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# A Retrospective Evaluation of COVID-19-Related Nursing Diagnoses, Interventions, and Outcomes in Patients Hospitalized with a COVID-19 Diagnosis

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**Abstract**

**Background:** The rapidly increasing number of Coronavirus Disease 2019 (COVID-19) cases worldwide has led to higher hospital densities and increased the workload of nurses.

**Aim:** This retrospective and descriptive study was planned to determine COVID-19-related nursing diagnoses, interventions, and outcomes in hospitalized patients with COVID-19.

**Methods:** The study was conducted using the records of individuals (n = 849) who were hospitalized at a university hospital with a diagnosis of COVID-19 between March 2020 and February 2021. Data were collected using a form developed by the researchers, based on North American Nursing Diagnosis Association International (NANDA-I) nursing diagnoses, Nursing Interventions Classification (NIC) nursing interventions, and Nursing Outcomes Classification (NOC) nursing outcomes. Descriptive statistics were used to analyze the data.

**Results:** The most frequently used nursing diagnoses during hospitalization were identified as "Risk for injury," "Risk for infection," "Risk for transmission of infection," "Ineffective breathing pattern," and "Risk for impaired skin integrity." The most frequently used interventions specific to these diagnoses included: "Introduce environmental measures during each hospitalization," "Monitor vital signs regularly," "Implement isolation methods based on the infectious agent," "Auscultate lung sounds," and "Provide oxygen support." The "Reached" outcome was marked for all patients except those who died during the evaluation.

**Conclusion:** It is recommended to plan in-service training for nurses to enhance the effective use of NANDA-I diagnosis, NIC interventions, and NOC outcomes. Additionally, integrating up-to-date guidelines into the electronic information systems used in healthcare institutions is suggested.

*Keywords: Coronavirus Disease 2019 (COVID-19), North American Nursing Diagnosis Association International (NANDA-I), nursing process, patient care planning, standardized nursing terminologies*

## Introduction

Nursing is a discipline that has been dedicated to patient care since the time of Florence Nightingale and has integrated the nursing process into clinical care.[1] The nursing process is a structured problem-solving approach used in clinical practice and nursing education.[2] In the last decade, significant efforts have been made to enhance the usability and improve nursing documentation. One of the most important advancements has been the development and implementation of research-based standardized nursing terminologies, such as the International Classification for Nursing Practice (ICNP) and North American Nursing Diagnosis Association International (NANDA-I).[3]

The development of standardized nursing terminologies and the establishment of a common language among nurses are fundamental to advancing nursing as a scientific discipline. The growth of knowledge and the creation of a shared language in nursing have been supported by the evolution of standardized language systems that enhance the clinical judgement of nurses.[4-8]

The American Nurses Association (ANA) recognizes 12 standardized languages that support nursing practice.[9] Among these, the most commonly used in clinical settings are NANDA-I, Nursing Interventions Classification (NIC), and Nursing Outcomes Classification (NOC).[4,5,10-13] The creation and application of NANDA-I nursing diagnoses, NOC outcomes,

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and NIC interventions (NNN) facilitate a holistic, person-centered approach to care, tailored to the individual's disease or health status. Nursing-based care planning benefits patients who actively participate in this methodology and enhances the continuity of their care from hospital to home. Utilizing standardized classifications such as the NNN taxonomy helps systematically document care and more accurately assess nursing-sensitive healthcare outcomes.[14,15]

It is also important to provide nursing care using NNN connections, ensuring scientific and evidence-based care for patients with chronic diseases, comorbidities, and those requiring long-term care in various healthcare environments. The importance of working with leading and guiding nursing classification systems is even more critical in conditions like Coronavirus Disease 2019 (COVID-19), where uncertainties are high. While the virus itself is novel, nursing diagnoses associated with the disease are not unique.[16] However, the extent to which nurses used disease-specific diagnoses, interventions, and outcomes while caring for patients diagnosed with COVID-19 during the unprepared pandemic response is an area for further research. The findings of this research are crucial for guiding future educational planning. Moreover, due to the limited information in the literature, there is a need for accurate and comprehensive documentation and sharing of information regarding nursing diagnoses made during the COVID-19 pandemic, the interventions applied for these diagnoses, and their outcomes. For these reasons, this study was designed to determine COVID-19-related nursing diagnoses, interventions, and outcomes in patients hospitalized with a COVID-19 diagnosis. Examining NNN connections in this registry-based study will support nurses' clinical decision-making and contribute to improving healthcare outcomes.

