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PERSPECTIVE PIECE

The Nurse Practitioner in the Time of COVID

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Introduction

Like all health care workers, nurse practitioners (NPs) have been working in unprecedented times. In both primary and acute care settings, NPs are on the front-line identifying and caring for patients with COVID-19. The purpose of this article is to provide a perspective of how COVID-19 has affected the practice of nurse practitioners in both primary and acute care settings. This includes a review of how we got to this point, the pathophysiology of COVID-19 and the changes that have occurred in daily practice. We will also speak to what the future may look like in both care settings.

Approach

The novel coronavirus pandemic has been challenging at all levels of healthcare. It appears there is something new about the COVID-19 outbreak every day and, the more we learn, the more we realize how little we understand this disease.

It is clear that this is not just like the flu. The first confirmed U.S. case of COVID-19 was January 21, 2002. The first 1000 deaths were reported by March 26 and by March 28 that number had doubled. Less than a month later, the death toll in the U.S. surpassed 50,000.[1] Before Memorial Day, the death toll in the U.S. surpassed 92,000. According to the Johns Hopkins COVID-19 dashboard, in one 90-minute time span, the number of COVID-19 cases worldwide increased by 3,173, U.S. cases increased by 1,958 and the number of U.S. deaths increased by 129. In total number of deaths, New York State ranks 5th behind the United Kingdom, Italy, Brazil and the U.S.[2]

The Spanish flu pandemic, that began in January 1918 and ran through December 1920, is what we compare this current pandemic. The Spanish flu came in waves with the second wave being more contagious and more deadly than the initial outset of the flu. A person born in America during that time saw their life expectancy drop by a dozen years.[3] An exact number of fatalities related to the Spanish flu is not known as record keeping was not as stringent at that time, but over 675,000 Americans and between 20 million and 50 million people worldwide died during that pandemic.

Pathophysiology

This coronavirus, known as the Severe Acute Respiratory Syndrome Coronavirus-2 (SARS-CoV-2) because of its genetic similarity to the original SARS coronavirus, is a β coronavirus that infects a person by attaching to the angiotensin-converting enzyme 2 (ACE2) receptor. The spikes that project from the virus are important in binding to the ACE2 receptor and fusing it with the cellular membrane.[4] These receptors are found in numerous tissues including the nasal and oral mucosa, as well as the nasopharynx, the lungs, particularly in the alveoli, the heart, kidneys, intestines, brain and the endothelial lining of the arteries and veins.[5]

The incubation period for COVID-19 is approximately 5 days, with patients exhibiting symptoms up to 14 days after exposure. Early in the pandemic, many patients with COVID-19 presented with flu-like symptoms as well as respiratory symptoms including shortness of breath. It was recognized that patients could quickly develop acute respiratory distress syndrome requiring intubation and mechanical ventilation.[6] As the number of cases increased, more and more symptoms were recognized, gastrointestinal symptoms including nausea, vomiting and diarrhea, the loss of the sense of smell and/or taste, rash and redness or discoloration of the toes, referred to as covid toes. These numerous presentations may be due to the widespread presence of the ACE2 receptor throughout the body.

While the many of patients who arrived at hospital emergency departments (EDs) because of COVID-19 were elderly with multiple health problems, providers soon found that younger, healthy people could also

have severe presentations from COVID-19. People under the age of 40 began presenting to EDs suffering from ischemic strokes and stroke-like symptoms.[7] Patients with COVID-19 have also suffered from increased thrombotic complications, such as pulmonary embolism. Although it remains unclear as to the cause of these complications, it is speculated that it could be caused by microthrombi that develop throughout the body as a consequence and complication of COVID-19.[8]

The difficulty is that some people infected with SARS-CoV-2 have mild to no symptoms while others suffer severe disease. In those patients with a severe presentation, they are found to be leukopenic particularly with decreased circulating T-cells and they have excessive amounts of proinflammatory cytokines, which can lead to extensive tissue damage.[4] One serious presentation is silent hypoxia, where patients who have extremely low arterial oxygen saturation are continuing to function at almost normal levels. These patients have the potential to decline and code very quickly and may not have even recognized that they were ill.

