

Effect of Evidence Based Guidelines on Nurses' Performance Regarding Pandemic COVID-19 in Isolation Units

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Abstract

Healthcare workers (HCWs) are on the front line of defense against the coronavirus disease 2019 (COVID-19) pandemic. Inadequate knowledge and negative attitudes among HCWs can directly affect practices, leading to delayed diagnosis, poor infection control practices, and the spread of disease. Knowledge, attitude, and practice (KAP) is necessary for better management of COVID-19. **Aim:** This study aimed to evaluate the effect of evidence based guidelines on nurses' performance regarding pandemic COVID -19 in Isolation Units. **Design:** A quasi experimental design was used. **Setting:**This study was conducted in Isolation Units at internal medicine Hospital with Agar, Internal Medicine Hospital, and Cardiothoracic Hospital attached to Zagazig University Hospitals in Sharkia Governorate, Egypt. **Sample:** A purposive sample of 50 nurses. **Tools:**1) Self-Administered questionnaire for nurses to assess nurses' demographic characteristics, and nurses' knowledge regarding COVID-19 disease (Pre/ Post test), 2) Nurses' practices regarding COVID-19 (Pre/Posttest), and 3) Nurses' attitude Likert Scale towards COVID-19 (Pre/Posttest) **Results:** Most (96.0%) of the studied nurses had adequate self-reported practices towards preventive measures against COVID-19 after the intervention, compared to less than two-thirds (60.0%) had reported total inadequate practices in the pretest itself. There was a highly statistically significant positive correlation between nurses' total knowledge, practices and their attitudes towards COVID-19 before and after the intervention ($P<0.01$). **Conclusion:** the implementation of evidence-based guidelines regarding COVID-19 had a statistically significant effect in improving knowledge, practices and attitudes of nurses. Additionally, there was a highly statistically significant positive correlation between nurses' knowledge, practices, and their attitudes towards COVID-19 before and after the intervention, supporting the proposed hypotheses. **Recommendations:** The illustrated developed booklet should be accessible to all nurses caring for people with COVID-19 to use as a reference guide in their practice.

Key words: Evidence Based Guidelines, Nurses' Performance, and Pandemic COVID -19.

Introduction:

The corona virus disease (COVID-19) first emerged in China in Wuhan in late 2019 and has since spread to more than 200 countries, prompting the World Health Organization (WHO) to designate it like a global pandemic. Positive cases of COVID-19 have been reported in around 5.6 million people worldwide, with at least 350,000 deaths. Governments and health authorities are issuing general warnings. COVID-19 is linked to an increased risk of the most serious and life-threatening disease in older people (Azlan, et al., 2020).

COVID-19 infections are becoming more common on the African continent, especially in Egypt. As of June 29, 2020, COVID-19 has caused approximately 382,600 confirmed cases, more than 9,700 deaths, and approximately 147,000 recoveries in Africa, with approximately 24% of these cases originating in Egypt alone (Africa CDC, 2020). Misunderstandings among nurses about the virus, its mode of transmission, and the essential steps to prevent infection according to this novel have delayed efforts to provide critical treatment in some cases, leading to the rapid spread of infection in hospitals, and endangered patients (Elshenawie, et al. ,2020).

COVID-19 knowledge, attitudes and practices (KAP) are important in determining a caregiver's readiness to take change initiatives. Accordingly, KAP studies provide a starting point for determining the type of intervention that may be needed to change public perceptions of the virus. It would also be beneficial to better understand the condition in order to develop prevention methods and health promotion programs (Azlan et al., 2020). Nurses are the first line of contact with patients and one of the main sources of infection in healthcare. As a result, nurses are considered to be at high risk of infection. WHO and the Centers for Disease Control and Prevention (CDC) released recommendations for the prevention and control of COVID-19 for healthcare workers (HCWs) in late January. WHO has also launched a series of online COVID-19 training sessions and materials in different languages to advance prevention initiatives such as sensitizing and training nurses in preparatory activities (Bhagavathula et al., 2020).

Most patients with COVID-19 experience fever along with typical respiratory symptoms and signs such as nonproductive cough and shortness of breath, fatigue and myalgia (Chan et al., 2020 and Riou & Althaus, 2020). Half of the patients show gastrointestinal symptoms, mainly diarrhea, in addition to respiratory symptoms; However, it rarely occurs alone with gastrointestinal symptoms (Pan et al., 2020). In addition, loss of smell or taste and other symptoms are strong indicators of COVID-19 infection (Menni et al., 2020). COVID-19 can be transmitted quickly through close contact with an infected person (Phan et al., 2020 and Parry, 2020). Elderly people and those with comorbidities are more prone to infection and also more prone to serious illnesses related to acute respiratory distress syndrome (ARDS) and cytokine storms (Guo et al., 2020).

To avoid the transmission of coronavirus infection, the knowledge and practice of nurses must be oriented towards strict prevention measures. Understanding the knowledge, attitudes and practices of nurses in the face of COVID-19 is essential at this time. The goal of COVID-19 care should be to prevent the spread

of infection. Nurses play an important role as educators and counselors, teaching service users and caregivers, providing community health education and supporting other members of the multidisciplinary team in their development. To prevent transmission of infection, they should use proper hand washing technique, maintain safe social distancing, use disinfectant materials such as alcohol, avoid shaking hands, use a tissue over their mouth and nose when coughing or sneezing and wear a mask when coughing or sneezing (WHO, 2020 b).