### Research Questions

In this study, answers to the following questions were sought for patients hospitalized with a diagnosis of COVID-19:

1. What are the NANDA-I nursing diagnoses?
2. Which nursing interventions were applied?
3. How were patient outcomes evaluated?

## Materials and Methods

### Design

This is a retrospective and descriptive study. The aim of this study was to determine the nursing diagnoses, interventions, and outcomes related to COVID-19 in patients hospitalized with a COVID-19 diagnosis.

### Population and Sample

The inclusion criteria for the study encompassed all patients admitted to a university hospital with a diagnosis of COVID-19 between March 2020 and February 2021, including all age groups.

### Data Collection Tool and Data Collection

Data were collected between January 17 and April 29, 2022 by the researchers using a data collection form. This form was developed by the researchers in line with the study's aim, utilizing relevant literature sources.[4,5,8,12,16-19] The data collection form included questions regarding the individuals' descriptive characteristics (age, gender, comorbid diseases, duration of hospitalization) and the nursing process. Data were retrieved from the hospital's electronic information system in accordance with the study's objectives.

### Data Analysis

Data analysis was performed using the IBM Statistical Package for the Social Sciences 28.0 (IBM SPSS Corp.; Armonk, NY, USA) and Microsoft Excel (Microsoft, Redmond, WA, USA). For data analysis, frequency and percentage were used for categorical data, while mean and standard deviation were used for numerical data.

### Ethical Considerations

Ethics committee approval was obtained from Ethics Committee of Koç University (Approval Number: 2022.010.IRB1.010, Date: 13.01.2022) before starting the study. Additionally, institutional permission was obtained from the hospital where the study was conducted. Since this was a retrospective study, it was accepted that individuals had given consent for participation based on the statement, "I consent to the use of my personal data for research purposes," included in the consent forms they signed during hospitalization. The study adhered to the principles of the Declaration of Helsinki.

## Results

The mean age of the patients was 58.20 ± 20.09 years. Of all patients, 57.0% were male, and 84.1% had comorbid diseases. The mean duration of hospitalization was 7.31 ± 5.79 days, and 43 patients were recorded as deceased (exitus) after hospitalization (Table 1).

It was found that nurses providing care for patients with COVID-19 recorded 24 nursing diagnoses from the NANDA-I classification and three nursing diagnoses that were not included in the NANDA-I classification system (Table 2). The most commonly recorded NANDA-I nursing diagnoses in the care plans included risk for falls, risk for infection, and risk for impaired skin integrity from the safety/protection domain and ineffective breathing pattern from the activity/exercise domain. The most frequently recorded nursing diagnoses that were not included in the NANDA-I classification system were the risk of transmission of infection and risk of ineffective respiratory function (Table 2).

Table 3 presents the most frequently used nursing interventions performed by nurses caring for patients diagnosed with COVID-19. The most commonly performed interventions included: "Risk for falls – Introduce the environment at each hospitalization," "Ineffective breathing pattern – Monitor pain and provide oxygen support," "Risk for impaired skin integrity – Perform skin assessment every 12 hours," "Hyperthermia – Monitor body temperature," and "Ineffective airway clearance – Provide an appropriate position to prevent aspiration, perform airway aspiration if necessary, provide oxygen support, and apply invasive/non-invasive ventilation methods." (Table 3).

When the outcomes of the interventions for the nursing diagnoses were analyzed, the nurses recorded the evaluations as "reached" for 94.93% of the patients who recovered or were discharged and "not reached" for 5.07% of the patients who were recorded as deceased.

