



## Effect of Educational Program on Nurses' Knowledge, Practice and Attitude Regarding Covid -19 at Maternity Care Units

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### ABSTRACT

COVID-19 pandemic remains a worldwide challenge. Healthcare providers including maternity nurses fighting on the frontlines. Issues as knowledge, awareness of mode of disease transmission, basic hygiene principles and measures will help support them and safeguard lives of everyone. **Aim of this study:** to evaluate the effect of educational program on nurse's knowledge, practice and attitude regarding Covid 19 at maternity care units **Subjects and Methods:** Quasi- experimental study design was used; study was conducted at Minia university hospital for maternity and child. A convenient sample of seventy nurses was included. Data were collected using a structured interviewing questionnaire sheet contained a series of questions regarding nurses knowledge, attitude, and practice (KAP) about COVID-19. In addition to, a supportive material (guidelines) was distributed to the studied sample. **Results:** This study revealed that nurses had lower knowledge scores (32.9%) in pre-program which increased to (90.0%) in post-program after the program, (58.6%) of them had negative attitude pre-program while post-program decreased to (18.6%) and (84.3%) had incompetent practice pre-program while post-program decreased to (18.6%) with highly statistically significance differences P – value .0001. **Conclusion:** applying educational program about COVID-19 for maternity nurses was effective in increasing their knowledge, improves infection control measures, change negative attitudes, and improve practices. **Recommendations:** Apply further wide range educational programs for whole nursing staff, nursing supervisors, and workers.

**Keywords:** Maternity, Knowledge, Attitude, Practice, COVID-19.

### Introduction

The global spread of COVID-19 continues to be a major concern. Researchers throughout the world have worked tirelessly to try to find a cure for this disease, but thus far they have been unsuccessful. Therefore, measures such as infection prevention guidelines, early virus diagnosis, and the finding of efficient therapy may prove to be powerful instruments in stemming the spread of this illness. (Lotfi, et al 2020)

The remarkable rise in the global illness burden has piqued the curiosity of scientists, researchers,

legislators, and the general public in the new coronavirus (COVID-19). (Guan et al., 2020)

As of 4 August 2020, about 18 million individuals throughout the globe have been infected with COVID-19, and over 700,000 fatalities have been attributed to the virus thus far. There have been 128,993 confirmed cases of COVID-19 in Egypt between January 3 and December 25, 2020, with 7,260 fatalities. (World Health Organization 2020)

Humans are now susceptible to a new viral strain called COVID-19. An unprecedented number of cases have been documented due to the ongoing COVID-19

outbreak. COVID 19 viruses are contagious via person-to-person contact and may produce symptoms similar to those of the seasonal flu. Several researchers (**Louay et al., 2020**)

The common cold and other minor respiratory illnesses are caused by coronaviruses. High body temperature, dry cough, abnormal chest CT, and less common symptoms such sputum production, headache, hemoptysis, and diarrhea may all be present in individuals infected with COVID-19. COVID-19 which is associated with severe acute respiratory syndrome causes pneumonia and is highly contagious. (**Rothan & Byrareddy, 2020; WHO, 2020**)

In such a short amount of time, the illness has spread to eighty percent of the world's nations, bringing with it a host of problems. COVID-19 has been declared a fatal illness and has spread rapidly across international borders. COVID-19 is spread between humans by respiratory droplets and direct human-to-human contact. Close contact (less than 1 meter) with an infected person who is exhibiting respiratory symptoms (such as coughing or sneezing) increases the likelihood that the infected person's mucosae (mouth and nose) or conjunctiva (eyes) will be exposed to infectious respiratory droplets (typically defined as > 5-10 m in diameter). (**Shahnaz et al. 2020**)

About 20 million people throughout the globe call themselves nurses, making it the biggest healthcare profession in the world. In order to avoid the transmission of illness, nurses should be informed of and educated on infection control procedures. Empirical research, however, suggests that nurses find COVID-19 difficult owing to the disease's rarity, a lack of resources (such as information, training, and seminars), and the emotional toll of losing patients to the virus. Since COVID-19 is a relatively new virus, nurses may misdiagnose patients and contribute to the

spread of the disease inside hospitals by administering the wrong medication. (**Lancet, 2020**)

Optimistic attitudes and continued use of safe behaviours may be fostered and spread prevention of COVID-19 by health education programs. (**Zhong et al., 2020**)

While healthcare personnel play an essential role in lowering mortality and morbidity rates, they are also at increased risk of contracting such conditions from their patients. The original COVID-19 epidemic in China presented significant problems to the healthcare system, particularly in the areas of nosocomial infection prevention and healthcare worker safety. This research aims to assess the impact of an applied guideline on nurses' knowledge and use of Covid-19 in maternity care settings since they are the main health care providers who deliver health education to expectant women. (**Wang et al., 2019**)

### **Significance of the study**

As of July 2020, there have been 11,191,676 cases documented worldwide, with 529,127 fatalities. With 2,638,903 cases and 196,169 fatalities, Europe is the worst hit area. There were only 268,102 cases and 5,673 fatalities in Africa in 2020 (CSSE). There have been 128,993 confirmed cases of COVID-19 in Egypt between January 3 and December 25, 2020, with 7,260 fatalities. (**Healthy People 2020, WHO**)

According to the most recent statistics compiled by the International Council of Nurses, 1,500 nurses have lost their lives to COVID-19. The ICN estimates that more than two million healthcare professionals throughout the globe may have been infected with COVID-19 according to the organization's examination of global case data. (**Said, 2020**)

In order to protect themselves, mother, and the newborn, maternity care nurses and institutions must be

ready for the possibility of an infection. Interventions (an education campaign) will therefore be utilized to help them combat this pandemic.

