Assiut Scientific Nursing Journal
http://asnj.journals.ekb.eg
http://www.arabimpactfactor.com
DOI: 10.21608/ASNJ.2022.99881.1245

Anxiety among Nurses Previously Infected with Coronavirus Disease 2019 and Its Relation to Their Performance and Quality of Work Life

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Abstract
The coronavirus disease 2019 (COVID-19) pandemic has caused distressing experience among nurses worldwide. However, the prevalence of anxiety symptoms and how anxiety influence clinical performance and quality of work life (QWL) among nurses in this unrestricted emergency are unknown. **Aim:** This study was designed to assess the level of anxiety among nurses previously infected with COVID-19 and its relation to their work performance and QWL. **Methods:** A descriptive correlational study was conducted at the compound of university hospitals and Ministry of Health hospitals. The sample consisted of 190 nurses. Four tools were used to collect data, namely, socio-demographic data, Clinical Nurse Performance Questionnaire, QWL Questionnaire, and Hamilton Anxiety Scale. **Results:** A statistically significant correlation (0.001**) was observed between clinical nurse performance, QWL, and anxiety. The nurses under study had severe symptoms of anxiety and general physiological symptoms; however, they had a moderate level of performance. **Conclusion:** Anxiety among the nurses in this study positively affected their performance and QWL. **Recommendations:** More studies on nurses infected with COVID-19 are needed.

Keywords: Anxiety, COVID-19 pandemic, Nursing work performance & Quality of work life.

Introduction
The healthcare team (white arm) was the first line of defense during the coronavirus disease 2019 (COVID-19) pandemic. Particularly, anxiety **(Kang et al., 2020; & Lai et al., 2020)** affected healthcare workers (HCWs), especially nurses exposed to infection by this virus and directly involved in caring for patients with COVID-19. HCWS, particularly nurses, will continue to be at the frontline of patient care in hospitals and must ensure that all patients receive individualized, high-quality care, regardless of their infection status, and participate in the preparation for increased nursing and health system demand related to COVID-19. The constantly rising mortality rates, lack of drugs and vaccines, huge workload, inadequate personal protective equipment (PPE), and inadequate support negatively affect the health of HCWs **(Lai et al., 2020).** In such circumstances, nurses with a high risk of infection continue to provide patient care **(Dai et al., 2020).** Other consequences of this pandemic included job burnout, increased healthcare costs, and psychological distress (e.g., fear, anxiety, depression, stress, insomnia, denial, and anger) (**Hassannia et al., 2020; & Vizheh et al., 2020).**
Anxiety within the COVID-19 pandemic is prevalent among the nursing workforce, potentially affecting their well-being and work performance. A high-performing nurse pays attention as nursing performance is vital in providing quality patient care and safety, researchers have faced enormous challenges such outbreaks bring **(Lam et al., 2018),** such as the increasing workload on nursing staff and increased risk of infection among frontline nurses **(Shih et al., 2009).**
Maintaining the work performance of nurses in such a critical situation is evaluated using several elements, such as timely management of nursing activities and a well-prepared or accurate patient service. Nurses' performance is defined as the work, achievement, or fulfillment of the nurses' responsibilities based on their assigned tasks (**Al-Shehrsupri et al., 2019).** Nurses deliver nursing care continuously for 24 h, which affects the results **(Liu et al., 2020).**
Nurses' work performance can be classified into two types: task performance and contextual performance. Task performance is defined as an activity that contributes to the technical core of the organization, either directly or indirectly, and involves job-related aspects, such as professional, clinical, interpersonal communication, and problem solving skills; teamwork; and leadership. Clinical leadership is also imperative to the performance of nurses, which focuses on patients and healthcare teams rather than the formal leadership position that is absolutely linked to management levels; nurses are expected to demonstrate professional skills and behaviors when

communicating with patients, families, colleagues, doctors, or directors. Thus, the acquisition of clinical leadership skills allows nurses to direct and support patients and healthcare teams when providing care **(Rodríguez et al., 2018).**

