

ORIGINAL ARTICLE

Nursing interventions for patients with COVID-19: A medical record review and nursing interventions classification study

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Funding information

Research Deputy of Tabriz University of Medical Science, Grant/Award Number: IR.TBZMED.REC.1398.1317

Abstract

Purpose: To describe the nursing interventions provided to patients with COVID-19 using the Nursing Interventions Classification.

Method: This is a retrospective study involving the review of 1,344 patient records of adults admitted to a specialty hospital for COVID-19 in Tabriz, Iran. The nursing intervention was used to classify documented nursing care and interventions provided to COVID-19-positive patients from February 20 to August 20, 2020. Data were analyzed descriptively using SPSS16.

Findings: The 10 most frequently documented nursing interventions across in-patient (ward) and intensive care unit (ICU) contexts included Admission Care (7310), Environmental Management (6486), Health Education (5510), Infection Protection (6550), Medication Administration (2300), Positioning (0840), Respiratory Monitoring (3350), Vital Signs Monitoring (6680), Nausea Management (1450), and Diarrhea Management (0460). No records of distraction, relaxation techniques, or massage for anxiety reduction were documented.

Conclusion: This study used a common language to describe nursing interventions for patients with COVID-19 admitted to a tertiary hospital.

Implications for nursing practice: The most commonly identified nursing interventions for COVID-19 identified in this study provide evidence-based insight into nurses' scope of practice in the COVID-19 in-patient context.

KEYWORDS

Clinical protocols, COVID-19 virus, nurses, standardized nursing terminologies

INTRODUCTION

Since being declared a public health emergency of global concern on January 30, 2020, Coronavirus 2019 (COVID-19) has rapidly spread around the world, catalyzing an unprecedented need for skilled nursing care (Lucchini et al., 2020; Pickler et al., 2020). COVID-19 infection ranges in presentation and can include asymptomatic yet contagious infection to severe illness requiring life-supporting measures. Particularly problematic to health systems are that moderate to severe COVID-19 infections require sustained, coordinated, and intensive medical support (Fernandez et al., 2020). Consequently, health systems

globally have suffered, and continue to suffer, the impact of this global pandemic.

In attending to this critical and unprecedented health crisis, nurses have been mobilizing their professional training, knowledge, and skills to provide needed care for the large volume of COVID-19-positive patients requiring hospitalization (Lucchini et al., 2020; Pickler et al., 2020; Swanson et al., 2020). A systematic review of nurses' experiences showed that nurses, regardless of the circumstances encountered, feel a great sense of professional duty to work during the pandemic (Fernandez et al., 2020). However, the role of nurses in the COVID-19 response has not been well documented, and the scope of

nurses' supportive care of hospitalized patients with COVID-19 is not well understood. The Nursing International Classification (NIC) provides a method by which to consider the scope and extent of nursing work in the COVID-19 pandemic.

The NIC, 7th edition, contains 565 nursing interventions for patient care (Butcher et al., 2019). However, these interventions have not been studied in the context of care for patients with COVID-19. Therefore, considering the importance of expanding knowledge about the interventions needed to care for individuals with COVID-19 infection, the most frequently utilized nursing interventions should be determined. Recently published articles are mainly about protecting healthcare workers from COVID-19 (Herron et al., 2020) or the psychological effects of the COVID-19 pandemic on nurses (Pappa et al., 2020). To the best of our knowledge, there is no empirical study that examines nursing practices for COVID-19-positive patients.

BACKGROUND

Iran documented its first diagnosed case of COVID-19 on February 19, 2020. From this initial occurrence to September 26, 2020, at 2:19 pm CEST, there have been 443,086 confirmed cases of COVID-19 and 25,394 COVID-19-related deaths (WHO, 2020a). The COVID-19 pandemic has greatly impacted Iran's healthcare system, including the metropolis of Tabriz, where two public hospitals were allocated as specialty hospitals to care specifically for patients infected by COVID-19 following identification of the first case. To reduce nosocomial infection and promote containment, in-patient clinics in these facilities were closed and a number of wards were specially allocated to patients with suspected or confirmed COVID-19 infection. The overwhelming majority of available hospital nurses in Tabriz were required to provide care to patients in COVID-19-specific wards in order to ensure sufficient staffing, regardless of their previous experiences with infectious diseases or intensive care. Although a key institutional criterion for safe care provision is the number of RNs (Rosa et al., 2020), the requisite training of RNs to provide specialty care for a new pandemic and in alternative units or contexts may present myriad challenges (e.g., safe care, competency).

