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Effect of COVID-19 Complications of Recovered Nurses on Quality of Work–Life and Patients' Safety Culture

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ABSTRACT

Introduction: Coronavirus disease 2019 (COVID-19) has many dramatic complications that reduce the quality of work-life of affected nurses and affect the patients' safety culture. **Aim:** To assess the effect of COVID-19 complications on the quality of work-life and patients' safety culture. **Methods:** The study was based on a descriptive-correlational design. Data were collected from medical and surgical departments at Ibn Sina Hospital in Iraq and Sohag and Qena University Hospitals in Egypt. **Sample:** All nurses working at medical and surgical departments who recovered from COVID-19 were chosen for the study. The COVID-19 Complications Questionnaire was constructed, along with the Work-Related Quality of Life Scale, and the Patient Safety Culture Questionnaire were adopted. **Results:** The complications included a sore throat, dyspnea, headache, coagulopathy, anxiety, and confusion. The study sample perceived an average level of quality work-life and patient safety culture. **Conclusion:** There was a significant negative correlation between inflammatory, pain, and circulatory complications and the quality of work-life among nurses and a significant negative correlation between respiratory complications and patient safety culture. There was a highly statistically significant positive correlation between quality of work-life and patient safety culture ($P<0.01$). **Recommendations:** This study recommended that preventive measures be considered. Moreover, planned training programs for nurses about the COVID-19 infection should be included.

Keywords: COVID-19; Nurses; Quality of Work-Life; Patient Safety Culture

INTRODUCTION

The COVID-19 pandemic has significantly burdened frontline healthcare workers and hospitals. Continuous emotional strain, burnout, moral distress, and interpersonal challenges with colleagues or supervisors have become prevalent among healthcare workers during the pandemic. These factors may contribute to diminished levels of patient safety. The coronavirus that causes severe acute respiratory syndrome (COVID-19) is an infectious disease. A large number of infected people recover without need for treatment. However, some required medical attention. People with chronic diseases are more susceptible to developing an infection (World Health Organization, 2022).

Ensuring the safety of patients stands as the fundamental objective of medical institutions. The common symptoms and/or complications of COVID-19 are shortness of breath, cough, sore throat, fever, general malaise, muscle and joint pain, diarrhea, nausea or vomiting, and smell and taste dysfunction. Additionally, some patients with COVID-19 were asymptomatic (Mullol *et al.*, 2020). Impairment of pulmonary function, muscle weakness, fatigue, pain, anxiety, depression, vocational problems, and various degrees of reduced quality of life were reported (Kesikburun *et al*., 2023; Klok *et al*., 2020). Lungs' injuries, liver, kidney, heart, vessels, organ failure, and hemolytic anemia were also reported (Consoli *et al.*, 2022; Wang *et al*., 2020). Additionally, headache, neuropathic pain, dizziness, seizure, olfactory dysfunction, cerebrovascular problems, altered level of consciousness, ataxia, dyspepsia, and vision impairment were observed (Radygina &

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Mochalova, 2023; Beghi *et al*., 2020).

Nursing personnel are at the forefront of healthcare and are faced with many COVID-19 pandemic challenges (Li *et al.*, 2020). During COVID-19, it was crucial for nurses to take care of their physical and psychological well-being and their patients to be able to perform their heavy workloads (Mo *et al.*, 2020; Smith *et al.*, 2020). The quality of work-life balance is the degree to which employees can perform their tasks adequately within a positive work environment (Nurmaini *et al.*, 2021). The quality of work-life balance affects an individual's performance and work success (Jin & Lee, 2020). Balancing work and life enables nurses to enhance their quality of life (Zakiyah & Basuki, 2023).

Patient safety culture is the result of perceptions, values, competencies, attitudes, and behavior. It is a determinant of the organization's health and complies with safety management principles. Patient safety culture is affected by the service introduced by the unit, roles within the job, working hours, stressors within the job, satisfaction, and infection control Ismail & Khalid, 2022; Fujita *et al*., 2019.

