Araştırma Makalesi
(Research Article)

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Evaluating The Impact of COVID-19 on Nursing Sensitive Quality Indicators: A Multicenter Study

COVID-19'un Hemşirelik Hassas Kalite Göstergeleri Üzerindeki Etkisinin Değerlendirilmesi: Çok Merkezli Bir Çalışma

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ABSTRACT

Objective: To assess the impact of the COVID-19 pandemic on Nursing Responsive Quality Indicators in healthcare delivery.
Methods: This multicentre, retrospective, cross-sectional and descriptive design. Nursing Responsive Quality Indicators in 15 hospitals affiliated with a private healthcare group were analysed. Data from January 2018 to December 2021 were compared to assess the effects of the pandemic on patient care quality indicators, such as patient satisfaction, pressure sore rates, and incidence of thrombophlebitis.
Results: The study found significant increase in pressure sore and thrombophlebitis rates and a decrease in patient satisfaction scores after the COVID-19 pandemic. It was determined that the COVID-19 pandemic had negative effects on the quality of nursing care and the pandemic increased concerns about patient safety and satisfaction.
Conclusion: The COVID-19 pandemic has had a significant impact on Nursing Sensitive Quality Indicators, highlighting the need for healthcare systems to adapt to maintain high-quality nursing care. Despite the challenges, ongoing evaluation and improvement of Nursing Sensitive Quality Indicators are crucial for addressing the evolving needs of patients and ensuring effective, patient-centered care. Future strategies should leverage insights from this period to enhance the resilience of healthcare delivery against current and future health crises.

ÖZ

Amaç: Bu çalışma, COVID-19 pandemisinin sağlık hizmetleri sistemlerinin iş yükünü nasıl etkilediğini ve bir hastane ağı içerisindeki Hemşirelik Duyarlı Kalite Göstergeleri'ni nasıl değiştirdiğini inceleyerek, pandeminin bakım kalitesi üzerindeki etkisini değerlendirmeyi amaçlamaktadır.
Yöntem: Bu çalışma, çok merkezli, retrospektif, kesitsel ve tanımlayıcı bir tasarıma sahiptir. Özel bir sağlık grubuna bağlı 15 hastanedeki Hemşirelik Duyarlı Kalite Göstergeleri analiz edilmiştir. Ocak 2018 ile Aralık 2021 tarihleri arasındaki veriler, hasta memnuniyeti, basınç yarası oranları ve tromboflebit insidansları gibi hasta bakım kalitesi göstergelerinin pandemi etkilerini değerlendirmek amacıyla karşılaştırılmıştır.
Bulgular: Çalışma, COVID-19 pandemisi sonrasında basınç yarası ve tromboflebit oranlarında anlamlı bir artış, hasta memnuniyeti puanlarında ise bir düşüş olduğunu ortaya koymuştur. COVID-19 pandemisinin hemşirelik bakım kalitesi üzerinde olumsuz etkileri olduğu ve pandeminin hasta güvenliği ile memnuniyetine yönelik endişeleri artırdığı belirlenmiştir.
Sonuç: COVID-19 pandemisi, Hemşirelik Duyarlı Kalite Göstergeleri'ni belirgin bir şekilde etkilemiş ve yüksek kaliteli hemşirelik bakımını sürdürmek için sağlık sistemlerinin uyum sağlaması gerektiğini ortaya koymuştur. Zorluklara rağmen, Hemşirelik Duyarlı Kalite Göstergeleri'nin sürekli değerlendirilmesi ve iyileştirilmesi, hastaların değişen ihtiyaçlarını karşılamak ve etkili, hasta merkezli bakım sunumunu sağlamak açısından kritik öneme sahiptir. Gelecekteki stratejiler, bu dönemde elde edilen bulgulardan yararlanarak sağlık hizmetlerinin mevcut ve gelecekteki sağlık krizlerine karşı dayanıklılığını artırmayı hedeflemelidir.

