Willingness of Nurses to Work during A Covid-19 Pandemic: The Role of Knowledge, Attitude, and Practices

Esmat Sayed Abd El-mageed[1], Mohamed Gamal Elsehrawy[2], & Tarek Mahmoud Shaker[3]

[1] Assistant Professor of Medical-Surgical Nursing, Faculty of Nursing, Assiut University, Egypt.
[2] Lecturer of nursing administration, Faculty of Nursing, Port Said University, Egypt.
[3] Lecturer of Medical-Surgical Nursing, Faculty of Nursing, Mansoura University, Egypt.

Abstract

Background: COVID-19 pandemic has caused an excessive loss of life and becomes a major threat to human life around the world. Nurses' willingness to participate in the care of patients with COVID-19 increases as the awareness of diseases and training increases. **Aim:** To explore the role of knowledge, attitudes, and practices on willingness of nurses to work during COVID-19 pandemic. **Methods:** Cross-sectional descriptive research design. Setting: The study was conducted at all Port Said governmental hospitals (6 hospitals). Subject: 426 nurses working in Port Said governmental hospitals. Tool: Knowledge, attitudes, and practices questionnaire was utilized for data collection. **Results:** Nearly two-thirds of the nurses had an adequate level of knowledge, practices, and a positive attitude regarding COVID-19. Also, nurses' willingness to work and care for patients with COVID-19 is not only affected by their knowledge, attitude, and practice but also, were positive predictors for nurses` willingness. **Conclusion:** Knowledge, attitude, & practices had a significant positive role in improving nurses' willingness to work during the COVID-19 pandemic. **Recommendations:** Educational programs for nurses about COVID-19 outlined by WHO and Ministry of Health and Population in Egypt, with periodical evaluation.

Keywords: Willingness, COVID-19 Pandemic, knowledge, attitude, practices.

Introduction

A new type of coronavirus was first discovered in Wuhan, China at the end of 2019, causing acute infectious pneumonia in China and many other countries including the United States, the United Kingdom, France, Italy, South Korea, and Singapore. Recently, the disease was officially named Coronavirus Disease 2019 (COVID-19) by the World Health Organization (WHO) **(Fan et al., 2020).** In Egypt, the total number of reported cases as of May 2021 is 262,650, and the number of reported deaths is 15,096 (**WHO, 2021**).

The patient presented with fever, dry cough, shortness of breath, loss of smell and taste. Approximately one-fifth of those infected do not show any symptoms. Although most people have mild symptoms, lung infiltration may occur in the most severe cases. However,

the elderly and people with serious chronic diseases (including heart disease, diabetes, and lung disease) face a higher risk. There is still no clear treatment, and global pharmaceutical companies are scrambling to develop vaccines **(Gralinski and Menachery, 2020 and Nashwan et al., 2020).**

Nursing is the main active partner in preventing any primary and secondary infectious diseases. In every country, regardless of its socio-economic development, nursing is considered a top priority and professional for disease prevention and pain relief during and after treatment of any disease including COVID-19 (WHO, 2020a).The outbreak of infectious diseases places a heavy responsibility on health care teams and leads to a lack of preparedness **(Patel et al., 2017)**. Effective prevention training may provide nurses and other members of health care team with protection during an epidemic. In addition, their knowledge and attitudes are expected to greatly affect the compliance level with the correct use of protective measures, and will ultimately be reflected in the results of COVID-19 patients **(Mohamed et al., 2020).**

With the increase in awareness of infectious diseases and pre-disaster training during infectious diseases, nurses' willingness to participate in the care of COVID-19 patients has also increased **(Wu et al., 2020)**. On the other hand, the lack of willingness to work in a disaster may result in a severe shortage of nursing manpower, which may hinder response to disasters **(Connor et al., 2014).**

Significance of the study

The COVID-19 pandemic has increased rate of loss of life and has become a major threat to humanity all over the world **(WHO, 2020b)**. In addition, the Centers for Disease Control and Prevention (CDC) reported that nurses accounted for the largest proportion of hospitalized medical staff with COVID-19 **(Kambhampati et al., 2020).** Therefore, this study aims to explore the impact of knowledge, attitudes, and practice on nurses' willingness to deliver patient care during the COVID-19 pandemic; it is hoped that this study can provide evidence for leaders to design educational programs to improve nurses' ability to fight against high-risk patients during the epidemic, and Willingness to cooperate.