Significance of the Study

COVID-19 has threatened nursing staff lives and caused them psychological stress while caring for infected patients (Sun *et al.*, 2020; He *et al.*, 2021). The COVID-19 infection rate reached 5.62% among healthcare workers, with >50% of the cases involving nurses (Sabetian *et al.*, 2021). The healthcare workers' infection percentage worldwide was 11%–29% Hendy *et al.*, 2022; Bracis *et al.*, 2020. Thus, the researchers of the current study thought that the nurses who recovered from COVID-19 may show complications that may affect their quality of work-life and consequently affect patient safety culture in different settings.

Aim of the Study

This study aimed to assess the effect of COVID-19 complications of recovered nurses on quality of work–life and patients' safety culture.

Study Questions

- Do COVID-19 complications of recovered nurses negatively affect the quality of their work–life?
- Does the high quality of work–life of COVID-19 recovered nurses positively affect the level of patients' safety culture?

METHODOLOGY

A descriptive correlational research design was applied for this study.

Setting

Data were collected from the medical and surgical departments of (three hospitals) Ibn Sina Hospital in Iraq and Sohag and Qena University Hospitals in Egypt.

Sample

The study sample included all nursing staff working at medical and surgical departments who recovered from COVID-19. Each nurse from all nursing staff was asked if they had been infected by COVID-19 or not. The infected nurses were included in the study sample, and those who were not were excluded. The number of patients included from Ibn Sina Hospital, Sohag University Hospital, and Qena University Hospital was 32, 30, and 33, respectively.

Tools

First Tool: A COVID-19 complication questionnaire comprising the following two parts was constructed by the researchers:

Part 1: Background characteristics of the study sample data, namely, department, age, sex, social status, nursing qualification, experience, hours of weekly work, and chronic disease.

Part 2: Data on COVID-19 complications affecting the body systems, including the respiratory,

gastrointestinal, circulatory, and nervous systems, in addition to pain and inflammatory-related complications.

The questionnaire was constructed based on a review of literature obtained from the COVID-19 Resource Center (2021) and Tenforde *et al.*, (2020). The scoring system was as follows: no (0) and yes (1).

Second Tool: This study used the Work-Related Quality of Life (WRQoL) Scale adopted from Easton and Van Laar (2018) after obtaining their permission. The tool consists of 24 items in seven categories: general well-being, home-work interface, job career satisfaction, control at work, working conditions, stress at work, and overall quality of working. WRQoL is a five-point Likert scale ranges from 1 (strongly disagree) to 5 (strongly agree).

Third Tool: The Patient Safety Culture Questionnaire adopted from Sorra *et al*. (2018) is a five-point Likert scale consisting of 59 items in nine categories. It is used to collect information about teamwork within units, supervisor/manager expectations and actions promoting patient safety, organizational learning—continuous improvement, management support for patient safety, overall perceptions of patient safety, teamwork across units, staffing, handoffs and transitions, and nonpunitive responses to errors. The scale ranges from strongly disagreeing to strongly agreeing. Additionally, feedback and communication about errors, communication openness, and the frequency of events reported.

The scale score for this dimension is ranges from 1 (never) to 5 (always). Finally, a patient safety grade with a scale score ranging from 1 (failing) to 5 (excellent) is included.

For second and third tools the following conditions are considered:

Considerations are given to negative statements throughout the statistical analysis.

For the Scoring System: a response rate of <50% was considered low, 50%–75% considered average, and ≥75% considered high.

The Study was Conducted as Follows:

1. Review of literature in January 2021.
2. Translation of data collection tools in February 2021.
3. Permissions to conduct the study were granted from the heads of the designated units.
4. Revision of content validity to check clarity and applicability of the tool was done by nine experts in the field of nursing (three from each Faculty of Nursing departments of Mosul, Sohag, and Qena).
5. A pilot study was conducted in September 2021 on 10 nurses to assess the clarity, applicability, measurement reliability, and time needed to collect the data (it was approximately 15–20 minutes).
6. The reliability of the study sample tools was measured using Cronbach's alpha coefficient test, with the constructed COVID-19 complication questionnaire obtaining 0.895, WRQoL Scale obtaining 0.747 and Patient Safety Culture Questionnaire obtaining 0.744. The tools required minor modifications without affecting the meaning of the statements; thus, the pilot sample was included in the study.
7. Official permissions: The study was approved by the Scientific Committee of Faculty of Nursing of Mosul University on August 20, 2021, and by the Graduate Studies and Research Committee Faculty of Nursing Sohag University on July 11, 2021.
8. Study Participants consent: Nurses were asked if they had COVID-19 or not; the infected nurses who recovered were included in the study. Each participant was interviewed for data collection. Consent was obtained from the participating nurses, after explaining the aim of the study. Confidentiality of the study sample participants and anonymity were assured. Study participants were informed that they are free to accept or refuse to participate in the study. Data were collected in October 2021 from the designated settings.