#### ***Aim of the Study:***

The aim of the present study was to evaluate the effect of educational program on nurses' knowledge, attitude and practice regarding COVID-19 at maternity care units.

#### ***Research hypotheses:***

1. Nurses who received evidence based practices guidelines will have improvement in their knowledge, attitude and practice regarding covid-19.

2. There will be significant correlation between nurses' knowledge with their practices regarding care of maternity women during covid-19.

3. There will be significant correlation between post-test knowledge, attitude and practice scores of nurses with their selected socio-demographic characteristics.

#### ***Subjects and Methods***

##### **Research design:-**

Quasi-experimental research design (pre and post intervention) was utilized in this study.

##### **Setting of the study:**

This research was conducted at obstetrics, labor, gynecological and other units of Minia university hospital for maternity and children, hospital for all of Minia, including the city of Minia and the eight satellite towns. In addition to the private rooms and surgical suites on the upper levels, the hospital's first floor has a pediatric clinic, an antenatal care clinic, an infertility clinic, and an imaging and diagnostics centre. The obstetrics and gynecology services are located on the second level, while the prenatal, high risk pregnancy, birth, and postpartum rooms, as well as the pediatric department and critical care unit, are located on the

third floor. The inpatient ward is open 24/7, whereas the outpatient clinics are only open from 9 AM to 1 PM.

#### **Sampling:**

##### **Sample size**

A convenient sample was used, All nurses (70 nurses) who work in obstetrics (11 nurses), labor (18nurses), gynecological (12 nurses), private operations room (7 nurses), major operations room (9 nurses), obstetric triage (7 nurses) and private obstetric (6 nurses) departments, who work in the previously mentioned setting from (June - October 2020).

**Exclusion criteria:** Nurses who are in long vocation at the time of data collection (as child care leave, vocation without pay)

#### ***Data Collection Tools:***

To gather data, three main tools were used: It consisted of:

##### **Tool I: A self-administered Questionnaire:**

A specially designed self-administered questionnaire was developed and utilized by the researchers to collect the necessary data from the nurses and consisted of two parts as follow:

##### **Part (1): Socio-demographic characteristics:**

As age, educational level, and duration of work, place of residence and attendance of training courses).

##### **Part (11): Nurses knowledge about Covid-19**

**Infection:** To evaluate the Knowledge of nurses about covid19 such as: source of information regarding COVID-19, mode of transmission, symptoms, and characteristics of covid19, prevention and control of the disease,..etc.

**Scoring system for knowledge:** Knowledge consists of 26 questions, were either in the form of a multiple choice answer or in form of true, false, These

questions were given scores (1 or zero) it was assigned to each answer representing (complete correct, or incorrect respectively). Overall knowledge scores were categorized as: Unsatisfactory: (< 70%) (0-18.1), satisfactory: ( $\geq 70\%$ ) (18.2 -26)

**Tool II: Nurses attitudes toward Covid-19 Infection (pre/post) (Nwafor et al., 2020):** To evaluate nurses attitude toward covid-19 such as: Is it important to use a face mask in crowded place? It is important to wash hands and face after when provide care for maternity women? And .....etc.

**Scoring system for attitude:** A 3 point Likert scale, ranged from 1 Disagree, 2 Undecided to 3 Agree was applied for the attitude. Total attitude scores were classified as: Positive attitude when nurses' answers were ( $\geq 70\%$ ) (37.8 -54).and negative attitude if their answers were (< 70%) (1<37.8).

**Tool III: Practical observational checklist of maternity nurse about covid-19 (pre/post) (Nebraska Medicine, 2020):** This is including questions to evaluate nurse's practice regarding covid-19 infection. It was included nurse's reported practices during as Follow Special Advices for Covid-19, wash hands at work, use tissues or use elbow during coughing/sneezing? And ...etc.

**Scoring system for practice:** with a similar scoring system as previous (correct = 2, incorrect = 0, no opinion =1). The total score of each nurse was categorized into competent and incompetent practices as follows: incompetent (< 80.0%) (0-20) and competent ( $\geq 80.0\%$ ) (20.1 -25.0).

**Validity:** The sheet was reviewed by a panel of 5 experts from community health & obstetrics and gynecological department nursing professors who reviewed the tool for clarity, relevance,

comprehensiveness, understanding, applicability and considered the aim of this study.

**Reliability:** The test assessed through Cronbach's alpha test as the reliability of the questions relating to knowledge was 0.89, reliability of the questions relating to attitude 0.85 was, and the reliability of the questions relating to reported practice was 0.88. The tools' reliability was estimated by using the Pearson correlation coefficient test to compare variables

**Pilot Study:** A pilot study was conducted on (7 nurse) 10% of obstetrics nurse at the previous mentioned setting to assess the current study tools for its clarity, validity and time required to be applied. No modifications done wherefore nurses who participated in the pilot trial studied and incorporated.