Aims of the study

To explore the role of knowledge, attitudes, and practices on willingness of nurses to work during COVID-19 pandemic.

Research question

Do knowledge, attitudes, and practices of nurses have a role in the willingness of nurses to deliver patient care during the COVID-19 pandemic?

Subjects and Methods

The subjects and methods of the present study were described as technical, operational, administrative, and statistical designs.

Technical design.

It included research design, setting of the study, subjects, and tools of data collection.

Research design:

Cross-sectional descriptive research design was utilized in this study.

The cross-sectional research design is an observational research design. In a cross-sectional study, researchers simultaneously measure the results and exposure of study participants (**Setia, 2016**).

Setting of the study:

The study was conducted at all Port Said governmental hospitals (6 hospitals) that affiliated to the ministry of health (2 hospitals) included 140 nurses and the universal health insurance project in Egypt (4 hospitals) included 286 nurses**,** in the following departments; Reception & Emergency, Medical, Surgical, Chest, Orthopedic, Intensive Care Unit, Cardio, Renal, Pediatric, Gynecology & obstetric

Subjects:

- A simple random sample of 426 nurses who agree to participate in the research was included, it was calculated from the total number of nurses (N= 1187) according to the following sample size equation.
- Steve Thompson formula was utilized to calculate the sample size, at 5% ∞ error (95.0% significance) and 20.0 β error (80.0% power of the study) (Janet et al., 2020).

$$n= \frac{N \times P(1-P)}{N-1 \times (d^2 \div z^2) + P(1-P)}$$

$$n= \frac{1187 \times 0.5(1-0.5)}{1187-1 \times (0.05^2 \div 1.96^2) + 0.5(1-0.5)} = 426$$

n=Sample size

N=Total society size

Z= the corresponding standard class of significance 95 d=error percentage = (0.05) = 1.96

P=percentage of availability of the character and objectivity= (0.1)

d =error percentage = 0.05

Tool of the study:

The data of the current research was gathered through using the Knowledge, attitudes, and practices (KAPs) questionnaire. This questionnaire was developed by **Zhanget al., (2020).** It aims to assess the knowledge, attitudes, and practices of HCWs (health care workers) toward the COVID-19 pandemic. It was adopted by the researchers in his study to assess KAPs of nurses concerning COVID-19 with some modifications.

Permission from the primary author to use the tool was granted and obtained by e-mail in November 2020. The tool is classified into two parts:

Part I: Personal characteristics and general information of nurses:

It included the nurse's age, gender, marital status, educational level, years of experience, previous training about COVID-19, source of knowledge regarding COVID-19, work place, and willingness to work or care for patients with COVID-19 when/if they have the chance.

Part II: Nurses' KAPs concerning COVID-19:

This part was consisting of 19 items classified into 3 dimensions (knowledge of staff nursing regarding COVID-19 pandemic includes 11 items,

attitudes of staff nursing regarding COVID-19 pandemic includes 4 items and nurse's practice regarding COVID-19 pandemic which includes 4 items).

❖ **Scoring system:**

The scoring system was measured with a 5-point Likert scale ranging from (1 = *not understanding* to 5 = *master*). The attitudes of nurses were assessed regarding level of fear, level of fatigue, confidence to defeat the virus, and if patients should disclose their exposure to COVID-19, the attitude items ranged from (1 = *always* to 5 = *rarely*). Practices were assessed regarding frequency of hand washing, carefully removal of personal protective equipment (PPE) according the protocol, participation in training about infection control during outbreak, and maintaining quarantine with family, practices items ranged from (1 = *always* to 5 = *rarely*).

The inadequate level of knowledge and practice and negative attitude was obtained at (<70%), while the adequate level of knowledge and practice and positive attitude was obtained at (≥ 70%).

Operational design.

