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Nursing diagnoses in hospitalized patients with COVID-19 in Indonesia

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Abstract

Background: The COVID-19 pandemic has become a global public health issue, and the roles of nurses are very much needed in providing nursing services in the current situation. The enforcement of appropriate nursing diagnoses for patients with COVID-19 is also fundamental in determining proper nursing care to help the patients achieve maximum health.
Objective: This study aimed to describe and analyze nursing diagnoses in patients with COVID-19 treated in the isolation rooms and ICUs.
Methods: This study used a secondary data analysis from hospital medical record data of patients with COVID-19 from early December 2020 to the end of February 2021. Data were selected using a cluster random sampling technique and analyzed using descriptive statistics.
Results: The results showed that the signs and symptoms of the patients with COVID-19 that often appeared were fever, cough, shortness of breath, and decreased consciousness. The common nursing diagnoses in the hospitalized patients with COVID-19 were hyperthermia, ineffective airway clearance, gas exchange disorder, self-care deficit, spontaneous ventilation disorder, spontaneous circulation disorder, knowledge deficit, and shock risk.
Conclusion: This study offers an insight into nursing practices in the hospital setting, which can be used as a basis for nurses to perform complete nursing assessments and nursing diagnoses during the pandemic.

Keywords

COVID-19; humans; nursing diagnosis; nursing assessments; Indonesia

Background

The COVID-19 has become a public health issue and has attracted worldwide attention (Deng & Peng, 2020). On 30 January 2020, World Health Organization (WHO) has declared the COVID-19 pandemic as a public health emergency for international concern (GÜNer et al., 2020). The COVID-19 infection can cause mild to severe Acute Respiratory Infection (ARI) and even acute respiratory distress syndrome, sepsis, and septic shock (Huang et al., 2020; Roudsari et al., 2020). The symptoms that arise in patients with COVID-19 are fever, cough, runny nose, shortness of breath, headache, weakness (malaise), muscle ache, nausea/vomit, abdominal pain, and diarrhea (Tsai et al., 2021). For patients with mild symptoms, hospitalization is not necessary unless there is a concern that it will worsen rapidly, according to medical consideration. However, some of the treated patients (15%) will experience severe illnesses who require oxygen therapy, about 5% will be admitted to the ICU, and some will have to be put on a mechanical ventilator, with severe pneumonia as the most common diagnosis for severely ill patients with COVID-19 (Rasmussen et al., 2020).

As one of the front-line elements of health workers, nurses are required to provide excellent health services (Sholihah, 2020; Rony et al., 2021). One study stated that nurses have an essential role in handling this pandemic, as 75% of medical personnel are nurses who directly provide nursing care for every patient infected with COVID-19 (Li et al., 2020). Nursing care is a series of nurse interactions with clients and their environment in achieving the goal of meeting clients' needs based on nursing diagnoses, nursing interventions, and expected outcomes (Carpenito-Moyet, 2009).

Nursing diagnoses are vital in determining proper nursing care to help clients achieve optimal health (González Aguña et al., 2021). A nursing diagnosis is a clinical assessment of the experience or response of an individual, family, or community to a health problem, to the risk of a health problem, or a life process. Establishing a nursing diagnosis is a systematic process consisting of three stages: data analysis,

problem identification, and diagnosis formulation (Tim Pokja SDKI DPP PPNI, 2017). Nursing diagnoses that are widely adopted based on the results of assessments and responses given by patients with COVID-19 are anxiety related to unknown disease etiology, ineffective breathing pattern associated with shortness of breath, hyperthermia associated with increased metabolic rate, infection associated with the failure to avoid pathogens caused by COVID-19 exposure (Dewi et al., 2020). The enforcement of nursing diagnoses in Indonesia refers to the Indonesian Nursing Diagnosis Standards (IDHS). The IDHS is a benchmark used as a guideline for establishing nursing diagnoses to provide safe, effective, and ethical nursing care (Tim Pokja SDKI DPP PPNI, 2017).

The total number of positive patients with COVID-19 in the world as of August 2020 reached 20,388,408 people, which was accumulated from positive patients being treated, positive patients who recovered, and positive patients who died. In Indonesia, the total number of positive patients with COVID-19 as of January 2021 was 1,066,313 people, with 862,798 recovered and 29,729 deaths (Wijaya & Yulianto, 2021). Data collected from the medical records at the Semen Gresik Hospital in January and February 2021 showed 259 patients in the COVID-19 isolation rooms and 48 patients in the COVID-19 ICUs.

In 2014, Semen Gresik Hospital was a private hospital accredited at the plenary level by KARS Team (Hospital Accreditation Committee). During the COVID-19 pandemic, patients with COVID-19 were treated in the isolation rooms and the COVID-19 ICUs at Semen Gresik Hospital. The isolation rooms can accommodate 52 people, while the COVID-19 ICUs can accommodate 14 people. During the pandemic, Gresik City, where the study was conducted, had the highest COVID-19 prevalence in East Java. However, it is noteworthy that nursing diagnoses for each patient with COVID-19 can be different. Therefore, this study aimed to describe and analyze nursing diagnoses in patients with COVID-19 hospitalized in the isolation room and ICU room at the Semen Gresik Hospital, East Java, Indonesia.

Methods

Study Design and Setting

This study used a secondary data analysis from the Semen Gresik Hospital medical record data of patients in isolation rooms and ICUs from December 2020 to February 2021. The study was conducted from April to June 2021.

Samples

A total of 500 patients with COVID-19 from December 2020 to February 2021, with 407 patients treated in the isolation rooms and 93 patients in the ICUs. The number of the medical records was calculated using the Slovin formula (Nursalam, 2015) as the following: $n = 500/[1+500(0.05)^2] = 222.2$, rounded up to 222 patients with COVID-19. Cluster random sampling was used to select the samples, as described in **Figure 1**. The inclusion criteria of the samples were patients' data who were confirmed positive for COVID-19 through the PCR Swab test and hospitalized in the isolation rooms and ICUs at the Semen Gresik Hospital during December 2020 and January 2021. The exclusion criteria were patients' data who were confirmed positive for COVID-19 through a PCR swab test in outpatient services and/or the data of patients with COVID-19 who were hospitalized in the isolation rooms of the hospital without a PCR swab test.