#### **Method of data collection:**

**Operational Design:** The present study's operational design consisted of three distinct phases: the planning phase, the execution phase, and the assessment phase. The purpose of this study was to assess the impact of recommendations for teaching nurses about COVID-19 in maternity care settings.

#### **Preparatory phase:**

Part of this process was looking at what's already been written on the study's many components, both at home and abroad. This familiarized the researcher with the scope of the issues and directed her in the development of the appropriate data gathering instruments. The researcher put the tool through its paces by having a panel of experts evaluate it for things like knowledge, accuracy, and applicability of questions.

#### **Ethical considerations:**

The necessary approvals for conducting the research were obtained from the relevant authorities. Nurses were consulted on the importance and goals of this research. Participants who were informed that their

participation was entirely optional and that they may stop at any moment, that their information would be kept private, and that their data would be used exclusively for this research.

#### ***Implementation phase:***

After receiving formal approval from the hospital's director and the study's ethical committee from the faculty of nursing, investigators were able to begin the investigation. From June 2020 until October 2020, the research was carried out. At the start of each interview, researchers introduced themselves, welcomed the nurses, and obtained written permission after outlining the study's goals, timeline, and procedures. After obtaining each nurses informed permission and explaining the study's purpose, the researchers will have the nurses fill out separate questionnaires. The nurses' prior knowledge, attitude and practice regards to covid-19 infection were evaluated.

The aforementioned location was visited by the researchers twice weekly, during both the morning and evening shifts. Two sessions per day to cover all theoretical and practical guidelines and implemented according to work conditions; total of six sessions; two sessions for knowledge (lasting from 60-90 minutes each), two sessions for attitude (lasting two hours each), and two sessions for practice (lasting two hours each). At this stage, the nurses worked in smaller groups of three to five members each. At the start of the first meeting, researchers went through the purpose of the guide and got some history on everyone involved.

#### **The Supportive material (handout Arabic booklet-guideline):**

The researchers created and used it to help nurses better deal with Covid-19 infection. It had a significant impact on their mindset and behavior. It was

split into two sections, the first of which focused on teaching nurses the fundamentals of the disease (its definition, morphology, kinds, causes, route of transmission, most prevalent symptoms, and treatment options, among other things). The second section addresses the nurse's professional conduct and includes advice on maintaining personal hygiene (such as covering one's mouth and nose when coughing or sneezing, washing hands frequently with water and soap, avoiding contact with the face and eyes, and using alcoholic gel to rub hands before and after caring for patients) and caring for patients regardless of their infectious status. And it's crucial that they continue serving in the capacities of health educator for their patients, students, and communities.

#### **Outcome follow-up and evaluation phase:**

The investigators conducted 2 time of evaluation:

- Before a guideline is put into effect for the first time, nurses were tested (pretested) using assessment instruments 1, 2, and 3.
- After three months of implementing the recommendations, a second round of testing (posttest) was conducted to gauge nurses' familiarity with, and willingness to implement, covid-19 related best practices in maternal and newborn care.

#### **Statistical analysis design:**

The collected data were organized; categorized, analyzed using the statistical package for social studies (SPSS) version (20). (Windows Microsoft). Data were presented using descriptive statistics in form of frequencies and percentages for qualitative variables, mean and standard deviations for quantitative variables. The statistical test such as chi-square test was to determine relation between qualitative data and the comparison between mean scores was performed using Fisher exact and ANOVA test. Statistical significance difference was considered when  $p\text{-value} \leq 0.05$ , and high significance when  $p\text{-value} \leq 0.001$  and no

statistical significance difference was considered when  $p\text{-value} > 0.05$ .

## RESULTS

**Table (1):** Illustrates that, 92.9% of studied sample aged from 22 >27 years old. In terms of education, 82.9% of them were diploma degree. Regarding employment, 91.4% had been in the field for 1-5 years, 20.0% had previous training in the use of Covid19 in a maternity care facility, and 62.9% lived in urban, while 37.1% were found in rural regions.

**Figure (1):** Shows that (65 %) of the studied were taken information about the Covid-19 via television and radio, 4% through beer, and 30% through other means (including the internet, social media, telegrams, and academic theses).

**Table (2):** Indicates that, 67.1% of studied sample had unsatisfactory knowledge pre-program while post-program dropped to 10.0% with highly statistically significance differences  $P\text{-value} .001$ , 58.6% of them had negative level of attitude pre-program while post-program decreased to 18.6% with highly statistically significance differences  $P\text{-value} .001$ . And concerning to their total practice levels regarding Covid19, 84.3% of studied sample had incompetent practice pre-program while post-program plummeted to 18.6% with highly statistically significance differences  $P\text{-value} .001$ .

**Figure (2):** Displays that, 32.9% of studied sample had satisfactory knowledge pre-program while post-program improved to 90% with highly statistically significance differences  $P\text{-value} .001$ .

**Figure (3):** Portrays that, 15.7% of studied sample had positive level of attitude pre-program while post-program improved to 81.4% with highly statistically significance differences  $P\text{-value} .001$ .

**Figure (4):** Shows that, 15.7% of the studied sample had competent level of practice pre-program while post-program improved to 81.4% with highly statistically significance differences  $P\text{-value} .001$ .