Evidence-based practice (EBP) is seen as a pathway to more effective health care. Evidence-based practice guidelines leverage systematic and progressive narratives, usually supported by empirical literature, to assess healthcare providers and patients in making decisions about interventions appropriate for health care services linked to private clinics. Various evidence-based methods have reduced the rate of healthcare-associated infection (HAIs); Hand hygiene is by far the most effective way to reduce the prevalence of HAIs; percutaneous injuries caused by needles and sharp objects are responsible for the infection. Besides the evidenced role of hand washing and percutaneous injury, other non-pharmacological interventions, such as cleaner hospital environment, significantly reduce the rate of HAI. Conducting EBP should ensure safe, quality care, improve patient outcomes and reduce costs. EBP also empowers clinicians through compensation, which leads to higher levels of commitment, teamwork, and job satisfaction (Arafat et al., 2018).

Significance of the study:

Nurses in particular have frequent contact with infected patients and play a crucial role in infection management. The influx of COVID-19 patients in Egypt increased in 2020 (Ministry of Health and Population "MOHP" in Egypt, 2020). Public understanding of COVID-19 in Egypt is very important to take action to remove barriers to addressing issues, especially during the rapid escalation phase. Knowledge and attitudes about pandemic infectious diseases have a direct impact on the level of panic among nurses and undermine efforts and attempts to prevent the spread of the disease. Therefore, nurses need to improve their knowledge and practice to prevent infection and limit the spread of COVID19 (Lababidi, et al.,

2020). Knowledge is the basis for behavior change, while beliefs and attitudes are the drivers of behavior change. One of the core competencies of nurses is the ability to competently care for COVID-19 patients and prevent the transmission of infection (Zhou et al., 2020).

Evidence Based "EB" nursing practice is the gold standard in nursing care (Arelene et al., 2011). These guidelines provide comprehensive recommendations for the prevention of HAIs in hospitals and other acute care settings based on the best evidence currently available. Evidence-based national guidelines are general principles of best practice that should be incorporated into local practice guidelines and reviewed to reduce practice variation and ensure patient safety (Loveday et al., 2014). The aim of this study was to evaluate the effect of Evidence Based guidelines on nurses' performance regarding pandemic COVID -19 in isolation units. Hopefully, the results of this study will help provide predictive data that could support nursing practice and research.

Aim of the study

The aim of this study was to evaluate the effect of evidence based guidelines on nurses' performance regarding Pandemic COVID -19 in Isolation Units. This aim was fulfilled through the following objectives:

- Assess nurses' level of knowledge regarding Pandemic COVID -19 disease.
- Assess nurses' practice during the COVID-19 pandemic in the Isolation Units.
- Assess nurses' attitude towards COVID-19 control and prevention.
- Design, implement, and evaluate the effectiveness of evidence based guidelines on nurses' Performance regarding in respect to Pandemic COVID -19 in Isolation Units.

Hypotheses

To achieve the purpose of this study, the following research

hypotheses were formulated:

H1: Mean knowledge scores of nurses after the program will be higher than their scores before the program.

H2: Nurses' mean practice scores after the program will be higher than their scores before the program.

H3: Significant improvement in nurses' attitudes after implementation of the evidence-based guidelines .

H4: There will be a positive correlation between knowledge, attitude, and practice after implementation of evidence-based guidelines.

Operational definitions:

Performance:

The term performance refers to the act of performing or doing. It is an achievement, an accomplishment or a realization. For the purposes of this study, the term refers to the knowledge, practice and attitude of the nurses in relation to the control and prevention of COVID-19 in Isolation Units.

Evidence Based Guidelines:

It is about putting evidence into practice, any practice that has been shown by scientific research to be effective according to a set of explicit criteria. In this study, the researchers drew on the evidence-based guidelines developed by the World Health Organization (WHO) (2019, 2020 a) and the Loveday et al., 2014 national evidence-based guidelines on prevention of HAIs with respect to practices of nurses in relation to COVID-19 such as hand washing, alcohol hand rub, mask on and off, gloves on and off, gown on and off, face shield or goggles on and off, personal protective equipment on and off, and practices for COVID-19 Prevention measures.

Subjects and methods:

Research Design:

A quasi-experimental research design with one group pre-posttest technique was used to conduct the study. A quasi-experimental design is a useful tool in situations where real experiments cannot be used for ethical or practical reasons because it uses a non-random method to assign subjects to groups (Thomas, 2020).

Setting:

The current study was conducted in Isolation Units at Internal Medicine Hospital with Agar ,

Internal Medicine Hospital, and Cardiothoracic Hospital attached to Zagazig University Hospitals in Sharkia Governorate, Egypt. There was two Isolation Units at Internal Medicine Hospital with Agar , one on the ground floor, had 6 beds ,and the other on first floor, had 9 beds , while Isolation units at Internal Medicine Hospital has 2 rooms each room has 3 beds, and Isolation units at Cardiothoracic Hospital consisted of 13 rooms each room has 3 beds.

