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Deployment of information technology to facilitate patient care in the isolation ward during COVID-19 pandemic

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Dear *JAMIA* Editors,

As coronavirus disease 2019 (COVID-19) has become a global pandemic, we read with great interest the perspective by Turer et al¹ on electronic personal protective equipment (ePPE). While they defined ePPE as “telemedicine tools used by on-site emergency providers to evaluate patients physically in the emergency department (ED) to avoid physical proximity,” we would like to share our hospital’s experience regarding the utility of ePPE in the negative-pressure isolation ward.

Information technology has been implicated in infection control measures in various aspects.^{2,3} In Taiwan, patients with probable and confirmed COVID-19 were admitted into negative-pressure isolation wards. We have deployed several strategies using information technology to facilitate patient care in the negative-pressure isolation ward during the COVID-19 pandemic.

With an increasing number of cases, the demand for N95 respiratory masks and PPE may rapidly exceed the supply, and critical supply shortages occur in many parts of the world.⁴ Donning and removing PPE is also time-consuming and brings much stress to the healthcare staff. Therefore, reducing the need of entering the

negative-pressure isolation rooms is imperative, and we apply several strategies in our hospital. By optimizing the workflow, the nursing staff give medications and perform nursing care while delivering breakfast, lunch, and dinner. The medications are simplified, and those with once-daily dosing are preferred. In addition to the video monitoring equipment, we introduce a continuous contact-free monitoring system in the isolation ward, which monitors the heart rate, respiration, and postural status using a single-frequency continuous-wave radar and monitors the body temperature using an infrared thermal sensor.⁵ The nursing staff are able to get real-time information about the vital signs and conditions of the patients, so we are able to limit the times that the nursing staff enter the rooms to about 3 times daily. Some patients develop respiratory failure and require mechanical ventilation. The monitoring and control modules of ventilators are set outside the isolation room, connecting to the rest of the ventilator (the pneumatic system) in the room with an extension wire or Bluetooth technology (Some ventilators can even upload the monitoring data to the cloud via Wi-Fi). Without wearing PPE, respiratory therapists and physicians are able to have the monitoring data in hand and adjust the ventilator settings outside the isolation room.

Psychological care is provided by psychiatrists via a teleconference system. Although the patients can talk with their family and friends with videotelephony software, a few patients may still develop psychological problems such as anxiety, helplessness, and emotional distress in the isolation rooms. Through regular talks with the patients via the teleconference system, the psychiatrists can help support the patients' mental health remotely. This also avoids the unnecessary needs of extra nursing care, reducing the consumption of PPE.

We adopted an electronic signature system so that the patients can sign informed consent forms (ICFs) on a tablet in their rooms. If paper-based ICFs were used, the signed ICF would be removed from the room after patient discharge and disinfected with ultraviolet light. With the electronic signature system, the signed ICFs are timely uploaded to the hospital information system.

In summary, with the assistance of modern information technology, we can provide better and efficient care to patients with COVID-19 in the negative-pressure isolation ward, with limited consumption of epidemic prevention materials, especially PPE. Our experience demonstrates that ePPE could be applied in many aspects of the healthcare system.

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AUTHOR CONTRIBUTIONS

M-JT conceived the strategy, drafted the manuscript, and edited and approved the manuscript for submission. W-TT, H-SP, C-KH, and A-NC

deployed the strategy and edited and approved the manuscript for submission. S-FJ, M-KH, and M-FH conceived the strategy and edited and approved the manuscript for submission.

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CONFLICT OF INTEREST STATEMENT

None declared.

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