

Care of A Pregnant Woman Tested Positive for Coronavirus (COVID-19) Based On The Neuman Systems Model: A Case Report

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ABSTRACT

Nurses play a crucial role in healthcare services and are responsible for providing high-quality care based on theories and models. Numerous models are available for nurses to plan care with. The Neuman systems model approaches the individual from a holistic and systematic perspective and is widely used in the nursing process. In this case study, nursing care based on the Neuman systems model was planned for a patient tested positive for coronavirus (COVID-19), which is a challenge the whole world is facing today. However, it is even riskier for pregnant women. Stressors were determined using the “six basic questions” in the Neuman systems model. Then, appropriate nursing interventions were planned to help the case experience less stress and adapt to the new situation more quickly. Nursing care consisted of primary, secondary, and tertiary protection. This was a case report of a pregnant woman tested positive for COVID-19. The Neuman systems model was used to plan nursing care within the nursing process. We believe that the results will serve as a guide for nurses facing challenges of the COVID-19 pandemic.

KEYWORDS: Nursing theory; Case report; COVID-19; Nursing; Pregnancy

INTRODUCTION

Novel coronavirus (COVID-19) is a zoonotic RNA virus that is likely to have first passed from bats to humans. COVID-19 is a public health problem as it may infect 60% of the world population [1]. The COVID-19 pandemic has been a traumatic event on a global scale that has caught the attention of the authorities, healthcare providers, and the public. The virus continues to spread despite drastic efforts to contain it [2]. As the COVID-19 has turned into a global pandemic, it has forced almost all countries to adopt strict measures [3]. Outbreaks, such as the COVID-19 pandemic, cause psychological problems as well as widespread health problems and mortality. Older people with one or more chronic diseases or a weakened immune system are at increased risk for COVID-19 [4]. Pregnant women are also a risk group. Mechanical and physiological changes during pregnancy make women vulnerable to some infections [5]. Immunological changes during pregnancy make women more likely to develop respiratory viral infections and severe diseases [6].

Pregnancy is a stressful and challenging period imbued with physiological, hormonal, and emotional changes [7]. Exposure to an infection during pregnancy can result in adverse outcomes affecting both the mother and the baby. Pregnancy is a physiological process, which makes women susceptible to viral infections [8]. which may cause miscarriage, preterm birth, malformation, or congenital infections, especially in the first or second trimester [9]. Although pregnant women constituted only 1% of the population infected with influenza A virus subtype H1N1 during the 2009 swine flu pandemic, they accounted for 5% of all deaths from H1N1 [10]. The Severe Acute Respiratory Syndrome coronavirus (SARS -CoV) and the Middle East Respiratory Syndrome coronavirus (MERS -CoV) are responsible for serious complications during pregnancy, including endotracheal intubation [11]. COVID-19 is also a major risk factor for pregnant women, who require special attention to prevent, diagnose, and treat infections [8]. Lei et al. [12] reported fever, cough, muscle pain, weakness, sore throat, diarrhea, and

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shortness of breath, as well as fetal distress and preterm delivery in pregnant women who tested positive for COVID-19 (n=9) [12]. Huang et al. [13] and Wang et al. [14] conducted research on COVID-19 pneumonia during pregnancy and found a correlation between clinical features and prepartum and postpartum complications [13,14]. The researchers have concluded that it is of utmost importance that pregnant women adhere to infection control guidelines. The COVID-19 causes physiological mental and emotional problems [15]. in pregnant women. Pregnancy may sometimes cause post-stress chronic anxiety [16]. Pregnant women trying to adapt to physiological and psychological changes should be encouraged to develop resilience against stress [17].