The operational design covers the description of the ethical approval preparatory phase, pilot study, and fieldwork.

Ethical approval:

The research approved by the Research Ethics Committee of the faculty of Nursing-Port Said University. Verbal consent was obtained from all participants before collecting any data. A simple and clear explanation of the purpose of the research was done/. All data are considered confidential and will not be used outside of the purpose of this research. Participants were told that they had the right to withdraw from the study at any time without any reason.

Preparatory phase:

This phase started from September 2020 until November 2020.This phase involved the review of literature. The tools were translated by the researcher into Arabic, and then tested for its validity & reliability, and accordingly the necessary modifications were done.

Validity:

• **Face validity:** jury opinions were elicited regarding the tools' format, layout, parts, and scoring system. It was ascertained by a jury group of five experts in nursing administration and medical surgical nursing.

• **Content validity:** It was conducted to determine the appropriateness of each item was included in the questionnaires sheet. Based on the jury recommendations corrections, addition, and/ or omission of some items were done.

Reliability: It was done by distributing the tool of data collection primary format to 40 staff nurses and after two weeks the researcher redistributes the questionnaire form to the same nursing staff. Cronbach's alpha test was used to test the tool reliability; also the total Cronbach's alpha reliability was 0.79, which demonstrates good reliability.

Pilot study:

- It was conducted before performing the main study in December 2020. The questionnaire was tested on a sample of nursing staff that represent

10% of the total subjects. They were randomly selected and excluded from the total sample to determine the applicability of the tool, the feasibility of the test, the clarity of the language, estimate the time required to fill out the questionnaire, and identify potential barriers and problems that may be encountered in the data collection process

- Data obtained from the pilot study were analyzed, and some modifications were done. Completion of the tool took about 15-20 minutes.

Fieldwork

- An initial interview: the researchers introduced themself to initiate communication, explained the nature and purpose of the study for nurses, and their agreement was obtained.

- Personal characteristics, general information, and Willingness nurses of nurses were assessed using part I of the tool.

- KAPs of nurses regarding the COVID-19 pandemic were assessed using the second part II of the tool.

- The researchers distributed the questionnaire format and started to collect data from nurses at their workplace, in the presence of the researcher for any clarification.

- If/when they have the chance; participants are asked to express their willingness to take care of COVID-19 patients.
- The researcher visited the hospitals at Port Said governorate to communicate with staff nurses according to the available time, during all shifts and for two days per week.
- The whole process of data collection

was starting from December 2020 until March 2021.

Administrative design.

Written official permission was obtained from the Dean of Faculty of Nursing, Port-said University to carry out this study at the selected settings. The researcher sent the official letters for permission to collect the data from the last-mentioned settings. The medical and nursing directors of each hospital contacted and informed to obtain permission to conduct the study.

Statistical design.

Use SPSS software (Social Science Statistical Package, 21st Edition, SPSS Inc. Chicago, IL, USA) to organize, tabulate and statistically analyze the collected data. For qualitative data, the Mann-Whitney test was used to complete the comparison between the two groups. The comparison between two or more groups is done using the Kruskal-Wallis test. Use the chi-square test to assess the relationship between variables. Use significance at $p<0.05$ to explain the results of the significance test. Logistic regression was used to determine predictors of nurses' willingness to cooperate with COVID-19 patients.

Results:

Table (1): shows that the mean age of the studied nurses was 34.13±9.89. Three-fifths of them were married, two-fifths graduated from the technical institute and their years of experience were from 5-10 years, approximately half of the nurses attended 1-3 times training about COVID-19. Also, about one-third of nurses were working in the emergency

department, and their source of knowledge about COVID-19was television. Finally, about two-third of nurses report they are at high risk of exposure to COVID-19, and more than two-thirds of them were willing to care for patients with COVID-19.

Figure (1): shows that nearly two-thirds of the studied nurses (61.5%) had an adequate level of knowledge about COVID-19.

Table (2): reveals that the highest percentages of studied nurses are always afraid of infection (62.9%) and feel tired during the outbreak (54.9%). Also, only one-third of nurses who have the confidence to defeat the COVID-19 and reported that visitors with significant risk factors for COVID-19 should be informing their exposure.

