

Assessment of knowledge, practice, and preparedness of critical care nurses towards the COVID-19 pandemic: A cross-sectional study in Egyptian hospitals

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Abstract: Background To plan successful policies towards mitigating the consequences of COVID-19, it is essential that critical care unit nurses have the necessary knowledge, perform best practices, and obtain appropriate equipment. Therefore, we conducted this study to examine the knowledge, practices, and equipment in critical care departments in Egyptian hospitals. Methodology: A cross-sectional study was conducted from 11/20 to 12/22/2020 using a pre-tested electronic questionnaire consisting of two sections, the first to examine the demographic characteristics of the two patients, and the second section includes 33 questions to examine knowledge, practices, and equipment, benefiting from the Ministry of Health's database Results: critical care nurses have a very good knowledge of COVID-19, with a rate of more than 90 percent. About practices, the results were good, as workers in these departments are committed to up to 66% of the total, and concerning supplies, most hospitals recorded a clear lack of equipment related to the pandemic. Conclusion: The researchers concluded that the critical care department nurses in the Egyptian government hospitals do everything in their power to carry out their duties to the fullest, and they are not dissatisfied with the work and do not think about leaving their jobs, and they have been able to overcome the lack of equipment by cooperation and self-efforts in eliminating this problem. critical care nurses' knowledge was mild, but their practice was at a moderate level. There was a negative weak correlation between nurses' knowledge, practice, and preparedness toward the covid-19 pandemic.

Keywords: COVID-19 epidemics, Egyptian hospitals, critical care workers.

I. INTRODUCTION

In this section author are advised to write brief part of research work, Conclusion of literature survey, problem statement and methodology used by author for doing research. Author can use references in whole body of paper. <10 Point, Sentence Case> The Coronavirus shocked the whole world when it appeared and then began to spread rapidly until it took possession of 215 countries in the world and led to more than 12.5 million cases and 556000 deaths during the first 7 months only. [1] It was characterized by its rapid spread and indistinguishability between rich and poor, or developed and poor, and it moved very quickly from a health emergency as of January 31, 2020, to a pandemic on March 11, 2020, in a short period of 40 days. Moreover, all these repercussions led to an unprecedented global crisis, with health, social, economic, and political dimensions all over the world. [2] Egypt is one of the countries with limited infrastructure, health care systems, and human resources for medium health, and it could easily have become the most affected country without the timely and well-thought-out measures implemented to address the epidemic. 3 This includes the suspension of all international flights, the closure of all parts of the country, the closure of shopping centers and other public places, the closure of schools and universities, and the suspension of religious places, for varying periods.4 Despite these

unprecedented national measures at the level of the Egyptian state, the success or failure of these efforts largely depends on the management of those who have already been infected with the Coronavirus, and also depends on the good handling of infected cases, and work to prevent the spread of infections.⁵

Nurses and other health care workers - in general - and critical care workers, are on the front lines and play a critical role in winning the battle against COVID-19. Nurses lead large-scale public health operations through their participation in every crisis management activity, whether treatment or protection activities. ⁶ The role of nurses during COVID-19 or any other pandemic begins with initial assessment and triage, sample collection and diagnostic testing, assessment of patients' severity, and thereafter providing necessary care to patients with overt or latent symptoms, providing intensive care to critically ill patients, and engaging Also in the proper handling of dead bodies. [7]

Despite tight budgets and resources, stressful working conditions in government hospitals, and concerns about personal and family safety, the nursing sector has maintained a sense of duty and is dedicated to patient care. Furthermore, the personal sacrifice and professional fellowship of the nursing fraternity have increased due to the increased burden on the health system during the COVID-19 pandemic. Thus, to plan appropriate interventions, it is important that healthcare professionals, especially nurses, are kept informed of current advances in knowledge about prevention, diagnosis, treatment, and management of COVID-19. Some previous studies have indicated poor knowledge and awareness of the disease leading to ineffective management and unexpected outcomes in patients and caregivers alike. [8] Moreover, knowledge has been shown to influence the attitudes and practices of individuals. In addition, it also creates a kind of reservation on the work among healthcare professionals and may also lead to infection themselves in the absence of correct information. [9] Furthermore, correct, and up-to-date knowledge plays a more important role, particularly in the context of COVID-19, where collective knowledge about the disease is rapidly developing. In addition to knowledge, attitudes and practices also serve as important components in influencing the performance of the WASH Holding Company. To perform duties optimistically, a positive attitude towards illness is most important. [10] In addition to a positive attitude, it is also essential that health care workers remain safe and infection-free during times of pandemic to ensure that as many people as possible are catered for and served. Thus, it is essential to understand global practice protocols at the time of epidemics. In a resource-limited country like Egypt, it becomes even more important that existing employees are trained and updated on COVID-19 and follow good practices to prevent infection among themselves.