The other type of work performance is contextual performance, which emerges as an important aspect of overall work performance, which is defined as activities that contribute to the social and psychological essence of the organization, such as volunteering to do tasks and cooperation with colleagues, which facilitate the achievement of organizational goals **(Van Bogaert et al., 2014 & cited by Rodríguez et al., 2018).**

Al Mamun & Hasan (2017) have reported that the quality of work life (QWL) and psychosocial safety work climate are management approaches that enhance the QWL well-being, which is an important organizational equipment to improve work performance for job satisfaction, design, and enrichment. A basic objective of ensuring a healthy work life is improving working conditions and organizational effectiveness. Therefore, high QWL is essential for organizations to achieve high performance and growth in profitability and continue to recruit and retain employees **(Dechawatanapaisal, 2017).**

Significance of the study

Nurses comprise the largest group in the healthcare team at any country and play a great role in preventing COVID-19, responding to its spread, and providing patient care **(Choi et al., 2020).** Patients with COVID-19 still need nurses to recover and continue treatment. Therefore, nurses' work efficiency is essential in this pandemic, and therefore, the role of nurses' performance in facing this virus is of paramount importance **(Jiang et al., 2020).**

The first pandemic wave of COVID-19 has started in **March 2020;** more than 194 million cases of COVID-19 have been reported in over 188 countries, and Egypt is not an exception, which recorded the highest rate of COVID-19 infections at 1,774 cases in June, while the Ministry of Health recorded the highest death rate related to COVID-19 with 97 deaths on June 15, 2020, and at the beginning of the second wave, in November 2020, the daily infection rate reached 365 recorded cases; however, it jumped to 911 and 42 deaths through days and is still rising **(Hossny et al., 2020).**

Studies on the relationship between anxiety and job performance and QWL during the COVID-19 pandemic remain limited. In a review of national and international literature related to this study, recent studies have explored the influence of personal resilience, social support, and organizational support in reducing COVID-19-related anxiety among nurses **(Labrague & Santos, 2020).** The findings of a study conducted in Iran have shown that HCWs who were responsible for providing care to patients with COVID-19 had increasing workload, stress, and anxiety. However, no studies have examined the effects of anxiety on the performance of nurses who were previously infected with COVID-19; therefore, this study was designed to determine to what extent the anxiety level of nurses affects their clinical performance level and QWL.

Aim of the study:

Assess the level of anxiety among nurses previously infected with COVID-19 and its relation to their performance and quality of work life through:

1. Assess the level of anxiety among nurses previously infected with COVID-19.
2. Assess the level of work performance among nurses previously infected with COVID-19.
3. Determine the QWL level among nurses previously infected with COVID-19.
4. Assess the association of anxiety with work performance and QWL among nurses previously infected with COVID-19.

Research questions:

1. What is the level of anxiety among nurses previously infected with COVID-19?
2. What is the level of work performance among nurses previously infected with COVID-19?
3. What is the level of QWL among nurses previously infected with COVID-19?
4. Is their relation between anxiety, performance, and QWL among nurses previously infected with COVID-19?

Subject and Methods:

Research design:

Research design: A descriptive correlational study design was used.

Research setting:

This study was conducted at the compound of Assiut University Hospitals and Ministry of Health hospitals.

Sample:

In this study, a convenience sample was used consisting of all nurses previously infected with COVID-19 as the inclusion criteria in the predetermined settings (N = 190).

Tools of the study: Four tools were used, namely, socio-demographic datasheet, Clinical Nurse Performance Questionnaire (CNPQ), Hamilton Anxiety Scale (HAS), and Quality of Work Life Scale (QWLS).

Tool (1) Socio-demographic datasheet:

This tool was developed by the researchers based on a review of national and international literature to assess demographic data of the nurses under study,

which included age, gender, level of education, marital status, and years of experience.