Adults affected with COVID-19 who require hospitalization often present with significant shortness of breath and respiratory distress requiring respiratory support and, at times, intubation (Rosa et al., 2020; Tang et al., 2020). Persistent complexities with symptom management, rapid functional decline, emotional and social stresses compound the requirements of skilled nursing care provision (Rosa et al., 2020). Considering the extent of intervention required for patients with COVID-19 and the lack of curative treatment, the supportive care provided by professional nurses is a critical factor to wellbeing and recovery. Despite recognition that the delivery of comprehensive nursing based on a systematic nursing process is beneficial to patient wellbeing and recovery in other contexts (Chae et al., 2018) like primary care (Pérez Rivas et al., 2016) and post coronary artery bypass graft

surgery (Johny et al., 2017), care plans for COVID-19-positive individuals have not yet emerged. Similarly, supportive care provided by hospital-based nurses caring for patients with COVID-19 is not well understood. Hence, it is too early to determine how the COVID-19 pandemic will impact nursing care and reflect (or not) the scope and skills of professional nurses who often coordinate assessment and deliver supportive care. An understanding of the scope of interventions delivered and documented by in-patient nurses during the COVID-19 pandemic is needed to provide these initial insights.

In addition, there is a need to develop a curriculum that provides a better understanding of the knowledge, skills, and competencies needed to care for patients in public health emergencies (Kollie et al., 2017). By identifying the interventions that are performed frequently among a particular group of patients, it is possible to identify the resources needed for better care, the level of care, the type of specialized care required, the time required for care, cost, and effectiveness (Possari et al., 2015). Therefore, it is necessary to identify the most common nursing interventions utilized in the care of patients with COVID-19 to better inform effective and efficacious care, and identify gaps in care provision. These understandings could help inform future care plan development, resource allocation, and nurse skill training in preparation for ongoing COVID-19 crisis with potential application to future viral pandemics. Hence, the aim of this study was to describe the nursing interventions utilized for patients with COVID-19 in order to present initial guidance for the development of care plans focused on COVID-19 for nurses practicing in hospitals.

METHODS

Design and Participants

This is a descriptive, retrospective study examining the nursing care of 1344 early consecutive patients with confirmed or suspected COVID-19, who were hospitalized at Sina educational hospital (one of the referral hospitals for COVID-19 patients) in Tabriz, Iran. In this hospital, the nurse-to-patient ratios are 1:2–3 in intensive and 1:10 in medical wards. Seriously ill patients are admitted in intensive care units (ICU). Several support services, such as respiratory therapy, physical therapy, and dieticians, are available for all patients. It is notable that in Iran, nurses must obtain at least a bachelor-level degree, and, to work as a nurse in a hospital, must undergo an academic test and ethics interview. Using a convenient sampling method, all nursing records of patients with suspected or confirmed COVID-19 were obtained from February 20 to August 20, 2020, the first 6 months after the initial case of COVID-19 was confirmed in Iran. Nursing records of patients hospitalized due to suspected or confirmed COVID-19 infection; records of patients discharged following COVID-19 infection, and those records of patients who expired as a result of COVID-19 infection, were included in the review. Outpatient records and referred cases were excluded.

Data Collection

In Sina hospital, both electronic (e.g., report of tests) and paper-based (e.g., nursing report) records are used. Following discharge or death, printed and manuscript records (i.e., as paper files), are preserved as archive records. Every day the first author, as a clinical faculty member, reviewed newly received files submitted to the archive. Internship changes (e.g., suspension of student nursing interns) and mandated attendance of clinical faculty at the hospital in the wake of the new pandemic resulted in additional time slack to devote to review and sampling of archive records on a daily or near daily basis.

The first author reviewed the medical records of 1,344 patients with confirmed or suspected COVID-19 and extracted data on demographics and other medical information (e.g., underlying comorbidities, signs, and symptoms). The first author then reviewed the nursing notes, extracted data on performed nursing interventions, and classified these interventions. The use of a standard nursing term (SNT), also called a nursing classification system, is considered essential to demonstrating the nursing process and to guiding nursing practices and documentation to improve communication about patient health (Butcher et al., 2018). Although there are many approved SNT collections used around the world, the Nursing Intervention Classification and Nursing Outcomes Classification are among the most widely used SNTs (Othman et al., 2020). Nursing intervention is a key component of the nursing process and is a research-based classification of interventions delivered by nurses based on judgment and clinical knowledge to improve patient outcomes (Swanson et al., 2020).