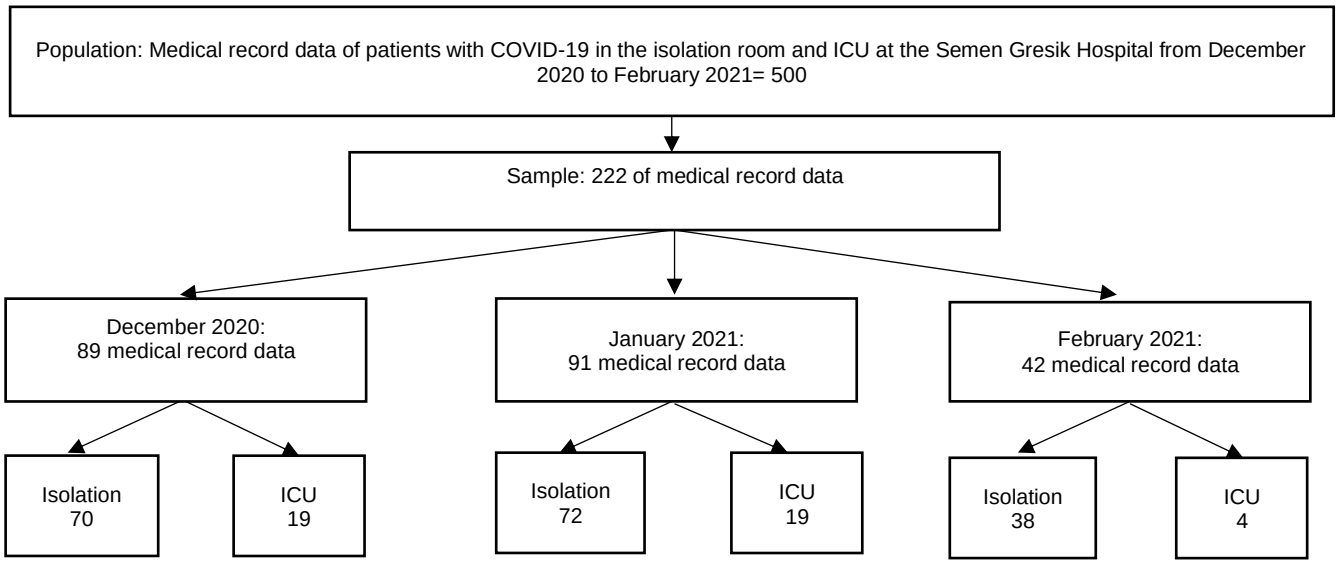

Figure 1 Cluster sampling scheme

Data Collection

The researchers directly collected the data of the patients who had been treated in the COVID-19 isolation rooms and ICUs and excluded the patients' names who did not meet the inclusion and exclusion criteria. The names of patients who met the criteria were recorded sequentially according to the date of admission and put the samples' names in folded pieces of paper into the box and randomly selected. The researchers took the medical record data for patients with COVID-19 gradually, i.e., ten medical records every day. After the number of samples has met the quota target, the results of recording nursing diagnoses were tabulated and analyzed descriptively.

Instrument

The instrument used for the nursing diagnosis variable for patients with COVID-19 was the recapitulation sheet of signs and symptoms of the patients obtained from the patient's medical record data of the hospital.

Data Analysis

Data were analyzed using descriptive statistics.

Ethical Consideration

This study was ethically approved by the Ethics Committee of Universitas Muhammadiyah Lamongan with No.068/EC/KEPK-S1/03/2021 on 30 March 2021.

Results

The total sample of this study was 222 medical record data of patients with COVID-19 consisted of 180 patients treated in the isolation rooms and 42 patients in the ICUs. **Table 1** shows that most of the patients with COVID-19 were aged 20-60 years (75.7%), with the majority working as private employees (28.4%), and the least being doctors and police with the same number of 0.4%. In addition, nearly half of patients with COVID-19 (49.1%) had a senior high school education, while some of them (29.3%) had an undergraduate degree.

Table 2 shows that almost all patients with COVID-19 have pneumonia treated in the isolation rooms or the ICU.s As many as 62.2% of patients had comorbidities, including Diabetes Mellitus, hypertension, coronary heart disease, stroke, Acute Renal Failure, Chronic Renal Failure, hepatitis, Cancer, Post-op Sectio Caesarea, Gastritis, and Gastroenteritis. However, almost all patients (97.8%) in the isolation rooms had recovered, more than the recovered patients in the ICUs.

Furthermore, based on **Table 3**, the most common signs and symptoms experienced by patients with COVID-19 in the isolation rooms was fever with a temperature of more than 37.5°C (55%). In contrast, the most common signs and symptoms experienced by the patients in the ICUs was shortness of breath (93.3%).

Table 1 Sociodemographic characteristics of patients with COVID-19

Variables	*n*	%
Age		
0 - 1 years old	0	0
2 - 10 years old	4	1.8
11 - 19 years old	4	1.8
20 - 60 years old	168	75.7
> 60 years old	46	20.7
Gender		
Male	130	58.6
Female	92	41.4
Occupation		
Farmer	29	13.1
Civil servant/teacher	28	12.6
Entrepreneur	25	11.3
Private sector employee	63	28.4
School college student	20	9.0
Housewife	32	14.4
Unemployed	20	9.0
Doctor	1	0.4
Nurse	3	1.4
Police	1	0.4
Education		
No school	0	0
Elementary school	10	4.5
Junior high school	14	6.3
Senior high school	109	49.1
Academy	24	10.8
Bachelor degree	65	29.3

Table 2 Comorbidity and prognosis profile

Variables	Isolation Room		ICU	
	n	%	*n*	%
Pneumonia				
Yes	176	97.8	42	100
No	4	2.2	0	0
Comorbidity				
Yes	112	62.2	42	100
No	68	37.8	0	0
Prognosis				
Death	4	2.2	20	47.6
Recovery	176	97.8	22	52.4

Table 3 Clinical manifestation profiles

Signs and Symptoms	Isolation Room		ICU	
	n	%	*n*	%
Fever, temperature >37,5° C	99	55	21	47.7
Phlegm cough/dry cough	88	48.8	38	86.3
Shortness of breath, respiration > 20 x/minute	68	37.8	41	93.3
SPO_2 decreased <90%	64	35.6	40	90.9
Wheezing	56	31.1	20	45.5
Having no idea on the change process of the disease	50	27.8	14	31.8
Having no idea of the treatment procedures for COVID-19	50	27.8	14	31.8
Did not aware having the disease	47	26.1	16	36.3
PO2 decreased < 83 %	40	22.2	36	79.5
SaO_2 decreased 85% - 90%	38	21.1	31	70.45
Excessive sputum	32	17.8	18	40.9
Dry rhonchi	25	13.9	8	18.1
Abnormal blood Ph	25	13.9	28	63.6
PCO_2 increased	12	6.6	16	36.3
Unable to take a shower	11	6.1	36	79.5
Unable to go to the toilet	11	6.1	36	79.5

Table 3 (Cont.)