Subject:

A purposive sample of 50 nurses working in the above-mentioned Isolation Units at Zagazig University Hospitals during the study period. The sample was calculated using a power and sample size calculation program to give a power of 80%. They were selected on the basis of the following criteria:- Inclusion criteria:- Both sexes, nurses with at least one year of experience, with varying ages between 20 and 50 years old, and willing to participate in the study. Exclusion criteria: Nurses had any chronic diseases and nurses who don't cooperate in the study.

Tools of data collection:

Tool I: Self-Administered Questionnaire for Nurses:

It was designed by the researchers after reviewing previously conducted research, visiting the Ministry of Health and Population (MOHP) and WHO websites for frequently asked questions , and opinions of expertise for content validity. It was translated into Arabic form to avoid misunderstanding, It was applied to all nurses before and after implementation of EB guidelines. It covered two parts as the following:

Part I: Nurses' Demographic Characteristics:

It included 11 items of personal demographic characteristics of the nurses such as age, gender, marital status, residence, Living status ,level of education, years of experience, income, awareness of information, sources of information about COVID-19, training courses regarding nursing care for patients with COVID-19

Part II : Nurses' knowledge regarding COVID-19 disease (Pre/ Posttest):

It was used to assess current nurses' knowledge regarding COVID-19 disease. It was applied in the pre and the post program phase; and filled in by the nurses. The knowledge section consisted of 71 multiple choice questions (MCQ) covering the main general information as virus's nature, signs and symptoms, and incubation period of COVID-19 (10 point), modes of transmission and risk groups for COVID-19 (12 point), complications of COVID 19 (5 point), diagnostic measures (7 point), methods of treatment and nursing care of COVID-19 (9 point), vaccination (1 point), isolation (7 point), preventive measures (13 point), and personal protective equipment (7 point). It was adapted from **Abdelhafiz et al., (2020); Gao et al., (2020); Gharpure et al.; (2020), & Zhong et al., (2020).**

The scoring system:

Response scores were assigned as follows: Each question was assigned one for each correct answer and zero for incorrect answer or don't know. Total score of knowledge was 71 point. Total nurses' Knowledge equal or above 80% was considered satisfactory and unsatisfactory if less than 80% based on statistical analysis.

Tool II: Nurses' Practice Regarding COVID-19 (Pre/Posttest):

This tool was designed by the researchers. It was used to assess nurses' practice regarding COVID-19. It included two parts as the following:

Part I: Nurses' practices observational checklists:

This section contained 76 items related to practices covering seven main parts including hand washing (14 points), alcohol based hand rubbing (8 points), putting on and taking off mask (14 points), putting on and taking off gloves (14 points), putting on and taking off gown (7 points), putting on and taking off face shield or goggles (4 points), and putting on and taking off personal protective equipment (15 points). **It was adopted from (CDC, 2020 & WHO, 2020 b).**

Part II : Nurses' self-reported practices towards preventive measures against COVID-19:

It contained 53 items covering seven main parts including personal protection (20 points), coughing

and sneezing etiquette (4 points), contact with others precautions (5 points), healthy food and exercises (6 points), family visits (3 points), travel and shopping (6 points), and quarantine (9 points). **It was adopted from (Meier et al., 2020; Ngwewondo et al., 2020 ; & Wong et al., 2020);**.

Scoring system:

Each item in each technique was checked as "done," and "not done." These were scored from "1" and "0" respectively so that a higher score indicated better practice. The total scores of all techniques were summed-up and divided by the numbers of steps to calculate a mean score. Means and standard deviations were calculated for nurses in the pre and the post program phase. The overall practice score considered adequate when total score equal or above 80% and inadequate if it below 80% based on statistical analysis.

Tool III: Nurses' Attitude Likert Scale Towards COVID-19: (Pre/Posttest):

It included twenty six closed ended questions assessing nurses' attitudes toward COVID-19 as a preventable and controllable disease in which nurses' responses were evaluated on a 3-point Likert scale ranging from agree to disagree. It was adapted from **Al-Hanawi et al., (2020), Huynh et al., (2020); & Salman et al., (2020)**.

Scoring system:

Response to each item was recorded on the 3-point Likert scale as follows: agree (2-points), undecided (1-point), and disagree (0-point). Total scores ranged from 0 to 52 score. This score converted to percentage and categorized as the following: agree or undecided were considered a positive attitude, disagree was considered a negative attitude. Positive attitude if score $\geq 70\%$ and negative attitude if score $< 70\%$ based on statistical analysis.

Ethical considerations and human rights :

Prior to the first interview, verbal consent was obtained from each subject after being informed of the nature, purpose, and utility of

the study. Nurses were also informed that the sharing was voluntary and that they can unsubscribe at any time without giving a reason. The confidentiality of the information received was guaranteed by the encryption of all data. Researchers assured nurses that the data would be used for research purposes only.

Pilot study:

A pilot study was carried out on 5 nurses (10%) of the total study sample to test the clarity and practicability of the tools and to estimate the needed time to fill in each form. Necessary modifications were done according to the pilot study results. Pilot subjects were later excluded from the main study sample.