Classification of Interventions

Because nursing activity may fall into more than one nursing intervention category, and because some nursing interventions are in fact other nursing activities, a set of decision rules was established a priori to ensure consistency and rigor in data collection and interpretation. An important principle of coding was to categorize the activity according to the most specific intervention category possible. Examples of such decision-making rules included:

- a. If the activity is giving a drug for fever, then place the activity in the category of fever treatment interventions (3740) instead of medication administration (2300).
- b. If the activity is oxygen administration, place the activity in the category of oxygen therapy interventions (3320). However, if the activity includes monitoring oxygen saturation and other monitoring for other signs of respiratory status, categorize it as a Respiratory Monitoring intervention (3350).
- c. If patient education is nonspecific, place it in the intervention category of Teaching: Disease Process (5602).

In order to prevent coding errors, activities administered repeatedly were only recorded once if delivered to one patient (e.g., suction). When patients received care in both the hospital ward and ICU,

only the ICU reports were checked to prevent repetition of a patient's report in two sections. This last rule decreased sampling time significantly.

Following the explicit decision rules, the first author then placed each nursing activity in the appropriate nursing intervention group. A second rater with PhD in nursing training and experience in respiration-infection wards independently classified a random sample of 100 terms of nursing activity. Interrater reliability was measured between the first and second rankings by percentage agreement, which was 86% and considered excellent agreement. A third research team member checked disagreements to encourage impartial adjudication until consensus was attained.

Ethical Consideration

The Ethics Committee of Tabriz University of Medical Sciences (ethical code: IR.TBZMED.REC.1398.1317) approved this study. Due to the educational nature of the hospital, consent to access patient medical records was obtained from patients and their family members during admission.

Statistical Analysis

The first author inputted extracted data into the Statistical Package for Social Sciences (SPSS, Inc., Chicago, Illinois, USA) version 16.0. Collected data were summarized as means (\pm SD). Categorical variables were summarized as numerical counts and percentage.

RESULTS

Of the 1,344 cases surveyed, the mean and standard deviation of age were 58.69 ± 17.53 years, respectively (range, 18–98 years). The mean and standard deviation of the length of hospital stay were 5.17 ± 5.86 from 1 to 49 days, respectively. Of a total 1,344 samples, 1,123 (83.56%) patients were admitted to the hospital with COVID-19 symptoms; among them, 1,087 (80.88%) were admitted to the medical ward and 36 (2.68%) to the ICU. The remaining 221 (16.44%) cases had come to the hospital due to other problems and were diagnosed with COVID-19 during the time of hospitalization; among them 42 (3.12%) patients were admitted due to surgery, 23 (1.71%) due to burns, 30 (2.23%) due to poisoning, and 126 (9.38%) due to other medical problems. Demographic characteristics and other medical information are shown in Tables 1 and 2. Nursing interventions were classified into 34 nursing interventions. The top ten most commonly encountered nursing interventions in the ward and ICU contexts are shown in Table 3.

“Admission Care (7310)” ranked among the 10 most common nursing interventions. This intervention is indicative of the hospital procedure of having a nurse conduct the initial intake assessments for all patients. Of the records surveyed, the nursing intervention “Environmental Management (6486)” was documented in 100% of the patient



TABLE 1 Demographic characteristics of patients admitted to Sina Hospital with confirmed or suspected COVID-19 infection over a 6-month period, Tabriz (N = 1,344)

Variable		Frequency	Percent
Age	≤ 29	75	5.58
	30–39	154	11.46
	40–49	195	14.51
	50–59	245	18.23
	60–69	261	19.42
	≥ 70	414	30.80
Gender	Male	751	55.88
	female	593	44.12
Residency	City (Tabriz)	1,092	81.25
	Town	229	17.4
	Village	23	1.71
Marital Status	Single or divorced or widowed	121	9.00
	Married	1,223	91.00
Education	Illiterate	478	35.57
	Elementary–Mid school	389	28.94
	High school	296	22.02
	Graduate	147	10.94
	Unknown	34	2.53
Job	Manual worker	147	10.94
	Office work	175	13.02
	Retired	402	29.91
	Housekeeper	470	34.97
	Other	95	7.07
	Unknown	55	4.09

records, across the ward and ICU contexts. This high incidence relates to the common practice of placing objects within the reach of patients and ensuring that the bed rails remain elevated, in order to prevent falls and other adverse events as a consequence of poor Environmental Management (6486).