Previous studies have shown that there is an urgent need to raise the level of current knowledge of health care workers to overcome patient management challenges and to address the stigma associated with the fear of infection through occupational exposure.¹¹ The current study aims to assess the {knowledge, practices, and equipment} among nurses working in critical care departments in Egypt.

II. METHODOLOGY

Study design and preparation

This cross-sectional survey was conducted among the nursing staff working in critical health care departments in Egyptian hospitals, for the period from 20/11/2021 to 12/22/2021. Because of the closure and the requirements of social distancing, it was not feasible to conduct a community survey during that period. So, the researchers collected data using a self-reported questionnaire through social media platforms, nurse groups in general, and critical care nurses. The answers were collected by the same means as well. The survey link was shared via email, SMS, and WhatsApp groups with a nursing professional over the age of 18, working in hospitals that have critical care in Egyptian government hospitals.

Study tool

The questionnaire consists of seven main tables, within the following contents: -

- The first table: is dedicated to knowing the demographic characteristics of the respondents, which contains {sex, job title, working times (permanent or temporary)}. The table also includes some questions that reveal some characteristics of the hospitals in which they work, such as {the number of beds, is their training room}.
- The second table: was dedicated to revealing the cognitive aspect, as it included five questions (sequence from 1 to 5) related to general knowledge of the Covid 19 virus, and the answer was designed in a multiple-choice manner.

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- Table 3: It is intended to reveal the cognitive aspect as well but contains two questions (sequences 6 and 7), to inquire about the place (or agency) from which nurses receive their information.
- Table No. 4: Dedicated to revealing daily practices. It includes 7 questions from a sequence of 8 to 14, which included questions about the number of people injured because of work, the extent of work pressure, and are they thinking of leaving work...., and other questions related to daily practices. Table No. 5, which included 10 questions (from a sequence 15 to 24), related to daily practices as well, such as aspects of training, vacations, shifts, etc., and the extent of commitment to wearing masks, gloves, and glasses, and the extent of distancing as well.
- Table No. 6, which includes four questions (from a sequence (25 to 28), these questions are devoted to inquiring about equipment and supplies.
- Table No. 7 includes 4 questions from sequence 29 to 32, including inquiries about miscellaneous administrative issues related to the critical care department.

Ethical considerations

Considering the ethics of scientific research, the first page of the questionnaire included a summary of the research objectives and purpose, and to guarantee the right to withdraw at any time without the need to mention the reasons. Confidentiality and privacy.

Data management and statistical analysis

The obtained data were organized into an excel sheet. The personal details of the participants such as (name, mobile phone number, and email) were excluded, and an identification number was assigned to each person, to preserve the confidentiality of the participants. The data was then encoded and purified to prepare it for analysis.

Percentages were used to describe the proportion of critical care personnel who correctly answered questions regarding knowledge, practice, and equipment relevant to COVID-19 as scores. The appropriate statistical methods were used to reach logical conclusions, where the descriptive statistics method was used to know the characteristics of the sample, and the method of financial ratios and comparisons to find out the frequency of answering the questionnaire questions.

III. RESULTS

A total of 350 responses were received through an online survey for the period from 11/20/2021 to 12/22/2021. We excluded responses from 26 individuals from the final analysis that had either incomplete or missing sections of demographic details. 324 analyzable answers were approved with a score of 92%. The results of the data analysis were as follows: -

First: the demographic characteristics of the respondents

- Table 1 summarizes the demographic characteristics of the study sample working in intensive care departments, which are: Most of the sample members are women, and the percentage of women is 85%. And men only 15%. 63% of the respondents hold a nursing diploma, 31% of them are nursing technicians, and the rest (6%) are specialized nurses. 99% of the respondents are permanent. More than half of the hospital sample contains 100-200 beds, and the other half is distributed among the remaining groups. 86% of hospitals have only training components. 78% of hospitals send their staff for external training. 66% of the study sample members work outside official working hours.

