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Selected nursing diagnoses and interventions in patients with COVID-19 hospitalized during pandemic

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Abstract

Introduction. In March 2020, the WHO announced global pandemic due to the outbreak of coronavirus disease (COVID-19) caused by the SARS-CoV-2 virus. COVID-19 is considered as a highly infectious disease, with a considerable mortality rate, especially among older people with concomitant diseases (heart failure, pulmonary diseases, arterial hypertension, diabetes). The pathogen affects mainly the respiratory system, and may also lead to acute respiratory distress syndrome, sepsis. In a severe state of health of a patient nurses make many nursing diagnoses, based on which they plan and implement nursing interventions to limit the risk of complications/death.
Objective. The aim of the study was presentation of selected nursing diagnoses and interventions in patients hospitalized due to COVID-19 during the period of pandemic.
Materials and Method. Nursing diagnoses and nursing interventions associated with these diagnoses were analyzed among patients hospitalized due to COVID-19 during pandemic, based on practical experiences in Poland.

Results. The COVID-19 pandemic was a new challenge for nurses in inpatient health care to provide patients with attentive care in a severe health condition. The efforts of nurses had to be focused on solving many care problems in the bio-psycho-social sphere in order to limit the risk of complications/death. The implementation of nursing interventions had to proceed smoothly, with consideration of the provision of secure environment of patient care and personal protection.
Conclusions. The symptoms of COVID-19 are frequently multisystemic and are related with the risk of complications/death. The presented nursing diagnoses and interventions in patients ill with COVID-19 disease are an example of the provision of high quality care of patients infected with SARS-CoV-2 virus. Nursing care of a patient with COVID-19 should be characterized by the subjective approach to the patient in accordance with the holistic concept of solving health problems in the bio-psycho-social sphere.

Key words: *nursing diagnoses in patients with COVID-19, nursing interventions in patients infected with SARS-CoV-2, COVID-19 pandemic in Poland*

Introduction

In March 2020, the World Health Organization announced global pandemic due to the outbreak of coronavirus disease (COVID-19) caused by the SARS-CoV-2 virus. The virus is transmitted mainly by airborne droplets when talking, sneezing or coughing by an infected person. The presence of the virus particles was also described in stool and urine. SARS-CoV-2 virions suspended in the form of an aerosol generally survive for up to 3 hours at the temperature of the environment of 21-23^0 C, on the surface of paper/cardboard up to 24 hours, and on the surface of stainless steel or plastic objects – 72 hours [1].

Epidemiological data demonstrate that as of 4 January 2022, 5,446,753 deaths due to infection with the SARS-CoV-2 virus were reported worldwide. Therefore, COVID-19 disease is considered to be highly infectious, with a considerable mortality rate [2]. In 2020, in Poland, approximately 41,500 patients died due to COVID-19, which constituted nearly 9% of the total number of deaths. In 2021, the number of deaths due to the COVID-19 disease increased more than twice, and reached the level of more than 91,000 [3]

The pandemic caused by COVID-19 united scientists around the world in order to seek possible therapeutic and preventive measures, and limit the effects of the pandemic [4]. In Poland, the first recommendations concerning COVID-19 diagnostics and therapy were published by the Polish Society of Epidemiology and Physicians of Infectious Diseases on 31 March 2020 [5].

According to Chinese researchers the majority of patients experience non-complicated course of COVID-19. Some patients do not require hospitalization [6, 7], whereas in about 14% of patients the course of the disease is severe, requiring hospitalization and oxygen therapy, and

approximately 5% of patients require treatment in an intensive care unit [8]. It is considered that acute respiratory distress syndrome, septic shock and sepsis are frequent complications in severe cases of COVID-19. Researchers describe severe complications due to infection with the SARS-CoV-2 virus as multiorgan failure, including heart failure, and kidney failure [9]. In the opinions of Chinese and American research teams, during the period of pandemic a severe course of the COVID-19 disease and mortality were observed in relation with old age and concomitant diseases (heart failure,, pulmonary diseases, arterial hypertension, diabetes) [10, 11].