Nurses can best administer nonpharmacological treatments to reduce stress levels in patients because they spend much more time with them than other healthcare professionals [18]. Nurses are responsible for maintaining and improving health and preventing and treating diseases. In this process, they utilize nursing models based on nursing theories [19]. The Neuman Systems Model (NSM) is one of the models that brings professionalism and scientificity to care and focuses on stress factors and responses to them [20]. For five decades, the NSM has been a comprehensive care and educational model for nurses seeking ways to improve the quality of care [21,22]. The model adopts a holistic approach and focuses on physiological, developmental, spiritual, psychological, and sociocultural variables to guide nursing interventions. It identifies all internal and external stress factors to help patients cope with their health problems [23]. It is used in different nursing fields, including the healthcare of pregnant women. It plays a key role in managing and eliminating stressors associated with health problems [24,25]. It addresses perceived stressors and provides necessary nursing interventions based on primary, secondary, and tertiary prevention measures [26]. Pregnant women are subjected to numerous stressors at varying degrees. The model serves as a guide for pregnant women to cope with stressors and protect their health.

The COVID-19 pandemic has affected the whole world and claimed hundreds of thousands of lives. This case study focused on the NSM to develop clinical strategies to protect pregnant women from pandemic-related stressors. Data were collected from

a pregnant woman who tested positive for COVID-19. She was provided with nursing care within the scope of the NSM to help her cope with stressors. This section presented the details of the case and provided a care plan based on the NSM.

CASE REPORT

The study was approved by the Ethics Committee of Erzincan Binali Yıldırım University (06/25). Written permission was obtained from the Erzincan Mengücek Gazi Training and Research Hospital (62639109-929-E-448). The participant was informed of the research purpose. She was interviewed after verbal consent was obtained (July,2020).

Patient Profile

Mrs. G. was a 42-year-old housewife born in Erzincan. She was married for 18 years and had four children delivered through C-section. During one of her visits to the obstetrics clinic, she took a polymerase chain reaction (PCR) test because she presented with shortness of breath and cough. The test came out positive. She had no family members who tested positive for COVID-19. She was admitted to the COVID 6 Inpatient Service.

Complaints

Cough, shortness of breath, and muscle and joint pain.

Background

She had a lumbar disc herniation surgery five years ago. She had four C-sections. She had no chronic disease. She had no addictions (tobacco, alcohol, etc.).

Family History

She had family members diagnosed with diabetes mellitus and lung cancer.

Data Summary

The data were collected using a demographic characteristics questionnaire developed by the researcher and an NSM form based on a literature review [25]. The form addressed all NSM concepts (Table 1).

Table 1: NSM data collection from.

Case: A Pregnant Woman Positive for COVID 19				
Basic Structure				
Physiological	Sociocultural	Psychological	Spiritual	Developmental
Age (year): 42	-Married for 18 years	Worried about her baby getting coronavirus	Praying not to lose her baby	-Other COVID-19 patients getting well or dying
Body Height: 1.62				
Body Weight: 84		-Worried about losing her baby		
Body Mass Index: 32.06 kg/m ²				
Body Heat: 36.2°C				
Blood Pressure: 110/70mmHg	-Primary school degree	-Feeling guilty for ignoring isolation measures and contracting the virus		-No physiological problems associated with the genital system
Pulse: 92				
No addictions (tobacco, alcohol, etc.)				
Extremity: No edema				
No bad obstetric history				