Unable to change clothes	8	4.4	36	79.5
Unable to feed themselves	8	4.4	15	34.1
Unable to make up their own	8	4.4	15	34.1
Heartburn	6	3.3	0	0
Decreased consciousness/unconscious	3	1.7	21	47.7
Diarrhea	3	1.7	0	0
SaO_2 <85%	3	1.7	21	47.7
Pulse Frequency <50 x/minute	3	1.7	21	47.7
Breath Frequency < 6x/minute	3	1.7	21	47.7
Systolic Pressure < 60 mmHg	3	1.7	21	47.7
Nausea, Vomit	2	1.1	0	0
Pain in surgical site	2	1.1	0	0
Pulse Frequency >150x/minute	1	0.6	0	0
Anosmia	0	0	0	0

Hyperthermia (55.0%) was the most common nursing diagnosis in patients with COVID-19 treated in the isolation rooms, followed by ineffective airway clearance (38.3%). Meanwhile, the gas exchange disorder (90.9%) was the most common nursing diagnosis found in patients treated in the ICUs, followed by self-care deficit (81.8%), ineffective airway clearance (75.0%), and spontaneous ventilation disorder (56.8%) (**Table 4**).

Table 4 Data distribution of nursing diagnoses for patients with COVID-19

Nursing diagnoses in the isolation rooms	***n***	**%**
Hyperthermia	99	55.0
Ineffective airway clearance	69	38.3
Gas exchange disorder	45	25.0
Knowledge deficit	24	13.3
Spontaneous ventilation disorder	18	10.0
Self-care deficit	11	6.1
Acute pain	8	4.4
Shock risk	3	1.6
Diarrhea	3	1.6
Spontaneous circulatory disorder	2	1.1
Nausea	2	1.1
Risk of ineffective cerebral perfusion	1	0.6
Risk of nutritional deficit	1	0.6
Nursing diagnoses in the ICUs		
Gas exchange disorder	40	90.9
Self-care deficit	36	81.8
Ineffective airway clearance	33	75.0
Spontaneous ventilation disorder	25	56.8
Hyperthermia	21	47.7
Spontaneous circulatory disorder	21	47.7
Shock risk	21	47.7
Knowledge deficit	16	36.3

Discussion

Signs and Symptoms in Patients with COVID-19 Treated in the Isolation rooms and ICUs

Fever (temperature > 37.5°C) is the most common sign and symptom in COVID-19 patients in the isolation rooms. This is caused by an increase in the body's metabolic rate in response to viral infection. Fever symptom was higher in the isolation room than in the ICUs because, while in the isolation rooms, it was still in the initial phase of the disease process. As explained by Li et al. (2020), patients with COVID-19 will experience fever symptoms for three to seven days. Fever is the most dominant symptom; 43.8% of cases occurred the moment when patients were admitted to the hospital, and it increased to 88.7% during hospitalization (Guan et al., 2020).

Complaints of coughing and shortness of breath are more common in the ICUs than in the isolation rooms because the treatment in the ICU is follow-up care for the patients' condition who is deteriorating. Coughing and shortness of breath caused by viruses spread and invaded through the respiratory mucosa, triggering a series of immune responses and inducing cytokines that lead to changes in immune components, such as peripheral blood leukocytes and lymphocytes (Jafarzadeh et al., 2020; Zhang et al., 2020; Khan et al., 2021; Vale et al., 2021). The virus stimulates plasma cells to produce Immunoglobulin E (IgE). IgE will then attach to mast cell wall receptors called sensitized mast cells (Motta Junior et al., 2020; Ando & Kitaura, 2021). Sensitized mast cells will degranulate and release a number of mediators such as histamine and cytokines (Khan et al., 2021). These mediators cause an increase in capillary permeability resulting in mucosal edema, increased mucus production (Persson, 2021). Guan et al. (2020) also stated that coughing is a second-order problem after fever.

The decrease in oxygen saturation (SPO_2) was almost partially experienced by patients with COVID-19 in the isolation rooms and the ICUs. Mejía et al. (2020) stated that 90.9% of patients experienced a decrease in oxygen saturation. While Thille et al. (2013) noted that the decreased oxygen saturation could reach 87% due to diffuse alveolar damage, resulting in ARDS. However, the infection causes simple local interstitial edema, particularly localized at the interfaces between lung structures with different elasticity, where stress and tension are concentrated. Due to the increased pulmonary edema, loss of surfactant, and excessive pressure, alveolar collapse occurs, and part of the cardiac output releases fluid from the non-aerated lung tissue, resulting in pulmonary shunts (Waters et al., 2012).

In the analysis data of blood gas, our study showed that patients with COVID-19 in the ICUs and isolation rooms experienced a decrease in PO2, decrease in SaO2, increase in PCO2, and abnormality of blood pH. In addition, the ICU patients had a higher chance of experiencing an imbalance of gas components in the blood because they have advanced Acute Respiratory Distress Syndrom (ARDS) condition. In

addition, the symptoms of decreased consciousness were found in the isolation rooms and the ICUs. Patients with COVID-19 with ARDS will experience hyperactivation of CD4 and CD8 lymphocytes (Kang et al., 2020). This leads to an increase in pro-inflammatory mediators (cytokine storm) and results in lung damage and the formation of fibrosis tissue so that a malfunction may occur (Fara et al., 2020; Huang et al., 2020).

This study also found no signs and symptoms of anosmia either in the isolation rooms or in the ICUs, although studies stated that the patients with COVID-19 may experience anosmia or olfactory dysfunction that arises due to the changes in smell conduction because of the inflammatory process damaging cells in the nasal epithelium or nasal mucosa required for normal olfactory function (Izquierdo-Dominguez et al., 2020; Kanjanaumporn et al., 2020). Besides, a small number of patients in the isolation room had diarrhea, which is in line with D Amico et al. (2020) stated that 3% of patients with COVID-19 showed signs of diarrhea. Viruses cause infections in the digestive system because they release more viruses in the intestines which last longer than in the respiratory tract, causing gastrointestinal symptoms (Ye et al., 2020). Another mechanism that may occur is that the systemic inflammatory response can develop into a Systemic Inflammatory Response Syndrome (SIRS) condition, in which a cytokine storm can directly cause damage to the intestinal epithelium (Uzzan et al., 2020).

Nursing Diagnoses for Patients with COVID-19 in the Isolation Rooms and ICUs

There are 13 nursing diagnoses in the isolation rooms and eight diagnoses in the ICUs. All diagnoses in the ICUs are the same with some diagnoses in the Isolation rooms, including hyperthermia, ineffective airway clearance, gas exchange disorder, knowledge deficit, spontaneous ventilation disorder, self-care deficit, shock risk, and spontaneous circulatory disorder. Each nursing diagnosis is mostly based on the signs and symptoms of the patients, and we describe each diagnosis briefly for clarity.

The most common diagnosis was hyperthermia. The signs and symptoms of hyperthermia include fluctuating fever. Moller et al. (1989) stated that hyperthermia is associated with an increase in the body metabolic rate and the process of infection.