Figure (2): shows that about two-thirds of the nurse's participants (66.2%) had a positive attitude regarding COVID-19.

Figure (3): shows that about two-thirds of the nurses' participants (65.5%) had an adequate level of practice regarding COVID-19.

Figure (4): shows that more than two third of the nurses participants (70.7%) were willing to care for patients with COVID-19.

Table (3): presents that significant statistical relations were found between the nurses´ willingness to care for patients with COVID-19 and their level of knowledge, practice (p < 0.01), and attitude (p < 0.05).

Table (4): shows a multiple linear regression analysis which demonstrates that nurses` knowledge, attitude, practice, and low-risk level of exposure to COVID-19 were statistically significant independent positive predictors for the willingness of nurses' to work and care for patients with COVID-19. While the high-risk level of exposure to COVID-19 was a statistically significant independent negative predictor for the nurses` willingness to work. This model explains only 1.4% (from staff nurses) have a variation from this.

Table (5): demonstrates that significant relations were found between knowledge, attitude & practice of nurses regarding COVID-19 and their educational level, the relation between nurses' attitude and both years of experience and previous training, finally, the relation between nurses' knowledge and both previous training and source of knowledge(p < 0.05).

Table (1): Personal characteristics of the studied sample (n=426).

Variable	Sample	
	No	**%**
Age in Years		
Mean ± SD	34.13±9.89	
Gender		
▪ Male	142	33.3
▪ Female	284	66.7
Marital status		
▪ Single	76	17.8
▪ Married	267	62.7
▪ Divorced	55	12.9
▪ Widowed	28	6.6
Educational level		
▪ Nursing diploma	43	10.1
▪ Technical institute	182	42.7
▪ Bachelor degree	133	31.2
▪ Postgraduate	68	16
Years of experience		
▪ Less than 5 years	171	40.1
▪ 5-10 years	178	41.8
▪ More than 10 years	77	18.1
Previous training about COVID-19		
▪ Not attend	101	23.7
▪ 1-3 times of attendance	207	48.6
▪ 4-5 times of attendance	118	27.7
Source of knowledge about COVID-19		
▪ Television	131	30.8
▪ Internet	49	11.5
▪ Nursing/ Medical journal	71	16.7
▪ Training – education	114	26.8
▪ Newspaper	61	14.3
Your department		
▪ Emergency	130	30.5
▪ Medical	65	15.3
▪ Surgical	27	6.3
▪ Chest	67	15.7
▪ Ortho	20	4.7
▪ Intensive care unit	50	11.7
▪ Cardio	16	3.8
▪ Renal	19	4.5
▪ Pediatric	18	4.2
▪ Gynecology & obstetric	14	3.3
Risk categories(according to the risk of exposure to COVID-19)		
▪ Low level of risk	72	16.9
▪ Moderate level of risk	84	19.7
▪ High risk	270	63.4
Willingness to work and care for patients with COVID-19		
▪ Yes	301	70.7
▪ No	125	29.3

Figure (1): Distribution of the nurses according to their level of knowledge about COVID-19 (n=426).
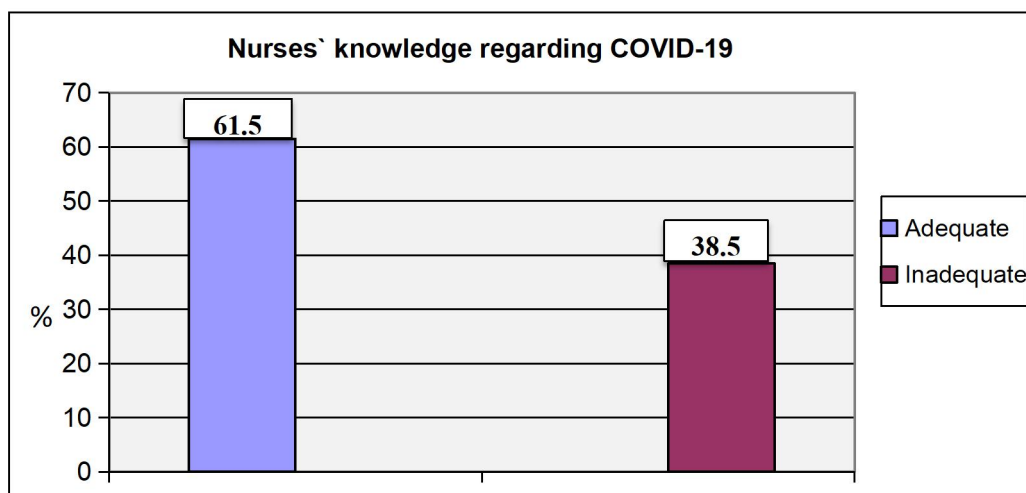