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INTRODUCTION

Nursing-sensitive quality Indicators (NSQIs) play a crucial role in evaluating and enhancing the quality of nursing care and its impact on patient outcomes in healthcare settings. These indicators were specifically designed to reflect the effects of nursing practices on patient care, which are distinct from other healthcare interventions. By highlighting key areas for improvement—such as patient satisfaction, infection rates, pressure ulcers, and staff satisfaction—NSQIs enable healthcare organisations to allocate resources and training more effectively, thereby optimising both care delivery and patient outcomes (Heslop, Lu and Xu, 2014; Montalvo, 2007).

The fundamental value of NSQIs lies in their ability to demonstrate a direct relationship between nursing care quality and health outcomes. This relationship not only underscores the effectiveness of nursing practices and highlights the organisational context in which care is delivered. As essential components of quality improvement strategies in healthcare, NSQIs provide a data-driven basis for informing policy changes and practice adjustments. Their widespread application across diverse healthcare environments—from hospitals and long-term care facilities to community health settings—underscores the global importance of nursing in improving patient care throughout the healthcare continuum (Heslop et al., 2014; Montalvo, 2007; Wong, Chau, Yu et al., 2000).

The importance of NSQIs in promoting high-quality healthcare is supported by research. Foundational studies by Montalvo (2007) and Griffiths et al. (2018) established a framework for identifying and using NSQIs to enhance the quality and safety of patient care. Subsequent research by Burston, Chaboyer, and Gillespie (2014) , Öner and Karadağ (2023), Afaneh et al. (2021), and Hakami et al. (2023) has built upon this groundwork, providing deeper iNSQIghts into the development, implementation, and effectiveness of NSQIs across various healthcare settings. Collectively, these studies reinforce the critical connection between nursing care and patient outcomes, highlighting the pivotal role of NSQIs in the assessment and improvement of health care services.

Implementing NSQIs enables healthcare organisations to create constructive feedback loops, foster continuous quality improvement, and enhance patient care. This iterative process of evaluation and improvement ensures that nursing care remains responsive to the changing needs of patients and the healthcare landscape by delivering patient-centred, safe and effective care. Through these efforts, NSQIs can play a key role in promoting a culture of excellence within nursing practice, leading to better health outcomes and increased patient satisfaction.
The COVID-19 pandemic has placed an unprecedented strain on healthcare systems worldwide, significantly affecting the delivery and quality of care. As hospitals and healthcare facilities adapted to the surge in COVID-19 cases, routine services, elective procedures, and standard quality-of-care practices were disrupted. This study is particularly relevant to the COVID-19 period because it examines the extent to which the pandemic influenced quality-of-care indicators, shedding light on changes in healthcare delivery, patient outcomes, and system efficiency.

Given the heightened workload, resource reallocation, and shifting priorities during the pandemic, understanding these impacts is crucial for future preparedness and healthcare system resilience. By assessing quality of care indicators in this context, this study provides valuable insights into how healthcare organisations responded to the crisis and what improvements can be made to maintain high-quality care during public health emergencies.

Research Question: To what extent has the COVID-19 pandemic affected quality of care indicators? This study aimed to assess the impact of the COVID-19 pandemic on quality-of-care indicators, particularly its effect on the workload of the healthcare system.

METHODS

The Type of Research

This study has a multicenter, retrospective, cross-sectional, descriptive design.

The Setting

The study was conducted in 15 hospitals affiliated with a private healthcare group between May and September 2023. Eight of these hospitals are in Istanbul, whereas the remaining seven are outside Istanbul. The study quality indicators were monitored in 15 hospitals by comparing data from two years before and two years after March 2020, when the first COVID-19 case was officially announced in our country.

The Population and Sample

The study population and sample comprised quality indicator data from January 2018 and December 2021. This study did not distinguish between the population and sample and used all available data. The average number of patient records per month averaged 2343.23±1593.36 files, with a range of 188–8280 files.

Data Collection

In the data collection form, data on number of beds, number of patients, etc., nursing-sensitive quality indicators (pressure injury, patient fall, thrombophlebitis, patient satisfaction [three different satisfaction measurement outcomes: overall satisfaction, patient satisfaction with care, and Net Promoting Score (NPS), and nurse profile (educational level, length of experience, staff turnover, time spent per patient, satisfaction with work environment) were recorded. The records were scanned from digital archives in the offices of the Nursing Services Directorate and the Education and Development coordinator of the institution. Hospitals were coded as H1, H2, H3, ..., H15 and anonymized during data recording, analysis, and presentation of results. Within the scope of this study, we analysed the rate of patient falls, pressure injuries, and thrombophlebitis after IV cancellation as well as patient satisfaction with care. Cases related to these indicators in terms of numbers and rates. We did not have access to patient information, medical records, or nurses' identities.