Testing Validity and Reliability:

Tools offered by the use of face and content validity. Face validation aimed to inspect the items to determine if the tools measured what they supposed to measure. Content validity was performed to determine whether the content of the tools covered the objective of the study. The tools were reviewed by five experts in each specialty and academic position, "2 professors and 3 assistant professors" in Medical Surgical Nursing, who reviewed the content of the tools for clarity, relevance, completeness, understanding and ease of implementation. In their opinion, minor changes had been made and the final form had been drawn up. The reliability of the tools was tested by the internal consistency method. Cronbach's alpha reliability coefficient was found to be 0.822, 0.874, and 0.908 respectively for nurses' knowledge questionnaire, nurses' practices, and nurses' attitudes Likert scale. Content validity and reliability testing was conducted before data collection began.

Field work:

The study was carried out after obtaining the official approvals to carry out this study from the heads of the aforementioned Units and local ethical committee. The researchers explained the purpose of the study to the department's heads and nurses; to obtain their co-operation. Ethical considerations were explained and confidentiality was ensured after obtaining oral informed consent from the nurses. Data was collected over an 8-months period, from April 2020 to the end of November 2020. The

researchers were present in two shifts at morning and afternoon shift during the study period.

Due to the pandemic COVID-19, Egyptian government hospitals applied strict rules of infection prevention and control measures to all hospital staff and nurses, which was a major hurdle for researchers during data collection (Tool I, Tool II Part2, and Tool III) and implementing theoretical sessions due to strict rules measures that must be followed such as a short contact time. Therefore, researchers obtained formal permission from the director of nursing and verbal consents from nurses in the Isolation Units to communicate with nurses through contact methods of email, telephone, WhatsApp, or other communication technologies accessible that had been identified for nurses. Regarding tool II Part 1 sometimes in dire circumstances the researchers obtained formal permission from the director of nursing, as the researchers explained in details to the head nurse at isolation units how to collect this part instead of applying by the researchers and sometimes another done by researchers themselves according to nurses circumstances.

The study was conducted through the following four phases:

Phase I: Assessment phase:

Review of relevant literature (nursing and medical textbooks, specialized journals, and internet resources on COVID 19). After reviewing related literature, the researchers developed tools and nursing experts verified the validity of the content. Researchers conducted a baseline assessment of all study participants to assess nurses who met the inclusion criteria for this study. Due to lockdown in Egypt in this critical situation to achieve social distancing, the researchers used online data collection method in respect to a self-administered questionnaire (Tool I), self-reported practice towards preventive measures against COVID-19 (Tool II, Part 2), and attitude COVID-19 Likert, scale (Tool III). A Google form was created and participants were asked to fill it out and submit it. A link to the questionnaire was shared with groups of nurses on WhatsApp. As regards nurses' practice observational checklists

(Tool II, Part1) have already done in Isolation Units. Tool I took about 20 minutes, tool II took about 15-20 minutes, Tool III took about 10 minutes to be filled from each nurse to collect the necessary data. The obtained data served as baseline data and guided the researchers in the formulation of guidelines.

II. Planning Phase:

Designing of EB guidelines, based on the assessment of nurse learning needs and the criteria of nurses' goals, priorities and expected outcomes, had been formulated to improve nurses' knowledge, attitudes and practice in relation to COVID-19. At this stage, the development of teaching sessions as a part of the guideline was done .

The EB guidelines was applied to study participants in 5 sessions; Each session lasted 20 to 30 minutes. The teaching method included: demonstration and re-demonstration. In addition, the teaching materials included: PowerPoint presentations, educational video clips, illustrative pictures, and a colored booklet designed by the researchers in Arabic and given to all nurses as a guide and reference to get a clear picture of all aspects related to COVID-19.

III. Implementation phase:

A pre-test was conducted, then the guidelines were implemented for two months and an immediate post-test was conducted. The study subject received EB guidelines.

The guidelines developed by the researchers to improve nurses' performance in the context of COVID 19. The guidelines were implemented in the form of sessions. The content of the guidelines was distributed over 5 sessions, including two theoretical which was carried out through Zoom application and three practical part carried out in study setting. Each session lasted 20-30 minutes. The researchers distributed nurses into small groups including 4 to 5 nurses in each group depending on the work situation. The guidelines were drafted and presented in Arabic. At the beginning of the first session, an orientation on the guidelines and their purpose was presented. Each session began with a summary of what was taught in the previous session and the objectives of the new one, considering the use of simple language adapted to the level of nurses. Motivation and reinforcement were used during the training sessions to enhance learning. The booklet

were distributed to the nurses at the end of the sessions. To achieve social distancing, the theoretical part was presented using PowerPoint presentations, illustrated pictures, educational video clips, and booklet through Zoom application where the link of zoom was sent by researchers to nurses in WhatsApp groups at the agreed time according to their working conditions. Also, Zoom sessions were recorded and sent in WhatsApp groups. On the other side, the practical part was presented in the form of demonstration and re-demonstration at Isolation Units.

The content of the sessions covered the following parts:

Two sessions covered theoretical part included:

Session I: Virus's nature, definition, causes, risk groups, modes of transmission, incubation period, symptoms, complications, diagnostic measures, preventive measures, treatment methods, nursing care, vaccination, isolation, and personal protective equipment in respect to COVID-19 infection.