Statistical Analysis

The Statistical Package for Social Sciences, SPSS 26.0 (IBM; SPSS Statistics, USA), was used for data entry and statistical analysis. The test of normality was done using the Shapiro–Wilk test; normality was 0.553.

Results presented in the form of frequencies, percentages, and least significant difference tests were used to clarify the mean differences among the study sample groups. Pearson correlation analysis was performed to assess the interrelationships among quantitative variables. *P*-values of >0.05 and <0.01 were considered statistically no significant and highly significant, respectively.

Ethical Consideration

The research proposal was approved by the Ethical Committee Faculty of Medicine South Valley University in Qena with reference number SVU-NURS-AND-4-22-1-303 on January 10, 2022.

RESULTS

Table 1: Background Characteristics of the Study Sample

Background Characteristics	Hospital			*P*-value LSD
	Ibn Sina[A] No. = 32	Sohag[B] No. = 30	Qena[C] No. = 33	
Department				A–B 0.001**
Medical	27**(84.4%)**	13(43.3%)	14(42.4%)	A–C 0.000**
Surgical	5(15.6%)	17**(56.7%)**	19**(57.6%)**	B–C 0.938
Age				
<25	12**(37.5%)**	21**(70.0%)**	22**(66.7%)**	A–B 0.004**
25–>30	11(34.4%)	7(23.3%)	4(12.1%)	A–C 0.059
30–>35	5(15.6%)	2(6.7%)	5(15.2%)	B–C 0.292
35 and more	4(12.5%)	0(0.0%)	2(6.1%)	
Sex				A–B 0.207
Male	18**(56.3%)**	12(40.0%)	16(48.5%)	A–C 0.536
Female	14(43.8%)	18**(60.0%)**	17**(51.5%)**	B–C 0.506
Social Status				A–B 0.808
Married	15(46.9%)	16**(53.3%)**	20**(60.6%)**	A–C 0.275
Single	17**(53.1%)**	14(46.7%)	13(39.4%)	B–C 0.406
Nursing Qualification				A–B 0.281
3 years diploma schools	8(25.0%)	2(6.7%)	13(39.4%)	A–C 0.000**
Clinical institute	4(12.5%)	9(30.0%)	19**(57.6%)**	B–C 0.000**
B.Sc.	20**(53.5%)**	19**(63.3%)**	1(3.0%)	
Experience (Years)				
<1	21**(65.6%)**	11(36.7%)	3(9.1%)	A–B 0.533
1–5	5(15.6%)	19**(63.3%)**	20**(60.6%)**	A–C 0.026**
6–10	0(0.0%)	0(0.0%)	7(21.2%)	B–C 0.005**
11–15	4(12.5%)	0(0.0%)	3(9.1%)	
16–20	2(6.3%)	0(0.0%)	0(0.0%)	
Hours of Weekly Work				
<20	2(6.3%)	4(13.3%)	1(3.0%)	
20–39	27**(84.4%)**	9**(30.0%)**	10**(30.3%)**	A–B 0.008**
40–59	3(9.4%)	7(23.3%)	3(9.1%)	A–C 0.000**
60–79	0(0.0%)	5(16.7%)	5(15.2%)	B–C 0.001**
80–99	0(0.0%)	5(16.7%)	1(3.0%)	
>100	0(0.0%)	0(0.0%)	13(39.4%)	
Have Chronic Disease				A–B 0.795
No	28**(87.5%)**	23**(76.7%)**	25**(75.8%)**	A–C 0.354
Yes	4(12.5%)	7(23.3%)	8(24.2%)	B–C 0.515