The diagnosis of ineffective airway clearance was determined by coughing complaints. It is associated with airway hypersecretion, retained secretions, or an infectious process (Guan et al., 2020). Some patients had a cough with phlegm that was difficult to come out, and some patients had a dry cough, accompanied by shortness of breath. Dry rhonchi or wheezing was also found, and this finding is supported by Guan et al. (2020); Gulati et al. (2020). The ineffective airway clearance is related to the airway hypersecretion and the infectious process (Tim Pokja SDKI DPP PPNI, 2017; Barros et al., 2020; González Aguña et al., 2021; Nascimento et al., 2021).

The nursing diagnosis for patients with COVID-19 was the gas exchange disorder. The signs and symptoms found were shortness of breath, abnormal breathing patterns (fast/slow), some had additional breath sounds (wheezing/rhonchi), some patients' consciousness decreased, sometimes had a complaint of dizziness, and decreased oxygen saturation. These findings are consistent with the results of Kang et al. (2020); Mejía et al. (2020). The gas exchange disorder diagnosis is related to the changes in the alveolar-capillary membrane (Petersson & Glenny, 2014; Barbeta et al., 2020; Chen et al., 2020; González Aguña et al., 2021; Ostergaard, 2021).

A small number of patients with COVID-19 experienced a knowledge deficit. Van Scoy et al. (2021) said this was due to the lack of information they received regarding the COVID-19 disease. From the results of this study, the patients showed an attitude of not knowing about the transmission process and the stages of the virus infection process. This finding is supported by a previous study (Gerhold, 2020). Patients did not know clearly the procedure for handling this disease (Zhou et al., 2021), and some patients have tried to refuse treatment in the isolation room. Knowledge deficit may be related to the ignorance of finding information sources or lack of exposure (Dhanani & Franz, 2020; Huynh et al., 2020).

Spontaneous ventilation disorder is the next nursing diagnosis. It was signed by the signs and symptoms of shortness of breath (dyspnea) (Gulati et al., 2020), an increase in PCO2 level (Petersson & Glenny, 2014), a decrease in PO2 level, a decrease in SaO2 (Kang et al., 2020), an increase in the use of accessory expiratory muscles (Ostergaard, 2021). The patients were anxious and had tachycardia. The body will consider viruses that infect the respiratory tract as foreign substances (antigens) (Hashemi & Homayuni, 2017; Batool Janjua et al., 2021; Khan et al., 2021). The binding between antigen and antibody will stimulate the release of chemical mediators such as histamine, neutrophil chemotactic show acting, epinephrine, norepinephrine, and prostaglandins (Matzkin et al., 2019). The increase in chemical mediators will stimulate an increase in capillary permeability, swelling of the airway mucosa (Ostergaard, 2021). Swelling of the airway mucosa will constrict the respiratory tract (bronchus) and shortness of breath (Gulati et al., 2020). It causes a decrease in the amount of external oxygen that enters during inspiration, thereby decreasing oxygen from the blood (Kang et al., 2020; Mejía et al., 2020). If this condition persists, it will result in a decrease in tissue oxygen so that the patient becomes pale and weak (Hunt et al., 2021; Ostergaard, 2021). The diagnosis of spontaneous ventilation disorder is associated with respiratory muscle fatigue (Ostergaard, 2021).

Self-care deficit diagnosis was also identified. It was indicated by the condition of some patients who were unable to go to the toilet on their own, unable to dress, unable to feed themselves, and some are unable to do make-up (Nascimento et al., 2021). General weakness caused by respiratory distress (gas exchange disorder) was known to cause patients to be unable to take care of themselves (Barbeta et al., 2020; Ostergaard, 2021). Studies indicated that the patients with COVID-19 with self-care deficit diagnosis are mostly related to weakness (Liu et al., 2020; Ostergaard, 2021).

The risk of shock was found in a small percentage. This diagnosis was signed by the condition of the patients with decreased consciousness to unconsciousness, decreased systolic blood pressure <60 mmHg, weak pulse <50 beats per minute, decreased respiratory rate, SaO2 <85 percent. This risk of shock is when the body experiences insufficient blood flow to body tissues (Ostergaard, 2021), which leads to life-

threatening cellular dysfunction (Motta Junior et al., 2020; Noris et al., 2020). This shock risk is also related to hypoxemia, sepsis (Alhazzani et al., 2020; Zhang et al., 2020; Ostergaard, 2021; Viana-Llamas et al., 2021). The diagnosis of shock risk is one of the diagnoses that can be applied in patients with COVID-19 with ARDS (Acute Respiratory Distress Syndrome) (de la Rica et al., 2020; Guo et al., 2020).

In addition, another nursing diagnosis of patients with COVID-19 treated was spontaneous circulation disorder. This was the same as patients treated in intensive care with respiratory failure problems due to other diseases (Mejía et al., 2020). When the coronavirus enters and infects the receptor, the virus builds and develops in the upper respiratory tract and lung tissue (Motta Junior et al., 2020; Ostergaard, 2021). The infection causes systemic endothelial dysfunction in COVID-19, which causes hemostasis disorders accompanied by platelet adhesion and aggregation activity, resulting in death due to blood clots in COVID-19 patients (Petrishchev et al., 2020). Furthermore, spontaneous circulation disorder is partly due to a cytokine syndrome that is closely related to a decrease in lymphocyte levels which triggers a significant decrease in CD8+ T cells and is positively correlated with mortality and morbidity rates of COVID-19 patients (Guan et al., 2020; Lu et al., 2020; Debuc & Smadja, 2021). This decrease in circulation has a significant effect on the circulation of nutrient supply for tissue metabolism, which results in a reduction of the distribution of blood circulation, which results in organ damage (Noris et al., 2020; Ostergaard, 2021).

The other nursing diagnoses did not exist in the ICUs, such as acute pain, diarrhea, nausea, risk of ineffective cerebral perfusion, and risk of nutritional deficit. Each diagnosis is explained in the following description.

The diagnosis of acute pain in some patients with COVID-19 in isolation rooms occurred to those with comorbidities, including childbirth by cesarean section, colon cancer, and gastritis. The percentage of this diagnosis was 2.8%. The patients complained of heartburn, lower left abdominal pain, prevalent abdominal pain, and pain in the surgical site. Shanthanna et al. (2020) stated that complaints of pain usually emerged in patients with COVID-19 who had comorbidities. However, there was no complaint of pain in patients with COVID-19 who did not have comorbidities.

Diarrhea and nausea were found in patients with COVID-19 with gastroenteritis. The patients showed symptoms of loose stools and nausea. Diarrhea diagnosis is related to gastrointestinal inflammation and infectious process (D Amico et al., 2020; Wei et al., 2020). The diagnosis of nutritional deficit risk was found in patients with COVID-19 with gastritis and gastroenteritis. Patients showed the symptoms of loose stools, nausea, vomiting, weakness, and some patients complained of weight loss. There was even a decrease in serum albumin level.