Nurse practitioners

Nurse practitioners provide comprehensive care to all people in a variety of settings. Acute Care Nurse Practitioner (ACNP), provide care to acutely, chronically, and critically ill individuals, working to stabilize and restore health. Nurse practitioners that work in primary care will have a different population focus that includes family, pediatrics, adult-geriatric, or women's health but they all provide care for acute and chronic problems and have an emphasis on health promotion and disease prevention.

Changes to primary care practice during a pandemic

Dramatic changes have occurred in primary care during this pandemic. There has been significant decrease in the number of people requesting an appointment to see their provider. This is occurring even as most primary care practices have instituted telehealth as a mechanism for safely seeing patients.

According to Mehrotra et al the reported number of ambulatory visits has declined by 60 percent for mid-March and April with the biggest decline in the New England and Atlantic states (64%) and lowest in the Mountain states (45%).[9] Larger declines were seen in specialty practices including pediatrics (62%). Significant yet decreased visits were seen in adult primary care (49%) and the smallest decline was noted in behavioral health. When age of client was considered, individuals aged 7-17 (71%) and elders age 75 plus (65%) had the highest decline in visits. This data set was collected from March 1 through April 5 and represents about 5% of ambulatory visits [10], including a variety of healthcare organizations and physician, physician assistant, and nurse practitioner visits.

Practice changes in primary care have been required to keep both the nurse practitioner, clinic staff and other patients safe from exposure to COVID 19 in the facility. Visits have been converted to telehealth or patients have been seen in their cars with clinic staff including the NP utilizing personal protective equipment (PPE). Telehealth visits have increased by 30%.[9] Telehealth visits are new to most NP's practice.

Two of the biggest challenges in telehealth are physical assessment of the patient and connectivity via an electronic device. Being able to obtain history of present illness from the patient including medications is unchanged in the virtual telehealth environment. Many patients can assess some if not all their vital signs including their weight during the visit. Pieces of the physical exam can still be performed through patient participation. Range of motion, overall well-being, and coherence are physical attributes that can be assessed if the patient is able to position the camera to allow viewing of themselves and any movement needed for the assessment. Visual assessments can be made of skin concerns and injuries. When a patient is using their mobile device for the visit most time, they can give you an excellent view of rashes, lesions, cuts, any concerns that are related to the skin. Fortunately, the adage that 95% of people will tell you what is wrong with them remains true. Making sure that the patient can share their concerns can be influenced by their internet connection.

Influences on connectivity via an electronic device can be on the patient side or the clinic. Many rural communities do not have consistent or adequate internet service. One third of rural Americans (37 %) report not having a broadband internet connection at home.[10] The device most of American's own is a smart phone, which holds true as well in rural areas at 71% of people report owning a smartphone. Delayed responses due to a lag in internet connectivity can be a challenge during a patient visit. Patients may have a smartphone or computer to use during a visit but have challenges using its full capability. Involving family members skilled in the use of electronic communication in the virtual visit helps alleviate some of these challenges.

Some patients still need a physical exam or require clinical testing for a diagnosis. Not all clinics can isolate patients from staff and other patients. When this is not the case, patients may be seen in their cars with staff utilizing proper PPE. When seen in the office or in their car, patients and family should be masked during the visit. If patients are seen in the office only one family member if needed to facilitate the visit is allowed in the room or in some cases the building. PPE is utilized with the staff and the patient masked during the entire

encounter. Staff use gloves and depending on the situation a gown and face shield for protection. All surfaces must be decontaminated after each patient visit. This includes all personal items (stethoscopes, mobile phones, keyboards, nametags) as well as landlines and workstations. All surfaces should be routinely cleaned and hand washing by all staff should be done often not just after a patient encounter.

The biggest concern from many working in a primary care setting is not knowing who has COVID-19. The patient may present with all or some of the known symptoms, but there are individuals that have no symptoms and test positive for SARS-CoV-2 virus. Just like those that work in the acute care setting, providers come home, put their clothes in the washer, and shower prior to any contact with their families. This is routine behavior during flu season but with COVID-19, the stakes are higher.