Session II: Preventive measures against COVID-19 including personal protection, coughing and sneezing etiquette, contact with others precautions, healthy food and exercises, family visits, travel and shopping, and quarantine.

Three sessions covered practical part included

Session III: Demonstration and re-demonstration of hand washing technique and alcohol based hand rubbing technique.

Session IV: Demonstration and re-demonstration of putting on and taking off mask, putting on and taking off gloves, putting on and taking off gown, putting on and taking off face shield or goggles.

Session V: Demonstration and re-demonstration of putting on and taking off personal protective equipment.

After completion of the EB guidelines, every nurse received a copy of the booklet as a as a guide in Isolation Units.

IV. Evaluation phase:

After the implementation of the guidelines, the post-test was done to the studied nurses' performance by the same format of the pre-test using tools to evaluate the effect of the implemented EB guidelines.

Statistical Design:

The collected data organized, tabulated and statistically analyzed using Statistical Package for Social Science (SPSS) version 25 for windows, running on IBM compatible computer. Descriptive statistics were applied (e.g. frequency, percentages, mean and standard deviation). Paired T test (t) used to compare between means of quantitative variables as the test of significance. Pearson correlation test (r) was used to test the correlation between studied variables. Reliability of the study tools was done using Cronbach's Alpha. A significant level value was considered when $p < 0.05$ and a highly significant level value was considered when $p < 0.01$. No statistical significance difference was considered when $p > 0.05$.

Results

Table (1): Demonstrates that majority (80.0%) of the studied nurses were females and the age ranged from 20 to < 30 years with a mean age of 27.96 ± 4.21 , most (92.0) of them married, less than two thirds (60.0%) had graduated from nursing institutes, and (68.0%) from rural areas. All studied nurses (100.0%) live with their families, more than half (52.0%) of them had a sufficient income, less than two thirds (64.0%) had 5-<10 years of nursing experience, with mean 7.12 ± 4.30 , while only (16.0%) had attended programs related to COVID-19. The main sources of information about COVID-19 came from social media and mass media (88.0% and 76.0% respectively), while only (8.0%) came from family.

Table (2): shows that there were statistically significant differences between pre-test and post-test of the studied nurses with regard to total knowledge (t 16.04 at $P \leq 0.01$). The mean and standard deviation of total knowledge of the studied nurses was 66.96 ± 4.86 after the intervention compared to 33.24 ± 17.35 in the pre-intervention period.

Table (3): Demonstrates that the most (96.0%) of the studied nurses had adequate self-reported

practices towards preventive measures against COVID-19 after the test, compared to less than two-thirds (60.0%) had reported total inadequate practices in the pretest itself. The mean score and standard deviation of the total score of nurses' practices after the intervention was 120.52 ± 7.92 compared to 77.84 ± 24.19 in the pre-intervention period. There were high statistically significant differences between the pre- and post-test of the studied nurses in terms of total practices ($t 16.21$ at $P \leq 0.01$).

Figure (1): Shows that the most (96.0%) of studied nurses had adequate total practices observational checklists posttest about hand washing, alcohol based hand rubbing, putting on and taking off mask, putting on and taking off gloves, putting on and taking off gown, putting on and taking off face shield or goggles, and putting on and taking off personal protective equipment, while more than half (56.0%) of them provided pre-test of inadequate total practices.

Table (4): Reveals that the most (92.0%) of the studied nurses had a total positive attitude towards COVID-19 control and prevention after the intervention, while less than two-thirds (60.0%) of them had a negative total attitude before the intervention.

Also, this table reports that the mean and standard deviation of studied nurses' total attitude towards COVID-19 control and prevention was 44.96 ± 6.81 after the intervention compared to 28.52 ± 11.42 in the pre intervention phase. There were high statistically significant differences between the pre-test and the post-test of the studied nurses regarding total attitude ($t 11.84$ at $P \leq 0.01$).

Table (5): indicates that there was a highly statistically significant positive correlation between nurses' total knowledge, practices and their attitudes towards COVID-19 before and after the intervention ($P < 0.01$).

Table (1):Frequency and Percentage Distribution of the Studied Nurses according to their Demographic Characteristics (n=50).

Demographic Characteristics	No.	%
Age (Year)		
20-<30	40	80.0
30-<40	8	16.0
40-<50	2	4.0
$\bar{x} \pm S.D$	27.96±4.21	
Gender		
Male	10	20.0
Female	40	80.0
Marital Status		
Married	46	92.0
Unmarried	4	8.0
Residence		
Urban	16	32.0
Rural	34	68.0
Living status		
With family	50	100.0
Without family	0	0.0
Educational level		
Nursing Diploma	8	16.0
Nursing Institute	30	60.0
Bachelor of Nursing	12	24.0
Monthly income		
Enough	26	52.0
Not enough	24	48.0
Years of experience in field of nursing in general		
1-< 5	10	20.0
5-<10	32	64.0
≥ 10	8	16.0
$\bar{x} \pm S.D$	7.12±4.30	
Attended any educational program regarding nursing care for patients with COVID-19		
Yes	8	16.0
No	42	84.0
Awareness of any special information about COVID-19		
Yes	50	100.0
No	0	0.0
*Sources of information about COVID-19		
World Health Organization	18	36.0
Ministry of Health	32	64.0
Social media	44	88.0
Mass media such as radio and television	38	76.0
Doctors	20	40.0
Friends	10	20.0
Family	4	8.0

(*) select more answer

Table (2): Comparison between The Studied Nurses Regarding Their Knowledge about COVID-19 at Pre and Post Intervention (n=50).