Table (1): frequency distribution of the demographic characteristics of the study sample working in intensive care departments		
The characteristics of the study sample	Total 324	%
Gender		
Males	48	15%
Females	276	85%
Job title/position		
Specialist Nursing	20	6%
Nursing technician	100	31%

Nursing Diploma	204	63%
Part-timer	4	1%
Full timer	320	99%
Number of beds per hospital		
26–99 beds	120	31%
100–199 beds	88	54%
200–299 beds	32	10%
300–499 beds	72	22%
500 or more beds	12	4%
There are internal training programs		
No	44	14%
Yes	280	86%
There are training programs outside the hospital		
No	36	22%
Yes	126	78%
Do you work after work in a private hospital?		
No	111	34%
Yes	213	66%

Second: Examination of nurses' knowledge of information related to COVID-19

Table 2 summarizes the findings related to the COVID-19 Cognitive Aspect Examination. Table No. 3 summarizes the sources of obtaining this knowledge. Among the most important results are the following: -

- The knowledge of workers in intensive care departments in Egyptian hospitals was sufficient for most of the simple questions (more than 90%), especially about preventive measures, alcohol concentration to kill viruses,
- At the time they obtained relevant information, most critical care workers reported having obtained information about COVID-19, for 1-2 hours per day (48%) and some for less than 1 hour (25%), 27% Of them have 3 to 4 hours per day to look at the information. As for the sources of information, the most trusted are the Ministry of Health (93%), television 76%, and the media/internet website 44%, as for the rest of the sources such as friends and the World Health website. Organized, they got a few low prices.

Table (2): frequency distribution of the COVID-19 Cognitive Aspect Examination among the study sample working in intensive care departments

	Questions	N = 324	%
1	Which of the following is true about COVID-19? *		
	▪ Person to person transmission can occur by droplets	324	100%
	▪ Transmission can be airborne	132	41%
2	What are the steps to take to protect yourself? *		
	▪ Wash your hands with soap and water for at least 10 s	10	3%
	▪ Wash your hands with soap and water for at least 20 s	316	97%
	▪ Avoid close contact; put a distance with other people (1.5–2 m)	320	99%
3	Which of the below products are you recommending to patients to disinfect?		
	▪ Alcohol 60%	52	16%
	▪ Alcohol 70%	320	99%
	▪ Alcohol 95%	52	16%

4	Indicate which of these options can be used to treat COVID 19 to date? *		
	▪ Acetaminophen	276	85%
	▪ -steroidal anti-inflammatory drugs (NSAIDs)	4	1%
	▪ Corticosteroids	28	9%
	▪ Symptomatic respiratory relief (inhalers)	188	58%
	▪ Lopinavir/ritonavir (initially for HIV)	244	75%
	▪ Chloroquine/remdesivir in combination	116	36%
	▪ Tocilizumab (initially for rheumatoid arthritis)	212	65%
5	Intravenous high dose vitamin C is recommended for COVID 19 treatment?		
	▪ True	116	36%
	▪ False	132	40%
	▪ I do not know	80	25%

Table (3): frequency distribution of the COVID-19 sources of obtaining this knowledge among the study sample working in intensive care

	Questions	N=324	%
6	Do you have time to get information about the COVID-19 outbreak?		
	▪ 3–4 h/day	88	27%
	▪ 1–2 h/day	156	48%
	▪ < 1 h/day	80	25%
7	Where do you get your information on COVID-19 from?		
	▪ CDC website	108	33%
	▪ Ministry of Public Health website (MOPH)	302	93%
	▪ World Health Organization (WHO)	94	29%
	▪ Infectious Disease Society of America (IDSA)	58	36%
	▪ Media website/Internet	106	44%
	▪ Facebook	54	33%
	▪ Friends/family members	62	38%
	▪ Television	135	76%
	▪ nurses' groups	8	5%
	▪ Other, specify: ECDC, LSID, Webinar	6	4%

Third: Examination of the practices of workers in intensive care departments

Table No. 4 summarizes the nurses' answers, and they were as follows: -

- Q8 and 9 about their fear (for themselves and their families) of infection with 19 delegates, the answer was: On average only 2% are not afraid, and the remaining 98% are afraid of it to varying degrees.
- Q10 and 11 / are related to their feelings of depression and exhaustion. The answer was more than half of the sample (56%) of them rarely feel that, but 25% of them reported that this does not affect their work, and 47% of them rarely affect their work, and 25% of them often affect their work.
- Q12 / On the effect of feelings of tension on the nurse's relationship with their colleagues and their families, the answers were, about half of them are slightly affected, and the rest are distributed in normal proportions.

- Q13 and 14/ about their desire (and procedures) to leave work. More than half said they did not want to do so (52%), 20% wanted little, 20% wanted often, and only 9% wanted (all the time) to change jobs.