Table (2): Attitudes of nurses regarding COVID-19 pandemic (n=426).

Items	Always	Most of time	sometimes		Rarely
Are you afraid of infection?	62.9	19.2	10.8	2.8	4.2
During the outbreak, how often did you feel tired?	54.9	21.8	20.4	0.9	1.9
During the outbreak, the frequency of having the confidence to defeat the COVID-19 last week?	29.6	16.4	22.3	9.4	22.3
Visitors with significant risk factors for COVID-19 should be informing their exposure.	31.0	4.9	27.7	7.0	29.3

Figure (2): Distribution of the nurses according to their attitude regarding COVID-19 (n=426).
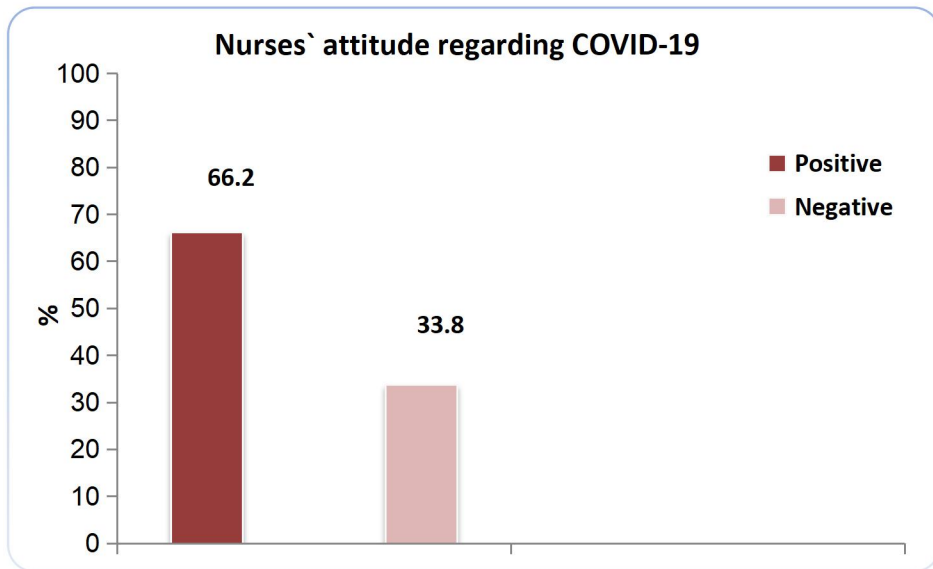