Tool (2) CNPQ:

This tool was developed by **Kahya & Oral (2018)** and cited by **Hossny et al., (2020).** It is used to measure the performance of clinical nurses and includes contextual tasks consisting of 38 performance components under eight categories, namely, contextual skill (11 elements) (e.g., taking responsibility for the tasks and working harder than necessary), professional skill (four elements) (e.g., keeping nursing equipment in good condition), clinical skill (six elements) (e.g., planning patient care according to individual needs and managing the nursing activities in time), interpersonal communication (three elements) (e.g., expressing enthusiasm for nursing work), problem solving (three elements) (e.g., hastily solving clinical problems), professional ethics (three elements) (e.g., attitude to patients and their family), teamwork (four elements) (e.g., cooperating with other members of the team), and leadership (four items) (e.g., motivating other nurses and coaching others in duties). This scale was measured on a 5-point Likert scale from 1 (never performing) to 5 (critical). The scoring system refers to three levels: low, moderate, and high performance.

Permission to use this was obtained from the author by sending an email. The face validity (jury) of the tool was examined by five experts from the Department of Nursing Administration; moreover, the scale was reported to have high reliability (0.84) using Cronbach's alpha and has high validity (93%) using Pearson's correlation.

Tool (3) QWLS:

This tool was developed by Brooks (2001) to measure the QWL of nurses. It includes 41 items divided into four dimensions—work life/home life (six items), work design (10 items), work world (five items), and work context (20 items)—which includes the following subitems: management and supervision (seven items), coworkers (five items), development opportunities (three items), and work environment (five items).

Scoring system

The scoring system used a 5-point Likert scale, ranging from 5 for "strongly agree," 4 for "agree," 3 for "uncertain," 2 for "disagree," and 1 for "strongly disagree." The scores of each dimension were summed and then converted into a percent score. A score of 60% or higher was considered "agree," and a score of less than 60% was considered "disagree."

Tool (4) HAS:

This scale was developed by Hamilton (2004) and translated back into English to check its validity and was updated by Beck (2011) to measure the severity of anxiety**.** The HAS consists of 14 items; each item was scored using a 5-point Likert scale: 0 = not present, 1 = mild, 2 = moderate, 3 = severe, and 4 = very severe.

The total score of this scale ranged from 0 to 56, which was classified into four levels: a score of 17 or less indicates mild anxiety, a score of 18–24 indicates mild to moderate anxiety, a score of 25–29 indicates moderate to severe anxiety, and a score of more than 30 indicates severe anxiety.

The scale was reported to have high reliability using Cronbach's alpha (0.97) and high validity using Pearson's correlation (98%).

Pilot study:

A pilot study was conducted on 10% of the study population to revise and clarify the tools and to estimate the time needed to fill the study tools. Furthermore, the pilot study helped determine the organizational and administrative procedures needed for the study and detect constraints that may arise and how to deal with them. No modifications were made. It took approximately 2 weeks from September 2019. The reliability of the study tools was assessed using Cranach's alpha coefficients for the structured questionnaires, which was 0.83.

Ethical considerations:

The researchers received approval from the Ethics Committee of the Faculty of Nursing, Assiut University. Written informed consent was obtained from all applicants. The confidentiality of the data obtained has been assured; the aim of the study was clarified to all applicants before the initial data collection.

Results:

Table (1): Distribution of socio-demographic data of the study subjects (n= 190).

Items	No	%
Age group		
Less than 30 years	109	57.4
30–40 years	47	24.7
More than 40 years	34	17.9
Mean ± SD	**32.36 ± 8.77 (19–57)**	
Type of hospital		
Assiut University hospitals	107	56.3
Ministry of Healthy hospitals	83	43.7
Department		
Emergency	96	50.5
ICU	21	11.1
Pediatric	44	23.2
Surgical	29	15.3
Gender		
Male	54	28.4
Female	136	71.6
Experience year		
Less than 5 year	81	42.6
5–10 years	34	17.9
More than 10 years	75	39.5
Mean ± SD	**10.92 ± 9.84 (0.3–38)**	
Education		
Nursing diploma	75	39.5
Nursing institute	54	28.4
Bachelor of nursing	61	32.1