Number of Pregnancy: Four	-Praying not to lose her baby	-Experiencing stress and anxiety		-No bleeding
Current state: 26 weeks pregnant				
No bleeding				
Uterus compatible with gestational week				-No cervical opening
Defense Mechanisms of Basic Structure				
Flexible Line of Defense	Normal Line of Defense		Line of Resistance	
-She gets support from her husband, family, and relatives, but they cannot visit her due to preventative measures and 14-day quarantine.	-The patient stated that she had no pregnancy problems and that she could cope with a possible infection.		-The patient cares about her health and baby.	
-She avoids harmful substances.				
-She pays attention to her diet. She drinks two liters of water every day. She does not skip meals.				
-She researches to learn more about pregnancy and infection protection.	-Therefore, we did not observe depression and burnout in the patient. However, the patient was isolated because she had a contagious infection. The healthcare workers wearing personal protective equipment during treatment adversely affected her mood. She was tense and stressed-out during quarantine.		-She has high self-esteem and employs active coping strategies.	
Spiritual wellbeing				
-She believes that prayer and worship will keep her and her baby healthy				
Gender and Age (Developmental)	-Psychosomatic symptoms and depression are signs of the normal line of defense. We did not observe them in the patient.		-She practices occupation therapy. She experiences no psychological problems, such as depression and burnout, which means that the stressors did not make it to the line of resistance, thanks to her effort.	
-No reproductive system problems				
-She is being followed up for pregnancy or birth complications because she is a high-risk pregnancy				
-Normal cervical length				
-No cervical opening				
-No bleeding				
Environment				
Intra-stressors	Inter-stressors		Extra-stressors	
-The patient thinks she will die because recovery takes too long.	-The patient experiences anxiety because she does not know the prognosis.		-She states that the cleaning staff is more laidback than other staff.	
-Unwanted pregnancy				
-She regrets being pregnant due to advanced age.	-She does not know the healthcare team		-She feels bad because her husband is not let into the clinic due to the hospital policy	
-Advanced age pregnancy coupled with an infection	-The healthcare workers wear personal protective equipment during treatment		-Other patients get worse. General uncertainty about the disease	
-Homesick	-She believes that the healthcare workers keep her in the dark about her condition. The quarantine makes her feel bad.		She thinks that she will fall behind on house chores if she stays in the hospital for too long.	
-She is not allowed to see her husband and relatives due to quarantine measures. She is worried about infecting family members.				
Determining Stressors (Six basic questions used to identify stressors according to the NSM)				
1. What do you think is the greatest challenge of the pandemic? PATIENT: Being away from my children and home NURSE: The patient is homesick and concerned that she might not see her family again.				
2. How has the pandemic affected your lifestyle? PATIENT: The disease came out of nowhere, which caused uncertainty and took its toll on me. Staying at home, social distancing, and not sharing things like towels and utensils are new to us. I am more careful about stuff than before. NURSE: The patient knows enough about healthy living, has changed her lifestyle according to the pandemic rules, and is ready to cooperate.				
3. Have you ever had such a challenge before? If so, what was it, and how did you handle it? PATIENT: No, this is the first time. NURSE: This is the first time the patient has experienced this stressor.				

4. Based on your current situation, what do you think will happen to you in the future?

PATIENT: I think I'll be okay as long as I heed to hygiene and preventive measures. I'm more careful about hygiene now. My baby will be okay as long as I'm careful.

NURSE: The patient cares about her health and does her best, but she's concerned because she doesn't know much about the infection.

5. What are you doing, and what can you do to help yourself?

PATIENT: I'll be more careful if I get better. I used to make time for things other than myself. But from now on, I'll make more time for myself. I believe that I'll get better with your help. I'll pray for myself and my baby and perform my religious duties to feel good spiritually.

NURSE: The patient trusts the nurses and is open to cooperation for her care and treatment.

6. What do you expect from your family, friends, and healthcare team (caregivers)?

PATIENT: It's necessary to keep in touch with family. They are also worried about me and my baby. My family has always been there for me. But I sometimes feel sad that I cannot see them because of the quarantine. The medical staff is too cautious about infections. I mean, they kind of keep their distance from us, patients. I think they should be more sensitive about it and help us feel better as we go through this period.

NURSE: The lack of connection with family due to quarantine appears to be a source of stress. The fact that the room is full of medical equipment and that the medical staff always wears personal protective equipment also makes her feel stressed and nervous.

A Neuman Systems Model-Based Nursing Care Plan for the Case

The Table 2 below shows the primary, secondary, and tertiary prevention levels of NSM-based nursing interventions for the patient.

Table 2: Primary, secondary, and tertiary prevention levels of NSM-based nursing interventions.