Nurses play a key role in the care of patients with COVID-19. They are exposed to stress related with the risk of becoming infected, as well as negative emotions seeing anxiety, suffering and death of patients [12]. Based on practical experiences, the authors of the presented study observed severe states of health of patients hospitalized due to COVID-19, which determined nursing diagnoses and a number of nursing interventions. The main symptoms observed were: respiratory disorders, ventilator-associated pneumonia due to respiratory system infection, high fever, thromboembolic complications, lack of appetite, nausea, vomiting, and communication disorders. The above-mentioned observations provided incentives for this study of exemplary nursing diagnoses and nursing interventions undertaken by a branch of clinical hospital in Poland during the period of the COVID-19 pandemic.

Results

Health problems on the part of the respiratory system

1. Nursing diagnosis: Respiration disorders on the background of infection manifested by shallow and rapid breathing, shortness of breath and cough.

   Goal of nursing interventions: Reduction of respiratory disorders, prevention of complications.

Nursing interventions	Justification
Control of vital signs – heart rate, temperature, saturation, arterial blood pressure, breathing, auscultation of the patient.	Performance of physical examination will allow the assessment of the state of health of a patient.
Preparation and transport of the patient for a chest X-ray examination	Chest X-ray examination is necessary to diagnose pneumonia in adults [13].
Blood collection for laboratory tests on doctor’s order.	To determine the severity of the infection
Administration of oxygen if necessary in accordance with doctor's order.	Oxygen therapy is used to maintain SpO2 within the range from 95- 98%.

2. Nursing diagnosis: Respiratory failure – shallow and rapid breathing, drop in saturation levels, severe shortness of breath and fatigue.

   Goal of nursing interventions – improving breathing efficiency, thereby reducing respiratory failure.

Nursing interventions	Justification
Monitoring of vital signs, SpO2, character of breathing and respiration rate, performance of ECG, assessment of the colour of skin and mucous membranes.	Monitoring of vital signs allows current assessment of clinical situation of a patient and control of the course of exacerbation of respiratory failure
Measurement of peak expiratory flow (PEF) and forced expiratory volume (FEV_1).	These measurements allow identification of deteriorating state of health of a patient with COVID-19.
Assessment of the state of consciousness in the event of increasing shortness of breath.	While observing an increasing shortness of breath the degree of hypoxia may be assessed using, e.g. the Borg dyspnea scale.
Assisting the patient in adopting a comfortable position in bed.	High diaphragm position (in lying position) hinders ventilation and oxygen transport to the alveoli. When the patient is properly positioned, the effectiveness of diaphragmatic breathing increases, thus reducing shortness of breath.

3. Nursing diagnosis: Disturbed breathing process associated with increasing respiratory failure.

   Goal of nursing interventions**:** Improvement of the breathing process.

Nursing interventions	Justification
Placing the patient in the Semi-Fowler position if no indications are found	Preventing aspiration of secretions into the lower respiratory tract.
Decontamination of the throat and mouth using antiseptics, e.g. 0.12-0.2% chlorhexidine gluconate using disposable sponges or brush-sponges with suction function.	These activities will enable effective removal of the biofilm and reduction of the risk of infection.
Assessment of the state of consciousness in the event of increasing shortness of breath.	While observing an increasing shortness of breath the degree of hypoxia may be assessed using, e.g. the Borg dyspnoea scale.
Oxygenating the patient with a mixture of 100% oxygen concentration for about 30 seconds before starting the evacuation of residual secretions from the lower respiratory tract. This operation is	Oxygenation of the patient before the procedure of evacuation of residual secretions prevents oxygenation disorders while suctioning the patient. It should not be routinely practiced (due to side effects resulting from the use of 100% oxygen

repeated after the suction procedure is completed.	concentration), but only in the event of a significant drop in blood saturation during suctioning [14].
Evacuation of accumulating secretions from the upper respiratory tract using a disposable catheter.	Evacuation of accumulating secretions from the upper respiratory tract prevents its accumulation and movement to the deeper part of the respiratory tract
Moisturizing of the oral mucosa	Dry mucous membranes are easily damaged
Humidification of the breathing mixture delivered to the patient through the mask in case of residual secretion that is difficult to expectorate and drying of mucous membranes.	Humidified secretion is diluted and therefore easier to expectorate.