Many patients are requesting testing with or without symptoms. Other patients who may have had COVID-19 symptoms and tested negative for influenza prior to the reported outbreak in the United States are asking if they may have had the virus. They also ask if they should be tested to see if they have the antigen. Testing for the presence of SARS-CoV-2 is not recommended for individuals without symptoms. Antigen testing is also currently not recommended for well individuals in a primary care setting.

As we are writing this perspective, most states are in a planned restart that is gradually lifting restrictions on social distancing and stay at home practices. Until there is a vaccine and or proven effective treatment, it is doubtful that the way we deliver care will revert to how we practiced prior to the COVID-19 outbreak. The need for adequate PPE will continue as wearing a mask and using other precautions for patients with respiratory complaints will continue to be common practice. The practice of having entire families in the exam room with the patient or in the waiting room needs to be evaluated as we move forward. Telehealth may help to eliminate some of this practice with an initial visit and a subsequent follow-up visit after arrangements can be made for the care of small children or others that cannot be left alone.

Telehealth will continue to advance in the future if it is supported by payments options that are on par with face-to-face visits. Devices continue to be developed that will improve the physical assessment of a patient from a distance. In-person visits will continue but as we move forward, more intense screening is needed prior to seeing someone who is sick and possibly contagious in the clinic.

When a vaccine is available, a plan to immunize people will be critical to avoid further outbreaks. This may require nurse practitioners to organize on site clinics that will only focus on immunizations. These can be done in collaboration with other healthcare providers including pharmacists and physicians. Funding for prevention will be critical to prevent future outbreaks of COVID-19.

Care of the hospitalized patient during a pandemic

The first thing that you notice when you enter a hospital is the activity that can frequently be considered organized chaos. It can be noisy and crowded depending on your location. That changed when the World Health Organization declared COVID-19 a global pandemic on March 11, 2020. The hallways are now quiet and without visitors. The patients lying or sitting quietly in their rooms are also without visitors. No friends, no family; just the staff that enters their rooms for care that is needed.

The emergency department (ED), which can be beyond controlled chaos, no longer has patients sitting in the hallways. There is good and bad to that. There are people who are waiting to come in to the ED for fear of 'getting infected' which can be devastating to their outcome, but there are also very few, to no people arriving to the ED for their primary care services. It is another sign that healthcare needs to be overhauled.

Instead of patients, equipment lines the halls. Because of the risk of contamination, very little equipment and few supplies sit in each room waiting to be used. It requires a lot more organization and planning so that you can take all the supplies that you might need into the room with you. The ED itself is also segregated. There is an entrance specifically for those patients suspected or confirmed to have COVID-19. Staff in these areas can spend much of their shift in their PPE. One plus is that telemedicine is being used to communicate with those patients who are still able to converse, which decreases the number of times someone must enter and exit the room.

In Kentucky, we have been fortunate to have limited cases of COVID-19 positive patients. Hospitals have not been overrun as they have been throughout Europe and in New York City and other hot spots around the country. Still, there are patient care challenges that have occurred because of the pandemic. In patients who have been tested for COVID-19, many bedside diagnostic tests are not completed until the SARS-CoV-2 test comes back negative. Providers must rely on their assessment skills when making patient care decisions. In patients where the suspicion of COVID-19 is low, patients may still be able to travel for some diagnostic tests, such as CT scans. Patients must travel wearing a mask, or if intubated, on their same ventilator, not a transport ventilator.

The number of people and the equipment that enters a room needs to be kept at a minimum to prevent contamination and risk to healthcare providers as well as other patients. Donning and doffing of PPE takes time and there can be no shortcuts. Organization is particularly important at this time. It is not as simple as just stepping out of the room to get forgotten supplies. Care must be done in bundles. When you go in to the room, you stay in. A newly admitted ICU patient may need to be intubated and if so, the central and arterial lines need to be placed while in there. During that time, you are unable to provide care to any of your other patients. It is hot and it is uncomfortable, and, at times, it can be more difficult to breath through an N-95 masked that is covered by another surgical mask.

Emergent care is almost non-existent. This can be even more devastating for a profession that has, at its core, protecting the patient. However, if something happens, before ever entering a room, all the PPE must be put on. While providers always try to anticipate an emergency, it is now even more important. If a patient codes, resuscitation cannot begin until all your PPE is donned. Along with that, the number of personnel in the room is kept at a minimum. This all will decrease the chance at a successful resuscitation, which can be a difficult reality for many healthcare providers.