***Highly Significant (P<0.01)*

Table 1 showed the highest working percentage (84.4%) in the medical departments at Ibn Sina and 56.7% and 57.6% in the surgical departments at Sohag and Qena, respectively. Age percentages were 37.5%, 70.0%, and 66.7% for <25 years at the three hospitals, respectively. Sex percentages were 56.3% for males at Ibn Sina in addition to 60.0% and 51.5% for females at Sohag and Qena, respectively. For social status Ibn Sina had 51.3% singles, whereas 53.3% and 60.6% married ones at Sohag and Qena respectively.

Qualification was 53.5% and 63.3% for B.Sc. degree at Ibn Sina and Sohag, respectively, whereas 57.6% for clinical institute at Qena. Experience was 65.6% for <1 year and 63.3% and 60.6% for 1–5 years at the three hospitals, respectively. The highest percentage was 84.4%, 30.0%, and 30.3% for working 20–39 hours/week, and 87.5%, 76.7%, and 75.8% had no chronic diseases at the three hospitals, respectively.

There was a highly statistically significant difference for department between Ibn Sina and both Sohag and Qena; age between Ibn Sina and Sohag; nursing qualification and experience between Ibn Sina and Qena and between Sohag and Qena, and work hours/week between Ibn Sina and both Sohag and Qena plus between Sohag and Qena ($P < 0.01$).

Table 2: COVID 19 complications

COVID 19 Complications	Hospital			*P*-value LSD
	Ibn Sina[A] No. = 32	Sohag[B] No. = 30	Qena[C] No. = 33	
Respiratory system-related complications				A–B 0.213 A–C 0.318 B–C 0.783
Loss of smell	7(21.9%)	10(33.3%)	10(30.3%)	
Sore throat	13**(40.6%)**	10(33.3%)	13**(39.4%)**	
Congestion	6(18.8%)	8(26.7%)	8(24.2%)	
Cough	8(25.0%)	9(30.0%)	6(18.2%)	
Dyspnea	4(12.5%)	11(36.7%)	12(36.4%)	
Chest pain	2(6.3%)	9(30.0%)	9(27.3%)	
Gastrointestinal-related complications				A–B 0.000** A–C 0.487 B–C 0.003**
Nausea	5(15.6%)	15**(50.0%)**	5(15.2%)	
Vomiting	1(3.1%)	14**(46.7%)**	3(9.1%)	
Diarrhea	3(9.4%)	9(30.0%)	6(18.2%)	
Abdominal pain	7**(21.9%)**	14**(46.7%)**	12**(36.4%)**	
Loss of taste	7**(21.9%)**	10(33.3%)	6(18.2%)	
Inflammatory-related complications				A–B 0.243 A–C 0.383 B–C 0.044*
Chills	8(25.0%)	9(30.0%)	4(12.1%)	
Fever	11**(34.4%)**	14**(46.7%)**	8**(24.2%)**	
Hypersensitivity	2(6.3%)	5(16.7%)	3(9.1%)	
Pain complications				A–B 0.923 A–C 0.705 B-C 0.784
Body aches	9(28.1%)	10(33.3%)	14(42.4%)	
Headache	18**(56.3%)**	13**(43.3%)**	17**(51.5%)**	
Fatigue	7(21.9%)	11(36.7%)	8(24.2%)	
Muscle weakness	13(40.6%)	9(30.0%)	5(15.2%)	
Circulatory system-related complications				A–B 0.258 A–C 0.983 B–C 0.246
Coagulopathy	1(3.1%)	3**(10.0%)**	1(3.0%)	
Cardiovascular complications	1(3.1%)	2(6.7%)	1(3.0%)	
Nervous system-related complications				A–B 0.601 A–C 0.920 B–C 0.668
Confusion	9(28.1%)	11**(36.7%)**	11**(33.3%)**	
Depression	9(28.1%)	5(16.7%)	10(30.3%)	
Anxiety	10**(31.3%)**	6(20.0%)	7(21.2%)	