The next diagnosis was the risk of ineffective cerebral perfusion found in patients with COVID-19 with concomitant ischemic stroke. The patient showed weakness in half of their limbs, walked a bit shuffling, spoke sluggishly, and the CT-Scan showed a picture of ischemia. SARS-Cov-2 causes a cytokine storm that leads to hypercoagulation and an increase in vascular thrombosis in patients with COVID-19 (Panigada et al., 2020), causing patients with COVID-19 to suffer a stroke, including acute ischemic stroke (Tan et al., 2020). This diagnosis is related to disseminated intravascular coagulation (Panigada et al., 2020; Levi & Iba, 2021).

The risk of ineffective cerebral perfusion diagnosis in patients with COVID-19 had a very low total percentage. The risk of cerebral perfusion appears with indicators such as decreased consciousness, diastolic pressure, syncope, agitation, restlessness, hyperventilation, fever, and cognitive impairment (Tim Pokja SDKI DPP PPNI, 2017). It indicates a lack of oxygen for COVID-19 patients, which results in disruption of oxygen supply in the body (Huang et al., 2020). This regulation disorder causes hypoxic conditions, which refer to values below 40 mmHg in the presence of dyspnea and hyperventilation (Stendardi et al., 2008). The body compensates for hypoxia by increasing ventilation in a minute period, followed by an increase in respiratory rate and tidal volume (Vaporidi et al., 2020). Hyperventilation conditions further cause arterial vasoconstriction, which blocks the blood supply to the cerebral cortex which causes a decrease in consciousness, cognitive impairment, and changes in all forms of response (McHenry et al., 1965; Giannessi et al., 2008). Accurately individuals with COVID-19 represent poor outcomes with comorbid impairment of cerebrovascular hemodynamics due to hypoxia (Brasil et al., 2021). Hypoxic conditions indirectly cause damage to organs, especially the brain, due to lack of oxygen and an inflammatory process. Generally, severe complications are found in patients with COVID-19, such as stroke, hemorrhage, and acute encephalitis, as well as nervous system disorders (Marshall, 2020; Rahman et al., 2021).

A diagnosis of a nutritional deficit risk means that the patients are at risk of experiencing insufficient nutrient intake to fulfill metabolic demands (Hunt et al., 2021; Richardson & Lovegrove, 2021). This diagnosis is related to the inability to absorb nutrients and an increase in metabolic demands (Keller et al., 2017; Richardson & Lovegrove, 2021).

The signs and symptoms of COVID-19 and nursing diagnoses in this study are limited to what was documented in the medical record. There is a possibility that there are data that might not be studied or incomplete, which made the nursing diagnosis not cover the actual condition of the patient. In addition, some nursing diagnoses were difficult to be implemented due to the incomplete data during the assessment.

Conclusion

The most common signs and symptoms in patients with COVID-19 treated in the isolation rooms were fever and cough, while the most common sign and symptom in patients with COVID-19 treated in the ICUs was shortness of breath. Nursing diagnoses in the Indonesian patients with COVID-19 who were treated in the isolation rooms were hyperthermia, ineffective airway clearance, gas exchange disorder, knowledge deficit, spontaneous ventilation disorder, self-care deficit, acute pain, shock risk, diarrhea, nausea, spontaneous circulation disorders, risk of ineffective cerebral perfusion, risk of nutritional deficit. In contrast, nursing diagnoses in patients with COVID-19 who were treated in the ICUs were gas exchange disorder, self-care deficit, ineffective airway

clearance, spontaneous ventilation disorders, hyperthermia, spontaneous circulation disorder, shock risk, knowledge deficit. This study provided information about the nursing diagnoses and the intensive care nursing practice, as well as a resource for patients with COVID-19 caregivers. The role of nurses is critical in performing a comprehensive assessment from the emergency room and reassessment when they are in the room on a regular basis.

Declaration of Conflicting Interest

The authors declare that they have no conflict of interest in this study.

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Authors' Contributions

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Data Availability

Data sharing is not applicable to this article as no datasets were generated or analyzed during the current study.

References

Alhazzani, W., Møller, M. H., Arabi, Y. M., Loeb, M., Gong, M. N., Fan, E., . . . Dzierba, A. (2020). Surviving sepsis campaign: Guidelines on the management of critically ill adults with Coronavirus Disease 2019 (COVID-19). *Intensive Care Medicine, 46*(5), 854-887. https://doi.org/10.1007/s00134-020-06022-5

Ando, T., & Kitaura, J. (2021). Tuning IgE: IgE-associating molecules and their effects on IgE-dependent mast cell reactions. *Cells, 10*(7), 1697. https://doi.org/10.3390/cells10071697

Barbeta, E., Motos, A., Torres, A., Ceccato, A., Ferrer, M., Cilloniz, C., . . . Ferrando, C. (2020). SARS-CoV-2–induced acute respiratory distress syndrome: Pulmonary mechanics and gas-exchange abnormalities. *Annals of the American Thoracic Society, 17*(9), 1164-1168. https://doi.org/10.1513/AnnalsATS.202005-462RL

Barros, A. L. B. L. d., Silva, V. M. d., Santana, R. F., Cavalcante, A. M. R. Z., Vitor, A. F., Lucena, A. d. F., . . . Carmona, E. V. (2020). Brazilian nursing process research network contributions for assistance in the COVID-19 pandemic. *Revista Brasileira de Enfermagem, 73*(Suppl 2), e20200798. https://doi.org/10.1590/0034-7167-2020-0798

Batool Janjua, N., Petch, S., Akhtar Birmani, S., Seyal, S., Elhassadi, E., Azam, M., . . . Babu, S. (2021). Vertical transmission, maternal thrombocytopenia, & postpartum haemorrhage in coronavirus infection-a case report. *BJOG: An International Journal of Obstetrics and Gynaecology, 128*(Suppl 2), 198-198.

Brasil, S., Taccone, F. S., Wahys, S. Y., Tomazini, B. M., Annoni, F., Fonseca, S., . . . De-Lima-Oliveira, M. (2021). Cerebral hemodynamics and intracranial compliance impairment in critically ill COVID-19 patients: A pilot study. *Brain Sciences, 11*(7), 874. https://doi.org/10.3390/brainsci11070874

Carpenito-Moyet, L. J. (2009). *Nursing care plans & documentation: nursing diagnoses and collaborative problems* (5th ed.). Philadelphia: Lippincott Williams & Wilkins.

