



The evaluation of nursing care quality in critical care units for patients with COVID-19

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Abstract

Objectives: This study aimed to assess the quality of nursing care in critical care units (CCUs) for patients with COVID-19.

Methods: A cross-sectional study was conducted on 100 nurses working in CCUs at a teaching hospital in Tehran from June to December 2021. Nurses' performance in caring for COVID-19 patients was evaluated through a nursing care quality measurement scale. Data were analyzed by SPSS 21 software, and using t-tests, ANOVAs, Pearson's correlation coefficients, and regressions.

Results: The study revealed that 68.2% of nurses were female, and 67.2% of patients were male. The mean quality of care score ranged from medium to high (125.77±33.73), with better care provided to male patients compared to female patients ($p < 0.01$). A significant negative correlation was observed between the quality of care and patients' age ($r = -0.40$; $p < 0.0001$) as well as the number of monthly overtime hours worked ($r = -0.206$; $p = 0.03$). Age and gender were identified as predictive variables for the quality of care ($p < 0.05$).

Conclusion: The quality of care in CCUs for COVID-19 patients was rated as medium to high. Increasing the number of nurses during pandemic such as COVID-19 is essential to enhance the quality of care. Furthermore, training programs should be implemented to improve nurses' attitudes in COVID-19 wards, particularly towards caring for the elderly.

Keywords: COVID-19, Intensive care, Nursing, Quality of care, Iran.

Introduction

Care is a fundamental aspect of nursing, recognized as central to the profession's role in improving and maintaining patient health.^[1] Nurses, as the largest group in healthcare, are crucial to enhancing care quality and achieving organizational objectives. The significance of nurses' professional competence and care quality is underscored by health policymakers worldwide, emphasizing the need for assessments, planning, and system improvements to ensure patient and managerial satisfaction.^[2-5]

Nurses have played a critical role in combating the COVID-19 pandemic, with a substantial number of healthcare workers, including nurses, affected by the virus. The psychological impact of COVID-19 on healthcare professionals, particularly nurses, has been significant, leading to anxiety, fear, and potential mental health challenges that can impact their ability to provide high-

quality care. Studies have shown that nurses working in COVID-19 units experience elevated levels of stress and anxiety, potentially affecting their care delivery.^[6,7]

The demanding environment of critical care units (CCUs) for COVID-19 patients poses challenges for nurses, including environmental stressors, high workloads, staff shortages, and complex patient care needs, all of which can impact the nursing care quality.^[8] Research has highlighted the negative effects of nurse shortages on work hours, fatigue, burnout, and overall care quality.^[9] The COVID-19 pandemic has exacerbated these challenges, further straining nursing resources and potentially compromising patient care quality.^[10]

In light of these factors, it is crucial to assess and monitor the quality of nursing care in CCUs for COVID-19 patients to identify areas for improvement and ensure optimal patient outcomes. By addressing the challenges faced by nurses in these high-stress environments,

healthcare systems can better support frontline workers and enhance the nursing care quality.^[11,12]

According to Nobahar et al., factors such as effective human communication, organizational support for nurses, conducive work environments, appropriate tools and equipment, and facilities play a significant role in influencing the quality of nursing care in critical care departments.^[14] Other studies have also identified factors such as age, gender, work experience, department of service, and the type of health issues faced by hospitalized patients as key determinants of patient care quality.^[15,16]

During the COVID-19 pandemic, studies have highlighted the challenges faced by nurses in critical care departments, including the physical and mental demands that can potentially impact the nursing care quality. While previous studies indicated that CCUs generally offer high-quality care, the unique circumstances created by the COVID-19 crisis require further investigation to assess the current state of care quality.^[17,18]

Studies have shown that the lack of guidelines for managing COVID-19 patients in primary care settings, coupled with nurses' fears of contracting the virus, have affected the quality of nursing care during the outbreak.^[19] Additionally, resource shortages, equipment limitations, and high levels of stress among nurses have been identified as factors contributing to decreased care quality in COVID-19 departments.^[20-23]

Objectives

This study aimed to conduct a study to evaluate the nursing care quality to COVID-19 patients in CCUs.