Figure (3): Percentage distribution of nurses according to their level of practice regarding COVID-19 (n=426).
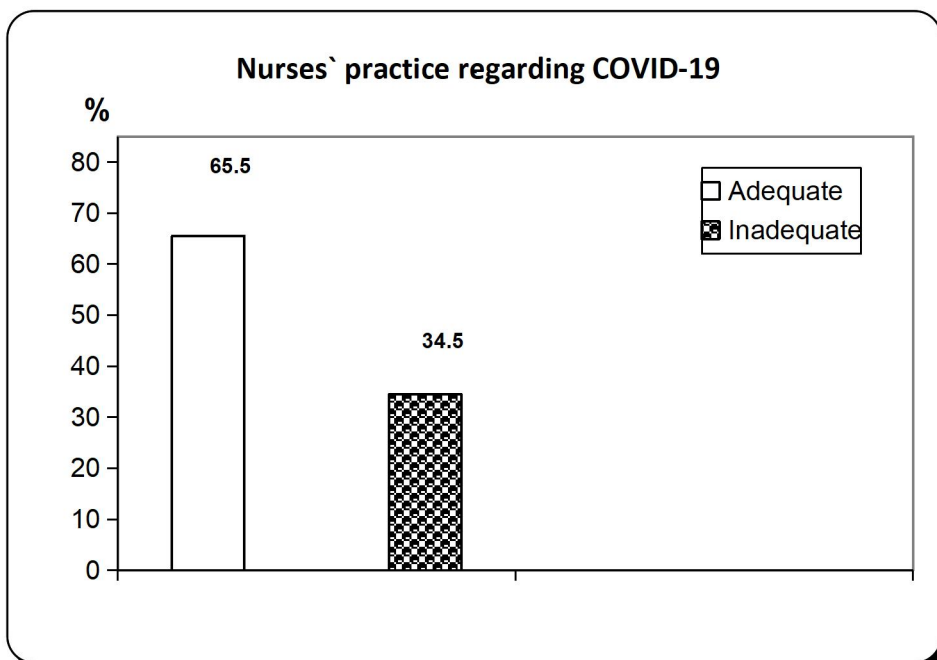
Figure (4): Percentage distribution of nurses according to their willingness to care for patients with COVID-19 (n=426).

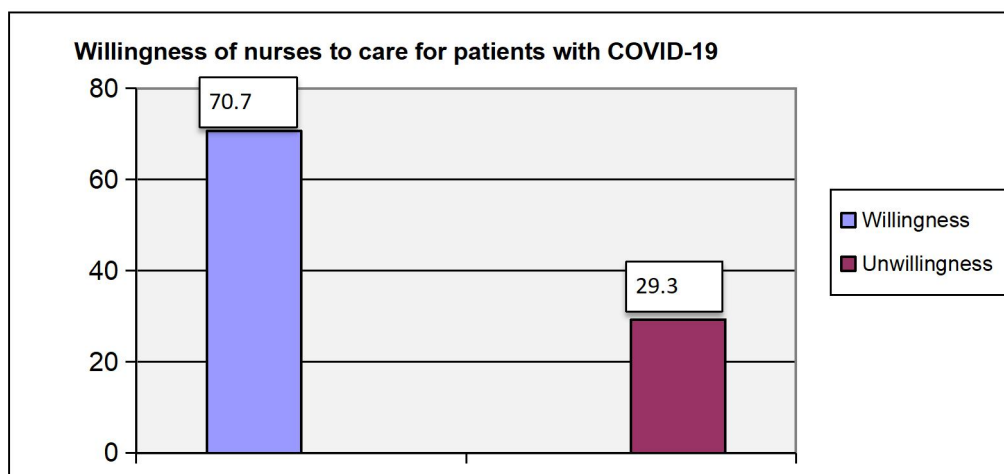**Willingness of nurses to care for patients with COVID-19**

Table (3): Relations between the willingness of nurses to care for patients with COVID-19 and their level of knowledge, attitude & practice (n=426).

Items		Willingness (301)		Unwillingness (125)		Z	P value
		No	%	No	%		
Knowledge							
	Inadequate	128	30.0	36	8.5	7.027	0.009**
	Adequate	173	40.6	89	20.9		
Attitude							
	Positive	191	44.8	91	21.4	3.447	0.040*
	Negative	110	25.8	34	8.0		
Practice							
	Inadequate	116	27.2	31	7.3	7.376	0.007**
	Adequate	185	43.4	94	22.1		

Z Mann-Whitney test.   *Significant p< 0.05   **Significant p < 0.01

Table (4): Predictors of nurses` willingness to work and care for patients with COVID-19(n=426).

