Since January 2020 Elsevier has created a COVID-19 resource centre with free information in English and Mandarin on the novel coronavirus COVID-19. The COVID-19 resource centre is hosted on Elsevier Connect, the company's public news and information website.

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COVID-19: Initial Perioperative and Perianesthesia Nursing Response in a Military Medical Center

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A B S T R A C T

Nurses have historically led efforts to improve the health of populations while simultaneously and unselfishly providing care during pivotal moments of national need. The COVID-19 pandemic has placed an unprecedented strain on the US health care system, including severe shortages of hospital beds, supplies, equipment, pharmaceuticals, and healthy frontline clinicians. Perioperative and perianesthesia leaders and clinicians have unique opportunities to provide patient care during the COVID-19 crisis. In this manuscript, we describe the initial changing roles and contributions of perioperative and perianesthesia registered nurses during the COVID-19 pandemic and share recent experiences from a military medical center. Perioperative and perianesthesia nurses are vital to the overall nursing viability of the health care system, as they possess the requisite knowledge and skills to provide expert clinical care in many hospital settings and meet the demands of a global pandemic.

Throughout history, nurses have answered the call to lead and serve in times of great public need. With a lineage reaching back to the American Revolutionary War, nurses have courageously provided patient care during wartime, terrorist attacks, natural disasters, and global pandemics.[1] Nurses are essential in times of crisis because of their education and experience in triage, assessment, emergency care, ground and air patient evacuation, physical and psychosocial support and recovery, disaster management, disease prevention, and nursing surveillance. Thus, nursing care during epidemic and pandemic crises is one of the best predictors of patient outcome.[2]

Military nursing has a storied and revered past, with military nurses providing life-saving care in response to virtually every United States (US) military conflict. During Operations Enduring Freedom and Iraqi Freedom, military nurses were a vital part of a joint military effort in which case-fatality rates were the lowest in US warfare history.[3] Additionally, military nurses have provided care during pandemic crises, including the 1918 influenza pandemic, during which more than 200 Army nurses died.[4]

Coronavirus disease 2019 (COVID-19) is caused by severe acute respiratory syndrome coronavirus 2. Common symptoms, which include cough, shortness of breath, fever, fatigue, body aches, loss of appetite, and sore throat, appear 2 to 14 days after exposure and range from mild to severe (see coronavirus.gov for updated information).[5]

In November 2019, the first cases of COVID-19 were detected in Wuhan, China. By March 11, 2020, it had spread to 114 countries, prompting the World Health Organization to declare it a pandemic. By mid-April, at least 210 countries/regions had patients with COVID-19, and more than 610,000 people in the US, including 2,986 US military members, were infected.[6]

Most patients with COVID-19 do not require hospitalization. Nonetheless, the COVID-19 pandemic has placed an unprecedented

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strain on the US, military, and VA health care systems,[7] including severe shortages of hospital beds,[8] supplies such as personal protective equipment (PPE)[9] and diagnostic testing kits,[10] equipment like ventilators,[11] pharmaceuticals such as chloroquine and remdesivir, sedatives and anesthetics such as propofol, ketamine, midazolam,[12] and healthy frontline clinicians.[13]

Many hospitals are experiencing COVID-19–induced financial distress or crisis.[14] Widespread PPE use, frequent diagnostic imaging, stringent cleaning protocols, low nurse-to-patient staffing ratios, and overtime pay have increased costs. Conversely, revenue has declined due to a low census of non-COVID-19 patients, canceled elective surgeries and outpatient preventive health screening tests, and care for patients without medical insurance.

The rapid surge of inpatients with COVID-19 has overwhelmed some health care systems. Given the actual or potential demand for expanded intensive care unit (ICU) capacity, health care leaders have rapidly bolstered COVID-19 capabilities by converting regular hospital wards, postanesthesia care units (PACUs), and operating rooms (ORs) into contingency ICU beds.[15] Some created screening and treatment areas in tents, hospital cafeterias, and parking garages. Active duty, Reserve, and National Guard military members and two Navy hospital ships deployed to augment clinicians in cities such as Seattle and New York City.

Health care clinicians are on the front line battling COVID-19. The purpose of this manuscript is to describe the changing roles and contributions of perioperative and perianesthesia registered nurses during the COVID-19 pandemic and share recent experiences from a military medical center.

Changing Roles for Perioperative and Perianesthesia Nurses

Nationally, the US government relaxed regulations to, among other things, increase the workforce during the COVID-19 pandemic.[16] Registered nurses, advanced practice registered nurses such as certified perioperative clinical nurse specialists and certified registered nurse anesthetists, and other clinicians may practice to the fullest extent possible, in accordance with emergency preparedness plans.