Data Collection Tools

The researchers collected data using electronic records and nursing notes. A data collection form developed using Microsoft Office/Excel spreadsheet software was used in the facility's reporting system. The researchers recorded data obtained from the monthly nursing service management reports of the hospitals on a data collection form.

Nursing Services Indicator Data Collection Form

The Nursing Services Indicator Data Collection Form is a structured tool designed to systematically record and evaluate key nursing care quality indicators. The form comprises 47 items covering various aspects of patient safety, clinical outcomes, and nursing performance.
The form is completed daily by the nurse in charge of each unit, ensuring real-time documentation of nursing care quality indicators.

Data were collected from all inpatient wards, capturing information such as patient census, pressure injury risk levels, fall risk assessments, patient satisfaction scores, adverse events (e.g., falls, pressure injuries, thrombophlebitis), and use of intravenous cannulas.
At the end of each month, data recorded from all wards are compiled and analysed by nursing service managers to identify trends, performance gaps, and areas requiring intervention.
The final compiled data are then forwarded to the Business Development and Projects Department at the hospital headquarters, where a comprehensive hospital-wide evaluation is conducted to monitor nursing care quality and patient safety outcomes at the institutional level.
Braden Pressure Ulcer Risk Scale

The Braden Scale is a widely used tool for assessing the risk of developing a pressure ulcer. It comprises six subcategories: sensory perception, moisture, activity, mobility, nutrition, and friction/shear. Each category is scored from 1 (highest risk) to 4 (lowest risk), except for friction/shear, which is scored from 1 to 3. The total score ranged from 6 to 23, with lower scores indicating higher risk levels.
Low risk: Total score of 15–18, indicating minimal to moderate risk.
Moderate Risk: A total score of 13–14 indicates an increased risk of developing pressure ulcers without preventive measures.

High Risk: A total score of ≤12, indicating a significant risk of developing a pressure ulcer and requires intensive preventive intervention.
Patients were classified into these categories based on their Braden scores, as documented in routine nursing assessments.
The Itaki Fall Risk Scale (FRS)

The Itaki Fall Risk Scale is a validated tool designed to assess the risk of falls in clinical settings. Risk factors include age, history of falls, mobility impairment, cognitive status, use of assistive devices, medication, and sensory deficits.

A score of six or less indicates a low risk of falling, which can be managed with standard precautions.
Moderate Risk: A score between 7 and 13, indicating an increased fall risk requiring additional preventive measures.
High Risk: A score of ≥14, identifying patients at significant risk of falling, necessitating intensive fall prevention strategies, such as bed alarms, close monitoring, and environmental modifications.
These classifications were applied to all patients as part of routine nursing evaluations, and the recorded data were used for the study analysis.

Data Analysis

The data were analysed in two groups before and after the pandemic using IBM SPSS 26 program. The Shapiro-Wilk test was used to test the normal distribution conformity of continuous variables. Descriptive statistics, including mean, standard deviation, minimum, median, and maximum, were used to describe continuous variables. For categorical variables, descriptive statistics, such as frequency and percentage, were used. Spearman's rho correlation coefficient was used to analyse the correlation between continuous variables that did not conform to a normal distribution. The correlation coefficient was interpreted as follows: 0.90-1.00 as very high, 0.70-0.89 as high, 0.50-0.69 as moderate, 0.30-0.49 as low, and 0.00-0.29 as weak. To compare two independent variables that did not conform to a normal distribution, the Mann–Whitney U test was used. The statistical significance level was set at p 0.05.

Ethical Considerations

The study protocol was approved by the Acıbadem Mehmet Ali Aydınlar University Medical Research Evaluation Board (Approval date: July 13, 2023; decision number: 2023-11/366) and the Nursing Services Directorate of the institution where the study was conducted. This study was conducted in accordance with the principles of the Declaration of Helsinki.