Items	Pre				Post				T-test	P-value
	Satisfactory		Unsatisfactory		Satisfactory		Unsatisfactory			
	No.	%	No.	%	No.	%	No.	%		
Virus's nature, signs and symptoms, and incubation period of COVID 19	22	44.0	28	56.0	44	88.0	6	12.0	11.94	0.000**
Mode of Transmission and risk groups for COVID 19	16	32.0	34	68.0	50	100.0	0	0.0	14.28	0.000**
Complications of COVID 19	14	28.0	36	72.0	48	96.0	2	4.0	14.81	0.000**
Diagnostic measures	14	28.0	36	72.0	46	92.0	4	8.0	14.57	0.000**
Methods of treatment and nursing care of COVID 19	14	28.0	36	72.0	44	88.0	6	12.0	13.20	0.000**
Vaccination	22	44.0	28	56.0	50	100.0	0	0.0	7.90	0.000**
Isolation	14	28.0	36	72.0	40	80.0	10	20.0	11.66	0.000**
Preventive measures	18	36.0	32	64.0	48	96.0	2	4.0	14.40	0.000**
Personal protective equipment	20	40.0	30	60.0	48	96.0	2	4.0	11.42	0.000**
Total knowledge score $\bar{x} \pm S. D$	14	28.0	36	72.0	46	92.0	4	8.0	16.04	0.000**
	33.24 ± 17.35				66.96 ± 4.86					

T-test= Paired T-test. (**) Highly statistically significant at $p < 0.01$.

Table (3): Comparison Between The Studied Nurses Regarding Their Practices Towards COVID-19 (n=50).

Items	Pre				Post				T-test	P-value
	Adequate		Inadequate		Adequate		Inadequate			
	No.	%	No.	%	No.	%	No.	%		
Hand washing	25	50.0	25	50.0	48	96.0	2	4.0	12.13	0.000**
Alcohol based hand rubbing	24	48.0	26	52.0	48	96.0	2	4.0	10.75	0.000**
Putting on and taking off mask	24	48.0	26	52.0	47	94.0	3	6.0	12.61	0.000**
Putting on and taking off gloves	23	46.0	27	54.0	44	88.0	6	12.0	12.76	0.000**
Putting on and taking off gown	24	48.0	26	52.0	50	100.0	0	0.0	11.87	0.000**
Putting on and taking off face shield or goggles	27	54.0	23	46.0	50	100.0	0	0.0	13.73	0.000**
Putting on and taking off personal protective equipment	32	64.0	18	36.0	50	100.0	0	0.0	10.14	0.000**
Total nurses' practices observational checklists	22	44.0	28	56.0	48	96.0	2	4.0	13.76	0.000**
Personal protection	29	58.0	21	42.0	44	88.0	6	12.0	10.19	0.000**
Coughing and sneezing etiquette	33	66.0	17	34.0	50	100.0	0	0.0	10.53	0.000**
Contact with others precautions	28	56.0	22	44.0	48	96.0	2	4.0	11.55	0.000**
Healthy food and exercise	21	42.0	29	58.0	50	100.0	0	0.0	19.91	0.000**
Family visits	24	48.0	26	52.0	50	100.0	0	0.0	17.47	0.000**
Travel and Shopping	19	38.0	31	62.0	50	100.0	0	0.0	24.70	0.000**
Quarantine	29	58.0	21	42.0	48	96.0	2	4.0	12.84	0.000**
Total nurses' self-reported practices towards preventive measures against COVID-19	20	40.0	30	60.0	48	96.0	2	4.0	18.07	0.000**
Total practices score $\bar{x} \pm S. D$	22	44.0	28	56.0	48	96.0	2	4.0	16.21	0.000**
	77.84 ± 24.19				120.52 ± 7.92					

T-test= Paired T-test. (**) Highly statistically significant at $p < 0.01$.

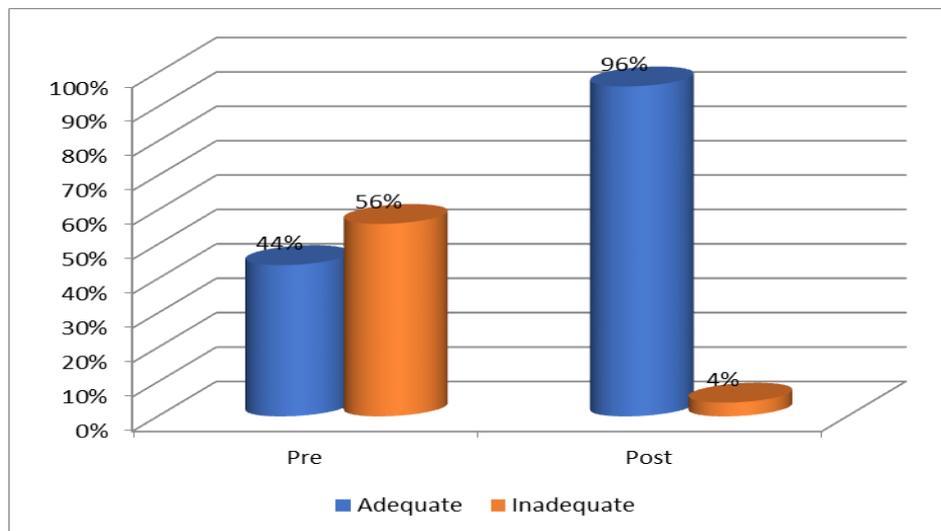


Figure (1): Percentage Distribution of the Studied Nurses Regarding Their Practices Observational Checklists Towards COVID-19 at Pre and Post Intervention(n=50).