Perioperative and perianesthesia leaders and clinicians have unique opportunities to provide patient care during the COVID-19 crisis. They know the nursing process and possess the clinical, critical thinking, and clinical judgment skills needed to provide competent patient-centered care in varied settings. Many have prior critical care or medical-surgical nursing experience. Nonetheless, some, especially those resuming employment after a leave of absence, may choose to supplement their previous education and experience and thus be better prepared to work outside perioperative settings. During the past 2 months, professional nursing organizations (eg, American Society of Perianesthesia Nurses, Association of perioperative Registered Nurses, and American Association of Critical-Care Nurses, Emergency Nurses Association, American Nurses Association), the Defense Health Agency, the US Army Medical Command, universities and colleges, and health care agencies began offering an abundance of online refresher courses, webinars, just-in-time training, and reference materials, most of which are self-paced, and either free or modestly priced.

Due to canceled elective surgeries and high demand for critical care services, perioperative and perianesthesia nurses are mobilizing from the PACU and OR to screen patients in triage tents outside the hospital, open temporary medical-surgical units in cafeterias or convention centers, and work in emergency departments and ICUs. Perianesthesia nurses who provide PACU Phase I care, for example, are particularly qualified to care for mechanically ventilated patients, administer vasoactive medications, and perform hemodynamic monitoring in a critical care environment.[17]

Novel ICU staffing models may be required to ensure that all patients receive required care. The Society of Critical Care Medicine recommends a tiered staffing strategy where non-ICU nurses work in pairs or teams with experienced clinicians.[18] Perioperative and perianesthesia nurses can provide general patient care such as administering medications, monitoring laboratory results, delivering enteral nutrition, and providing psychosocial care, freeing skilled ICU clinicians to manage multiple patients who require advanced mechanical ventilation or extracorporeal membrane oxygenation.[19]

According to the American College of Physicians, health care clinicians must treat patients and families with dignity and respect, and patients and families should actively partner in all aspects of their care.[20] There is increasing evidence demonstrating that patient and family engaged care is associated with improved health outcomes.[21] To hamper the spread of COVID-19, most hospitals either limited visitation to 1-2 family members or instituted a no visitation policy. Although limiting COVID-19 transmission, the policies distress both patients and family members and make it difficult for busy providers to communicate regularly and effectively with family members.

Recognizing the important need for clinicians to communicate with patients and families during the COVID-19 pandemic, the Department of Health and Human Services temporarily relaxed rules for sharing patient information with family members and for using nonpublic facing remote communications technologies.[22] Consequently, perianesthesia and perioperative nurses may now use popular applications such as Zoom, Skype, Google Hangouts, and FaceTime to communicate with family members of patients who require emergency or emergent surgery or are admitted for other reasons.[23]

Experiences From a Military Medical Center

The 167-bed military medical center is located in the southeastern US and has an OR with 11 surgical suites, which performs more than 11,000 annual surgeries with 12 surgical specialties. As is standard for Department of Defense (DOD) facilities, the medical center has a Hospital Incident Command System which allows leaders to implement its Contingency and Crisis Standards of Care, expand or restrict critical resources, deliver just-in-time training, facilitate patient flow and movement of critical equipment, and liaise with the community regarding health care utilization.[24]

Aligning with national recommendations,[25] the DOD directed military treatment facilities to postpone all nonessential surgeries and procedures, thereby enhancing the safety of medical personnel, prolonging supplies of PPE, and ensuring the availability of military medical personnel to provide care where needed.[26] Surgeons continued to perform emergency surgical procedures and operations necessary to sustain deployment readiness. Thus, some perioperative and perianesthesia nurses continued their usual work.

Medical center leadership directed changes to the physical layout of the OR and the PACU. A section of OR suites, with sterile core access, was converted to negative pressure. Temporary wall barriers were erected in the PACU to facilitate surgical cohorting by COVID-19 status.

Perioperative and perianesthesia nurse administrators focused on the flow of COVID-19 and non-COVID-19 patients through the perioperative environment and revised other patient care policies. For example, only two people are present in the room during airway manipulation, and other clinicians must wait outside the

room for approximately seven room air exchange cycles (21 minutes) before re-entering the room.[27]

Senior hospital executives consulted with perioperative and perianesthesia nurses to develop a Concept of Operations Plan that included a surge plan and interdisciplinary staffing model. Perioperative and perianesthesia nurse leaders converted OR suites to adjunct critical care rooms and developed a tiered staffing strategy, forming and scheduling teams of perioperative nurses, certified registered nurse anesthetists, and ICU nurses. Perioperative nurses can independently provide all care to lower acuity patients. Beyond the OR, a perioperative nurse led efforts to reopen previously used clinical space into a COVID-19 medical-surgical unit, expanding inpatient capacity.

