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MINIREVIEWS

Holistic care model of time-sharing management for severe and critical COVID-19 patients

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Abstract

The rapid global outbreak of coronavirus disease 2019 (COVID-19) and the surge of infected patients have led to the verge of exhaustion of critical care medicine resources worldwide, especially with regard to critical care staff. A holistic care model on time-sharing management for severe and critical COVID-19 patients is proposed, which includes formulation of individualized care objectives and plans, identification of care tasks in each shift and making detailed checklist, and management of quality of care. This study was conducted in the COVID-19 treatment center of Harbin, Heilongjiang Province. The data collected from the treatment center were recorded and analyzed. From the results we can deduce that it is especially suitable for non-intensive care unit (non-ICU) nurses to adapt care management mode of ICU as soon as possible and ensure the quality and efficiency of care during the epidemic. The holistic care model on time-sharing management for severe and critical cases with COVID-19 proposed based on our daily work experiences can assist in improving the quality and efficiency of care, thus reducing the mortality rate of patients in ICU.

Key Words: Holistic care model; Time-sharing management; COVID-19; Quality of care; Efficiency of care; Hierarchical management

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Core Tip: The rapid global outbreak of coronavirus disease 2019 and the surge of infected patients have made critical care medicine resource on the verge of exhaustion around the world, especially critical care nurses. Therefore, a large number of non-intensive care unit (non-ICU) nurses play the role of professional ICU nurses after short-term specialized training. We propose a holistic care model of time-sharing management for severe and critical cases from our daily work experiences in this article, which will be conductive to improving the quality and efficiency of care and thus reducing mortality in ICU.

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INTRODUCTION

Coronavirus disease 2019 (COVID-19) is caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) infection and it mainly spread by human-to-human transmission through close contacts *via* droplets, aerosols, and contaminated hands or surfaces[1-4]. It presents varied clinical manifestations, ranging from asymptomatic carriers to pneumonia, acute respiratory distress syndrome, septic shock, coagulation dysfunction, and even multiple organ dysfunction syndrome[5-7]. Till date, there has been no effective vaccine or targeted intervention for SARS-CoV-2 infection, but only a supportive therapy[8-10]. Approximately 15%-20% of patients with SARS-CoV-2 infection develop into severe and critical disease[11,12], and so a series of advanced medical technologies and measures, including high-flow nasal cannula, non-invasive mechanical ventilation, invasive mechanical ventilation, prone position ventilation, blood purification, critical care ultrasonography, intra-aortic balloon pump, hemodynamic monitoring, extracorporeal membrane oxygenation, and multidisciplinary cooperation, are required. With the swarming of COVID-19 patients, the shortage of critical care staff has become much more apparent[13], especially experienced critical care personnel. In our COVID-19 treatment center of Harbin, the ratio of nurses to patients is 1:2 for severe COVID-19 patients, while it is 1:1 for critical cases. The shortage of critical care nurses has been an urgent issue since the outbreak, and this is supported by the fact that the proportion of nurses in the national medical teams supporting Hubei Province has exceeded 60%.

In addition, the three-grade prevention measures are quite indispensable for critical care staff to fight against COVID-19 and avoid infection due to high transmissibility of SARS-CoV-2[14-16]. Prolonged care and treatment for severe and critical patients with higher viral shedding represents a substantially higher exposure risk for critical care staff[17]. The physical and psychological health of critical care staff is considered to be the utmost for heavy and cumbersome three-grade preventive measures[17,18], seriously limiting the working hours and further exacerbating the shortage of the personnel. It is necessary to pay more attention to the mental health of critical care staff under such enormous pressure, and this is because serious conditions can induce different degrees of mental health and sleep problems, affect quality and efficiency of work, and also have a long-term effect on their own health[19-21]. In our COVID-19 treatment center, critical care nurses are shifted and handed-over to other nurses after every 4 h, and this is in line with other treatment centers around the country, and is only one-third of the normal daily working hours. Therefore, a large number of non-ICU nurses play the role of professional ICU nurses after short-term specialized training. How to make these non-ICU nurses more familiar with the care mode of ICU as soon as possible and ensure the quality and efficiency of care for severe and critical cases is a practical problem that urgently needs to be resolved.

To better address this issue, a holistic care model of time-sharing management for severe and critical COVID-19 patients is proposed based on our daily work experiences in this article, which assists in improving the quality and efficiency of care and thus reducing the mortality rate of patients in ICU.