## Discussion

In this study, the medical records of 849 patients diagnosed with COVID-19 were analyzed, and nursing diagnoses, nursing interventions, and nursing outcomes were identified. When compared with relevant literature, despite the limitations of this registry-based study, it is

**Table 1.** Descriptive Characteristics of Participants (n = 849)

| Variables | Categories | *n* | % | M | SD | Range Min-Max | |
|---|---|---|---|---|---|---|---|
| Age | - | - | - | 58.20 | 20.09 | 0 | 95 |
| Length of Stay | - | - | - | 7.31 | 5.79 | 1 | 58 |
| Gender | Female | 365 | 43 | - | | - | |
| | Male | 484 | 57 | - | | - | |
| Comorbid Disease | None | 135 | 15.9 | - | | - | |
| | Yes | 714 | 84.1 | - | | - | |
| Types of Comorbid Diseases | Respiratory Diseases | 366 | 51.2 | - | | - | |
| | Hypertension | 207 | 28.9 | - | | - | |
| | Diabetes Mellitus | 171 | 23.9 | - | | - | |
| | Cancer | 89 | 12.4 | - | | - | |
| | Heart Diseases | 84 | 11.7 | - | | - | |
| | Neurological Diseases | 53 | 7.4 | - | | - | |
| | Renal Diseases | 49 | 6.8 | - | | - | |
| | Thyroid Gland Diseases | 43 | 6.0 | - | | - | |
| | Hematological Diseases | 30 | 4.2 | - | | - | |
| | Liver Diseases | 16 | 2.2 | - | | - | |
| | Other* | 9 | 1.2 | - | | - | |

*Other: Includes disorders of the lacrimal gland, ulcerative colitis, Crohn's disease.

strong in terms of sample size, time span, and comprehensive coverage of the NNN classification system. As a pioneering study, it contributes valuable data to the literature.[17-20] In a retrospective cohort study conducted by Barioni et al.[18] in 2022 on patients hospitalized with COVID-19 in the general intensive care unit of a hospital in Brazil, nursing diagnoses for adult patients (n = 57) were exclusively analyzed. Hidayti et al.[19] in 2021 examined the records of patients (n = 222) diagnosed with COVID-19 between December 2020 and February 2021 in a hospital in Indonesia. Their study evaluated the nursing diagnoses made specifically for these patients, the nursing interventions applied, and the patient outcomes achieved through follow-up interventions. Similarly, in the study conducted by Asghari et al.[20] in 2022 on the care plans of patients diagnosed with COVID-19 in Iran, only nursing interventions were examined,[20] while the study by Chang et al. in 2023 focused on NANDA-I nursing diagnoses. Collectively, these studies demonstrate that the nursing diagnoses that can be made for patients with a medical diagnosis of COVID-19, the nursing interventions applied, and the nursing outcomes evaluating these interventions serve as a valuable guide for both nurses and hospitals.[17-20]

In this study, the majority of patients were COVID-19 patients with comorbid diseases, reflecting the high prevalence of chronic and comorbid conditions in the general population. The most common comorbidities were respiratory diseases (51.2%, n = 366), hypertension (28.9%, n = 207), and diabetes mellitus (23.9%, n = 171), aligning with the relevant literature and highlighting the health conditions considered as risk factors for COVID-19.[18,19,21,22]

In our retrospective evaluation, a total of 27 nursing diagnoses were identified. The NANDA-I domains with the highest number of diagnoses were activity/rest, safety/protection, and nutrition. The most frequently recorded nursing diagnoses included risk for falls, risk for infection, risk for transmission of infection, ineffective breathing pattern, risk for impaired skin integrity, risk for impaired respiratory function, and hyperthermia. In other retrospective studies examining nursing diagnoses in COVID-19 patients, the most commonly used nursing diagnoses were impaired spontaneous ventilation, ineffective breathing pattern, imbalanced nutrition: less than body requirements, impaired gas exchange, decreased activity tolerance, risk for infection, risk for aspiration, and acute pain.[19,23-25] In this context, studies with a similar design align with the NANDA-I nursing diagnoses we evaluated. According to the nine studies included in the systematic review, the most frequently made NANDA-I nursing diagnoses were impaired gas exchange, ineffective breathing pattern, and hyperthermia, demonstrating results consistent with the literature. When the domains in NANDA-I were analyzed, the activity/exercise and safety/protection domains were found to contain human responses corresponding to the most common diagnoses.[26]