To prepare for patients with COVID-19 and atypical health care operations, all perioperative and perianesthesia nurses attended "just-in-time training." Given that military nurses must maintain competency in medical-surgical and emergency-trauma nursing, completing just-in-time training is natural for them. Experienced nurses assigned to the medical center's education department, including master's prepared clinical educators and clinical nurse specialists, reviewed the DOD COVID-19 Practice Management Guide (originally published on March 23, 2020),[24] published COVID-19 evidence, guidance from agencies such as the Centers for Disease Control and Prevention and Centers for Medicare & Medicaid Services and military guidance, developed the training curriculum and prepared lesson plans, and delivered training. Training re-familiarized perioperative and perianesthesia nurses about nursing care, such as medication administration, point-of-care testing, catheter care, antimicrobial stewardship, specimen collection, administration of oxygen, and documentation. Training also informed them about COVID-19-specific considerations such as basic room setup, enhanced droplet precautions, high-flow nasal cannula therapy, mechanical ventilation, neuromuscular blockade, and prone positioning. Educators used a variety of training delivery modalities, including instructor-led training, hands-on learning, and video-assisted learning. Instructors assessed learning efficacy through visual confirmation, return demonstration, teach-back, and written tests. The training feedback was predominately favorable, and nurses reported feeling comfortable providing care using a tiered staffing strategy.

As military members and federal service employees, perioperative, and perianesthesia nurses eagerly supported the COVID-19 response mission, and supervisors did not reduce their hours. Leadership selected clinicians for cross-training to other sections based on their level of experience, identified health risk factors, and desire to contribute. At military screening and testing sites, they used a questionnaire to screen and assess patients, measure body temperature, collect clinical specimens from persons who exhibited COVID-19 symptoms, and educate patients about COVID-19 self-care, and actions to take if symptoms worsened. Perianesthesia nurses cross-trained and provided care to both COVID-19 positive and negative patients in the inpatient medical-surgical, intensive care, stepdown, and medical telemetry units. Their skills complemented those of unit nurses and achieved optimal nurse staffing. In addition, perioperative and perianesthesia nurses helped sustain the 24-hour COVID-19 Nurse Advice Line and manage outpatients who were awaiting test results[28] by assessing patient symptoms, reinforcing quarantine and care instructions, informing persons under investigation of test results, determining return to work status, and referring patients for follow-up medical care.

Perioperative and anesthesia leadership were also involved in the decision to purchase two ultraviolet germicidal irradiation (UVGI) machines. The UVGI machines were primarily used to disinfect and terminally clean rooms that COVID-19 positive patients or patients under investigation for COVID-19 occupied and decontaminate N95 particulate filtering facepiece respirators so they could be reused.[29-31] In accordance with best practice guidelines[30,31] and scientific evidence,[29] perioperative nurses developed processes and policy regarding UVGI decontamination, trained staff, and implemented UVGI across the medical center. Additionally, perioperative nurses oversaw a program to plan and optimize PPE use for the medical center and the greater military community. Although not standard practice, during a crisis condition like the COVID-19 pandemic, decontamination and reuse of N95 masks prevented the medical center from exhausting its supply of this vital resource and enabled it to maintain its required level of wartime readiness materials.

Lessons Learned

The most powerful lesson learned is that perioperative and perianesthesia nurses have the requisite knowledge and skills to provide expert clinical care in many hospital settings and meet the demands of a global pandemic. Perioperative and perianesthesia nurses were affable to duty assignment changes, which sometimes required additional training, enabling them to work in different or higher levels of care. Nursing is a calling,[32] and it was refreshing to see perioperative and perianesthesia nurses rise to new challenges, adapt to changes outside of their norm, and meet the needs of the greater good. Although specialty trained to provide care to surgical patients, organizations should view perioperative and perianesthesia nurses as potent enablers to the overall nursing viability of the health system. Furthermore, we learned that for operational success, the hospital and nursing response must be flexible to policy changes, scientific advances, and increased demand. Hospital leadership instituted rapid changes across the medical center, based on the latest evidence, which potentially saved lives and reduced transmission of COVID-19. Finally, clear lines of communication between leadership and staff are essential to promote shared understanding,[33] increase engagement, and reduce clinician stress. Nursing leadership was very involved in the COVID-19 response, and steady communication with clinical staff helped influence a positive culture that embraced change and potentially improved care.

Conclusion

Nurses have historically led efforts to improve the health of populations while simultaneously and unselfishly providing care during pivotal moments of national need. In this manuscript, we described the changing roles and contributions of perioperative and perianesthesia registered nurses during the COVID-19 pandemic and shared recent experiences from a military medical center. Perioperative and perianesthesia nurses contributed to the overall response through planning and influencing policy, expanding critical services/bed capacity, training staff, introducing novel methods to reduce PPE burn rates, cross-training to other clinical areas, leveraging communication technology to communicate with family members, and continuing to provide expert surgical patient care. Although the national pandemic has changed routine health care operations, perioperative and perianesthesia nurses are vital to the overall nursing viability of the health system, as they possess the requisite knowledge and skills to provide expert clinical care in many hospital settings and meet the demands of a global pandemic.

The COVID-19 pandemic is a rapidly evolving situation requiring hospitals and health care agencies as well as clinicians to adjust strategies based on scientific developments, patient demand, health care capacity, and available resources. For the latest clinical

information, we recommend the comprehensive COVID-19 tool kits that the American Society of Perianesthesia Nurses,[34] and the Association of Perioperative Registered Nurses [35] developed to support perioperative and perianesthesia nurses.

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