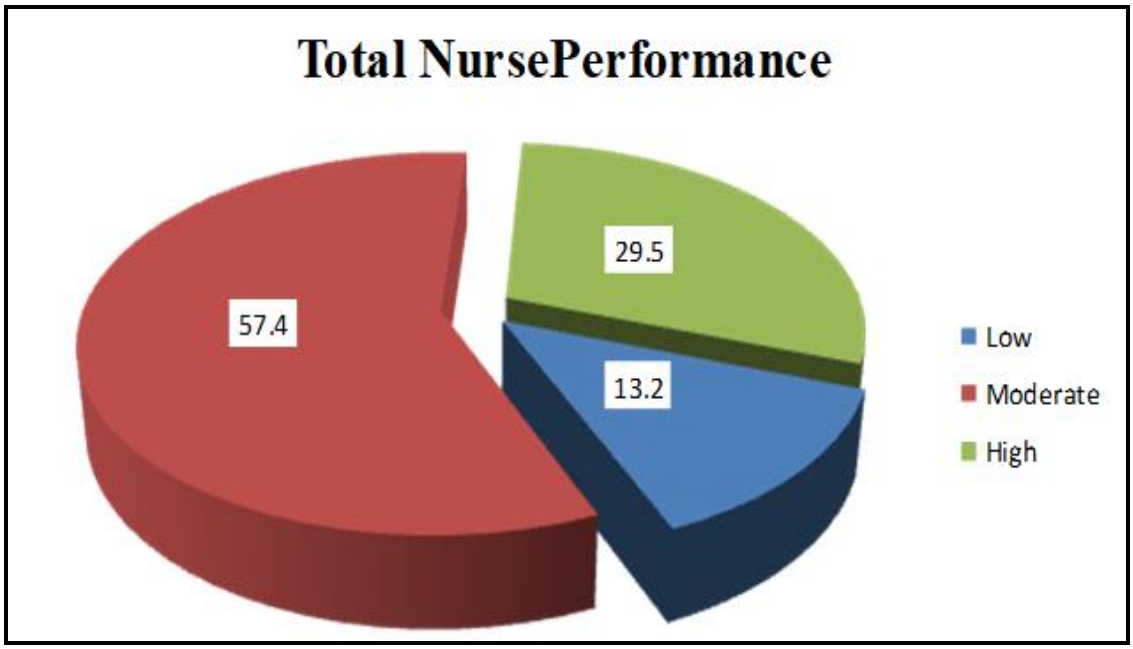

Figure (1): Levels of clinical performance of the nurses in this study (n = 190).