Nursing-delivered Health Education (5510) was documented in 100% of the cases in both ward and ICU environments. Although the topic of Health Education (5510) differed, most of the patient education delivered by nurses focused on infection control. Awareness of when to inform the nurse of a problem was also classified as Health Education (5510). Infection Protection (6550) was also highly documented. Unsurprisingly, given the nature of COVID-19 as a viral contagion mandating stringent infection control practices, nurses maintained and documented appropriate isolation techniques (e.g., gown, mask); encouraged adequate fluid intake and rest; promoted mobility and exercise, and encouraged deep breathing, as appropriate. All of these activities were classified under infection control practices when used for these purposes.

“Medication Administration” was also documented in 100% of case charts. Nurses reported following the five rights of medication admin-

TABLE 2 Symptoms and medical information of patients admitted to Sina Hospital, Tabriz, with suspected or confirmed COVID-19 over a 6-month period (N = 1,344)

Variable		Frequency	Percent
Underlying Comorbidities	None	689	51.26
	Heart disease	193	14.36
	Diabetes	115	8.56
	Respiratory	42	3.13
	Renal	23	1.71
	Multiple problem	173	12.87
	The other	109	8.11
PCR result	Positive	569	42.34
	Negative	775	57.66
Outcome	Discharge	1,133	84.30
	Death	211	15.70
Fever	No	739	54.99
	Yes	605	45.01
Chills and fever	No	820	61.01
	Yes	524	38.99
Dry cough	No	423	31.47
	Yes	921	68.53
Sore throat (pharyngitis)	No	1,223	91.00
	Yes	121	9.00
Hyposmia (low smell)	No	1,331	99.03
	Yes	13	0.97
Shortness of breath (breath gasp)	No	538	40.03
	Yes	806	59.97
Nausea	No	785	58.41
	Yes	559	41.59
Vomiting	No	1,249	92.93
	Yes	95	7.07
Diarrhea	No	1,271	94.57
	Yes	73	5.43
Myalgia (muscular pain)	No	873	64.96
	Yes	471	35.04
Headache	No	1,129	84.00
	Yes	215	16.00
Tachypnea	No	1,209	89.96
	Yes	135	10.04
Fatigue	No	1,088	80.95
	Yes	256	19.05
Anorexia	No	1,236	91.96
	Yes	108	8.04
Current smoker	No	1,142	84.97
	Yes	202	15.03
Current opiate user	No	1,304	97.02
	Yes	40	2.98

TABLE 3 Nursing interventions for patients admitted to Sina Hospital, Tabriz, with suspected or confirmed COVID-19 over a 6-month period ($N = 1,344$)

Nursing intervention	Ward ($N = 1,259$)	ICU ($N = 85$)
	n (%)	n (%)
Admission care (7310)	1,259 (100%)	85 (100%)
Environmental management (6486)	1,259 (100%)	85 (100%)
Health education (5510)	1,259 (100%)	85 (100%)
Infection protection (6550)	1,259 (100%)	85 (100%)
Medication administration (2300)	1,259 (100%)	85 (100%)
Positioning (0840)	1,259 (100%)	85 (100%)
Respiratory monitoring (3350)	1,259 (100%)	85 (100%)
Vital Signs monitoring (6680)	1,259 (100%)	85 (100%)
Nausea management (1450)	507 (40.27%)	52 (61.17%)
Diarrhea management (0460)	505 (40.11%)	52 (61.17%)

istration (2300) including administering the right dose of the right medication to the right patient, at the right time, using the right route. Nurses also monitored patients for adverse medication effects. The most reported side effect was dry mouth, which was either experienced prior to or following the drug administration. Oxygen and inhaler use was also classified under medication administration (2300). Documentation of dry mouth was especially prominent within the records of the first month of patient admission. In the current study, if the patients were presenting in stable condition, they were asked to drink warm fluids. However, if the patient was ill or had a mouth ulcer, mouthwash was used according to the specialist's instructions.

"Positioning (0840)" was documented in all extracted records. Here, nurses commonly encouraged patients to participate in position changes, assisted patients into the designated therapeutic position, and monitored oxygenation status before and after position change. Attention was paid to positioning the body in proper alignment, turning immobilized patients a minimum of once every two hours, and optimizing positions to alleviate dyspnea (e.g., semi-fowler position). When appropriate, nurses developed a written schedule for repositioning.