RESULTS

The results, as shown in Table 1, indicated an average of 2343.23±1593.36 patient files per month, with a range ranging from 188 to 8280 files.

Table 1. Nursing Care Quality Indicators

	Mean ±SD	Med. (Min.-Max.)
Total number of patients record per month	2,343.23±1,593.36	2,112.5(188-8,280)
Number of patients at low risk of pressure injury	2,061.21±1,535.56	1,729(0-11,624)
Number of patients at moderate risk of pressure injury	1,034.64±911.9	788(0-5,142)
Number of patients at high risk of pressure injury	494.16±831.07	293(0-11,574)
Total number of patients with pressure injury	0.8±1.26	0(0-9)
Number of patients with low risk of falling	1,056.22±613.85	1,015(0-5,458)
Fall risk level, moderate number of patients	521.61±1,680.29	0(0-10,637)
Number of patients with high risk of falling	3,624.8±3,215.57	2,495.5(0-27,819)
Falling number of patients	0.68±0.94	0(0-6)
Total days of hospitalization	2,273.64±1,568.24	1,767(430-7,872)
Number of patients who developed thrombophlebitis	0.16±0.48	0(0-6)
Number of patients with IV* cannulas	3,400.82±2,589.96	2,583(77-15,027)
Lying overall satisfaction	0.96±0.04	0.97(0.45-1)
Inpatient NPS**	0.81±0.15	0.83(-1-1)
Inpatient nursing satisfaction	0.96±0.04	0.97(0.38-1)
Patients fall rate	0±0	0(0-0)
Pressure injury rate	0±0	0(0-0.01)
Proportion of patients developing thrombophlebitis after IV* cannulation	1.6±0.94	1.39(0.09-8.61)

**IV: intravenous **NPS: Net Promotor Score*

Patients classified as having a low risk of pressure injury had an average count of 2,061.21±1,535.56, with a median of 1,729 (range 0–11,624), whereas those at moderate risk averaged 1,034.64±911.9 (median 788, range 0–5,142). The high-risk group had an average of 494.16±831.07, with a median of 293 (range 0–11,574). The total number of patients who developed a pressure injury was low, with an average of 0.8±1.26 (median 0, range 0–9).

For fall risk assessment, the number of patients at low risk of falling averaged 1,056.22±613.85 (median 1,015, range 0–5,458), whereas those at moderate risk had a highly variable average of 521.61±1,680.29 (median 0, range 0–10,637). Patients at high risk of falling were notably higher, averaging 3,624.80±3,215.57 (median 2,495.5, range 0–27,819). However, actual falls were rare, with an average of 0.68±0.94 (median 0, range 0–6).

Hospitalisation metrics indicated an average total day of hospitalisation of 2,273.64±1,568.24 (median 1,767, range 430–7,872). The incidence of thrombophlebitis remained low, with an average of 0.16±0.48 cases per month (median 0, range 0–6), while the number of patients with IV cannulas was 3,400.82±2,589.96 (median 2,583, range 77–15,027).

Regarding patient satisfaction, the mean overall satisfaction averaged 0.96±0.04 (median 0.97, range 0.45–1), while inpatient Net Promoter Score (NPS) was 0.81±0.15 (median 0.83, range -1 to 1). Similarly, inpatient nursing satisfaction was consistently high at 0.96±0.04 (median 0.97, range 0.38–1).

The quality indicators for patient safety showed that both fall and pressure injury rates were consistently 0%, with a median of 0 across all observations. The proportion of patients developing thrombophlebitis after IV cannulation was 1.60±0.94%, with a median of 1.39% (range 0.09–8.61%), suggesting a relatively low but monitored occurrence (Table 1).

Table 2 provides a comprehensive overview of the nurse staff profile, encompassing key indicators, such as the total number of nurses, educational qualifications, and average working time.