Primary Prevention				
Descriptive Characteristics (Signs and Symptoms)	Etiology (Cause)	Nursing Diagnosis	Goals/Expected Patient Outcomes	Planned Nursing Interventions
-The patient misperceives her health status.	-A general uncertainty about infection	*Lack of information	-Helping the patient adapt to the process	-Assessing how much the patient knows about the pandemic
				-Providing her with reading materials and educational guides
-She cannot perform health-promoting behaviors correctly.	-Not knowing about illness, treatment, and interventions	*Lack of information	-Informing the patient of interventions	-Assessing her readiness to learn and scheduling training
				-Using patient-centered and individual-specific methods to train her on the COVID-19 pandemic
				-Providing her with information on training content, routines, effects and goals of drugs, clinical care features, interventions for fast recovery, deep breathing and coughing exercises, in-bed active-passive exercises, and isolation measures
				-Determining how well she knows and to what extent she performs interventions and addressing her gaps in knowledge
				-Training her and her family on discharge
				-Identifying people at risk Determining how the patient contracted the virus
				-Taking isolation measures placing the patient in a single-person room
				-Getting the infection control department to determine how and why the virus is spreading

-She keeps asking questions about her condition.	-Airborne transmission	* Risk of transmission	-Communicating with the patient	-Informing the patient on the infection chain and her responsibilities during the hospital stay
	-Droplet transmission			-Monitoring the local and systemic signs and symptoms of the infection
				-Determining susceptibility to the infection
				-Taking neutropenic measures
				-Ensuring asepsis for all patients
			-Transmission by contact	-Implementing isolation measures
	-Identifying the differences between viral and bacterial infections			
	-Notifying the surveillance unit and the contact tracing team about suspected cases			
	-Notifying the surveillance unit and the contact tracing team about positive cases			
	Lack of information on infection sources and prevention		-Not infecting anyone during the hospital stay	-Allowing the patient to express her feelings and thoughts
				-Reminding the patient that she is not alone and that there are support systems available.
				-Informing the patient on diagnosis, treatment, and progress
				-Explaining all procedures
				-Briefing the patient on relaxation techniques and making sure that she practices them
	-Reducing anxiety		-Ability of the patient to convey her needs and negative emotions and to perform necessary activities	-Assessing the patient's stress level regularly and recording all signs and symptoms, including physical ones
				-Monitoring the patient's mood regularly
-Being there for the patient and answering her questions				
-Letting the patient know that everybody experiences anxiety from time to time				
				-Speaking to the patient slowly, clearly, and concisely
				-The nurse making sure of her own worries and preventing anxiety triggers
				-Sympathizing with the patient
				-Eliminating excess stimuli

-Physiological, emotional, cognitive symptoms anxiety, unease, expecting the worst, uncertainty	-Factors affecting or hindering basic human needs for safety	*Anxiety	-Providing a safe environment	-Identifying cognitive or physical limitations that increase the risk of falls
				-Taking the history of falls Identifying environmental factors that increase the risk of falls
				-Monitoring the patient's movement, gait, balance, and fatigue level
				-Providing the patient with equipment to help her balance while moving
				-Taking necessary precautions during the transfer of the patient Having the patient's belongings within reach
	-Related to pregnancy and inflammation	*Risk for falls	-No falls	-Assessing the ability of the patient to get in and out of bed
				-Using elevated seats, armrests, and high and firm bed rails for easy transfer
				-Adjusting the mechanical bed to the lowest
				-Responding to alarms immediately
				-Providing enough light so that the patient has no difficulty seeing
				-Removing objects that may cause falling
				-Providing level and non-slippery floor surfaces
Secondary And Tertiary Prevention				
Descriptive Characteristics (Signs And Symptoms)	Etiology (Cause)	Nursing Diagnosis	Goals/Expected Patient Outcomes	Nursing Interventions
-Changes in respiratory patterns and rate (25-28 min)			-Clear and clean tracheobronchial tract	-Monitoring respiratory rate, rhythm, depth, and patterns
				-Monitoring vital signs
				-Monitoring the patient in terms of pain, restlessness, anxiety, and air clearance
				-Positioning the patient to improve ventilation capacity
				-Administering chest physiotherapy
-Dyspnoea, orthopnea Expressing discomfort	-Due to inflammation	* Ineffective Breathing Patterns	-Vital signs within normal range	-Monitoring respiratory secretions
				-Positioning the patient to reduce dyspnoea and to improve ventilation capacity
				-Teaching the patient how to perform deep breathing and coughing exercises
				-Providing training on oxygen therapy
				-Monitoring respiratory and oxygenation status