Predictor	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B	
	B	Std. Error	Beta			Lower Bound	Upper Bound
(Constant)	0.891	.277		3.221	.001*	.565	2.129
Knowledge	0.006	.114	.145	1.857	.049*	-.128-	.324
Attitude	0.031	0.015	0.102	2.012	0.045*	0.001	0.061
Practice	0.039	0.011	0.091	2.295	0.039*	-0.059-	0.018
Low risk	-0.028-	0.014	-0.098-	2.446	0.012*	-0.059-	0.045
Moderate risk	-.012-	.015	.162	1.224	.223	-.010-	.045
High risk	-.014-	.024	-.206-	-1.915-	.036*	-.043-	.016

R-square= 0.014   model ANOVA; F= 0.528   *Significant $p < 0.05$

Table (5): Relationship between personal characteristics of nurses and their knowledge, attitude & practice (n=426).

Personal characteristics	Knowledge	Attitude	Practice
Age in Years	χ^2=1.106 p= 0.776	χ^2=1.279 p= 0.552	χ^2=1.127 p= 0.552
Marital status	χ^2=1.072 p= 0.784	χ^2=1.639 p= 0.506	χ^2=2.342 p= 0.473
Educational level	χ^2=7.023 **p= 0.007***	χ^2=4.476 **p= 0.048***	χ^2=5.573 **p= 0.021***
Gender	Z=1.587 P= 0.265	Z=2.313 P= 0.079	Z=1.187 P= 0.374
Years of experience	χ^2=1.431 p= 0.489	χ^2=8.256 **p= 0.016***	χ^2=1.386 p= 0.501
Previous training about the covid-19 virus	Z=5.043 **P= 0.036***	Z=4.181 **P= 0.049***	Z=0.972 P= 0.531
Source of knowledge about COVID-19	χ^2=6.786 **p= 0.012***	χ^2=3.105 p= 0.291	χ^2=2.692 p= 0.337
Your department	χ^2=1.651 p= 0.602	χ^2=2.367 p= 0.316	χ^2=1.993 p= 0.535

χ^2chi-square test   *Significant $p < 0.05$

Discussion

Nurses are the largest proportion of health professions(59%) and work at the frontline of COVID-19 response **(WHO, 2020c).**Well-prepared and skilled HCWs including nurses who are willing to care for COVID-19 patients are the key to control this epidemic**(Wu et al., 2020).**

Current research shows that nearly two-thirds of nurse participants have sufficient knowledge, practice, and positive attitudes to COVID-19. From a researcher's point of view, this may be due to the extensive coverage of COVID-19 by the WHO and the Egyptian Ministry of Health and Population, which helps to simplify information access. In addition, there are also training programs

conducted by the Ministry of Health and Population, hospitals, Health insurance organizations, and online caregivers to understand COVID-19 preventive measures.

In this regard, **McEachan et al. (2016)** The report stated that assessing nurses' knowledge, practices, and attitudes in the first stages of the epidemic can guide nurses to prevent occupational exposure, because incorrect knowledge, attitudes, and practices will directly increase the risk of infection. In addition, **Abdelhafiz et al. (2020)** pointed out that to alleviate the increasing number of COVID-19 cases, medical staff should insist on taking preventive measures, which are mainly affected by the knowledge, attitudes, and practices of front-line staff, including nurses.

Similarly, **Limbu et al. (2020)** It is found that medical staff has a higher level of knowledge and clinical practice regarding COVID-19. They concluded that during the COVID-19 pandemic, education and training are needed to improve positive attitudes and practices at work. These findings are consistent with studies conducted in Saudi Arabia (**Asaad, El Sokkary, Alzamanan, and El Shafei, (2020), Ethiopia (Tadesse, Gebrewahd, and Demoz, 2020), and Pakistan (Khan, 2020). But in line with (Bhagavathula et al. (2020)** reported that the knowledge level concerning COVID-19 among medical staff is poor.

