time training is particularly effective in enhancing responders’ situational awareness and personal preparation and resiliency.

In our previous experience during the response to the 2014 Ebola outbreak in West Africa, we applied an innovative just-in-time training methodology using virtual reality simulation. We demonstrated that virtual reality simulation was effective in increasing the safety of staff before they took on the risk of working in an Ebola treatment center.

Unfortunately, the rapid spread of COVID-19 in Northern Italy meant we had to train the MCUH health care workers in a matter of days; in light of the urgent need to respond, we could not devote time to developing a virtual reality scenario at that point. However, at the time of this writing, we are working on creating an online virtual reality simulation module to train health care staff virtually, especially those in low-resource settings.

At the beginning of the COVID-19 outbreak in Northern Italy, records from China showed a high risk of secondary infections among health care workers. Therefore, we immediately recognized the need to rapidly train the health care workers at our hospital in basic operational public health skills to ensure that they followed safety procedures and used PPE correctly. This training was also designed to instill confidence in any health care workers who felt uneasy about treating a highly transmissible infectious disease for which there is no vaccine or specific therapy. On May 29, 2020, 3 months after the beginning of the outbreak in Italy, nearly 28,000 Italian health care workers had contracted COVID-19 and 167 had died. These numbers reinforce the importance of implementing training to address competencies that we knew were beyond the experience of most of our colleagues. Moreover, our idea to address disaster medicine and population-based health management concepts was also crucial given that the rapid spread of COVID-19 had pushed the MCUH contingency plan to the limit, creating a crisis management condition that was leading to the collapse of all the major public health protections that society depends on daily. This was the first time that the majority of the MCUH’s health care workers had responded to a large-scale public health emergency or a disaster. Regrettably, most of them never studied disaster medicine or global health in medical or nursing schools, apart from those medical doctors who graduated after 2004 in Novara, where they attended our mandatory disaster medicine course during their final year of medical school.

Despite the increasing risk of disasters and health crises worldwide, Italy is not alone in failing to equip the new generation of health care workers with basic education in disaster medicine and global health and specifically...
Chart 1
Overview of a COVID-19 Just-in-Time Training Curriculum for Health Care Workers Used in an Italian Tertiary Referral Hospital During the COVID-19 Pandemic, March 2020

| Module | Learning objectives | Comments and lessons learned | Trainee characteristics observed during the session |
|--------|---------------------|-----------------------------|---------------------------------------------------|
| Introduction to COVID-19 policy, procedures, and protocols at the MCUH (Classroom lecture, 90 min) | • To understand how COVID-19 is transmitted | • Familiar with routes of transmission, clinical presentation, and epidemiology of COVID-19 |
| | • To recognize the signs and symptoms of COVID-19 | | |
| | • To understand the epidemiology and case definitions of COVID-19 | | |
| | • To know ways to protect oneself and one’s colleagues, patients, and family from COVID-19 | | |
| | • To be familiar with the main actors for COVID-19 coordination mechanisms in Italy and in the Piedmont region | | |
| | • To know the safety and security protocols in place at the MCUH | | |
| | • To know the policy and procedures in place at the MCUH | | |
| | • To follow all disinfection, waste management, and cleaning protocols at the MCUH | | |
| | • To comply with MCUH policies and practices with respect to code of conduct, health and safety, equal opportunity, and other relevant policies and procedures | | |
| Introduction to full PPE and donning and doffing PPE (Practical session, 60 min) | • To be familiar with all parts of PPE | • Seemed unfamiliar with COVID-19 response mechanisms in Italy and in the Piedmont region in particular |
| | • To understand the need to wear PPE | | |
| | • To know how to don PPE and practice doing so | | |
| | • To know how to doff PPE and practice doing so | | |
| | • To understand the decontamination process | | |
| Principles of disaster medicine and public health emergencies (Discussion-based exercise, 30 min) | • To understand the concepts of hospital surge capacity in terms of staff, stuff (i.e., PPE, pharmaceuticals, ventilators, beds, oxygen, and other supplies), and structure (i.e., the physical structure and the management infrastructure), and the importance of allocating scarce resources | • Given trainees’ unfamiliarity with this topic and lack of experience with large-scale public health emergencies, this module was vital in enabling trainees to better understand the crisis in the hospital and to accept that providing the normal quality of care might be impossible |
| | • To recognize the value of triage and the difficulties in dealing with the ethical challenges of distributing limited medical resources | • Discussion-based exercises drawing on trainers’ experiences in disasters (e.g., 2014 Ebola outbreak, 2010 Haiti earthquake) provided practical suggestions in response to the ethical challenges of allocating hospital resources |

Abbreviations: MCUH, Maggiore della Carità University Hospital; min, minutes; PPE, personal protective equipment.

*Approximately 200 hospital staff took this 4-hour training, which was offered every afternoon for 3 weeks starting on March 9, 2020.
global public health. Unfortunately, the teaching of disaster medicine is underrepresented in several countries worldwide. The COVID-19 pandemic should stimulate the academic community to consider introducing at least some basic disaster medicine and global health teaching in medical and nursing school programs.

Given the strong, traditional public health measures in place during the COVID-19 pandemic, e-learning has been the favorite training methodology worldwide. However, taking the proper precautions and safety measures, we decided to use a classroom-based approach to ensure that participants could practice donning and doffing PPE and could discuss any doubts directly with us. For those unable to be present or who wanted a review, we also offered an e-learning version of the training on the official MCUH e-learning platform together with the online courses provided by the World Health Organization and the Italian Higher Institute of Health. As in any good operations-level training, we trained health care staff following specific standard operating procedures, which we—members of the hospital crisis unit—had authored. This approach maximized the impact of the training and significantly reduced the risk of incomplete or unevenly distributed education among the hospital health care workers. In Chart 1, we report lessons learned during the implementation of each training module, which could facilitate the delivery of such COVID-19 just-in-time training elsewhere or the use of a similar curriculum for future public health emergencies. Even though we were not able to assess outcomes or evaluate the quality of the training, we strongly believe that this is a useful example of how to create a just-in-time training in a large hospital during a crisis of an unprecedented scale.

Conclusions

An effective response to the COVID-19 pandemic includes appropriate education and training of health care workers so that they will learn operational public health skills essential for infection control and management of disease treatment while reducing their risk of exposure. Just-in-time training has been recognized by disaster responders as a valid solution for rapidly acquiring new information and competencies just before deployment. In this Perspective, we reported an example of just-in-time training delivered in a tertiary referral hospital during the COVID-19 pandemic in Italy. The curriculum included not only disease epidemiology, IPC protocols, and application of PPE but also basic principles of disaster medicine and public health emergencies. Since Northern Italy was one of the worst-stricken places in the world at the time of this writing, we strongly believe that sharing our experience is key to supporting other countries in their advance preparations.

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