**Table (3):** Shows that, (100.0% of studied sample who aged from (32 – 36), 70.0% who had B.Sc.s. degree, 71.4% of who had attendance of training regarding and 54.2% who live in urban areas) all had satisfactory knowledge pre-program with statistically significance differences  $P\text{-value} \leq (0.027 \ \& \ 0.034, 0.02, 0.009, 0.001 \ \text{and} \ 0.006$ . while there was no statistically significance differences between studied sample age, educational level, duration of work, attendance of training, and place of residence with their total knowledge in post post-program.

**Table (4):** Implies that, (100.0% of studied sample who had duration of work (10 – 15), 67.4% who live in urban areas, respectively) had positive attitude pre-program with statistically significance differences  $P\text{-value} \leq (0.027 \ \& \ 0.038$  respectively). But no statistically significance differences between nurses age, educational level and attendance of training with their total attitude level pre-program. While 100.0% of studied sample who had attendance of training regarding Covid19 had positive attitude post-program with statistically significance differences  $P\text{-value} \leq 0.046$ . But no statistically significance differences between nurses age, educational level, duration of work and place of residence with their total practice post post-program.

**Table (5):** depicts that, 96.2% of studied sample who live in urban areas had competence level of practice in pre- & post-program with statistically significance differences  $P\text{-value} \leq (0.036 \ \& \ 0.015)$ . But no statistically significance differences between nurses age, educational level, duration of work and

attendance of training with their total practice in pre-& post-program.

**Table (6):** Reveals that there was a positive fair association between studied sample total knowledge and attitude with their age and duration of work ( $r=0.267$  &  $p$ -value  $< 0.025$  &  $r=0.257$  &  $p$ -value  $< 0.032$ ) and ( $r=0.252$  &  $p$ -value  $< 0.035$  &  $r=0.260$  &  $p$ -value  $< 0.030$  respectively) pre-program.

Additionally, there was a positive fair association between studied sample total knowledge with their educational level post-program ( $r=0.326$  &  $p$ -value  $0.006$ ), positive weak association between nurses attitude with their age post-program and ( $r=0.242$  &  $p$ -value  $< 0.043$ ), and positive fair association between studied nurses practice and with their age and duration of work ( $r=0.343$  &  $p$ -value  $< 0.004$  &  $r=0.327$  &  $p$ -value  $< 0.006$  respectively) post-program.

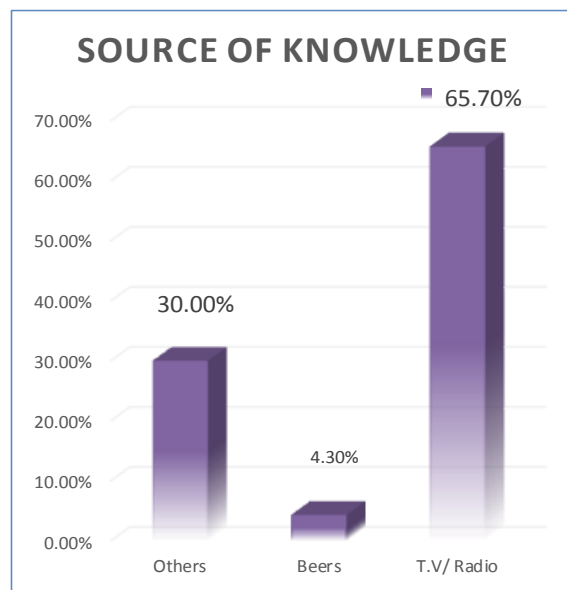
**Table (7):** Indicates that moderate positive correlation between knowledge scores of the studied sample and their attitude scores pre-program ( $r=0.628$ ,  $P$  value  $< 0.0001$ ), fair positive correlation between knowledge scores of the studied sample and their practice scores pre-program ( $r=0.264$ ,  $P$  value  $< 0.0001$ ), and between attitude and practice scores pre-program ( $r=0.346$ ,  $P$  value  $< 0.0003$ ).

Also, positive correlation between knowledge of the studied sample pre-program and their knowledge, attitude, practices scores post-program ( $r=0.382$ ,  $P$  value  $< 0.001$ ;  $r=0.337$ ,  $P$  value  $< 0.004$ ;  $r=0.363$ ,  $P$  value  $< 0.002$  respectively), positive correlation between attitude of the studied sample pre-program and their attitude post-program ( $r=0.369$ ,  $P$  value  $< 0.002$ ) and positive correlation between knowledge of the studied sample post-program and their attitude post-program ( $r=0.381$ ,  $P$  value  $< 0.001$ ). Lastly, a positive correlation is found between the participants' knowledge after the program and their attitudes after the program ( $r=0.381$ ,  $P$  value  $< 0.001$ ).