Methods

A cross-sectional study was conducted at Ayatollah-Kashani Hospital in Tehran, Iran, from June to December 2021. This hospital, an academic educational center with 30 active critical care beds, was a key facility dedicated to COVID-19 patients during the pandemic in Tehran. The study included the entire community of nurses working in the CCUs as its sample.

Based on a similar study^[24] with a standard deviation of 8.62 for quality of care, a significance level of 0.05, and a margin of error of 2, a sample size of 72 was calculated. To accommodate a potential attrition rate of 30%, 100 participants were selected for the study.

Inclusion criteria required at least one month of experience working in an intensive care unit, while nurses' reluctance to participate served as an exclusion criterion.

Demographic data for nurses and patients was collected

through questionnaires, including age, gender, marital status, number of children, work experience, education level, shift type, monthly overtime hours, night shifts, and employment type. A checklist developed by Zeraati et al.,^[25] in Iran was used in the second part of the research tool to assess the quality of nursing care in CCUs. This checklist comprises 46 items related to nursing care provided to hospitalized patients in special care units. The items are rated on a Likert scale of 1 to 4, with 4 indicating the most favorable score, 3 relatively favorable, 2 unfavorable, and 1 not applicable. The total score ranges from 46 to 184. Zeraati et al.,^[25] reported content validity index (CVI) and content validity ratio (CVR) values of 0.898 and 0.725, respectively, and Cronbach's alpha of 0.91.

Data collection involved observing nurses' care behaviors. The first author, acting as an observer, introduced himself as a student to prevent observer presence bias. The observer researcher spent several days in the ward before sampling began to normalize his presence among the nurses. Each selected nurse was accompanied by the researcher during care activities to assist and observe their caring behavior. After observing and recording the behavior on the checklist, the nurse completed a demographic questionnaire. The observation took place over an 8-hour shift for each sample. In the COVID-19 department, safety precautions were strictly followed by the observer, who was a nurse in that department, including wearing gowns, masks, protective shields, and other necessary equipment as per hospital guidelines.

Data collected for this study were analyzed using SPSS software (version 21.0, SPSS Inc, Chicago, IL, USA), with the normality of quantitative variables assessed using the Kolmogorov-Smirnov test. Descriptive statistics, including numbers, percentages, means, and standard deviations, were used to classify and describe the data. Statistical analyses, such as independent t-tests, ANOVA, Pearson correlation coefficients, and regression analysis, were employed to analyze the data, with a significance level set at 0.05.

Prior to data collection, informed consent was obtained in writing form from all participants after explaining the study's purpose and ensuring the confidentiality of their personal information. The rights of all participants were respected in accordance with the latest version of the Helsinki Declaration. Approval to conduct the study was granted by the Research Vice-Chancellor of Kashan University of Medical Sciences under the ethics code IR.KAUMS.NUHEPM.REC.1401.016.

Results

In this study, 100 nurses in the COVID-19 intensive care unit were observed to assess their caring behavior. The mean age of patients and nurses was 58.20±22.94 and 38.63±6.37, respectively. The research findings revealed that nurses worked a mean of 67.30±21.25 hours of overtime per month, with a mean experience of 14.86±7.49 years [Table 1].

It was observed that 68 nurses participated in the study, 75 nurses were on rotating shifts, and 80 nurses held a bachelor's degree. The independent t-test results indicated a statistically significant difference in the mean quality of care scores between male and female patients, with male patients receiving higher scores (p<0.0001). Additionally, the ANOVA test showed significant differences in the

mean quality of care scores among nurses working morning, evening, and rotating shifts (p<0.01). Tukey's post hoc test further revealed a significant difference between nurses on the evening shift and those on rotation shifts (p=0.03) [Table 2].

Furthermore, the Pearson correlation coefficient test demonstrated a statistically significant inverse relationship between the mean nurse quality care score in COVID-19 CCUs and patient age, as well as the number of monthly overtime hours performed by the nurse (p<0.05); [Table 3]. To assess the impact of variables, a backward regression analysis was conducted, including variables with p-values less than 0.2 in the model. Non-significant variables were systematically removed, leaving two significant variables, age, and sex, in the final model [Table 4].