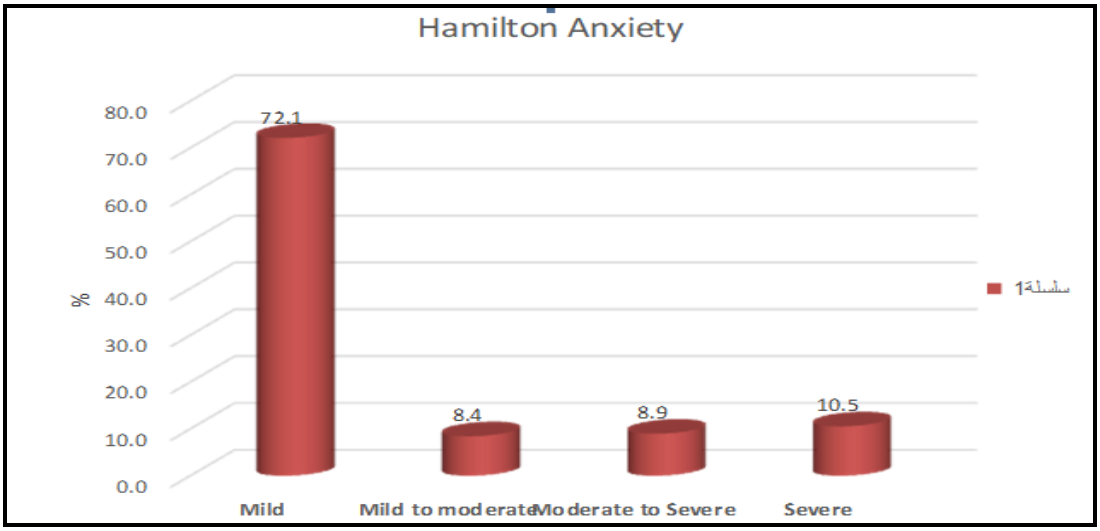

Figure (2): Levels of anxiety according to the Hamilton Anxiety Scale of the nurses in this study.

Table (2): The total mean performance and total mean quality of work life dimensions as perceived by the study subjects.

Main items	Mean ± SD	Range
Nurse performance dimensions		
Contextual	44.99 ± 9.11	11–66
Professional skill	18.61 ± 3.94	10–28
Clinical skill	26.71 ± 6.07	9–42
Interpersonal communication	13.46 ± 3.3	5–21
Problem solving	13.87 ± 3.25	5–21
Professional ethics	13.79 ± 3.14	5–21
Teamwork	16.83 ± 4.35	6–24
Leadership	17.31 ± 4.74	4–25
Total	**165.57 ± 29.53**	**82–226**
Quality of work life dimensions		
Work/home life dimension	19.92 ± 3.71	8–26
Work design dimension	28.73 ± 4.62	20–42
Work context dimension	**56.65 ± 10.40**	31–94
Work world dimension	**12.84 ± 3.65**	5–24
Total	**118.14 ± 16.44**	71–186

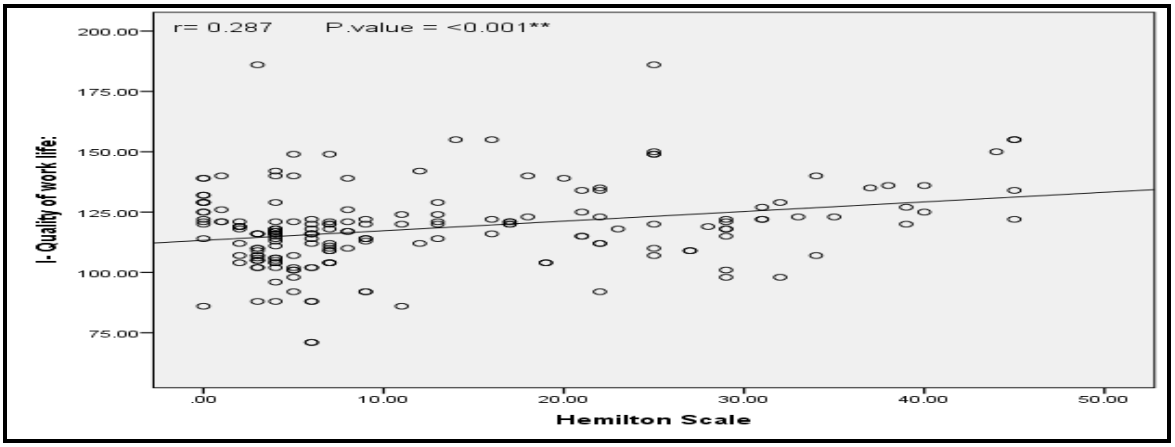

Figure (3): Correlation coefficient between quality of work life and anxiety.