**Table (1):** Frequency distribution of the studied sample regarding to their socio-demographic characteristics (n= 70)

Items	No.	%
<b>Age</b>		
22- < 27	65	92.9
27- < 32	2	2.9
32 – 36	3	4.2
<b>Education level</b>		
Diploma	58	82.9
B.Sc	10	14.2
Masters	2	2.9
<b>Duration of work</b>		
1 -5	64	91.4
5 – 10	2	2.9
10 – 15	4	5.7
<b>Attendance of training</b>		
Yes	14	20.0
No	56	80.0
<b>Place of residence</b>		
Rural	26	37.1
Urban	44	62.9

**Figure (1):** Percentage distribution of the studied sample regarding to their sources of knowledge regarding Covid-19 (n = 70)



**Table (2):**percentages destitution of the studied sample regarding to their total Knowledge. Attitude level and Practice about Covid-19 pre and post program. (n = 70)

Items	Pre (n = 70)		Post (n = 70)		Test of significance	
	No.	%	No.	%	X <sup>2</sup>	P – value
<b>Knowledge</b>						
Unsatisfactory	47	67.1	7	10.0	48.234	0.0001**
Satisfactory	23	32.9	63	90.0		
<b>Attitude level</b>						
Negative	41	58.6	13	18.6	23.635	0.0001**
Positive	29	41.4	57	81.4		
<b>Practice</b>						
Incompetent	59	84.3	13	18.6	27.015	0.0001**
Competent	11	15.7	57	81.4		

$p>0.05$ non-significant

\*\*  $p<0.001$  highly significant

Figure (2): Percentage distribution of the studied sample regarding to their total knowledge levels regarding Covid-19 at Maternity Care Units pre and post program (n = 70).

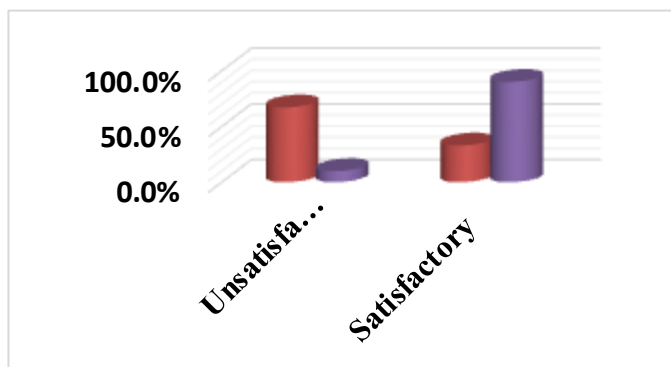


Figure (3): Percentage distribution of the studied sample regarding to their total attitude levels regarding Covid19 at Maternity Care Units pre and post program (n = 70).

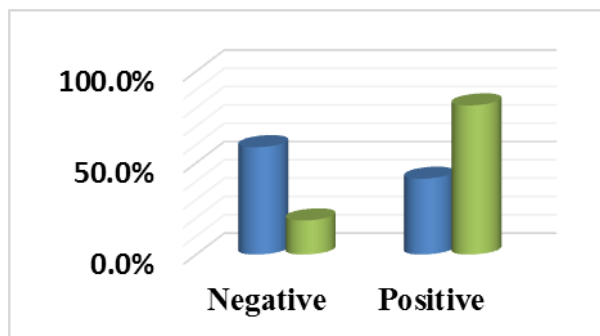


Figure (4): Percentage distribution of the studied sample regarding to their total practice levels regarding Covid-19 at Maternity Care Units pre and post program. (n = 70).

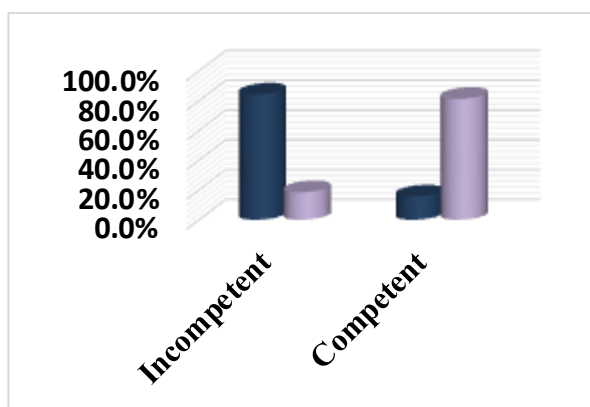


Table (3): Relation between socio-demographic characteristics of the studied sample with their total knowledge levels regarding Covid19 at Maternity Care Units pre/ post-program (n = 70).

Items	Total knowledge level ( pre)				Total knowledge level ( post)			
	Satisfactory (n = 23)		Unsatisfactory (n = 47)		unsatisfactory (n = 7)		satisfactory (n = 63)	
	No.	%	No.	%	No.	%	No.	%
<b>Age</b>								
22- < 27	19	29.2	46	70.8	7	10.8	58	89.2
27- < 32	1	50.0	1	50.0	0	0.0	2	100.0
32 – 36	3	100.0	0	0.0	0	0.0	3	100.0
Fisher test/ P – value	6.202 (0.034)*				0.509 (0.741)			
<b>Education level</b>								
Diploma	15	25.9	43	74.1	7	12.1	51	87.9
B.Sc	7	70.0	3	30.0	0	0.0	10	100.0
Masters	1	50.0	1	50.0	0	.0	2	100.0
Fisher test/ P – value	7.589 (0.02)*				1.099 (0.447)			
<b>Duration of work</b>								
1 -5	19	29.7	45	70.3	7	10.9	57	89.1
5 – 10	0	0.0	2	100.0	0	0.0	2	100.0
10 – 15	4	100.0	0	0.0	0	0.0	4	100.0
Fisher test/ P – value	8.008 (0.009)**				0.465 (0.694)			
<b>Attendance of training</b>								
Yes	10	71.4	4	28.6	7	12.5	49	87.5
No	13	23.2	43	76.8	0	0.0	14	100.0
Fisher test/ P – value	11.802 (0.001)**				1.944 (0.163)			
<b>Place of residence</b>								
Rural	10	21.7	36	78.3	3	12.5	21	87.5
Urban	13	54.2	11	45.8	4	8.7	42	91.3
Fisher test/ P – value	7.517 (0.006)**				0.254 (0.615)			

Percentage done by row  
\*statistically significance differences at < 0.05

Table (4): Relation between socio-demographic characteristics of the studied sample with their total attitude levels regarding Covid-19 at Maternity Care Units pre/ post program (n = 70).