Table 1. Quantitative characteristics of nurses and patients

Variable	Mean± SD	Std. Error Mean	Minimum	Maximum
Age (patient)	58.20±22.94	2.294	4	99
Age (nurse)	38.63±6.73	0.673	25	51
History of work (year)	14.86±7.49	0.749	1	25
Children (number)	1.09±.91	0.091	0	3
Night shift (number per month)	6.44±4.17	0.417	0	13
Overtime (hours per month)	67.30±21.25	2.126	20	120

Table 2. Quality of nursing care score based on nurse and patient characteristics

Variable	N (%)	Quality of nursing care			
		Mean± SD	Std. Error Mean	P-value	
Sex(patient)	Male	47(67.2%)	3.89±0.073	0.010	0.01*
	Female	23(32.8%)	3.85±0.087	0.012	
Sex (nurse)	Male	32(32%)	3.88±0.077	0.013	0.32*
	Female	68(68%)	3.86±0.085	0.010	
Marital status	Single	25	3.86±0.074	0.014	0.73*
	Married	75	3.87±0.086	0.009	
Level of education	Bachelor	80	3.87±0.082	0.009	0.23*
	Master	20	3.84±0.086	0.019	
Employment	Official	71	3.86±0.078	0.009	0.57**
	Temporary contract	9	3.88±0.132	0.044	
	Contractual	15	3.88±0.068	0.017	
	Commitment	5	3.90±0.095	0.042	
Shift	Morning	22	3.89±0.078	0.016	0.01;** post hoc Tukey: evening vs rotation p=0.03
	Evening	3	3.97±0.020	0.012	
	Rotation	75	3.85±0.082	0.009	
Quality of care (total score)	-	125.77±33.73	3.373	-	

*t-test; **ANOVA

Table 3. Pearson correlation between quality of care scores and quantitative characteristics

Variable	Quality of care
Age (patient)	$r = -0.40$; $p < 0.0001^*$
Age (nurse)	$r = -0.036$; $p = 0.72$
History of work (year)	$r = -0.098$; $p = 0.33$
Children (number)	$r = -0.054$; $p = 0.59$
Night shift (number)	$r = -0.187$; $p = 0.06$
Overtime (hours per month)	$r = -0.206$; $p = 0.03^{**}$

* Correlation is significant at the 0.01 level (2-tailed)

**Correlation is significant at the 0.05 level (2-tailed)

Table 4. Variables predicting quality of nursing care

Model *	B	Beta	t	P value	
Constant	2.253	0.184	12.255	0.0001	Adjusted R
Age (patient)	0.008	0.335	3.531	0.001	Square = 0.163;
Sex (Male)	0.205	0.190	2.005	0.048	R Square=0.179

*Liner Regression

Discussion

The quality of care for COVID-19 patients in CCUs is reported to be medium to high. Asadi et al. found that the quality of nursing care during the COVID-19 pandemic was favorable.^[26] Similarly, Azimilolty et al. conducted a study indicating satisfactory quality of nursing care.^[27] Fatehi et al. also noted that most nurses perceive nursing care quality as desirable.^[28] Consistent with these findings, Asgari et al. reported that nurses considered the quality of nursing care to be satisfactory.^[29] These studies collectively suggest that nurses in CCUs maintain their standard of care amidst the challenges posed by COVID-19, demonstrating their commitment and professionalism in providing care.

Interestingly, our study revealed that male patients with COVID-19 in CCUs received better care compared to female patients. This observation aligns with research indicating sex-based differences in quality of care, with women often receiving less care upon discharge.^[30] Furthermore, studies have shown disparities in care between men and women, such as women with ischemic stroke receiving lower quality care and being less likely to be discharged home.^[31] Although limited, studies on sex differences in patient care in CCUs have highlighted variations in diagnostic and treatment procedures based on gender.^[32,33] Notably, women are less likely than men to undergo lipid level testing and treatment during hospitalization,^[34,35] potentially influenced by unmeasured factors. Nursing managers should be mindful of these

disparities to ensure equitable care provision.