Chen, R., Gao, Y., Chen, M., Jian, W., Lei, C., Zheng, J., & Li, S. (2020). Impaired pulmonary function in discharged patients with COVID-19: More work ahead. *European Respiratory Journal, 56*(1), 2002194. https://doi.org/10.1183/13993003.02194-2020

D Amico, F., Baumgart, D. C., Danese, S., & Peyrin-Biroulet, L. (2020). Diarrhea during COVID-19 infection: Pathogenesis, epidemiology, prevention, and management. *Clinical Gastroenterology and Hepatology, 18*(8), 1663-1672. https://doi.org/10.1016/j.cgh.2020.04.001

de la Rica, R., Borges, M., & Gonzalez-Freire, M. (2020). COVID-19: In the eye of the cytokine storm. *Frontiers in Immunology, 11*, 2313. https://doi.org/10.3389/fimmu.2020.558898

Debuc, B., & Smadja, D. M. (2021). Is COVID-19 a new hematologic disease? *Stem Cell Reviews and Reports 17*(1), 4-8. https://doi.org/10.1007/s12015-020-09987-4

Deng, S.-Q., & Peng, H.-J. (2020). Characteristics of and public health responses to the coronavirus disease 2019 outbreak in China. *Journal of Clinical Medicine, 9*(2), 575. https://doi.org/10.3390/jcm9020575

Dewi, A., Utomo, B., & Rachman, S. (2020). *Nursing care guide (PAK) for patients critical with COVID-19*. Surabaya, Indonesia: Airlangga University Press.

Dhanani, L. Y., & Franz, B. (2020). The role of news consumption and trust in public health leadership in shaping COVID-19 knowledge and prejudice. *Frontiers in Psychology, 11*, 2812. https://doi.org/10.3389/fpsyg.2020.560828

Fara, A., Mitrev, Z., Rosalia, R. A., & Assas, B. M. (2020). Cytokine storm and COVID-19: A chronicle of pro-inflammatory cytokines. *Open Biology, 10*(9), 200160. https://doi.org/10.1098/rsob.200160

Gerhold, L. (2020). COVID-19: risk perception and coping strategies. *PsyArXiv*. https://doi.org/10.31234/osf.io/xmpk4

Giannessi, M., Ursino, M., & Murray, W. B. (2008). The design of a digital cerebrovascular simulation model for teaching and research. *Anesthesia & Analgesia, 107*(6), 1997-2008. https://doi.org/10.1213/ane.0b013e318187b987

González Aguña, A., Jiménez-Rodríguez, M. L., Fernández-Batalla, M., Herrero-Jaén, S., Monsalvo-San Macario, E., Real-Martínez, V., & Santamaría-García, J. M. (2021). Nursing diagnoses for coronavirus disease, COVID-19: Identification by taxonomic triangulation. *International Journal of Nursing Knowledge, 32*(2), 108-116.

Guan, W.-j., Ni, Z.-y., Hu, Y., Liang, W.-h., Ou, C.-q., He, J.-x., . . . Hui, D. S. C. (2020). Clinical characteristics of coronavirus disease 2019 in China. *New England Journal of Medicine, 382*(18), 1708-1720. https://doi.org/10.1056/NEJMoa2002032

Gulati, A., Pomeranz, C., Qamar, Z., Thomas, S., Frisch, D., George, G., . . . Sundaram, B. (2020). A comprehensive review of manifestations of novel coronaviruses in the context of deadly COVID-19 global pandemic. *The American Journal of the Medical Sciences, 360*(1), 5-34. https://doi.org/10.1016/j.amjms.2020.05.006

GÜNer, H. R., Hasanoğlu, İ., & Aktaş, F. (2020). COVID-19: Prevention and control measures in community. *Turkish Journal of Medical Sciences, 50*(SI-1), 571-577. https://doi.org/10.3906/sag-2004-146

Guo, Y.-R., Cao, Q.-D., Hong, Z.-S., Tan, Y.-Y., Chen, S.-D., Jin, H.-J., . . . Yan, Y. (2020). The origin, transmission and clinical therapies on coronavirus disease 2019 (COVID-19) outbreak–an update on the status. *Military Medical Research, 7*(1), 1-10. https://doi.org/10.1186/s40779-020-00240-0

Hashemi, L., & Homayuni, H. (2017). Emotional divorce: Child's well-being. *Journal of Divorce & Remarriage, 58*(8), 631-644. https://doi.org/10.1080/10502556.2016.1160483

Huang, C., Wang, Y., Li, X., Ren, L., Zhao, J., Hu, Y., . . . Gu, X. (2020). Clinical features of patients infected with 2019 novel coronavirus in Wuhan, China. *The Lancet, 395*(10223), 497-506. https://doi.org/10.1016/S0140-6736(20)30183-5

Hunt, R. H., East, J. E., Lanas, A., Malfertheiner, P., Satsangi, J., Scarpignato, C., & Webb, G. J. (2021). COVID-19 and gastrointestinal disease: Implications for the Gastroenterologist. *Digestive Diseases, 39*(2), 119-139. https://doi.org/10.1159/000512152

Huynh, G., Nguyen, M. Q., Tran, T. T., Nguyen, V. T., Nguyen, T. V., Do, T. H. T., . . . Nguyen, T. N. H. (2020). Knowledge, attitude, and practices regarding COVID-19 among chronic illness patients at outpatient departments in Ho Chi Minh City, Vietnam. *Risk Management and Healthcare Policy, 13*, 1571-1578. https://dx.doi.org/10.2147%2FRMHP.S268876

Izquierdo-Dominguez, A., Rojas-Lechuga, M. J., Mullol, J., & Alobid, I. (2020). Olfactory dysfunction in the COVID-19 outbreak. *Journal of Investigational Allergology and Clinical Immunology, 30*(5), 317-326. https://doi.org/10.18176/jiaci.0567

Jafarzadeh, A., Chauhan, P., Saha, B., Jafarzadeh, S., & Nemati, M. (2020). Contribution of monocytes and macrophages to the local tissue inflammation and cytokine storm in COVID-19: Lessons from SARS and MERS, and potential therapeutic interventions. *Life Sciences, 257*, 118102. https://doi.org/10.1016/j.lfs.2020.118102

Kang, C. K., Han, G.-C., Kim, M., Kim, G., Shin, H. M., Song, K.-H., . . . Kim, H. B. (2020). Aberrant hyperactivation of cytotoxic T-cell as a potential determinant of COVID-19 severity. *International Journal of Infectious Diseases, 97*, 313-321. https://doi.org/10.1016/j.ijid.2020.05.106

Kanjanaumporn, J., Aeumjaturapat, S., Snidvongs, K., Seresirikachorn, K., & Chusakul, S. (2020). Smell and taste dysfunction in patients with SARS-CoV-2 infection: A review of epidemiology, pathogenesis, prognosis, and treatment options. *Asian Pacific Journal of Allergy and Immunology, 38*(2), 69-77.