Given the nature of COVID-19 infection, respiratory problems were a foremost clinical concern for patients as reflected in medical and nursing care in the first six months of admission. Accordingly, "Respiratory Monitoring (3350)" was documented in 100% of participant records. Associated with this nursing intervention were the nursing activities of monitoring respiratory rate, rhythm, depth, and exertion (e.g., the effort of respiration). Nurses determined the need for suctioning, monitored readings from each mechanical ventilator, noticed increases in inspiratory pressures and decreases in tidal volumes, and instituting respiratory therapy treatments (e.g., nebulizer) as needed. In some cases, noting onset, characteristics, and duration of cough were the features that classified as "Respiratory Monitoring (3350)." Relatedly, "Vital Signs Monitoring" was noted in 100% of included charts. Vital signs were monitored twice daily in ward environments

and hourly in the ICU. Amendments to monitoring of vital sign assessments were guided by physician orders.

Nausea management (1450) was another common nursing intervention encountered. Nausea management (1450) was documented in 40.27% of charts in the wards and 61.17% of charts in the ICU. Regarding this nursing intervention, nurses identified factors (e.g., medication specially hydroxychlorocin) that may cause or contribute to nausea, identified strategies that have been successful in relieving nausea, and encouraged eating small amounts of food that are appealing to the nauseated person.

A final frequently employed nursing intervention was "Diarrhea Management (0460)," which was documented in 40.11% of charts in the wards and 61.17% of charts in the ICU. Here, nurses taught patients to eliminate gas-forming and spicy foods from diet, suggested elimination of foods containing lactose, monitored for signs and symptoms of diarrhea, instructed patient to notify staff of each episode of diarrhea, observed skin turgor regularly for signs of diarrhea-associated dehydration, monitored skin in the perianal area for irritation and ulceration, consulted a physician if signs and symptoms of diarrhea persisted, and provided instruction regarding a low-fiber, high-protein, and high-calorie diet, as appropriate.

DISCUSSION

The aim of this study was to describe the most common nursing interventions employed for patients with COVID-19. Regarding demographic characteristics and consistent with global reports of the severity of COVID-19 infection by age group (WHO, 2020b), our study had a higher proportion of older patients (≥ 70 years; 30.80%) than younger adults. Approximately half of the patients also had an underlying disease, reflecting the high prevalence of chronic and comorbid illness in the general population. The most common documented nursing activities were oriented toward the essential functions, safety, and predominantly physiological support of individuals requiring care for COVID-19, illustrating the indisputable necessity of nursing care provision for hospitalized individuals. These findings highlight the importance of nursing care for patients with COVID-19, particularly given that older people who have increased risk for frailty and are prone to multimorbidity are most at risk for serious and fatal illness from COVID-19 infection. Such a severe disease with unknown consequences and end-of-life conditions requires supportive care for the relevant patients (Kunz & Minder, 2020).

It is notable that none of the patients' records used a classification framework for their interventions in nursing reports. Similarly, a recent systematic review highlighted that there is little available evidence about the reporting of nursing interventions (Othman et al., 2020). In the context of the current research, three important points need to be considered in relation to the interpretation of study findings. First, in the Iranian context, physicians prescribe a large proportion of nursing activities—including those reported here—while nurses follow their instructions. In Iran, the healthcare system is dominated by physicians, and due to the inadequate distribution of power in hospitals, nurses



often lack autonomy. Many physicians see nurses only as their “helpers” and not as “occupational care providers” (AllahBakhshian et al., 2017). For instance, most nurses do not have enough autonomy to use a nebulizer for patients based solely on their clinical judgment and instead require a specific physician order to do so. Given that nurses provide nursing care according to the orders of physicians and the patient care needs are not planned by nurses, it can be concluded that in this specific context, the documentation of activities reflects physician-driven interventions rather than a culmination of nurses’ critical thinking and care planning (Khajehgoodari et al., 2020). As it has been recently demonstrated, the quality of nursing diagnoses in Iran is not high enough to provide a nursing care plan (Lotfi et al., 2020).

A second critical point influencing the interpretation of the findings is that other than the physician’s orders, nurses completed certain interventions because they were deemed mandatory from supervisors. The practice and institutional culture is such that if nurses do not complete the mandated interventions, they may make a deduction from nurses’ pay or wages. For instance, nurses are required to follow a top-down written schedule for repositioning patients. Similarly, in Tabriz, in order to prevent falling, raising the bedside and making the patient’s necessary equipment available has made it mandatory for nurses to do and document.