Table 2. Nurse Staff Profile

Indicator	Mean ±SD	Med. (Min.-Max.)
Total number of nurses	210.54±143.77	163(57-747)
Number of nurses graduated from health vocational high school	101.95±66.29	85(29-347)
Number of nurses with associate degree	27.02±24.31	19(3-144)
Number of nurses with a bachelor's degree	72.04±56.91	52(10-267)
Number of nurses with a master's degree	9.49±7.45	8(0-32)
Average Working Time of Nurses (months)	85.6±19.6	84.33(31.85-156.91)
Proportion of nurses graduated from health vocational high schools	0.5±0.11	0.47(0.29-0.81)
Proportion of nurses with associate degree	0.12±0.06	0.12(0.02-0.32)
Proportion of nurses with bachelor's degree	0.33±0.08	0.32(0.12-0.51)
Proportion of nurses with master's degree	0.05±0.03	0.05(0-0.12)

Table 3 reveals several notable associations between pre-pandemic nurse characteristics and inpatient satisfaction, nursing performance, and patient safety. The data revealed a positive correlation between nurses' average working time and the overall and nursing satisfaction of inpatients. This finding indicates that longer working hours for nurses may lead to better patient satisfaction and quality of care.

A high percentage of nurses with master's degrees is positively correlated with overall patient and nursing staff satisfaction. This underscores the potential impact of further education on improving patient and nursing satisfaction levels.

There was a positive correlation between the proportion of patients who developed thrombophlebitis after IV cannulation and certain nurse characteristics, such as longer working hours and higher proportions of nurses with bachelor's and master's degrees.

The data show a negative correlation between the proportion of nurses with a bachelor's degree and the pressure injury rate. These findings indicate that undergraduate education can protect against pressure injuries in patients.

Overall, these findings emphasised the intricate relationship between nurse characteristics and patient outcome indicators. This study highlights the significance of continuous efforts to enhance the nursing workforce composition and support ongoing professional development to enhance the quality and safety of patient care.

Table 3 shows significant associations between nurse characteristics and various indicators of inpatient satisfaction, nursing performance, and patient safety after the pandemic.

Table 3. Comparison of Nurse Education Level and Indicators in the Pre-Pandemic and After Pandemic Period

Indicator		Average Working Time of Nurses (months)	Proportion of Nurses Graduated from Health Vocational High School	Proportion of associate degree Graduate Nurses	Proportion of Nurses with bachelor's degree	Proportion of Nurses with master's degree
Pre-Pandemic Period						
Lying overall satisfaction	r	0.140**	-0.009	-0.003	-0.057	0.128**
	p	0.003	0.856	0.951	0.236	0.008
Inpatient NPS***	r	0.084	0.009	-0.026	-0.006	0.004
	p	0.08	0.854	0.584	0.905	0.94
Inpatient nursing satisfaction	r	0.105*	-0.072	0.054	-0.011	0.139**
	p	0.03	0.137	0.259	0.818	0.004
Patients fall rate	r	-0.007	-0.027	-0.049	0.087	-0.081
	p	0.891	0.574	0.31	0.071	0.092
Pressure injury rate	r	0.077	0.084	-0.082	-0.142**	0.014
	p	0.111	0.08	0.086	0.003	0.773
Proportion of patients developing thrombophlebitis after IV**** cannulation	r	0.149**	-0.046	-0.203**	0.142**	0.057
	p	0.002	0.335	<0.001	0.003	0.239
After Pandemic Period						
Overall Satisfaction	r	0.152**	-0.241**	0.145**	0.132*	0.145**
	p	0.006	<0.001	0.009	0.018	0.009
Inpatient NPS***	r	0.123*	-0.211**	0.117*	0.123*	0.135*
	p	0.027	0.001	0.035	0.027	0.015
Inpatient Nursing Satisfaction	r	0.153**	-0.299**	0.178**	0.191**	0.183**
	p	0.006	<0.001	0.001	0.001	0.001
Patient Fall Rate	r	0.180**	0.054	-0.09	-0.023	-0.064
	p	0.001	0.326	0.102	0.671	0.247
Pressure Injury Rate	r	0.179**	-0.119*	0.088	0.022	0.018
	p	0.001	0.03	0.11	0.687	0.75
Proportion of Patients Developing Thrombophlebitis after IV**** Cannulation	r	0.157**	0.037	-0.226**	0.053	0.161**
	p	0.004	0.504	<0.001	0.33	0.003

**p<0,05, **<0,001, ***NPS: Net Promotor Score, ****IV: intravenous*

Conversely, a negative correlation was found between overall satisfaction with inpatient care, inpatient NPS, and inpatient nursing satisfaction among nurses who graduated from the Health Vocational High School and Associate Degree programs.