Consistent with the literature, respiratory-related nursing diagnoses such as ineffective breathing pattern and risk of ineffective pulmonary function were identified as the highest-priority concerns in COVID-19 patients. This is due to the varying severity and spectrum of COVID-19, ranging from asymptomatic infection and mild upper respiratory tract disease to respiratory failure and/or death. The symptoms typically manifest as fever, fatigue, and dry cough,[27,28] which are defining characteristics of the nursing diagnoses made for these patients. In this context, the retrospective study conducted by Chang (2023) found that the nursing diagnoses identified were related to the symptoms and clinical findings of COVID-19. Accordingly, the most frequently recorded nursing diagnoses were hyperthermia and ineffective airway clearance.[22] In our study, a key finding was that 80% of the descriptive characteristics of the recorded nursing diagnoses corresponded to COVID-19 symptoms. The nursing diagnoses we evaluated aligned closely with the known signs and symptoms of COVID-19.

One significant result of this study is the remarkably low number of nursing diagnoses related to the psychosocial domain associated with COVID-19. In this context, suffering, anxiety, and fear were the least detected nursing diagnoses in our study. However, patients diagnosed with COVID-19 often experience fear and anxiety due to factors such as the lack of information caused by isolation, the uncertainty surrounding the COVID-19 pandemic, the absence of a definitive treatment, and a poor prognosis.[29] To provide individual-centered and holistic care, nursing care should address not only physical needs but also psychosocial needs. Factors such as increased workloads, limited time with patients due to the risk of transmission, activity restrictions, and the physical needs of patients in isolation may have influenced these behaviors of nurses.[30] However, it is noted that individually tailored nursing diagnoses, which are frequently used in COVID-19 patients, can enhance the quality of individualized care, improve symptom management, minimize time loss, and reduce the workload of nurses.[23]

**Table 2.** The Most Frequently Used Nursing Diagnoses by Nurses Caring for Patients Diagnosed with Coronavirus Disease 2019 (COVID-19)

| *NANDA-1 Nursing Diagnosis* | *n* | *%* |
|---|---|---|
| *DOMAIN 2. Nutrition* | | |
| Excess fluid volume | 2 | 0.24 |
| Imbalanced nutrition: less than body requirements | 2 | 0.24 |
| *DOMAIN 3. Elimination and Exchange* | | |
| Risk for constipation | 1 | 0.12 |
| *DOMAIN 4. Activity/Exercise* | | |
| Ineffective breathing pattern | 79 | 9.31 |
| Impaired bed mobility | 2 | 0.24 |
| Decreased activity tolerance | 3 | 0.35 |
| Disturbed sleep pattern | 10 | 1.18 |
| Self-care deficit | 20 | 2.36 |
| *DOMAIN 5. Perception/Cognition* | | |
| Impaired verbal communication | 3 | 0.35 |
| *DOMAIN 7. Role Relationships* | | |
| Impaired social interaction | 1 | 0.12 |
| *DOMAIN 9. Coping/Tolerance* | | |
| Fear | 1 | 0.12 |
| Anxiety | 5 | 0.59 |
| *DOMAIN 11. Safety/Protection* | | |
| Ineffective thermoregulation | 1 | 0.12 |
| Impaired tissue integrity | 1 | 0.12 |
| Impaired oral mucous membrane integrity | 2 | 0.24 |
| Hyperthermia | 14 | 1.65 |
| Ineffective airway clearance | 17 | 2.00 |
| Risk for bleeding | 22 | 2.59 |
| Risk for aspiration | 36 | 4.24 |
| Risk for impaired skin integrity | 70 | 8.24 |
| Risk for infection | 789 | 92.93 |
| Risk for injury | 799 | 94.11 |
| *DOMAIN 12. Comfort* | | |
| Nausea | 2 | 0.24 |
| Acute pain | 15 | 1.77 |
| *Nursing Diagnoses Not Included in NANDA-I* | | |
| Risk of transmission of infection | 554 | 65.25 |
| Risk of ineffectiveness in pulmonary function | 69 | 8.13 |
| Suffering | 1 | 0.12 |