** Significant P < 0.05; **Highly significant P < 0.01*

Table 2 states that the highest percentage of respiratory system-related complications was 40.6% and 39.4% for sore throat at Ibn Sina and Qena, respectively, whereas it was 36.7% for dyspnea at Sohag. Gastrointestinal-related complications were 50.0% and 46.7% for nausea and vomiting, respectively, at Sohag, and 21.9%, 46.7%, and 36.4% for abdominal pain at the three hospitals, respectively. Inflammatory-related complications were 34.4%, 46.7%, and 24.2% for fever, and pain complications were 56.3%, 43.3%, and

51.5% for headache at the three hospitals, respectively. Nervous system-related complications were 31.3% for anxiety and 36.7% and 33.3% for confusion at the three hospitals, respectively.

For inflammatory-related complications, there was a statistically significant difference between Sohag and Qena (P<0.05). For gastrointestinal-related complications, there was a highly statistically significant difference between Ibn Sina and Sohag, plus between Sohag and Qena (P < 0.01).

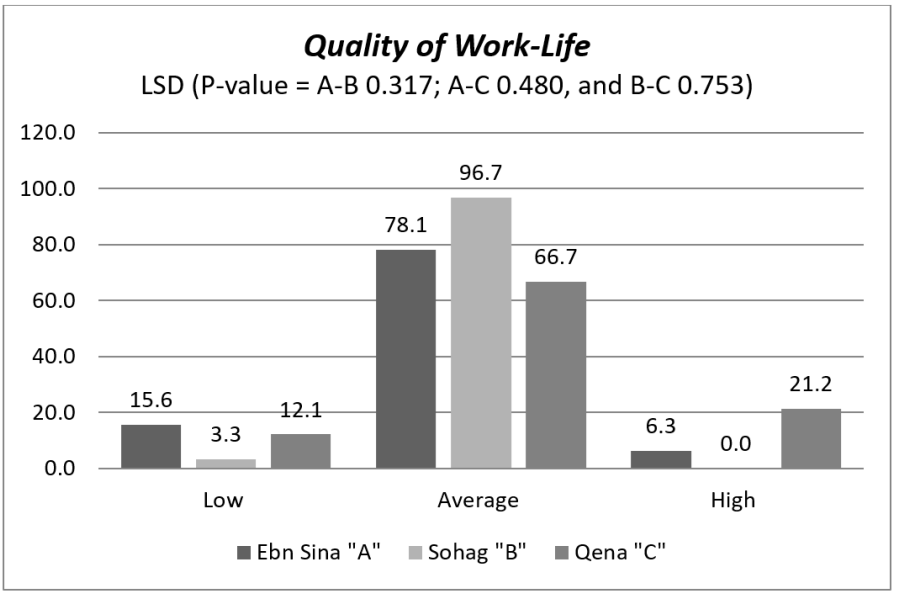

Figure 1: Percentage of Quality of Work–Life

Figure 1 Shows the average levels (78.1%, 96.7%, and 66.7%) of total quality of work–life at the three hospitals, respectively with no significant difference (P > 0.05).