Health problem – ventilator-associated pneumonia

4. Nursing diagnosis: Risk of development of infection (ventilator-associated pneumonia - VAP) as a result of mechanical ventilation.

   Goal of nursing interventions: Prevention of the risk of development of infection as a result of mechanical ventilation.

Nursing interventions	Justification
Placing the patient in a semi-high position, monitoring the retention of food content in the stomach	Administration of enteral nutrition in a way that prevents aspiration of food content into the respiratory tract.
Suctioning secretions every 2–4 hours (depending on the amount) from the bronchial tree only in a closed system.	Remaining secretions provide a basis for the development of infections.
Maintaining pressure in the sealing cuff on the level of 30–35 cm H_2O.	Maintaining the endotracheal tube in the correct position.
The use of positive end-expiratory pressure	Evacuation of secretions from the peripheral areas of the lungs and bronchioles into the larger bronchi which facilitates expectoration.

Health problem - thromboembolic complications

5. Nursing diagnosis: Risk of development of thromboembolic complications.

   Goal of nursing interventions: Prevention of development of complications.

Nursing interventions	Justification
Monitoring for signs of thromboembolic complications - shortness of breath, chest pain, cough, fainting.	Observation of intensification of the symptoms may evidence the occurrence of pulmonary embolism.
Assisting the patient during the chest X-ray examination.	This examination reveals areas of non-aerated lung and fluid in the pleural cavities.

Participating in a spiral computed tomography examination.	This examination allows a thorough assessment of the pulmonary arteries and their branches, and visualization of embolism in the branches of the pulmonary artery.
Administration according to doctor's orders of low molecular weight heparin by subcutaneous injection into the abdominal skin fold.	This drug selectively inhibits one of the blood clotting factors, so-called activated factor Xa.

Health problem – persistent cough

6. Nursing diagnosis: Discomfort resulting from chronic cough caused by excessive accumulation of secretions in the respiratory tract.

   Goal of nursing interventions: Cough relief, ensuring the patency of the respiratory tract by diluting secretions and effectively expectorating them.

Nursing interventions	Justification
Positioning the patient in a semi-high position if there are no contraindications at an angle of 30-45º.	Raising the headboard prevents aspiration of secretions into the lower respiratory tract.
Placing the patient in the Trendelenburg position.	Positioning of the patient in the drainage position facilitates the removal of secretions.
Evacuation of secretions from the upper respiratory tract using a disposable catheter.	Cleansing of residual secretions prevents accumulation and movement further into the airways.
Moisturizing of the oral mucosa.	Dryness of the mucous membranes may lead to their damage, which would be portals of entry for disease-causing pathogens.
Administration of oxygen before and after evacuation of secretions.	Administration of oxygen will prevent oxygenation disorders during evacuation of secretions.
Performing inhalation	Diluting the secretion/mucus remaining in the bronchi makes expectorating the secretion much easier.
Ensuring an appropriate microclimate in the room: room humidity within 60-70% and room temperature within 18-20°C.	Ensuring an appropriate microclimate in the room where the patient stays will facilitate patient's breathing.
Learning how to cough and clear secretions effectively (taking a deep breath and exhaling with expectoration).	Knowledge of how to cough effectively will allow evacuation and preventing secretions from retaining in the respiratory tract and avoiding infection.

Difficulty communicating

7. Nursing diagnosis: The patient has difficulty communicating with the environment, because chronic cough and shortness of breath make speech difficult.