There was a significant decrease in the overall inpatient satisfaction, NPS, and inpatient nursing satisfaction scores during the COVID-19 pandemic. This indicates a possible decline in patient satisfaction and perceived quality of nursing care. However, there was no statistically significant change in the fall and pressure injury rates before and after COVID-19, indicating that these patient safety indicators remained relatively stable despite the challenges posed by the pandemic. However, the proportion of patients developing thrombophlebitis after IV cannulation increased significantly after COVID-19, indicating a potential increase in thrombotic complications among patients undergoing IV interventions during the pandemic (Table 4).

Table 4. Comparison of Pre- and After Pandemic Indicator Data

	Pre-COVID-19 Pandemic	After COVID-19 Pandemic	
Indicator	Mean ±SD Med. (Min.-Max.)	Mean ±SD Med. (Min.-Max.)	p
Lying overall satisfaction	0.97±0.03 0.98- (0.45-1)	0.95±0.04 0.95 (0.59-1)	<0.001
Inpatient NPS*	0.85±0.10 0.86- (0-1)	0.75±0.19 0.79 (-1-1)	<0.001
Inpatient nursing satisfaction	0.97±0.03 0.98- (0.38-1)	0.95±0.04 0.96 (0.76-1)	<0.001
Patients fall rate	0.0003±0.0011 0- (0-0.0032)	0.0004±0.0006 0 (0-0.0038)	0.003
Pressure injury rate	0.0005±0.0011 0- (0-0.01)	0.0004±0.0009 0 (0-0.01)	0.285
Developing thrombophlebitis after IV** cannulation	1.77±1.03 1.5- (0.09-8.61)	1.39±0.76 1.27 (0.17-4.37)	<0.001

*Mann-Whitney U Test p<0,001 *NPS: Net Promotor Score, **IV: intravenous*

This study examined the characteristics of nurses before and after COVID-19 onset. Additionally, there were significant increases in the proportions of nurses with health vocational high school and associate degrees after COVID-19, whereas there were decreases in the proportions of nurses with bachelor's degrees. The percentage of nurses with master's degrees remained constant before and after COVID-19, and the proportion of highly educated nurses remained stable despite observed shifts in the broader workforce (Table 5).

Table 5. Comparison of Nurse Staff Characteristics Before and After The Pandemic

	Pre-COVID-19 Pandemic	After COVID-19 Pandemic	
	Mean ±SD Med. (Min.-Max.)	Mean ±SD Med. (Min.-Max.)	p
Average Working Time of Nurses (months)	92.76±17.76 89.02- (60.78-156.91)	76.29±17.92 74.95 (31.85-125.54)	<0.001
Proportion of nurses graduated from health vocational high schools	0.48±0.11 0.46- (0.29-0.73)	0.52±0.12 0.48 (0.32-0.81)	<0.001
Proportion of nurses with associate degree	0.11±0.050.1- (0.02-0.29)	0.14±0.06 0.14 (0.03-0.32)	<0.001
Proportion of nurses with bachelor's degree	0.36±0.080.36- (0.12-0.51)	0.29±0.07 0.29 (0.13-0.49)	<0.001
Proportion of Nurses with master's degree	0.05±0.03 0.05- (0-0.12)	0.05±0.02 0.05 (0-0.12)	0.109