Third, it is notable that none of the nursing interventions were psychosocial in nature. For instance, no interventions related to distraction, relaxation, or massage for anxiety were documented, despite evidence attesting to its utility (e.g., recent randomized controlled trial using progressive muscle relaxation technology for COVID-19-positive patients; Liu et al., 2020). This is a mismatch with patient needs given that patients presenting with COVID-19 experience anxiety and fear, directly related to the rate of COVID-19 transmission and its complications and mortality. This leads to other psychosocial challenges, including discrimination and loss (Ahorsu et al., 2020), which further compounds patient anxiety. Our findings illustrate the dominance of the physiological presentation of the patient and a strong influence of power and practice on nursing care: the patient’s physical condition or external factors such as a physician prescription or administrative mandate justified the nursing interventions. Consequently, nurses in this context are unlikely to provide care, including emotional care and psychosocial intervention, if it is not mandated (Sekse et al., 2018). This circumstance is likely compounded by the high workload of nurses (Lucchini et al., 2020) and necessity of considering physical needs in critical situations, such as in severe COVID-19 infection.

CONCLUSION

The top 10 nursing interventions in both ward and ICU were Admission Care (7310), Environmental Management (6486), Health Education, Infection Protection (6550), Medication Administration, Positioning (0840), Respiratory Monitoring (3350), Vital Signs Monitoring (6680), Nausea Management (1450), and Diarrhea Management (0460). Some of the nursing interventions like “Admission Care (7310),” “Medication

Administration,” and “Vital Signs Monitoring (6680)” are predictable because they are completed for all of admitted patients regardless of their nursing diagnosis. Some other nursing interventions were related to common signs of COVID-19-positive patients and included Respiratory Monitoring (3350), Nausea Management, and Diarrhea Management (0460). This study used a common language to describe nursing intervention for patients with COVID-19. The identified top and core nursing interventions for COVID-19 from this study provide insight into the scope of practice of nurses working with COVID-19 cases, and critical source of reflection of the scope of nursing practice within the Iranian context.

IMPLICATIONS FOR NURSING PRACTICE, RESEARCH, POLICY, AND/OR EDUCATION

Nursing care and the evaluation of intervention effectiveness is performed at some level in all hospitals, but because a common language is not used to express them, it is not possible to aggregate research and data. A lack of use of a standardized language to document interventions also makes comparative and longitudinal study of nursing interventions less tenable. The most commonly identified nursing interventions for COVID-19 identified in this study provide evidence-based insight into nurses’ scope of practice in the COVID-19 in-patient context. This study also provides a launch point for considering scope of practice within the Iranian nursing context, and may help inform proficient nursing education for students who will be tasked with successful implementation of these strategies in the future, as well as (ideally) those more autonomous initiatives.

LIMITATIONS

The nursing interventions recorded in this study mainly reflect interventions delivered in the first six months of COVID-19 presentation in Iran, in which respiratory distress and diarrhea were obvious symptoms of the disease. It is therefore possible that over time, and as more information is obtained about this emerging disease, the interventions will vary accordingly.

This study is a retrospective chart review, which can be prone to misclassification bias and subject to confounding (e.g., other nursing interventions may be present that were not measured). This may be compounded in the Iranian context, wherein nursing documentation has undergone criticism for being incomplete (Vafaei et al., 2018). However, the deficiencies in nursing scope and documentation practices provide a meaningful context for the holistic examination and evaluation of nursing care. In addition to the empirical data generated, the study provides a useful point of reflection regarding autonomous care in the Iranian practice context.

CONFLICTS OF INTEREST

No conflict of interest has been declared by the authors.

ACKNOWLEDGMENT

The researchers thank the Research Deputy of Tabriz University of Medical Science for providing permission and funding (number: IR.TBZMED.REC.1398.1317) for this study. Also, the researchers thank Miss Yalda Rasti, Infection Control Nurse of Sina Hospital, Tabriz, for helpful assistance in data collection and analysis despite demanding workloads.

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How to cite this article: Asghari, E., Archibald, M., & Roshangar, F. (2021). Nursing interventions for patients with COVID-19: A medical record review and nursing interventions classification study. *International Journal of Nursing Knowledge*, *1*–7. <https://doi.org/10.1111/2047-3095.12332>