Table (4): Comparison between The Studied Nurses Regarding Their Total Attitudes Towards COVID-19 Control and Prevention at Pre and Post Intervention (n=50).

Levels of Total Attitudes	Pre		Post		T-test	p-value
	No.	%	No.	%		
Positive	20	40.0	46	92.0	11.84	0.000**
Negative	30	60.0	4	8.0		
$\bar{x} \pm S. D$	28.52±11.42		44.96±6.81			

T-test= Paired T-test. P: p-value. **highly significant at p < 0.01.

Table (5): Correlation between Total Nurses' Knowledge, Practices, and Their Attitudes Towards COVID-19 Control and Prevention at Pre and Post Intervention(n=50).

Variables		Total Knowledge		Total Practice	
		Pre	Post	Pre	Post
Total Knowledge	r				
	p				
Total Practices	R	0.451	0.468		
	P	0.001**	0.001**		
Total Attitudes	R	0.398	0.406	0.718	0.562
	P	0.004**	0.003**	0.000**	0.000**

r= Pearson correlation coefficient test.*Significant at p < 0.05. **highly significant at p < 0.01.

Discussion:

The rapid spread of COVID-19 poses a serious threat to human health and has significant public health implications around the world. Nurses are key members of healthcare teams responsible for preventing the spread of infectious diseases. Additionally, nurses work on the front lines, providing direct care to people infected with COVID-19 (**Chen, et al., 2020**). Nurses involved in the care of patients with COVID-19 need to be adequately trained, based on sound knowledge and scientific evidence, to be able to provide high quality care to their patients (**Tobin, 2020**).

In the current study, the demographics characteristics of studied nurses revealed that, Majority of the studied nurses were females, which may be due to the fact that the largest nursing department in Egypt is females and their ages ranged from 20 to < 30 years, which might be due to the greater ability of younger nurses to cope with the workload of the Isolation Units. These results agreed with **Elshenawie et al. (2020)** who showed that more than two thirds of the studied nurses were in the 20s to under 30s age group and that more than half of them were females.

According to the present study, less than two-thirds of the studied nurses had graduated from nursing institutes which might be due to the number of degree-diploma schools has declined in recent years due to the trend of shifting nursing education to academia. Less than two-thirds of them had between 5 to < 10 years of nursing experience. These results were not supported by **Nemati et al., (2020)**, a study that showed more than half of the nurses had a bachelor's degree and more than a third of the participants had less than five years of work experience. In addition, the results were not the same as **Saadeh et al., (2020)**, who found that majority of participants had a bachelor's or master's degree.

In relation to sources of information about COVID-19, Majority of the studied nurses stated that, the highest source of information was social media. Possible explanation could be attributed to that younger nurses using social media more frequently for finding information, increasing widespread of technology, and lack of time among nurses for searching information in other sources due to increased workload during crisis. These findings were corroborated by **Nashwan et al., (2021)** who indicated that most of nurses in their study obtained information as regards COVID-19 from social media. Also, these findings were in agreement with **Ho et al., (2020)** who reported that social media was the highest source of information about COVID-19. However, these results were in agreement with **Huynh et al., (2020)** who mentioned that the most common sources of information about COVID-19 were social media and television while the least were seminars and workshops. On the other side, these results weren't consistent with **Albarrak et al., (2019)**, who indicated that the highest main sources of information were seminars and workshops.

In terms of total knowledge before and after the intervention, the present study showed that a high statistically significant difference between the pre-test and the post-test of the studied nurses, also revealed that the mean and the standard deviation of the total knowledge score of the studied nurses after the intervention was 66.96 ± 4.86 compared up to 33.24 ± 17.35 before the intervention phase. The result confirmed the urgent need for an evidence-based intervention program for nurses. From the researchers' point of view, these data reflect the importance of the Evidence Based Guidelines intervention program, which identifies the intervention as the most important independent predictor of improved knowledge.

Mohammed, et al. (2021) in the study entitled "Effect of educational Guidelines Intervention regarding COVID -19 on nurses knowledge and precautionary practices in gastrointestinal endoscopes " goes in the same direction as the present study and showed an

improvement with a statistically highly significant difference between the knowledge the nurses for COVID-19 before/after one month of the educational intervention. Similarly, **Huynh et al. (2020)** "Knowledge and attitude toward COVID-19 among healthcare workers at District Hospital, in Minh City" and found that the majority of HCWs in the district hospital had good knowledge and a positive attitude toward COVID-19 after program intervention.