Mann-Whitney U Test p<0,001

DISCUSSION

This investigation examines the profound implications of the COVID-19 pandemic on nursing care quality within a network of hospitals, revealing significant shifts in healthcare quality metrics. The pandemic's unique pressures have highlighted vulnerabilities in patient satisfaction, pressure injuries, and thrombophlebitis rates, prompting a critical examination of these changes against existing literature and health care standards. On average, hospitals accommodate 2.343 patients monthly, with a significant range of patient numbers across different facilities. A detailed analysis of patient risk assessments for pressure injuries identified approximately 2.061 patients as having low risk, 1.034 as having medium risk, and 494 as having high risk. The occurrence of actual pressure injuries remains exceedingly rare, with an average of 1 case per institution. Similarly, fall risk evaluations place over a thousand patients in the low-risk category, with a notable proportion in the medium- to high-risk category. Despite this, actual fall incidents reflect the rarity of pressure injuries, with an average of less than one incident per hospital.
Additionally, higher proportions of nurses with bachelor's and master's degrees were positively associated with overall inpatient satisfaction, the NPS of inpatients, nursing satisfaction, and the proportion of patients who developed thrombophlebitis after IV cannulation. This passage highlights the potential impact of higher education levels among nurses on improving patient satisfaction and clinical outcomes.

A positive correlation was observed between the average working years of nurses and overall inpatient satisfaction, inpatient Net Promoter Score (NPS), inpatient nurse satisfaction, patient fall rate, pressure injury rate, and proportion of patients who developed thrombophlebitis after IV catheterisation. A longer service duration may improve overall patient satisfaction and quality of care. However, this may also increase the risks of patient safety.

The pandemic has intensified patient demands and transformed healthcare delivery models, such as the increased reliance on telehealth. These changes, coupled with the strain on healthcare professionals, have eroded the personalised care experience, leading to a decline in patient satisfaction (Öner B, Zengül, Öner N, İvankova, Karadağ ve Patrician, 2021). This finding aligns with research positing that crises intesifty existing systemic stressors and diminish patient experiences. However, the data also pointed to variability across hospitals, indicating the need for enhancement in certain facilities to achieve uniform excellence in patient care. This observation aligns with the existing literature, emphasising the importance of quality indicators, health outcomes, and patient perceptions in evaluating healthcare quality (Gathara, Zosi, Serem et al., 2020; Kraska, Weigand and Geraedts, 2017; García-Altés, Subirana-Casacuberta, Llorens et al., 2021).

Further research into factors influencing patient satisfaction has revealed the critical role of nurse job satisfaction, organisational performance and patient experience in shaping overall satisfaction levels (Inoue, Karima and Harada, 2017). Moreover, studies highlight the significance of hospital image, service quality, and patient loyalty in determining satisfaction (Asmaryadi, Pasinringi, Thamrin and Muis, 2020; Budi Setyawan, Supriyanto, Tunjungsari, Nurlaily Hanifaty and Lestari, 2019; Ramli, 2019), advocating continuous measurement and enhancement of patient satisfaction through quality improvement initiatives (Kraska et al., 2017; Ramli, 2019; Subagja and Rosyidah, 2023; Ghosh, 2014).

The interconnected nature of patient perceptions and healthcare outcomes necessitates a holistic approach to care delivery, as supported by research underscoring the relationship between patient satisfaction and outcomes (Ghosh, 2014; Tellson, Walker and Woolverton, 2023).
The post-pandemic period has ushered in notable changes in the nursing profession, particularly with regard to the average working time of nurses. This shift indicates a movement towards a younger and possibly less experienced nursing workforce influenced by several key factors.

The pandemic period saw heightened turnover rates among nurses, driven by the intense pressures and risks associated with healthcare delivery. This phenomenon has significantly contributed to changes in workforce composition.

To manage the surge in patient numbers due to COVID-19, health care facilities ramped up recruitment efforts, bringing in newer, often less experienced nurses to fill the ranks. This influx of new staff is not only a direct response to the immediate needs of the pandemic but also reflects broader trends in workforce development.
The pandemic also accelerated the retirement plans of many experienced nurses who opted out of the workforce because of the elevated risks associated with working in such conditions. The loss of seasoned professionals has implications for professional nursing experience and knowledge base.
Research underscores these trends, with Boston-Leary (2024) noting a significant departure of nurses aged 25 to 44 from the hospital workforce between 2020 and 2021. The exodus of younger nurses has resulted in a broader shift in workforce demographics and experience levels. Similarly, Moon et al. (2021) pointed to an ageing nursing workforce,

with many approaching retirements, pointing towards a future tilt towards younger, less experienced nurses (Moon, Han, Park and Ryu, 2021).