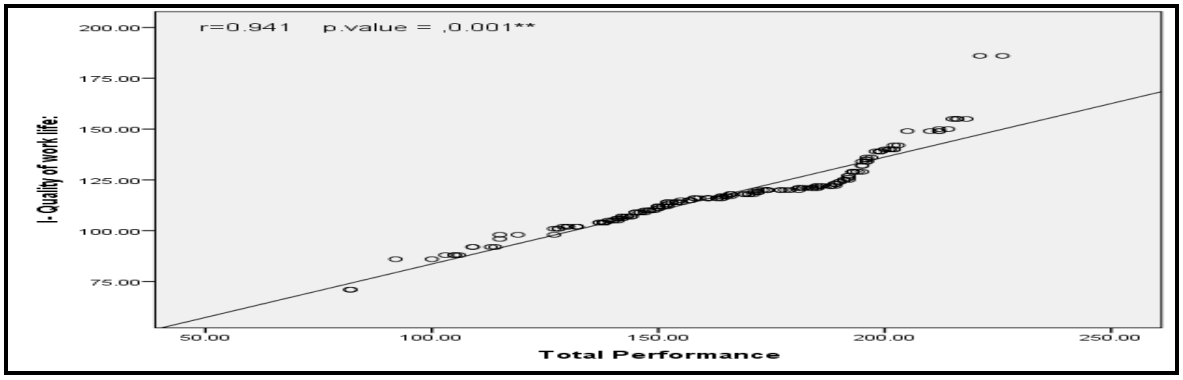

Figure (4): Correlation coefficient between the total nurse performance and total nurses' quality of work life

Table (3): Descriptive correlation co efficient between CNPQ dimensions, QWL dimensions, and HAS for the nurses under study.

Clinical nurse performance questionnaire (CNPQ)	Hamilton Anxiety Scale (HAS)	
	R	P
Contextual	0.193	0.008**
Professional skill	0.294	0.000***
Clinical skill	0.230	0.001**
Interpersonal communication	0.185	0.010*
Problem solving	0.112	0.124
Professional ethics	0.226	0.002**
Teamwork	0.322	0.000***
Leadership	0.278	0.000***
Total performance	**0.295**	**0.000***
Quality of Work Life Questionnaire		
Work/home life dimension	0.126	0.084
Work design dimension	0.183	0.012*
Work context dimension	0.290	0.000***
Work world	0. 098	0.178
Total quality of work life	**0.287**	**0.000***

**Statistically significant correlation at p-value < 0.05*

***Statistically significant correlation at p-value < 0.01.*

Table (4) Relationship between clinical Nurse Performance questionnaire and Socio demographic data of the studied nurses.

Socio-demographic data	Total (CNPQ)			P. value
	N	Mean ±SD	Range	
Age group				
Less than 30 years	109	161.07±28.42	82-216	0.049*
From 30- 40 years	47	170.94±25.95	115-226	
More than 40 years	34	172.56±35.43	92-218	
Type of Hospital				
Assiut university hospital	107	170.95±29.24	92-221	0.004**
Ministry healthy hospital	83	158.63±28.6	82-226	
Department				
Emergency	96	165.29±29.21	92-216	0.908
ICU	21	165.24±40.44	82-214	
Pediatric	44	168.07±31.37	103-226	
Surgical	29	162.93±17.16	138-201	

Socio-demographic data	Total (CNPQ)			P. value
	N	Mean ±SD	Range	
Gender				
Male	54	163.26±24.32	109-202	0.498
Female	136	166.49±31.4	82-226	
Experience year				
Less than 5 year	81	156.59±29.24	82-210	0.001**
From 5-10 years	34	172.06±22	137-216	
More than 10 years	75	172.32±30.55	92-226	
Education				
Nursing Diploma	75	172.13±28.77	92-226	0.039*
Nursing institute	54	163±27.19	103-216	
Bachelor of Nursing	61	159.77±31.29	82-215	

Independent T-test between the two groups *One-way A nova T-test between the three groups or more*
**Significant level at P value < 0.05,* ***Significant level at P value < 0.01*

Table (1): Distribution of socio-demographic data of the nurses under study (n = 190). More than half (57.4) of the nurses under study were aged less than 30 years. Most nurses were female. Approximately 42.6% of them had less than 5 years of experience, whereas more than one-third (39.5%) of them had more than 10 years of experience. Then, 39.5% and 32.1% graduated with diploma in nursing and bachelor's degree in nursing, respectively. More than two-thirds (66.3) of them were staff nurses, while 33.7% were head nurses. More than three-quarters of the nurses under study had been exposed to COVID-19. More than half of them were distributed at Assiut University Hospitals.