Formulating individualized care objectives and plans

In our COVID-19 treatment center, only severe and critical cases are admitted, and the total case number is 61. A total of 225 nurses from eight hospitals in Heilongjiang Province work in the first-line of clinical care, including 137 professional ICU nurses and 88 non-ICU nurses. According to the comorbidities and severity of COVID-19, individualized care objectives and plans have been developed, and hierarchical management is carried out (Table 1), which in turn facilitates more reasonable utilization of severely inadequate critical care resources. Heart rate, respiratory rate, blood pressure, and mean oxygen saturation as routine vital signs are obtained from both severe and critical COVID-19 patients in real time. It is a very intuitive approach to represent COVID-19 patients based on different disease severities by hanging different color signs on eye-catching location. Comorbidities of each patient and optimal target values for management are written on the prompting board beside the bed, so that critical care nurses can quickly understand the condition and master the key of care as well as action.

Identifying care tasks in each shift and making detailed checklist

The daily care plan is divided into six shifts on average, and the care tasks are identified in each shift. An absolute average is practically impossible. The workload of night shift is usually less than that of day shift due to well-known reasons. A detailed checklist is made for each shift to implement, avoid negligence of care, and facilitate frequent shift handover (Table 2 and 3). Through these detailed checklists, both professional ICU nurses and non-ICU nurses can understand the work content of each shift as soon as possible and complete the care tasks within the timeframe.

Controlling the quality of care

There is never a lack of good care model in clinical practice, but how to implement them strictly remains a big challenge. Based on our experience, there are three methods to provide supervision for the quality of care in severe and critical COVID-19 patients. First, critical care nurses who finished the care tasks of the previous shift have to face supervision of the succeeding ones. Second, each group of critical care nurses has a care team leader, who will be in charge of checking as well as completing the checklist. Care team leaders are usually experienced senior ICU nurses who distribute and coordinate the care work for each group to ensure smooth implementation of pre-defined care plan within 4 h. Lastly, the on-duty nurses who are in charge of ward care management are responsible for formulating individualized care objectives and plans, guaranteeing smooth completion of 24-h care plan, evaluating care effect, and timely giving of feedback to adjust care objectives and plans. Multifaceted supervision and management enable implementation of the holistic care model of time-sharing management successfully without becoming a dead letter.

CONCLUSION

The rapid spread of COVID-19 has given rise to a huge threat to the health-care system worldwide. Presently, epidemic prevention and control in China have been on the verge of victory, but in some other countries the situation is much worse. Our holistic care model of time-sharing management for severe and critical COVID-19 patients is of great practical significance for them. It is especially suitable for non-ICU nurses to adapt the care management mode of ICU as soon as possible and ensure the quality and efficiency of care during the epidemic, which may be an important cornerstone to overcome the epidemic.

Table 1 Hierarchical management for severe and critical coronavirus disease 2019 patients

	Severe patients	Critical patients
Temperature	Six times a day	Real-time monitoring
Atomization inhalation	Two times a day	Three times a day
Chest physiotherapy	Two times a day	Three times a day
Prevention of deep vein thrombosis	Two times a day	Three times a day
Arterial blood gas analysis	Three times a day	Six times a day or according to the actual situation
Calculating liquid equilibrium	Two times a day	Six times a day

Table 2 A detailed checklist in each shift for severe coronavirus disease 2019 patients

	08:00-12:00	12:00-16:00	16:00-20:00	20:00-00:00	00:00-04:00	04:00-08:00
Temperature	10:00	14:00	18:00	22:00	2:00	6:00
Atomization inhalation	8:30		16:30			
Chest physiotherapy	9:00		17:00			
Prevention of deep vein thrombosis		13:30		22:00		
Arterial blood gas analysis		14:30		22:30		6:30
Calculating liquid equilibrium			20:00			8:00

Table 3 A detailed checklist in each shift for critical coronavirus disease 2019 patients

	08:00-12:00	12:00-16:00	16:00-20:00	20:00-00:00	00:00-04:00	04:00-08:00
Temperature	Real-time monitoring					
Atomization inhalation	8:30	12:30	16:30			
Chest physiotherapy	9:00	13:00	17:00			
Prevention of deep vein thrombosis		13:30		22:00		7:30
Arterial blood gas analysis	11:00	15:00	19:00	23:00	3:00	7:00
Calculating liquid equilibrium	12:00	16:00	20:00	00:00	4:00	8:00

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