   Goal of nursing interventions: Facilitating patient communication.

Nursing interventions	Justification
Indicating other methods of communication: non-verbal communication, use of alternative communication methods.	Use of non-verbal communication and alternative forms of communication (interactive whiteboards, monitors with symbols) will facilitate the patient communication with the therapeutic team during the period of shortness of breath and impaired perception in the area of receiving messages [15].
Informing the patient about all procedures.	Informing the patient about planned procedures will provide the patient with a sense of security.
Ensuring an appropriate microclimate in the room: room humidity within 60-70% and room temperature within 18-20°C.	Ensuring an appropriate microclimate in the room where the patient stays will facilitate patient's breathing.
Learning how to cough and clear secretions effectively (taking a deep breath and exhaling with expectoration), postural drainage	Knowledge of how to cough effectively will allow evacuation and preventing secretions from retaining in the respiratory tract and avoiding infection.

Health problem – lack of appetite

8. Nursing diagnosis: Loss of taste due to COVID-19 resulting in the lack of appetite.

   Goal of nursing interventions: Providing the body with the necessary nutrients.

Nursing interventions	Justification
Diversifying meals through their appearance and colours serving favourite dishes if there are no contraindications.	The aesthetic appearance and colours of meals have a positive effect on the sense of sight and taste.
Periodic monitoring of body weight, performance of laboratory tests.	Monitoring of body weight will allow assessment whether there are any symptoms of malnutrition.
Oral supply of fluids, if necessary, in accordance with the individual doctor's order card, intravenous hydration.	The actions are aimed at preventing dehydration.

Health problem – effort intolerance

9. Nursing diagnosis: Problems in patient's self-care caused by limited tolerance of physical effort.

   Goal of nursing interventions: Increasing efficiency when performing hygiene activities.

Nursing interventions	Justification
Preparing optimal conditions and ensuring privacy while performing hygiene activities.	Providing appropriate conditions will protect the patient from hypothermia and provide a sense of psychological comfort.
Observation of the condition of the skin and mucous membranes during care activities.	During elevated body temperature the patient's skin is exposed to sores and abrasions. Blueness of the skin and mucous membranes may be a symptom of increasing shortness of breath - then hygiene activities should be performed for the patient.
Ensuring an appropriate microclimate in the room: room humidity within 60-70% and room temperature within 18-20°C.	Improving the patient's psycho-physical comfort.

Health problem - risk of pressure ulcers

10. Nursing diagnosis: High risk of pressure ulcers caused by diabetes and immobilization of the patient in bed according to the Norton Scale.

    Goal of nursing interventions: Reducing the risk of developing pressure ulcers.

Nursing interventions	Justification
Assessment of the health condition of a patient at risk of pressure ulcers.	The patient's health condition is assessed on the day of receiving care. The assessment includes the risk of developing pressure ulcers and is carried out systematically, and additionally, in the event of a significant change in the patient's clinical condition [16]. For the assessment of the risk of development of pressure ulcers standard predictive tools are used analyzing the presence of risk factors and grading their severity using point values. The Norton, Braden, and Waterlow scales are most often used [17]. The assessment allows planning of individualized nursing interventions preventing pressure ulcers and their consequences [18].

Relieving pressure-sensitive areas using a variable pressure mattress and change of body position.	Pressure ulcers occur as a result of continuous pressure lasting several hours (2-4 hours). Bone prominences are particularly vulnerable areas (sacrum and tailbone, shoulder blades, elbows, occiput). Each patient at risk of pressure ulcers should have body position regularly changed every 2-4 hours. The change of body position should be performed individually and should be adjusted to the results of physical examination and skin assessment, for this purpose body position change chart should be kept [19].
Use of prophylactic, specialist dressings for places susceptible to pressure ulcers.	Polyurethane foam dressings, hydrofiber dressings, hydrocolloid dressings, and non-stick absorbent dressings are used in the prevention of pressure ulcers. They protect the skin against pressure.
Early mobilization of the patient.	Patient immobilization is one of the factors predisposing to the development of pressure ulcers. The nurse's activities should include early rehabilitation of the patient. These activities are to be adapted to the patient's general condition.