A review of the literature reveals that most studies evaluating COVID-19 patients holistically and utilizing individual-specific nursing diagnoses are case studies. When these evaluated cases were analyzed, the most common nursing diagnoses in COVID-19 patients included ineffective airway clearance, impaired gas exchange, acute pain, imbalanced nutrition: less than body requirements, fatigue, anxiety, social isolation, risk for impaired parenting, risk of transmitting infection, labile emotional control, and situational low self-esteem.[31-33] In contrast to our findings, an analysis of nursing diagnoses in case reports indicates that psychosocial needs are evaluated alongside physical needs. This finding suggests that certain psychosocial needs of patients diagnosed with COVID-19 remain unmet, highlighting a significant gap in holistic nursing care. Various factors may contribute to this issue, including nurses' prioritization of patients' needs, heavy workloads, and nurses' lack of confidence or competence in identifying and addressing psychosocial needs.[18,20,22,24]

The nursing interventions applied to patients in the institution where the data were collected are not integrated with a standardized classification system such as the NIC. Instead, the interventions were developed by the nursing services and uploaded to the hospital's electronic information system. An examination of these nursing interventions revealed that the most frequently applied interventions addressed common nursing diagnoses, including "Introduce the environment at each hospitalization," "Monitor life signs," "Apply isolation methods based on the infectious agent," "Monitor pain," "Provide oxygen support," "Perform skin evaluation every 12 hours," and "Auscultate lung sounds." The literature includes studies both utilizing and not utilizing NIC interventions when providing care for patients diagnosed with COVID-19. In studies that did not use the NIC interventions, nursing interventions included non-standard interventions developed by the institution. These studies are consistent with the interventions identified in our study.[17,31,32,34,35] However, in studies that incorporated nursing interventions from the NIC classification system, different interventions were applied. For example, in the study conducted by González-Aguña[24] in 2021 47 nursing activities associated with the identified nursing interventions were implemented.[24] In the study by Asghari et al.[20] in 2022, which focused solely on nursing interventions for patients hospitalized with COVID-19, 10 NIC interventions were frequently used out of 34 identified NIC interventions: Admission Care, Environmental Management, Health Education, Infection Protection, Medication Administration, Positioning, Respiratory Monitoring, Vital Signs Monitoring, Nausea Management, and Diarrhea Management. An analysis of these studies indicates that NIC interventions used in other research differ from those in our study. Nurses determine the interventions they apply based on the diagnoses they make through critical thinking. The decision-making process enables nurses to provide rational, patient-centered care aligned with the individual's needs. For this reason, the use of a standardized diagnostic classification system is crucial for making nursing care visible and monitoring patient progress. Therefore, classification systems should be used to establish a standardized and up-to-date language when planning nursing interventions.[23]

Finally, in evaluating the outcomes of the interventions, it was determined that in the institution where our study was conducted, "reached" was recorded for patients who survived, while "not reached" was used for patients who died, as result indicators were not utilized. Similarly, in previous studies, the evaluation of intervention outcomes was limited to determining whether the target was achieved or not.[32] In the study conducted by González-Aguña, 34 NOC outcome indicators were used.[24] As with the NIC interventions, the

**Table 3.** The Most Frequently Used Nursing Interventions by Nurses Caring for Patients Diagnosed with Coronavirus Disease 2019 (COVID-19)