Keller, H. H., Carrier, N., Slaughter, S. E., Lengyel, C., Steele, C. M., Duizer, L., . . . Yoon, M. N. (2017). Prevalence and determinants of poor food intake of residents living in long-term care. *Journal of the American Medical Directors Association, 18*(11), 941-947. https://doi.org/10.1016/j.jamda.2017.05.003

Khan, M. A., Khan, Z. A., Charles, M., Pratap, P., Naeem, A., Siddiqui, Z., . . . Srivastava, S. (2021). Cytokine storm and mucus hypersecretion in COVID-19: Review of mechanisms. *Journal of Inflammation Research, 14*, 175-189. https://dx.doi.org/10.2147%2FJIR.S271292

Levi, M., & Iba, T. (2021). COVID-19 coagulopathy: Is it disseminated intravascular coagulation? *Internal and Emergency Medicine, 16*(2), 309-312. https://doi.org/10.1007/s11739-020-02601-y

Li, J.-Y., You, Z., Wang, Q., Zhou, Z.-J., Qiu, Y., Luo, R., & Ge, X.-Y. (2020). The epidemic of 2019-novel-coronavirus (2019-nCoV) pneumonia and insights for emerging infectious diseases in the future. *Microbes and Infection, 22*(2), 80-85. https://doi.org/10.1016/j.micinf.2020.02.002

Liu, Q., Luo, D., Haase, J. E., Guo, Q., Wang, X. Q., Liu, S., . . . Yang, B. X. (2020). The experiences of health-care providers during the COVID-19 crisis in China: A qualitative study. *The Lancet Global Health, 8*(6), e790-e798. https://doi.org/10.1016/S2214-109X(20)30204-7

Lu, R., Zhao, X., Li, J., Niu, P., Yang, B., Wu, H., . . . Zhu, N. (2020). Genomic characterisation and epidemiology of 2019 novel coronavirus: Implications for virus origins and receptor binding. *The Lancet, 395*(10224), 565-574. https://doi.org/10.1016/S0140-6736(20)30251-8

Marshall, M. (2020). How COVID-19 can damage the brain. *Nature, 585*(7825), 342-343. https://doi.org/10.1038/d41586-020-02599-5

Matzkin, M. E., Riviere, E., Rossi, S. P., Ponzio, R., Puigdomenech, E., Levalle, O., . . . Frungieri, M. B. (2019). β-adrenergic receptors in the up-regulation of COX2 expression and prostaglandin production in testicular macrophages: Possible relevance to male idiopathic infertility. *Molecular and Cellular Endocrinology, 498*, 110545. https://doi.org/10.1016/j.mce.2019.110545

McHenry, L. C., Slocum, H. C., Bivens, H. E., Mayes, H. A., & Hayes, G. J. (1965). Hyperventilation in awake and anesthetized man: Effects on cerebral blood flow and cerebral metabolism. *Archives of Neurology, 12*(3), 270-277. https://doi.org/10.1001/archneur.1965.00460270046006

Mejía, F., Medina, C., Cornejo, E., Morello, E., Vásquez, S., Alave, J., . . . Málaga, G. (2020). Oxygen saturation as a predictor of mortality in hospitalized adult patients with COVID-19 in a public hospital in Lima, Peru. *PloS One, 15*(12), e0244171. https://doi.org/10.1371/journal.pone.0244171

Moller, N., Beckwith, R., Butler, P. C., Christensen, N. J., Ørskov, H., & Alberti, K. (1989). Metabolic and hormonal responses to exogenous hyperthermia in man. *Clinical Endocrinology, 30*(6), 651-660. https://doi.org/10.1111/j.1365-2265.1989.tb00271.x

Motta Junior, J. d. S., Miggiolaro, A. F. R. d. S., Nagashima, S., de Paula, C. B. V., Baena, C. P., Scharfstein, J., & de Noronha, L. (2020). Mast cells in alveolar septa of COVID-19 patients: A pathogenic pathway that may link interstitial edema to immunothrombosis. *Frontiers in Immunology, 11*, 2369. https://doi.org/10.3389/fimmu.2020.574862

Nascimento, T. F., Almeida, G. M. F. d., Bello, M. P., Silva, R. P. L. d., & Fontes, C. M. B. (2021). Coronavirus infections: Health care planning based on Orem's Nursing Theory. *Revista Brasileira de Enfermagem, 74*(Suppl 1), e20200281. https://doi.org/10.1590/0034-7167-2020-0281

Noris, M., Benigni, A., & Remuzzi, G. (2020). The case of complement activation in COVID-19 multiorgan impact. *Kidney International, 98*(2), 314-322. https://doi.org/10.1016/j.kint.2020.05.013

Nursalam. (2015). *Nursing research methodology: Practical approach* (4th ed.). Jakarta, Indonesia: Salemba Medika.

Ostergaard, L. (2021). SARS CoV-2 related microvascular damage and symptoms during and after COVID-19: Consequences of capillary transit-time changes, tissue hypoxia and inflammation. *Physiological Reports, 9*(3), e14726. https://doi.org/10.14814/phy2.14726

Panigada, M., Bottino, N., Tagliabue, P., Grasselli, G., Novembrino, C., Chantarangkul, V., . . . Tripodi, A. (2020). Hypercoagulability of COVID-19 patients in intensive care unit: A report of thromboelastography findings and other parameters of hemostasis. *Journal of Thrombosis and Haemostasis, 18*(7), 1738-1742. https://doi.org/10.1111/jth.14850

Persson, C. (2021). Early humoral defence: Contributing to confining COVID-19 to conducting airways? *Scandinavian Journal of Immunology, 93*(6), e13024. https://doi.org/10.1111/sji.13024

Petersson, J., & Glenny, R. W. (2014). Gas exchange and ventilation–perfusion relationships in the lung. *European Respiratory Journal, 44*(4), 1023-1041.

Petrishchev, N. N., Khalepo, O. V., Vavilenkova, Y. A., & Vlasov, T. D. (2020). COVID-19 and vascular disorders (literature review). *Regional Blood Circulation and Microcirculation, 19*(3), 90-98. https://doi.org/10.24884/1682-6655-2020-19-3-90-98

Rahman, A., Tabassum, T., Araf, Y., Al Nahid, A., Ullah, M. A., & Hosen, M. J. (2021). Silent hypoxia in COVID-19: Pathomechanism and possible management strategy. *Molecular Biology Reports 48*, 3863-3869. https://doi.org/10.1007/s11033-021-06358-1

Rasmussen, S. A., Smulian, J. C., Lednicky, J. A., Wen, T. S., & Jamieson, D. J. (2020). Coronavirus disease 2019 (COVID-19) and pregnancy: What obstetricians need to know. *American Journal of Obstetrics and Gynecology, 222*(5), 415-426. https://doi.org/10.1016/j.ajog.2020.02.017