When a patient is at the end of life, the family is not there, at their bedside. Initially, there was not enough PPE to provide any family member with protection and so they had to be kept away. Staff had to become creative in order to provide comfort to both patients and families. Telemedicine is an option in some patients' rooms, which allows family to see and talk to their loved one. Facetime can be used to allow families to communicate. Nurses have always been inventive and compassionate when striving to provide the best for their patients. Nurses, APRNs and other healthcare providers have had to step in for the family to provide comfort and be present as a patient takes their last breath.

Some institutions have taken to allowing minimal family to be at the bedside when a patient is at the end-of-life. This requires enough PPE to protect anyone who enters the room. While it has worked well in some instances, in others, family members have later become sick and succumbed to this disease.

There are also many other patients who still require care and have not been infected with SARS-CoV-2. Women are still delivering babies; traumas are still occurring, and medical emergencies have not declined just because there is a pandemic. While there are increased staffing demands in units caring patients with COVID-19, this can require staff from other units to be moved to a COVID positive unit and ultimately decreases the staff available to care for everyone else. It increases the stress and anxiety of everyone involved, and can lead to early burnout.

Early in the pandemic, fear and anxiety ran high amongst providers. At the University of Kentucky Chandler Medical Center (UKCMC) plans were developed for a surge of patients that we have yet to see. Eventually the fear and anxiety related to the disease gave way to anxiety related to waiting for the surge to start. It almost became a 'just hurry up and get here' situation; the sooner the surge happened, the sooner we could get through it and back to some type of normal. Although some people likely think we overdid and overspent in our preparations, all the steps that were taken were necessary to be prepared. Waiting until the number of patients increases is too late.

The emotional toll that might come out of the COVID-19 pandemic has yet to be seen. How healthcare and healthcare workers will recover in places like New York City, Italy, Spain, and the United Kingdom remains unclear. Dealing with limited resources and watching patients die, alone, at an unprecedented rate will leave a lasting impact on those who lived that experience. Some individuals may never return to healthcare once this crisis is past. Some may become stronger because of it and it is likely that many will suffer some form of post-traumatic stress disorder.

One thing is certain; things will not go back to how they were at the start of this new decade. It remains to be seen how healthcare will change and how we will navigate our new reality with SARS-CoV-2 still around. We will continue to monitor every patient for COVID-19 and visitation will likely remain limited for all hospitalized patients.

Discussion

As we continue to learn more about this disease, it is reasonable that every person who is seen in the clinic or the hospital should be screened for any abnormal symptoms and possible exposures. As testing sites increase and testing supplies become more readily available, there should be a very low threshold to test for SARS-CoV-2. This will be imperative as people try to get back to a semblance of normal and have increased risks of exposure. It will also take on greater importance as we move through summer and into another flu season.

As we continue to move thru the COVID-19 pandemic there is an opportunity for us to improve healthcare. The changes that we made were necessary to push us along in developing new models of care that can improve access to individuals that cannot easily come into a clinic or hospital. A temporary change in nurse practitioner scope of practice was made by executive or-

ders from governors in specific states during the pandemic. This was done to increase access to healthcare in response to the increased demand for healthcare providers. Twenty -two states temporarily either suspended or waived existing collaboration, supervision, and protocol requirements of nurse practitioner practice. Executive orders have expired in some of these states while others continue with the expanded practice authority.

This pandemic has opened our eyes wider to the importance of global health care coordination. Supply chains for PPE were not a mainstream issue but have become an everyday reality for everyone. The changes to hospital policies related to PPE use and family visitation continues, as do telehealth appointments. People are beginning to return to clinics and emergency rooms wearing masks for healthcare visits. Programs have been set up to support healthcare workers including nurse practitioners to recover from the stress and anxiety experienced during the height of pandemic and will continue into the unknown next phase.

Some of the changes we have experienced during this pandemic may become permanent to our practices and some may not. What we do know is that healthcare will not go back to the way it was. This is an opportunity to increase patient access to services, improve encounters for care and support our healthcare workforce. We must continue to move forward.

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