Items	Total attitude level ( pre)				Total attitude level ( post)			
	Negative (n = 41)		Positive (n = 29)		Negative (n = 13)		Positive (n = 57)	
	No.	%	No.	%	No.	%	No.	%
<b>Age</b>								
22- < 27	40	61.5	25	38.5	12	18.5	53	81.5
27- < 32	1	50.0	1	50.0	1	50.0	1	50.0
32 – 36	0	0.0	3	100.0	0	0.0	3	100.0
Fisher test/ P – value	4.311 (0.103)				1.932 (0.370)			
<b>Education level</b>								
Diploma	34	58.6	24	41.4	11	19.0	47	81.0
B.Sc	6	60.0	4	40.0	1	10.0	9	90.0
Masters	1	50.0	1	50.0	1	50.0	1	50.0
Fisher test/ P – value	0.382 (0.966)				1.983 (0.407)			
<b>Duration of work</b>								
1 -5	39	60.9	25	39.1	12	18.8	52	81.3
5 – 10	2	100.0	0	0.0	0	0.0	2	100.0
10 – 15	0	0.0	4	100.0	1	25.0	3	75.0
Fisher test/ P – value	6.397 (0.027)*				0.567 (0.753)			
<b>Attendance of training</b>								
No	35	62.5	21	37.5	13	23.2	43	76.8
Yes	6	42.9	8	57.1	0	0.0	14	100.0
Fisher test/ P - value	1.781 (0.182)				3.991 (0.046)*			
<b>Place of residence</b>								
Rural	10	41.7	14	58.3	6	25.0	18	75.0
Urban	31	67.4	15	32.6	7	15.2	39	84.8
Fisher test/ P - value	4.301 (0.038)*				0.998 (0.318)			

Percentage done by row  
\*statistically significance differences at < 0.05  
\*\*Highly statistically significance differences at < 0.01



**Table (5): Relation between socio-demographic characteristics of the studied sample with their total practice levels regarding Covid19 at Maternity Care Units pre/ post program (n = 70).**

Items	Total practice level (pre)				Total practice level (post)			
	incompetent (n = 59)		competent (n = 11)		Competent (n = 57)		Incompetent (n = 13)	
	No.	%	No.	%	No.	%		
<b>Age</b>								
22- < 27	55	84.6	10	15.4	53	81.5	12	18.5
27- < 32	2	100.0	0	0.0	2	100.0	0	0.0
32 – 36	2	66.7	1	33.3	2	66.7	1	33.3
Fisher test/ P - value	1.437 (0.582)				1.121 (0.641)			
<b>Education level</b>								
Diploma	50	86.2	8	13.8	47	81.0	11	19.0
B.Sc	7	70.0	3	30.0	8	80.0	2	20.0
Masters	2	100.0	0	0.0	2	100.0	0	0.0
Fisher test/ P - value	2.043 (0.354)				0.361 (0.788)			
<b>Duration of work</b>								
1 -5	54	84.4	10	15.6	52	81.3	12	18.8
5 – 10	2	100.0	0	0.0	2	100.0	0	0.0
10 – 15	3	75.0	1	25.0	3	75.0	1	25.0
Fisher test/ P - value	0.923 (0.728)				0.682 (0.753)			
<b>Attendance of training</b>								
No	46	82.1	10	17.9	44	78.6	12	21.4
Yes	13	92.9	1	7.1	13	92.9	1	7.1
Fisher test/ P - value	0.971 (0.324)				1.511 (0.219)			
<b>Place of residence</b>								
Rural	25	96.2	1	3.8	25	96.2	1	3.8
	34	77.3	10	22.7	32	72.7	12	27.3
Fisher test/ P - value	4.399 (0.036)*				5.931 (0.015)*			

Percentage done by row  
\*Statistically significance differences at < 0.05

**Table (6): Correlation between studied sample selective socio-demographics characteristics with total knowledge, attitude, practices scores pre and post- program (n = 70).**

Items		Pre program			Post program		
		Knowled ge	Attitud e	Practic e	Knowled ge	Attitud e	Practic e
Age	r	<b>0.267</b>	<b>0.252</b>	0.049	0.046	<b>0.242</b>	<b>0.343</b>
	P-value	<b>0.025*</b>	<b>0.035*</b>	0.684	0.703	<b>0.043*</b>	<b>0.004*</b>
Educati onal	r	0.131	0.124	0.165	<b>0.326</b>	0.111	0.178
	P-value	0.279	0.304	0.173	<b>0.006**</b>	0.362	0.140
Duratio n	r	<b>0.257</b>	<b>0.260</b>	0.037	0.002	0.148	<b>0.327</b>
	P-value	<b>0.032*</b>	<b>0.030*</b>	0.760	0.988	0.222	<b>0.006*</b>