Changes in the nursing workforce have wide-ranging implications for health care delivery, from staffing ratios and patient outcomes to nurse burnout (Moon et al., 2021; Guttormson, Calkins, McAndrew, Fitzgerald, Losurdo and Loonsfoot, 2022; Brook, Duguid and Miller, 2023).
The after pandemic decrease in the average working time of nurses marks a significant transition toward a younger, less experienced nursing workforce. This trend, driven by factors like increased turnover, recruitment of new staff, and the early retirement of experienced nurses, poses challenges and opportunities for healthcare systems. Addressing these dynamics through focused strategies to retain experienced professionals and effectively integrate new recruits will be crucial in maintaining a skilled, resilient nursing workforce in the after-pandemic era (Guttormson et al., 2022; Efendi, Aurizki, Auwalin and McKenna, 2022; Couper et al, 2022).

The COVID-19 pandemic has prompted significant shifts in the educational composition of the nursing workforce, reflecting adaptations to the urgent demands for health care services during this unprecedented crisis. The observed increase in nurses with vocational high school and associate degrees after the pandemic resulted in an agile response to the immediate need for nursing staff, leveraging the quicker pathways these programs offer compared with traditional bachelor's degree programs. This shift underscores the need for a pragmatic approach to strengthening nursing workforces in response to the global health emergency.

The pandemic's pressure on healthcare systems necessitated a rapid increase in the nursing workforce, leading to accelerated recruitment from vocational and associate degree programs. These programs, with their shorter training periods, have become crucial in meeting urgent staffing needs during the peak of the health crisis.
The decrease in the proportion of nurses with a bachelor's degree indicates multiple challenges, including higher turnover rates among more educated nurses, retention difficulties, and potentially revised hiring practices during the pandemic. The broader impacts of the pandemic on higher education, such as disruptions to academic progression and graduation rates, could also contribute to this trend.

The mental health impacts of the pandemic on nurses, especially those early in their careers, have been profound, with reports of persistent post-traumatic stress symptoms (Moon et al., 2021; Guttormson et al., 2022; Brook et al., 2023). These experiences underscore the need for organisational support and policy interventions to safeguard healthcare workers' well-being.

The COVID-19 pandemic has underscored significant challenges in maintaining high-quality nursing care, yet it also offers a pivotal opportunity to reimagine and reinforce healthcare delivery frameworks. Drawing on the lessons learned during this crisis and proactively addressing the identified gaps, the aspiration to achieve and maintain exemplary nursing care quality, even despite adversity, is within reach. These efforts are essential not only for navigating current challenges but also for preparing for future healthcare crises.
Limitations of the Study

The findings of this study may be limited because of the limited time frame available for the dataset. In addition, differences in the demographic characteristics of hospitals and nurses may have affected the results. Important insights into potential contributing factors could have been obtained by analysing the root cause reports of the adverse events. Additionally, this study's omission of patient dependency level measurements poses a challenge in evaluating the results and interpreting the findings.

CONCLUSION

This study provides valuable information on the impact of the COVID-19 pandemic on the quality indicators of nursing care in a specific health care group. Our findings highlight the significant challenges nursing professionals and health care systems face in maintaining quality patient care during a global health crisis.
The analysis revealed significant changes following the onset of the pandemic, including increases in pressure injuries and thrombophlebitis rates and decreases in patient satisfaction scores. These findings highlight the complex interaction between external factors, such as healthcare delivery, patient outcomes, and infectious disease outbreaks.
To cope with ongoing and emerging challenges caused by the COVID-19 pandemic and other potential crises, healthcare institutions must remain vigilant, adaptable, and proactive. Using the insights gained from this research, we can work together toward a future in which the quality of nursing care remains at its highest level, despite unprecedented challenges.

Author Contributions

Concept and design: S.K.A. Data collection: S.K.A., M.A., Z.Ö. Data analysis and interpretation: S.K.A., N.A.P.A., M.A., Z.Ö. Manuscript writing: S.K.A., N.A.P.A., M.A., Z.Ö. Critical review: S.K.A.

Conflict of Interest:

The author(s) declare that they have no conflict of interest.

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