Table (4): frequency distribution of the practices of workers in intensive care departments among the study sample working in intensive care

	Questions	Never	Rarely	Often	Always
8	Are you afraid of getting infected with COVID-19 due to occupational exposure?	10	108	140	68
		3%	33%	43	21%
9	Are you afraid your family gets infected due to your occupational exposure?	4	40	104	176
		1%	12%	32%	54%
10	Do you feel depressed/exhausted due to the current pandemic?	24	92	180	28
		7%	28%	56%	9%
11	Are stress feelings affecting your duties (counselling, education, assessment)?	80	152	80	12
		25%	47%	25%	4%
12	Are stress feelings affecting your relationship with your staff and family members?	80	152	80	12
		25%	47%	25%	4%
13	Does any of your staff declare wanting to leave work due to COVID-19 fear?	168	64	32	14
		52%	20%	20%	9%
14	Do you implement specific idle-breaking or revitalization actions in your critical care unit to relieve your employees' stress?	64	108	54	22
		20%	33%	33%	14%

Table No. 5 includes questions related to practices as well, the answers of which are as follows:

- Q15/ Regarding the injury of the two workers in the critical care department because of COVID-19, 90% of the answers were negative.
- Q 16 / About stopping training hours during the pandemic, the answers were more than 60% Yes.
- Q17, Q18, and 19/ About routine preventive measures such as wearing gloves, glasses, and a mask, the answer was (yes) to all these questions at a rate of 90 percent or more.
- Q20 / About teamwork, the answers were no, 72% of the time.
- Q21 / Regarding the replacement of vacation days, the answers were distributed naturally among the hospitals in question.
- Q24, Q23, and Q22 / about measures that lead to a low probability of infection with Covid 19. Including: Have working hours been reduced, the answers were equal in that, half of the hospitals reduced working hours and the other half or reduced. Regarding reducing the working hours of the chief nursing specialist, the answer was almost the same as the previous answer (half for half). And to a question about changing shifts in a way that reduces the possibility of injury, the answer is yes, 72% of them.

Table (5): frequency distribution of the response of practices among the study sample working in intensive care

Q	Questions	No	Yes	NA
15	Was any of your staff members tested positive for COVID-19?	292	28	4
		90%	9%	1%
16	We're training hours suspended during the pandemic?	48	200	76
		15%	62%	24%
17	Are you required to wear a mask while performing your job?	7	310	7
		2%	96%	2%

18	Are you required to wear gloves while performing your job?	10	300	14
		3%	93%	4%
19	Do you wear goggles/goggles to protect your eyes while performing your work in the critical care unit?	15	291	19
		4%	90%	6%
20	Are you still working as a full team as before COVID-19?	236	44	0
		73%	27%	0
21	If you are alternating schedule, were you asked to use vacation days?	150	150	24
		48%	48%	4%
22	Did the working hours decrease for staff to decrease exposure?	148	164	12
		46%	51%	4%
23	Did you reduce working hours for the chief nursing specialist to reduce exposure to infection?	172	144	16
		51%	44%	5%
24	Were staff rotations changed in a way to decrease exposure?	60	232	32
		19%	72%	10%

Fourth: About the equipment

Table No. 6 included four questions related to the equipment, and the answers to them were as follows: -

- Q 25 / About the lack of important equipment such as masks and gloves, the answer was yes, with a rate of 91%
- Questions 26, 27, and 28 / related to equipment, such as supply delays, price increases, pressures from suppliers, all answers to these questions confirmed, at a rate of 80%, that there are problems in this aspect.

Table (6): frequency distribution of the response of practices among the study sample working in intensive care				
	Questions about supply	No	Yes	NA
25	Are you facing any shortage of masks, gloves, and hand gels at your hospital?	22	296	6
		7%	91%	2%
26	Are you facing delays in the supply of masks, gloves, or hand gels from suppliers?	16	284	24
		5%	88%	7%
27	Are you facing an increase in the price of the masks, gloves, and hand gels from the supplier in a regular manner?	20	272	24
		6%	84%	10%
28	Are you facing pressure from suppliers to pay cash or in a short period?	28	252	44
		9%	78%	14%

Fifth: Miscellaneous data

To increase our knowledge of the reality of critical care departments in Egyptian hospitals, questions were asked in separate axes as in Table No. 7. As follows: -

- Q29 / Does the hospital have an emergency preparedness management committee? The answer was 66% positive.
- Q30 / Is the nurse aware of best practices from other available plans (national, public health department, international, WHO, CDC) related to the epidemic? The answer was negative, 66% of the time.
- Q31 / About the contributions of the (critical care unit) to educating workers (critical care unit) about infection control measures, social distancing practices, personal protective equipment, prevention, and treatment, the answers were also not encouraging, up to 50% of the answers are negative.

- Q 32 / about the extent of monitoring (the critical care unit) to ensure that they are committed to infection control and social distancing measures, the answers were 60% /4 There is periodic monitoring.