| Nursing Diagnoses | $n_{NI}$* | Nursing Interventions | *n*** | %*** |
|---|---|---|---|---|
| Risk for injury | 34 | Introduce the environment at each hospitalization. | 799 | 100 |
| Risk for infection | 15 | Monitored vital signs regularly. | 773 | 97.97 |
| Risk of transmission of infection | 15 | Apply isolation methods according to the identified infectious agent. | 553 | 99.81 |
| Ineffective breathing pattern | 21 | Monitor pain.<br>Provide oxygen support as needed. | 77<br>77 | 97.46<br>97.46 |
| Risk for impaired skin integrity | 18 | Perform a skin evaluation every 12 hours. | 70 | 100 |
| Risk of ineffectiveness in pulmonary function | 16 | Auscultate lung sounds regularly. | 66 | 95.65 |
| Risk for aspiration | 6 | Implement practices to reduce aspiration risk. | 36 | 100 |
| Risk for bleeding | 11 | Monitor fluid intake and output. | 22 | 100 |
| Self-care deficit | 9 | Ensure patient privacy.<br>Assist with toilet needs (e.g., assisted toilet, providing bedpan or urinal).<br>Assist the patient with eating. | 20<br>20<br>20 | 100<br>100<br>100 |
| Ineffective airway clearance | 16 | Position the patient appropriately to prevent aspiration.<br>Perform airway aspiration if necessary.<br>Provide oxygen support.<br>Apply invasive or non-invasive ventilation methods as required | 17<br>17<br>17<br>17 | 100<br>100<br>100<br>100 |
| Acute pain | 13 | Evaluate pain using an appropriate pain scale.<br>Inform the patient and their family about pain management. | 15<br>15 | 100<br>100 |
| Hyperthermia | 18 | Monitor body temperature consistently. | 14 | 100 |
| Disturbed sleep pattern | 12 | Organize environmental factors (e.g., reduce noise and light).<br>Plan procedures during sleep periods to minimize disturbances.<br>Restrict fluid intake at night and ensure urination before bedtime.<br>Restrict daytime sleep to 1 hour or less.<br>Maintain habitual sleep routines (e.g., reading a book, brushing teeth).<br>Restrict caffeine intake in the afternoon.<br>Provide information on maintaining regular bedtime and wake-up times.<br>Avoid exercise within 3 hours before bedtime.<br>Advise pregnant women to shower before bed and avoid eating 2-3 hours before sleep. | 10<br>10<br>10<br>10<br>10<br>10<br>10<br>10<br>10 | 100<br>100<br>100<br>100<br>100<br>100<br>100<br>100<br>100 |

$n_{NI}$*: Total number of nursing interventions available for each nursing diagnosis in the electronic care plan system used by the institution.
*n***: Number of times the nursing intervention was implemented.
**%*****:** Percentage of nursing intervention implementation.

absence of a standardized classification system for NOC outcome indicators in our study limited the comparison of our findings with international studies. Nevertheless, the results of this study are valuable in demonstrating that nurses effectively utilized the nursing process during the unexpected pandemic.

These diagnoses, interventions, and outcomes offer guidance in providing well-planned, individualized nursing care throughout the ongoing crisis. However, further research with larger sample sizes is needed, and our study contributes to the literature as a comprehensive registration study within this context.

### Limitation

The NANDA-I nursing diagnoses in the electronic information system at the hospital where data were collected do not reflect the latest version of the NANDA-I nursing diagnoses (2021-2023). Additionally, the institution where the study was conducted uses a non-standard, locally developed list of interventions and results, with outcomes recorded as either "goal achieved" or "goal not achieved."

## Conclusion

The COVID-19 pandemic, which caught the global health system unprepared, emerged as an acute and unprecedented challenge. The extent to which nurses utilized NNN, which form the foundation of person-centered care, in addressing this crisis was an important question to investigate. The management of COVID-19, a disease that caused anxiety and fear among healthcare professionals due to initially unknown treatment and prevention methods, presented unique challenges. This study found that nurses used local, institution-specific interventions and outcome terminology rather than the standardized terminology in the NIC and NOC systems.

The identification of common nursing diagnoses, interventions, and outcome evaluations during the COVID-19 pandemic can enhance the quality of individualized nursing care by enabling all nurses caring for COVID-19 patients to use a shared language with a holistic and critical perspective. Therefore, it is recommended that the standard NNN classification systems be integrated into hospital information systems, and that in-service training be provided to nurses to ensure effective and correct use of these systems. Additionally, research should be conducted to evaluate the results.

Furthermore, this study underscores the importance of nurses' use of the nursing process during the COVID-19 pandemic. The resulting diagnoses, interventions, and outcomes provide valuable guidance in offering individualized care amidst the uncertainties of the pandemic. However, the study emphasizes the need for larger-scale research and highlights that standardized terms and processes will improve the quality of nursing care. In this regard, it is necessary to integrate standardized NNN classification systems into hospital information systems, provide in-service training to nurses for effective use, and systematically analyze the results of such research. Moreover, for future pandemics or similar epidemics, this research will contribute significantly to the development of strategies to manage such emergencies and improve the effectiveness of nursing care.

Ethics Committee Approval: This study was approved by Ethics Committee of Koç University (Approval Number: 2022.010.IRB1.010, Date: 13.01.2022).

Informed Consent: Since this was a retrospective study, it was accepted that individuals had given consent for participation based on the statement, "I consent to the use of my personal data for research purposes," included in the consent forms they signed during hospitalization.

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