Moreover, our study found that nurses working fixed evening shifts delivered better quality care compared to those on rotating shifts. This finding contrasts with Salimi et al.'s study, where nurses on rotating shifts scored higher on patient care behavior characteristics,^[36] possibly due to differing workloads. Consistent with Elbahnasawy et al.'s findings, heavy workloads were identified as a barrier to implementing Watson's theory,^[37] emphasizing the impact of workload on care provision. Other studies have also indicated that heavy workloads are perceived as the primary obstacle to delivering quality care.^[38,39] Salimi and Azimpour highlighted job satisfaction as the most influential factor affecting caring behavior.^[40]

The current study identified a negative correlation between patient age and nursing care quality, with care quality decreasing as patient age increased. Tarbiat-Nazlou et al.'s study suggested that patient age is the least effective predictor of caring behavior from nurses' perspective. This may be attributed to the peak of COVID-19, where elderly patients had a high mortality rate, leading nurses to feel that their efforts may be futile. Understanding this sentiment and perceiving care as unsuccessful contributed to decreased care quality for older patients. Research has shown that nurses are more motivated to work when they perceive success and the impact of their efforts.^[42] Conversely, motivation declines if they believe success is unlikely.^[43] Despite limited resources for COVID-19 patients, nurses have made efforts to triage effectively.

The study revealed an inverse significant relationship between the quality of care in COVID-19 CCUs and nurses' monthly overtime hours. As nurses' monthly overtime hours increase, the quality of care they provide decreases due to fatigue. Fatigue leads to job burnout over time, impacting care quality. Some studies have shown that longer working hours result in decreased care quality.^[3] Ghamari-Zare's study found no correlation between nurses' overtime and performance in critical cardiac departments, which contrasts with the current study's findings.^[17] This disparity could be due to the heightened stress and burnout levels during the COVID-19 pandemic, affecting nurses' performance.

Results of the regression analysis revealed that patient age and gender were significant variables predicting the quality of nursing care in CCUs. Salimi et al. identified three key factors influencing nurses' caring behavior: patient sex, patient age, and nurse age. It is noted that nurses tend to be more comfortable communicating with patients of the same gender due to societal customs and

religious beliefs.^[36] This finding aligns with Corbin's study, which highlighted age as a major influencing factor in care behaviors.^[44] Additionally, Rafiei et al. found that patient characteristics significantly impact nurses' caregiving behaviors.^[45]

One limitation of the study is the focus solely on demographic variables, neglecting other important factors that could affect care quality during the COVID-19 pandemic. Furthermore, the gender bias of the observer (female) during care interpretation may have influenced the checklist registration, which could not be addressed in this research. In contrast to studies relying on self-reports for care behaviors, a strength of this study is the observation of nurses' care behavior in real conditions, providing results closer to reality.

Conclusions

In conclusion, the study suggests that the quality of nursing care for COVID-19 patients in CCUs is at an optimal level. However, older and female patients received lower care, indicating a need for nursing managers to implement training programs to enhance care quality for these groups. Considering the impact of rotating shifts and excessive overtime hours per month, nursing managers should improve care quality by increasing nursing staff numbers and establishing fixed work shifts.

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Competing interests

The authors declare that they have no competing interests.

Abbreviations

Coronavirus disease 2019: COVID-19;
World Health Organization: WHO;
Critical Care Units: CCUs;
Content Validity Index: CVI;
Content Validity Ratio: CVR.

Authors' contributions

Conceptualization: MMS, IAF; Data handling: MMS, SY; experiments design: IAF; data analysis: MM; study validation: IAF; supervision: IAF; data presentation: draft preparation: IAF, SY, MMS; study consultation: SY; writing and reviewing, project administration: IAF, SY. All authors read and approved the final manuscript. All authors take responsibility for the integrity of the data and the accuracy of the data analysis.

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Role of the funding source

None.

Availability of data and materials

The data used in this study are available from the corresponding author on request.

Ethics approval and consent to participate

The study was conducted in accordance with the Declaration of Helsinki. Institutional Review Board approval (code: IR.KAUMS.NUHEPM.REC.1401.016) was obtained. All participants signed an informed consent form.

Consent for publication

By submitting this document, the authors declare their consent for the final accepted version of the manuscript to be considered for publication.

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