Health problem - fever

11. Nursing diagnosis: Hyperthermia (fever) caused by respiratory infection, manifested by increased sweating and periodic chills.
12. Goal of nursing interventions: Reduction of body temperature.

Nursing interventions	Justification
Measurement, monitoring of body temperature and registration of the results of measurements in individual patient records.	Monitoring of measurements of body temperature allows control of an increase or potential decrease in patient’s body temperature.
Assessment of the impact of fever on the patient's general condition (monitoring of heart rate, breathing, consciousness, blood pressure, diuresis, colour and moisture of the skin).	Assessment of the impact of fever on the patient's body determines the monitoring of the patient's health for deterioration.
Use of antipyretics.	Using gel compresses and cold/drying compresses, administration of pharmacological agents according to an individual medical order card, and assessment of their effectiveness.

Performance of body hygiene according to skin sweating. Change of underwear/bed linen, provision of loose underwear.	Improving the patient's well-being.
Observation of places at risk of rashes	The interventions undertaken will reduce the risk of rashes.
Replacing fluids intravenously according to an individual medical order card.	Preventing patient dehydration

Complex problem– nausea, vomiting

13. Nursing diagnosis: Nausea and vomiting caused by a viral infection which may be the cause of fluid and electrolyte disturbances.

    Gal of nursing interventions: Elimination of nausea and vomiting, preventing fluid and electrolyte, and acid-base disturbances.

Nursing interventions	Justification
Placing the patient in a semi-high position, or high position with the head positioned to the side, or placing in a recovery position.	A safe position in bed prevents aspiration of emetic contents into the respiratory tract [20].
Providing assistance during vomiting.	Assistance during vomiting reduces the risk of aspiration. The presence of a nurse increases the patient's sense of security.
Assessment of the patient's hydration status by observing skin elasticity, diuresis, character of a pulse and heart rate, value of arterial blood pressure, and the state of consciousness.	Observation of the signs of dehydration allows early capturing of the symptoms of fluid and electrolyte disturbances.
Observation of the patient for fluid and electrolyte, and acid-base disturbances.	If vomiting occurs, fluid and electrolyte, and acid-base disturbances may occur, the balance of which is indispensable for normal functioning of the body. Observation and correct interpretation of the results of laboratory tests will allow an early diagnosis of disorders and undertaking therapeutic actions.
Intravenous administration of fluids according to an individual medical order card.	Correction of hydration status.
Maintaining a fluid balance.	Correct fluid balance and proper hydration is the condition for maintaining body homeostasis.
Ensuring personal hygiene and hygiene of the patient's environment.	Rinsing mouth after vomiting eliminates the unpleasant taste. Elimination of irritating and unpleasant odours allows reduction of the vomiting reflex

Among the main tasks of members of the therapeutic team in the care of patients with COVID-19 is alleviation of the symptoms of the disease, and limitation of complications. It mainly belongs to nurses to provide complex, holistic care in relation with many symptoms in the bio-psycho-social sphere in patients infected with SARS-CoV-2. The presented examples of nursing diagnoses and interventions result from practical experiences in association with hospitalization of patients due to the COVID-19 pandemic in Poland. The elaborated material may be the source of knowledge for nurses and students of nursing for planning and implementation of care of patients with COVID-19 who are in a severe condition according to the holistic concept of care [21].

Conclusions

1. The symptoms of COVID-19 disease are frequently multisystemic and are associated with the risk of complications/death.
2. The presented nursing diagnoses and interventions in patients with COVID-19 are an example for the provision of high quality care of patients infected with SARS-CoV-2 virus.
3. Nursing care of patients with COVID-19 should be characterized by subjective approach to patients in accordance with the holistic concept of solving health problems in the bio-psycho-social sphere.

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