Figure (1): Levels of clinical nurse performance of the nurses under study (n = 190). This figure reveals that approximately one-third (29.5%) of the nurses under study had a high level of performance, and more than half of them had a moderate level of performance (57.4%). Meanwhile, only 13.2% of them had a low level of performance.

Figure (2): Levels of anxiety according to the Hamilton Anxiety Scale of the nurses under study (n = 190). This figure demonstrates the levels of anxiety among the nurses under study: 10.5% of them had severe anxiety. Meanwhile, nearly three-quarters (72.1%) of them had a mild level of anxiety.

Table (2): The total mean performance and total mean quality of work life dimensions as perceived by the study subjects.

This table shows that the clinical performance of the nurses under study had a high mean score (44.99 ± 9.11) regarding contextual performance and low mean score regarding interpersonal communication, problem solving, and professional ethics (13.46 ± 3.3, 13.87 ± 3.25, and 13.79 ± 3.14, respectively) during the first and second waves of COVID-19. Regarding the quality of work life dimensions, the nurses under study had the highest mean score for the work context dimension (56.65 ± 10.40). In contrast, the nurses under study had the lowest mean score for the work world dimension (12.84 ± 3.65).

Figure (3): Correlation coefficient between Quality of Work Life Scale and Hamilton Anxiety Scale scores. This figure shows the correlation coefficient between the total quality of work life and total anxiety scores: a highly statistically significant correlation (r = 0.287; p = 0.001**) was observed between clinical nurses' quality of work life and their anxiety.

Figure (4): Correlation coefficient between the total nurse performance and total nurses' quality of work life. This figure shows the correlation coefficient between total performance and total nurses' quality of work life: a positive statistically significant correlation (r = 0.941; p = 0.001**) was observed between the total performance and total quality of work life.

Table (3): Descriptive correlation coefficient between the CNPQ dimensions, QWL dimensions, and HAS of the nurses under study. This table shows the correlation coefficient between the main items of the CNPQ and overall HAS. A strong significant positive correlation was observed between total performance and total anxiety (0.000**). Regarding the main items of the CNPQ, a strong significant correlation was observed between teamwork, professional skills, and leadership skills and total anxiety (0.000**) Furthermore, a strong significant correlation was observed between clinical skill, professional ethics, contextual, and interpersonal communication and anxiety (0.001**, 0.002**, 0.008**, and 0.010**, respectively). Meanwhile, no significant correlation was observed between problem solving and anxiety (0.124). In contrast, a significant positive correlation was found between total quality work life and total anxiety (0.001**). Regarding the main items, a significant positive correlation was observed between the work context dimension and total anxiety

(0.000***), and a significant correlation was observed between the work design dimension and anxiety (0.012*). Meanwhile, no significant correlation was found between the work/home life and work world dimensions and anxiety (0.084 and 0.178, respectively).

Table (4): Relationship between total (CNPQ) and socio demographic data of studied nurses. This table shows strongly statistical significant relationship between total performance of the studied nurses and type of hospital at (0.004**) with high mean score related to Assiut university hospital (170.95 ± 29.24) and also there is a strongly statistical significant relationship between total performance of the studied nurses and their years of experience (0.001**) with high mean score related to those with experience more than 10 years (172.32 ± 30.55). Moreover, there were a strong significant relationship between level of education of studied nurses and their total performance (0. 039*) with high mean score related to diploma nurses (172.13 ± 28.77). It is observed that no statistical significant relation between clinical nurse performance and their Departments and Genders (0.908, and 0.498) respectively.

Discussion

Nurses are human beings; exposure to COVID-19 is a bad experience when conducting their work, making them anxious, a great psychological load, in performing their jobs **(Sarsangi et al., 2015; Abazari et al., 2020)**. This study was designed to assess the anxiety and performance levels and determine the effects of anxiety on the performance of nurses infected with COVID-19.