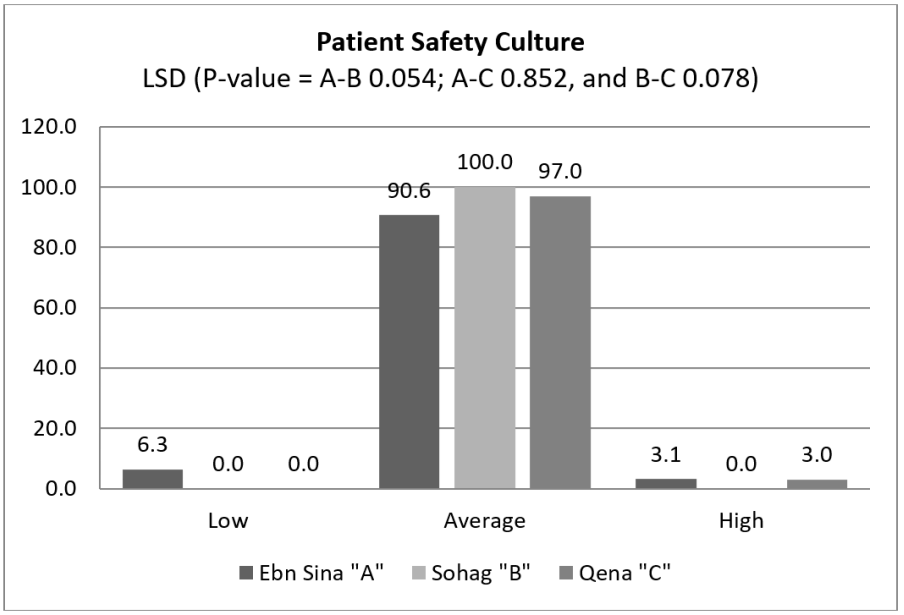

Figure 2: Percentage of Patient Safety Culture Level

Figure 2 Shows the average levels (90.6%, 100.0%, and 97.0%) of patient safety culture at the three hospitals, respectively with no significant difference (P > 0.05).

Table 3: Pearson Correlation of COVID-19 Complications to Quality of Work–life and Patient Safety Culture

		Correlations		1	2	3	4	5	6	7
1	Ibn Sina	Respiratory Complications	*r*							
			P							
2		gastrointestinal Complications	*r*	0.574**						
			P	0.001						
3		Inflammatory Complications	*r*	0.398*	0.218					
			P	0.024	0.232					
4		Pain Complications	*r*	0.649**	0.573**	0.642**				
			P	0.000	0.001	0.000				
5		Circulatory Complications	*r*	0.139	0.222	−0.219	0.006			
			P	0.448	0.222	0.229	0.975			
6		Nervous System Complications	*r*	0.552**	0.388*	0.624**	0.569**	0.255		
			P	0.001	0.028	0.000	0.001	0.159		
7		QWL	*r*	−0.099	0.145	−0.541**	−0.424*	0.028	−0.124	
			P	0.589	0.427	0.001	0.016	0.879	0.497	
8		Patient safety culture	*r*	0.119	0.214	−0.320	−0.044	−0.075	0.049	0.660**
			P	0.517	0.240	0.075	0.812	0.684	0.792	0.000
2	Sohag	Gastrointestinal Complications	*r*	0.903**						
			P	0.000						
3		Inflammatory Complications	*r*	0.877**	0.902**					
			P	0.000	0.000					
4		Pain Complications	*r*	0.859**	0.811**	0.781**				
			P	0.000	0.000	0.000				
5		Circulatory Complications	*r*	0.546**	0.494**	0.517**	0.555**			
			P	0.002	0.006	0.003	0.001			
6		Nervous System Complications	*r*	0.841**	0.748**	0.762**	0.692**	0.229		
			P	0.000	0.000	0.000	0.000	0.223		
7		QWL	*r*	−0.342	−0.234	−0.239	−0.361	−0.567**	−0.020	
			P	0.064	0.214	0.204	0.050	0.001	0.915	
8		Patient safety culture	*r*	−0.378*	−0.243	−0.296	−0.283	−0.232	−0.307	0.539**
			P	0.039	0.195	0.112	0.130	0.217	0.099	0.002
2	Qena	Gastrointestinal Complications	*r*	0.725**						
			P	0.000						
3		Inflammatory Complications	*r*	0.652**	0.419*					
			P	0.000	0.015					
4		Pain Complications	*r*	0.668**	0.496**	0.643**				
			P	0.000	0.003	0.000				
5		Circulatory Complications	*r*	0.089	0.006	0.177	0.122			
			P	0.622	0.975	0.324	0.498			
6		Nervous System Complications	*r*	0.721**	0.451**	0.491**	0.703**	0.158		
			P	0.000	0.008	0.004	0.000	0.380		
7		QWL	*r*	0.008	0.083	−0.008	0.056	−0.099	0.041	
			P	0.967	0.646	0.964	0.758	0.584	0.819	
8		Patient safety culture	*r*	−0.174	−0.021	0.136	0.050	0.018	−0.114	0.537**
			P	0.333	0.906	0.450	0.783	0.922	0.529	0.001

* *Significant P < 0.05 and* ***Highly Significant P < 0.01*

Table 3 showed a highly significant negative correlation between inflammatory complications and quality of work-life ($P<0.01$) and a significant negative correlation between pain complications and quality of work-life ($P<0.05$) at Ibn Sina. For Sohag, there was a highly significant negative correlation between circulatory complications and quality of work-life ($P<0.01$) and a significant negative correlation between respiratory complications and patient safety culture ($P<0.05$). There was a highly significant positive correlation between quality of work-life and patient safety culture ($P<0.01$) in the three hospitals.