\*Correlation is significant at the 0.05 level  
\*\*Correlation is significant at the 0.01 level

**Table (7): Correlation between total knowledge, attitude, practice scores among studied sample pre and post-program (n = 70).**

			Pre-program			Post-program	
			Knowledge	Attitude	Practice	Knowledge	Attitude
Pre-program	Knowledge	r	1				
		P-value					
	Attitude	r	0.628	1			
		P value	0.0001**				
	Practice	r	0.264	0.346	1		
		P value	0.027*	0.003**			
Post-program	Knowledge	r	<b>0.382</b>	0.180	0.218	1	
		P value	<b>0.001**</b>	0.136	0.070		
	Attitude	r	<b>0.337</b>	<b>0.369</b>	0.025	<b>0.381</b>	1
		P value	<b>0.004**</b>	<b>0.002**</b>	0.835	<b>0.001**</b>	
	Practice	r	<b>0.363</b>	0.097-	0.121	0.092	0.051-
		P value	<b>0.002**</b>	0.423	0.317	0.447	0.678

\*Correlation is significant at the 0.05 level  
\*\*Correlation is significant at the 0.01 level

**Discussion**

Nurses play a pivotal role in the global healthcare system and have encountered significant difficulties and challenges in the wake of the COVID-19 pandemic. Currently, healthcare providers are at the forefront of combating the COVID-19 outbreak and are diligently working to assist patients across various domains. (García-Martín et al. 2020)

Maternity nurses fulfill a crucial function within the healthcare system by actively contributing to the prevention of infections, implementing effective measures for infection control, isolation and maintaining continuous monitoring of patients. However, due to the inherent nature of their patient-facing role, maternity nurses are exposed to occupational risks when providing care during the COVID-19 outbreak (Smith et al., 2020).

The objective of this study was to evaluate the effect of educational program on nurses' knowledge, attitude and practice regarding Covid- 19 at maternity care units

It was hypothesized that the knowledge, attitude, and practices of maternity nurses would exhibit improvement following the implementation of an

educational program, in comparison to their pre-program levels.

Upon analyzing socio-demographic data, it was discovered that a significant proportion of nurses fell within the age range of 22 to 27 yrs. Furthermore, over fifty percent of these nurses possessed a diploma qualification. Additionally, the majority of nurses reported having a work experience duration ranging from one to five years. A majority of the participants, specifically over three quadrants, did not partake in any training program. The findings of this study did not support the findings of **Said et al. (2021)**, who reported that approximately one third of the participants were between the ages of thirty and forty, with a majority holding a bachelor's degree. Additionally, less than half of the participants had less than five years of experience. In contrast, the present study's results contradicted those of **Al-Dossary et al. (2020)**, as they revealed that the mean age of the nurses was 33.92 (SD  $\pm 7.22$ ). A majority of the participants in the sample possessed bachelor's degrees, accounting for over two thirds of the total. The observed phenomenon can be attributed to the emergence of the novel disease and its swift global dissemination.

Regarding the sources of information, the findings of the current study indicated that approximately two-thirds of the participants obtain their information from television and radio. These findings were consistent with a previous study conducted by **Huynh et al. (2020)**, which reported that nurses primarily relied on social media and the official website of the Ministry of Health for obtaining COVID-19 information.

Contrarily, the findings of **Nemati et al., (2020)** revealed a discrepancy as they identified the World Health Organization, the Ministry of Health, and media as the primary sources of information for nurses. It could be argued that the Egyptian media and television

industry demonstrate a strong commitment to enhancing the knowledge and understanding of the Egyptian population regarding the Covid-19 epidemic, with the intention of mitigating the transmission of the disease .

Nurses in the current study exhibited a statistically significant difference in their level of knowledge before and after participating in an applied education program ( $p = 0.0001$ ). These findings align with the results reported by **Joshi et al. (2020)**, which indicated that nurses across all three quadrants demonstrated a high level of knowledge and awareness regarding COVID-19 following the educational program. Furthermore, **Abdollahpour & Khadivzadeh, (2020)** have provided support for these findings by asserting that it was imperative to prioritize the enhancement of quality of care during pregnancy and childbirth, along with the education, support, and training of healthcare providers in order to effectively control the spread of infectious epidemics. The increased demand for nurses to stay updated on the latest advancements in disease management is likely a consequence of the rapid spread of COVID-19. This is crucial in order to enhance their knowledge and improve the quality of care provided at various maternity care units. By doing so, nurses can effectively safeguard themselves, their families, and their patients, as hospitalized individuals are particularly susceptible to nosocomial infections. The findings of the present study demonstrate a substantial and statistically significant disparity in nurses' attitudes towards COVID-19 before and after participating in the educational program. The present study identified a notable increase in positive attitudes towards the care of confirmed or suspected women following the educational program. These findings align with the research conducted by **Abdel Wahed et al., (2020)**, which observed that allied health workers exhibited

more positive attitudes compared to physicians in various aspects related to the government's involvement in diagnosing, treating, and managing COVID-19 infections .