In the current study, nurses mainly obtain knowledge about COVID-19 through TV, hospital training/education, and online, but the less common source is the Internet, which may be due to some confusing information on social media. In this regard, a study conducted by (**Kamaooko et al., 2021**) showed that strict government preventive measures,

the accessibility of online and TV information, and the publication of professional information on social media are the reasons for the high level of HCWs` knowledge. This result is agree with other researches in China (**Zhong et al., 2020), Nigeria (Reuben, Danladi, Saleh, and Ejembi, 2020), and Egypt (Abdelhafiz et al., 2020).**

This study shows that about two-thirds of nurses are afraid of contracting COVID-19, and only one-third of nurses are confident of defeating COVID-19. In addition, the low level of exposure to COVID-19 is a positive predictor of nurses' willingness to work. The high-risk level is a negative predictor of nurses' willingness to work. From a researcher's point of view, this may be because the highest proportions of the studied sample are medical and surgical nurses. During their work as a high-risk department of the emergency department, they are overcrowded, internal medicine, chest, and due to aerosol surgery. Surgery and surgery are caused by close contact with respiratory pathogens, as well as intensive care units. Some nurses report that they do not always remove and replace PPE or perform hand hygiene according to the protocol. However, the highest percentages of them were willing to work and care for patients with COVID-19 and accept it as a part of their job regardless of the risks.

This result is consistent with the results of (**McMullan, Brown, and O'Sullivan, (2016) and Liu et al. (2020).** In addition, **Kanu et al. (2021)** found that about half of medical staff lack confidence in providing care due to hospitals the lack of PPE and disinfectants leads to the safety of patients suspected of COVID-19. **However, Ip et al. (2015) and Al-Hunaishi, Hoe, and Chinna (2019)** are

inconsistent with current results because they found that occupational exposure may lead to health care People are unwilling to go to work, especially when they see their colleagues being infected. Similarly, in Thailand, **Apisrnthanarak et al. (2020)** disclosed that most medical staff was unwilling to deliver a care for new patients or care for COVID-19 patients.

Current research shows that more than two-thirds of nurses are willing to take care of COVID-19 patients. This willingness is not only affected by their knowledge, attitudes, and practices on COVID-19 prevention and control but also positively affected nurses' work and care Predictors of COVID-19 patients' willingness. This may be because adequate knowledge and practice and positive attitudes mainly affect nurses' adherence to the correct use of protective measures to help them protect themselves from a reduction in risk of infection and a reduction in stress, which reflects their willing to take care of COVID-19 patients.

Consistent with the current research, the Australian survey conducted by **Arbon et al. (2013)** exploring that nurses' willingness to participate in nursing increases with the increase of knowledge and skills. Effective training of nurses is an important measure to reduce the psychological pressure of nurses during the epidemic. **Nashwan et al. (2020)** added that nurses' knowledge of COVID-19 is a key predictor of their willingness to work with these patients. In addition, **Al-Hunaishi, Hoe and Chinna, (2019)** suggested that training can improve and increase the willingness to share in disasters as an influenza pandemic. In contrast, previous studies have shown that the absenteeism rate of nurses and other medical team has increased significantly, which may or

may not be due to illness during the influenza pandemic **(FitzGerald et al., 2012)** and **(Do et al., 2020).**

Finally, this research shows that there is a significant relationship between knowledge, attitudes, and practice regarding COVID-19 and the level of education and previous training on the COVID-19 virus, which highlights the importance of hospitals organizing appropriate training activities for nurses. This is consistent with **Ahmed et al. (2020),** who believe that additional training and education can improve knowledge about infection control. In addition, it is consistent with **Hua et al. (2020)** who find that the training program on COVID-19 is important to improve the knowledge, confidence, and preparedness of Chinese nurses. In contrast (Nemati, Ebrahimi and **Nemati, (2020)** reported that the knowledge of Iranian nurses is that there is no significant difference in their age, education level, and years of experience.

Conclusion

Knowledge, practices, and attitude had a significant positive role in improving nurses' willingness to work during COVID-19.

Recommendations:

1. Educational programs for nurses about COVID-19 outlined by WHO and Ministry of Health and Population in Egypt, with periodical evaluation to ensure adherence to the preventive measures and enhance nurses' willingness to work and care for patients with COVID-19.

2. Continuous updating for the content of nursing education curricula in

epidemiology, public health, and principles of infection control to ensure that nurses are sufficiently qualified to play frontline nursing roles especially during pandemic.

3. Necessary resources should be available to allow nurses to work in a safe environment that may help in reducing nurses' afraid of acquiring an infection during the fight with COVID-19.

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