DISCUSSION

The present study findings showed that more than one-fourth of the study sample had respiratory system-

related complications. Gastrointestinal-related complications varied from ~one-fifth for diarrhea and loss of taste, and ~50% had nausea, vomiting, and abdominal pain at Ibn Sina, Sohag, and Qena hospitals. Additionally, pain, circulatory, and nervous system-related complications were present at all three hospitals (Table 2).

These findings were supported by Kluge *et al*. (2020), who found ~5% of patients with COVID-19 require admittance to an intensive care unit for a severe disease complicated by acute respiratory distress syndrome. This finding was in accordance with Yi *et al*. (2020), who reported that COVID-19 gastrointestinal complications include abdominal pain, nausea, vomiting, and diarrhea. Azer (2020), who stated that complications affect the nervous, cardiovascular, respiratory, and gastrointestinal systems; and Sabetian *et al*. (2021), who found that 35.5% of nurses were asymptomatic and the complications were myalgia (46%); and cough (45.5%).

These results revealed an average level of quality work-life at the three hospitals (Figure 1). This finding was in accordance with Karunagaran *et al.* (2020), who reported that the quality of nurses' work-life was negatively affected during COVID-19. Dehkordi *et al*. (2020) showed that nurses' quality of work-life decreased, whereas fatigue and anxiety levels increased due to the increasing COVID-19 cases. Furthermore study shows that, the work-life quality is crucial for recruiting and retaining nursing staff, with enhancing well-being reducing absenteeism and increasing productivity, requiring effective strategies like support systems and improved teamwork (Lorber & Dobnik, 2023).

This study also revealed an average level of patient safety culture at the three hospitals (Figure 2). Likewise, Lee and Quinn (2020) stated that COVID-19 adversely affects patient safety culture, which negatively affects nursing care. Also, Sonis *et al.* (2020) found a lower safety level among patients with COVID-19 compared with those without COVID-19.

Moreover, there was a negative correlation between inflammation, pain, circulatory complications, and quality of work; this answers the first study question. Additionally, the study showed a positive correlation between quality of work-life and patient safety culture at the three hospitals (Table 3), answering the second question. These findings were in accordance with Maslakçı (2021), who reported that COVID-19 negatively affected nurses' work quality, and Lu *et al.* (2022), who stated that patient safety culture is significant in reducing burnout and enhancing work-life balance for staff.

Study Implications

Healthcare organizations and medical-surgical nurses have positive and negative implications. Positive implications include: 1) nurses being up-to-date about aspects of COVID-19 and other pandemics; 2) healthcare organizations, especially in developing countries, seeking electronic documentation programs as a formal method and trending to telenursing and other online methods. Negative implications include COVID-19's long-term complications and its effect on the quality of care provided for patients.

CONCLUSION

The current study concluded that the highest percentages had only one COVID-19 attack at the three hospitals; there was no statistically significant difference ($P > 0.05$). There was a significant negative correlation between inflammatory, pain, and circulatory complications and quality of work-life and a significant negative correlation between respiratory complications and patient safety culture. There was an average level of quality work-life balance and patient safety culture. There was a highly statistically significant positive correlation between quality of work-life balance and patient safety culture ($P < 0.01$).

Recommendation

- Preventive measures should be considered by the authorities and nurses to prevent COVID-19 infection and avoid complications; this will improve the quality of work-life and enhance patient safety culture.
- Nurses' education about COVID-19 infection symptoms, complications, and preventive measures should be streamlined.

- Hospital authorities should adopt nurses' education programs about quality of work-life and patient safety culture.

Conflict of Interest

The authors declare that they have no conflict of interests.

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