Research concurred with the findings of **Al Reshidi (2020)**, found a significant proportion of nurses exhibit a favourable attitude towards the COVID-19 pandemic. However, this statement contradicts the findings of **Huynh et al. (2020)**, who reported that a significant majority of nurses expressed agreement with the notion of isolating affected patients when necessary. The observed outcomes could potentially be attributed to variations in socio-demographic factors and a potential knowledge gap among nurses regarding crucial prevention and isolation measures. This emphasizes the importance of the current educational curriculum.

In relation to the overall scores of nurses' practices, it was observed that a significant majority of the sample demonstrated competent practices following their participation in an educational program, as compared to their pre-program performance. This difference was highly statistically significant, with a p-value of 0.0001. These findings align with the conclusions drawn by **Sahiledengle, (2019)** and the Centres for Disease Control and Prevention (**CDC, 2020**), who emphasized the necessity for healthcare facilities offering obstetric care to ensure that their personnel receive appropriate training and possess the necessary skills to implement recommended infection control measures, including the proper utilization of personal protective equipment. It is imperative for healthcare professionals to possess a comprehensive understanding of and comply with infection control protocols pertaining to the Covid-19 pandemic. According to a study conducted by **Al-Dossary et al. (2020)**, there was an observed increase in the implementation of preventive measures in response to COVID-19 following the intervention.

In relation to the association between the socio-demographic characteristics of nurses and their levels of knowledge, practice, and attitude, the study revealed a positive correlation between nurses' knowledge and variables such as age, educational attainment, and years of professional experience .

The findings of this study consisted with the research conducted by **Said et al. (2021)**, which demonstrated a strong and statistically significant positive relationship between knowledge and socio-demographic factors (such as age, education, and experience) both before and after the intervention ( $p < 0.001$ ). Additionally, this finding aligns with the research conducted by **Asif, (2019)**, which demonstrated that nurses possessing a bachelor's degree exhibited superior levels of prevention and perception regarding COVID-19 in comparison to individuals with different educational backgrounds. Nurses possessing master's degrees assume favourable clinical positions, exhibiting elevated levels of clinical proficiency and possessing a greater breadth of knowledge compared to their counterparts with bachelor's degrees.

However, the findings of **Nemati et al., (2020)** were incongruent with the present study's results, as they indicated that age and education level did not have an impact on the total knowledge score. Additionally, there was no significant difference observed in the total knowledge score between nurses with varying levels of work experience. Furthermore, the findings of **Kamineni et al. (2020)** contradicted the aforementioned statement and suggested that there is no statistically significant association between levels of knowledge and socio-demographic variables such as age, gender, and education. The potential cause may be attributed to the differentiation observed among various residential regions .

A positive correlation was identified between the attitudes of nurses and their age and years of experience. This observation is consistent with the research conducted by **Huynh et al. (2020)**, who found a highly significant positive correlation between attitudes and demographic characteristics prior to the program. According to the researchers, this correlation could be attributed to the positive relationship between age and both accumulated experience and adherence to favourable attitudes among nurses. Contrary to the findings of **Amanya (2020)**, the present study revealed a lack of statistically significant association between participants' socio-demographic characteristics and compliance with Covid-19 measures.

Furthermore, the current study revealed a significant positive association between the practices of nurses and their age and years of experience. The statistical analysis indicated a p-value of 0.004 and 0.006 for the pre- and post-program application, respectively. These findings align with the results reported by **Said et al., (2021)**, who also observed a highly significant correlation between practice and demographic characteristics (such as education, experience, and job) both before and after the program implementation, with a p-value of less than 0.001. However, there was a contradiction with the findings of **Amanya (2020)**, which signaled that the socio-demographic characteristics of healthcare professionals, such as age, gender, educational attainment, occupation, working hours, and work experience, hadn't a statistically significant association with their knowledge of Covid-19 or adherence to preventive measures.

With respect to the correlation between Knowledge, Attitude, and Practice (KAP), the present study has demonstrated a positive relationship between KAP following the implementation of an educational program. Furthermore, the study has also identified

positive associations between knowledge and attitude, as well as between knowledge and practice. This finding aligns with the study conducted by **Mbachu et al., (2020)**, which demonstrated a noteworthy correlation between knowledge and practice. Consequently, it is imperative to enhance the knowledge of all healthcare professionals in order to promote the adoption of preventive practices. The findings of **Alrubaiee et al., (2020)**, support the notion that a significant proportion of participants exhibited a high level of adherence to preventive measures against COVID-19. This might be attributed to the respondents' sufficient knowledge and awareness regarding the virus .

### Conclusions

Based on the aforementioned information, it can be inferred that the implementation of educational programs focused on COVID-19 for maternity nurses yields positive outcomes in terms of enhancing their knowledge, attitude, and practices. Also there was a positive correlation between nurse's knowledge and their age, educational level and years of experiences. In addition a positive correlation was observed between nurse's attitude with their age and years of experiences. While the current study revealed that there was a positive association between KAP post educational program.

### Recommendations

Applying further wide range educational programs for whole nursing staff, nursing supervisors, and workers. These programs help keep themselves, their families, and patients safe from infection.

It is strongly advised that nurses partake in various Covid-19 training programs as a mandatory endeavour .

The Ministry of Health (MOH) should constantly update its website and obligates healthcare providers to be aware of COVID-19 updates.

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