Table (7): frequency distribution of the response of practices among the study sample working in intensive care

Q No	Question	In progress	Yes	No
29	Does your hospital have an emergency preparedness/management committee for COVID-19?			
	In progress	84	26%	
	Yes	212	66%	
	No	28	18%	
30	Is the nurse aware of best practices from other available plans (national, DPH, international, WHO, CDC) related to the pandemic?			
	In progress	92	28%	
	Yes	20	6%	
	No	212	65%	
31	Has the (Critical care unit) prepared a plan to educate (Critical care unit) staff on infection control measures, social distancing practices, PPE, prophylaxis, and treatment?			
	In progress	104	32%	
	Yes	64	20%	
	No	156	48%	
32	Does the (Critical care unit) routinely monitor to ensure that (Critical care unit) staff adheres to infection control and social distancing measures?			
	In progress	92	28%	
	Yes	192	60%	
	No	40	12%	

Table (8) reveals a correlation matrix between the studied critical care nurses’ knowledge, practice, and preparedness in the COVID-19 era. There was a weak negative between the level of knowledge and practice among the studied nurses ($r = -0.117$, $P = 0.154$). Furthermore, there was a weak positive correlation between the level of knowledge and practice among the studied nurses ($r = 0.065$, $P = 0.427$). While there was a weak negative between practice and preparedness among the studied nurses ($r = -0.181$, $P = 0.026$).

Table (8): Correlation Matrix between the studied nurses’ mean scores of knowledges, practice, and preparedness

		Knowledge	Practice	Preparedness
Knowledge&	R_s		-0.117	0.065
	P		0.154	0.427
Practice	R_s			-0.181*
	P			0.026*
preparedness	R_s			
	P			

r: Pearson coefficient

*: Statistically significant at $p \leq 0.05$

IV. DISCUSSION

The nurses working in the critical care departments showed very good knowledge of information related to Covid 19, and the Ministry of Health was one of the most important sources of knowledge for them, and this means that their knowledge side is good.

- About the fear of injuries and the fear for their families from that, the nurses showed that they were not worried about that, and a large percentage of them were not ready to leave their jobs, and this indicates their high psyche and their belief in fate and destiny, and their belief in the humanitarian message in their work.
- Answers to questions related to preventive measures regarding the wearing of gloves, masks, and glasses {Q17, 18, 19} The answers were positive by more than 90 %, and this means the commitment of workers in critical care departments to safety and prevention measures. This result is reinforced by the answers to question number 15, {about the infection of the two workers in the critical care department with Covid 19}, where 90% of the answers were negative.
- As for the procedures for reducing working hours to reduce injuries, or was this procedure taken as a method to reduce injuries in all Egyptian hospitals, the positive answers about that were only about 50%. {Questions No.: 22, 23, 24}.
- Regarding teamwork {Q30}, the answers were 72% negative, and this is because the culture of teamwork is not common in our society in general, and this is not limited to the intensive care departments.
- As for the equipment, we note that there is a severe shortage of basic equipment such as masks and gloves. When asked about this, the confirmed answers came to the shortage by more than 90%, {Q 25}. About equipment as well, about the increase in prices and the delay in receiving them... The answers to questions 26, 27, and 28 confirmed that hospitals suffer from real problems with equipment.
- As for the various questions, we obtained good data about discovering the reality of critical care departments in Egyptian hospitals, for example, when inquiring about the existence of emergency preparedness management committees, - the answer was positive by 66 percent, this percentage may seem good, but it is not sufficient from the point of view of Researchers, because preparedness for emergency management and crisis management is no longer a luxury requirement in the health sector, especially in the time of Covid 19.
- Regarding the nurses' knowledge of the best practices from other available plans (national, public health administration, international, World Health Organization, Centres for Disease Control and Prevention) related to the epidemic, the answers were not encouraging, 66% of them were in the negative, which means a lack of interest in renewing and developing Nursing staff information in critical care departments.
- There are no contributions from the critical care department in educating the hospital staff, and this revealed the answers to question 31 in the last table.

As for the extent to which critical care units adhere to safety procedures, the results were good. The percentage of hospitals that monitor critical care unit work periodically is 66%, which is a good percentage, due to the strength and depth of control systems in health institutions in general.

V. CONCLUSION

The study proved that the workers in the intensive care departments had a very good response to COVID-19. There is fear and concern for the health of the nurses and their families, but this does not affect their performance. There is a need for a comprehensive training program for health care workers in terms of controlling infection prevention and management and how to maintain good mental health during a pandemic. The nurses were able to avoid the lack of equipment with their own cooperation and efforts.

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