-Body temperature above 37.5 ° C	-Due to inflammation	* Hyperthermia	-Balance between heat generation, heat gain, and heat loss	-Monitoring body temperature and other vital signs every two hours
				-Monitoring skin color and temperature
			-No fever	-Covering the patient with a blanket or thin sheet according to the level of fever
				-Encouraging the patient to drink plenty of fluids
-Increasing air circulation				
-Monitoring fever-related complications (seizure, altered consciousness, abnormal electrolyte levels, cardiac arrhythmia, and abnormal cellular changes)				
-Lack of energy	-Due to pregnancy and inflammation	* Fatigue	-Absence of observed or reported general fatigue	-Providing a comfortable environment allowing the patient to get uninterrupted sleep
-Mood swings				-Advising the patient to ask whatever she has in mind
	-Making sure the patient is sitting comfortably or placing her in semi-fowler position			
	-Promoting recovery, harmony, and adaptation. Getting the patient to rest			
-Difficulty falling asleep	-Dyspnoea	* Sleep deprivation	-Achieving the recommended amount of sleep	-Determining sleep/activity patterns
	-Due to pregnancy			-Planning care according to the patient's sleep/wake cycles
				-Explaining the importance of adequate sleep during illness, psychosocial stress, or anxiety
			-Monitoring sleep patterns and time	
	-Staying at the hospital		-Self-reported restfulness	-Monitoring sleep patterns and eliminating physical (sleep apnea, airway obstruction, pain/discomfort, frequent urination) and/or psychological factors (fear or anxiety) that interrupt sleep
				-Monitoring how much the patient participates in activities causing fatigue during wakefulness to prevent excessive fatigue
-Making adjustments in the environment (light, noise, heat, bed, duvet, etc.) to improve sleep				
-Encouraging the patient to set up a bedtime routine for an easy transition from wakefulness to sleep				

CONCLUSION AND RECOMMENDATIONS

The pandemic causes individual, family, and social problems. The COVID-19 infection takes its toll not only on the infected but also on their family. Treatment, care, adherence, and cooperation play a crucial role in the fight against infection. Raising public awareness and focusing on the disease is of paramount significance to counter the adverse effects of the pandemic, which is a critical challenge to the health and safety of the public. People without COVID-19 symptoms still spread the virus to others, and loosening restrictions let the pandemic get out of control. Pregnant women are at a higher risk of COVID-19 infection than the general population [27]. It is reported that flu and respiratory infections increase the risk of morbidity and mortality in pregnant women [28]. COVID-19 is also a dangerous infection for pregnant women because it can cause preterm birth or require respiratory support [14].

We collected data based on the Neuman Systems Model and adopted a holistic perspective to make nursing diagnoses and provide comprehensive care. The care helped the patient adapt to the situation and strengthen her line of defense. The pandemic continues to affect the whole world, and new information on transmission routes, epidemiology, treatment options, and care practices is coming in almost every day. Therefore, nurses should keep up with the literature that is being produced at an ever-expanding rate. Nursing faculties should provide courses and training to raise students' awareness of the threats of outbreaks in general, and the COVID-19 pandemic in particular.

ETHICAL STANDARDS

The study was conducted according to WHO Declaration of Helsinki - Ethical Principles for Medical Research Involving Human Subjects.

INFORMED CONSENT

Written informed consent was obtained from the patient who participated in this study.

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