Richardson, D. P., & Lovegrove, J. A. (2021). Nutritional status of micronutrients as a possible and modifiable risk factor for COVID-19: A UK perspective. *British Journal of Nutrition, 125*(6), 678-684. https://doi.org/10.1017/S000711452000330X

Rony, M. K. K., Bala, S. D., Rahman, M. M., Dola, A. J., Kayesh, I., Islam, M. T., . . . Rahman, S. (2021). Experiences of front-line nurses caring for patients with COVID-19 in Bangladesh: A qualitative study. *Belitung Nursing Journal, 7*(5), 380-386. https://doi.org/10.33546/bnj.1680

Roudsari, P. P., Alavi-Moghadam, S., Payab, M., Sayahpour, F. A., Aghayan, H. R., Goodarzi, P., . . . Arjmand, B. (2020). Auxiliary role of mesenchymal stem cells as regenerative medicine soldiers to attenuate inflammatory processes of severe acute respiratory infections caused by COVID-19. *Cell and Tissue Banking, 21*, 405-425. https://doi.org/10.1007/s10561-020-09842-3

Shanthanna, H., Strand, N. H., Provenzano, D. A., Lobo, C. A., Eldabe, S., Bhatia, A., . . . Narouze, S. (2020). Caring for patients with pain during the COVID-19 pandemic: Consensus recommendations from an international expert panel. *Anaesthesia, 75*(7), 935-944. https://doi.org/10.1111/anae.15076

Sholihah, L. (2020). *The role and competence of nurses in handling a pandemic in COVID-19 cases: Literature review.* Universitas Pendidikan Indonesia, Bandung, Indonesia. Retrieved from http://repository.upi.edu/50133/

Stendardi, L., Binazzi, B., & Scano, G. (2008). Pathophysiology of dyspnea. *Patologia Dell'Apparato Respiratorio, 23*(4), 208–218. https://doi.org/10.1056/nejm199512073332307

Tan, Y.-K., Goh, C., Leow, A. S. T., Tambyah, P. A., Ang, A., Yap, E.-S., . . . Chan, B. P. L. (2020). COVID-19 and ischemic stroke: A systematic review and meta-summary of the literature. *Journal of Thrombosis and Thrombolysis, 50*(3), 587-595. https://doi.org/10.1007/s11239-020-02228-y

Thille, A. W., Esteban, A., Fernández-Segoviano, P., Rodriguez, J.-M., Aramburu, J.-A., Vargas-Errázuriz, P., . . . Frutos-Vivar, F. (2013). Chronology of histological lesions in acute respiratory distress syndrome with diffuse alveolar damage: A prospective cohort study of clinical autopsies. *The Lancet Respiratory Medicine, 1*(5), 395-401. https://doi.org/10.1016/S2213-2600(13)70053-5

Tim Pokja SDKI DPP PPNI. (2017). *Indonesian nursing diagnosis standards* (1st ed.). Jakarta: Dewan Pengurus Pusat Perasatuan Perawat Nasional Indonesia.

Tsai, P.-H., Lai, W.-Y., Lin, Y.-Y., Luo, Y.-H., Lin, Y.-T., Chen, H.-K., . . . Chen, S.-D. (2021). Clinical manifestation and disease progression in COVID-19 infection. *Journal of the Chinese Medical Association, 84*(1), 3-8. https://doi.org/10.1097/JCMA.0000000000000463

Uzzan, M., Corcos, O., Martin, J. C., Treton, X., & Bouhnik, Y. (2020). Why is SARS-CoV-2 infection more severe in obese men? The gut lymphatics–Lung axis hypothesis. *Medical Hypotheses, 144*, 110023. https://doi.org/10.1016/j.mehy.2020.110023

Vale, A. J. M., Fernandes, A. C. L., Guzen, F. P., Pinheiro, F. I., De Azevedo, E. P., & Cobucci, R. N. (2021). Susceptibility to COVID-19 in pregnancy, labor, and postpartum period: Immune system, vertical transmission, and breastfeeding. *Frontiers in Global Women's Health, 2*, 8. https://doi.org/10.3389/fgwh.2021.602572

Vaporidi, K., Akoumianaki, E., Telias, I., Goligher, E. C., Brochard, L., & Georgopoulos, D. (2020). Respiratory drive in critically ill patients. Pathophysiology and clinical implications. *American Journal of Respiratory and Critical Care Medicine, 201*(1), 20-32. https://doi.org/10.1164/rccm.201903-0596SO

Viana-Llamas, M. C., Arroyo-Espliguero, R., Silva-Obregón, J. A., Uribe-Heredia, G., Núñez-Gil, I., García-Magallón, B., . . . Rodríguez-Guinea, I. (2021). Hypoalbuminemia on admission in COVID-19 infection: An early predictor of mortality and adverse events. A retrospective observational study. *Medicina Clinica, 156*(9), 428-436. https://doi.org/10.1016/j.medcli.2020.12.018

Waters, C. M., Roan, E., & Navajas, D. (2012). Mechanobiology in lung epithelial cells: Measurements, perturbations, and responses. *Comprehensive Physiology, 2*(1), 1-29. https://dx.doi.org/10.1002%2Fcphy.c100090

Wei, X.-S., Wang, X., Niu, Y.-R., Ye, L.-L., Peng, W.-B., Wang, Z.-H., . . . Ma, W.-L. (2020). Diarrhea is associated with prolonged symptoms and viral carriage in corona virus disease 2019. *Clinical Gastroenterology and Hepatology, 18*(8), 1753-1759. https://doi.org/10.1016/j.cgh.2020.04.030

Wijaya, D. Y., & Yulianto, A. (2021). Prototype of smart door using RFID technology with Internet of Things (IoT). *CoMBInES-Conference on Management, Business, Innovation, Education and Social Sciences, 1*(1), 196-204.

Ye, Q., Wang, B., Zhang, T., Xu, J., & Shang, S. (2020). The mechanism and treatment of gastrointestinal symptoms in patients with COVID-19. *American Journal of Physiology-Gastrointestinal and Liver Physiology, 319*(2), G245-G252. https://doi.org/10.1152/ajpgi.00148.2020

Zhang, Y., Wang, Z., Zhang, Y., Tong, H., Zhang, Y., & Lu, T. (2020). Potential mechanisms for traditional Chinese medicine in treating airway mucus hypersecretion associated with coronavirus disease 2019. *Frontiers in Molecular Biosciences, 7*, 358. https://doi.org/10.3389/fmolb.2020.577285

Zhou, C., Yue, X. D., Zhang, X., Shangguan, F., & Zhang, X. Y. (2021). Self-efficacy and mental health problems during COVID-19 pandemic: A multiple mediation model based on the Health Belief Model. *Personality and Individual Differences, 179*, 110893. https://doi.org/10.1016/j.paid.2021.110893

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