The results of this study reveal a strong significant correlation between anxiety, nurse performance, and QWL. This means that anxiety has a positive effect on nurses' performance and QWL. The results of this study support the findings of previous studies on the positive impact of anxiety on task performance **(Maunder et al, 2010) and (Smith A , 2001);** studies have reported that nurses under stress provide good performance and perform tasks successfully.

Regarding the main items of the CNPQ (Table 2 and Fig. 1), a significant correlation was observed between anxiety and all main items of the CNPQ, especially teamwork and professional skills. This is consistent with the study by **Tam et al. (2017),** who found a strong significant correlation between anxiety and teamwork and professional skills. Moreover, in this study, no correlation was observed between anxiety and problem solving skills (0.112). This might be due to that problem solving skills need systematic processes and are not affected by psychological stressors.

In the current context, more than two-thirds of the nurses under study had severe symptoms of anxiety and general physiological symptoms. They reported higher anxiety levels (Table 3 and Fig. 2). This finding is consistent with the findings of **Zheng et al. (2021)**, who found that the most common risk factor for insomnia, anxiety, and depression is the fear from infectious diseases. Furthermore, in this study, the nurses under study had experienced this infection during the COVID-19 pandemic, explaining their fear and anxiety. The main source of anxiety in nurses during the COVID-19 pandemic was the fear of becoming infected or unknowingly infecting others **(Mo et al., 2020).** Additionally, unmanaged anxiety could have long-standing effects on nurses' job satisfaction and work performance, resulting in recurrent absences **(Labrague & McEnroe- Petitte, 2018; & Lee et al., 2007).** Available data suggest that nurses experience the highest anxiety levels and prevalence of anxiety, ranging from 15% to 92% **(Liu et al., 2020).**

The results of this study revealed that approximately one-third of the nurses under study had a high level of performance, and more than half of them had a moderate level of performance (Fig. 1). This finding agrees with those of **Hossny et al. (2020),** who reported that more than half of the nurses under study in a university hospital in Egypt had a moderate level of performance, and more than one-third had a high level of performance.

The study results showed that nurses' performance had a significant relationship with age, type of hospital, years of experience, and level of education and no relation with gender and department (Table 4). In line with this result, **Al-Makhaita et al., (2014)** have reported that job performance and experience of nurses significantly correlated. Furthermore, **Kouhnavard et al., (2020)** have reported that job performance significantly correlated with age and work experience. These results can possibly be attributed to the inner efforts of nurses to provide care within this crisis and the outside support from institutions and the encouraging vision of society on the performance of nurses during this pandemic.

The results of this study showed that the quality of life decreased and fatigue and anxiety caused by COVID-19 increased; however, no statistically significant difference in anxiety levels was observed among nurses. Regarding the QWL, no significant difference in other components, except for the human resource development component, was observed. The results also showed a statistically significant relationship between the level of anxiety caused by COVID-19 and QWL and fatigue.

Conclusions

Based on the results of this study, the following was concluded: there were a strong significant correlation between anxiety level and performance. Nurses had a moderate level of performance, and the nurses in this study have severe symptoms of anxiety and physiological symptoms. There was a strong relationship between work performance and type of hospital, years of experience, and level of education among the studied nurses, while no relation with gender and department

Recommendations

More attention and support from colleagues, managers and society as a whole should be provided for nurses during times of crisis while they facing stresses and anxiety. Hospital managers must offer resources to clinical nursing staff who are infected with and exposed to COVID-19 as an effect of their work and closely screen the occupational health, well-being, and safety of their nurses.

Moreover, clear infection control protocols (standard, contact, and airborne) are essential to support nurses during the management of COVID-19 in clinical care to protect them with satisfactory PPE at each hospital, including masks, N95 respirators, googles, face shields, gowns, and gloves. Furthermore, the needs of nurses and medical crew, such as especial means of transport from and to their hospitals, nutrient regimen, and incentives, should be addressed.

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