These results agreed with **Elghiety et al. (2021)** in the study titled "Effect of Instructional Guidelines regarding COVID-19 on Nurses' Knowledge and Practices in Surgical unit" who showed that all nurses achieved satisfactory knowledge in all categories after the educational intervention, compared to the knowledge before intervention over COVID-19. Nurses' knowledge of COVID-19 data improved significantly after the implementation of the instructional guidelines, and there was a significant difference in nurses' knowledge of COVID-19 before and after one month of the introduction of the guidelines. Also, **Zhong et al., (2020)** in the study entitled "Knowledge, attitudes, and practices towards COVID-19 among Chinese residents during the rapid rise period of the COVID-19 outbreak: A quick online cross-sectional survey ". As indicated, most respondents were knowledgeable about COVID-19.

Regarding to nurses' total practices, the finding of the present study indicated that the mean score and standard deviation of total practices score of the studied nurses was improved from pre guidelines implementation to post guidelines implementation. This reflected the success of the Evidence Based Guidelines intervention program and its positive effect. This result might be explained by the fact that, precautionary practices toward COVID-19 is simple, easy to learn, and easy to practice by nurses, and the effect of the educational guidelines.

This results was in harmony with **Sliem et al., (2021)** in the study entitled "Effect of an Educational Guidelines on Nursing Students' Knowledge and Practice Regarding Limitation of COVID- 19" who revealed that, the mean score of studied nursing students' practices regarding limitation of COVID-19 was improved from pre guidelines implementation to post guidelines implementation.

Also, the present study showed that the total score for nurses' practices level in pre-test and post-test showed high statistically significant differences between nurses' practices categories indicating adequate practice after the Evidence Based Guidelines intervention program compared with practice before the guidelines program. This was in the same line with **Abd ElAziz et al., (2021)** in the study entitled "Effect of Nursing Educational Program on Nurses' Knowledge and Practices regarding Pandemic COVID-19 in Isolation Unit" who illustrated that the total score for nurses' practices level in pre-test and posttest showed statistically significant differences between nurses' practices categories indicating adequate practice level after the educational program compared with practice before the educational program. Also the majority of studied nurses were having adequate practices the skills during patients care after the educational program, compared to more than one tenth were having adequate practices level score before the educational program implementation with statistically significant differences.

Teaching programs for nursing staff, according to **Slater et al., (2018)**, play a vital role in assisting staff nurses in developing and enhancing their abilities needed to offer high-quality care to their patients. This was supported by the current study, which found that after implementing the EB Guidelines, nurses' knowledge and practice improved.

In respect to total attitudes towards COVID-19 control and prevention, the current study showed that most of studied nurses were having positive attitude towards COVID-19 control and prevention posttest, while less than two thirds of the them were having negative attitude pre-test. This is related

to the correlation between the nurse's attitude and knowledge which indicates that sufficient knowledge reflects their positive attitude among nurses towards COVID-19. This was a country such as Egypt, where stress and anxiety may occur because basic prevention measures are unavailable, and there is insufficient information about the disease. The knowledge that is a prerequisite for achieving positive attitudes and promoting positive behaviors among nurses are necessary, which helps individuals' cognition to invest a sense towards the infection regarding COVID-19. This parallels **Zhang et al., (2020)** in the study entitled "Knowledge, attitude and practice regarding COVID-19 among health care workers in Henan, China" that found an association between the knowledge level of HCWs about COVID-19 and their attitude.

The current study findings were supported by **Abdel Wahed et al., (2020)** in the study entitled "Assessment of Knowledge, Attitudes, and Perception of Health Care Workers Regarding COVID-19, A Cross-Sectional Study from Egypt" who revealed that an overall positive attitude of HCWs towards COVID-19 as a preventable disease. Furthermore, **Ayed & Mahmoud, (2020)** in the study entitled "Impact of Teaching Program Regarding COVID-19 on Knowledge, Attitudes, Practices among Student" mentioned that there was an improvement in secondary school students' attitudes compared to preprogram knowledge and there was a highly statistically significant difference between pre/post and after one month of program implementation to the secondary school student's attitude regarding COVID-19 .

As regards correlation between total nurses' knowledge, practices, and their attitudes towards COVID-19, the current study findings revealed that there was a highly statistically significant positive correlation between total nurses' knowledge, practices, and their attitudes towards COVID-19 at pre and post intervention. According to researchers' point of view, these results reflected the importance of

integration between knowledge, practice, and attitude, as well as, the effect of evidence based guidelines on improving knowledge, practice, and attitude regarding COVID-19. The present study agreed with the findings of **Elshenawie et al., (2020)** who showed there was positive correlation between knowledge, attitude, and practice of studied nurses regarding safety measures guidelines in caring patients with COVID-19 post-implementation phases. These results were consistent with **Kamate et al., (2020)** who noted that there was a strong relationship between knowledge and practical actions. Moreover, **Saqlain et al., (2020)**, in study about "Knowledge, Attitude, Practice and Perceived Barriers Among Health-Care Professionals Regarding COVID-19", found a positive correlation between knowledge, attitude, and practice, as well as, **Zhang et al., (2020)** cleared that knowledge affects the practice of preventive measures. On the other side, **Huynh et al., (2020)** mentioned that there was a negative correlation between knowledge and attitude scores.

Finally, the results of this study confirmed the research hypotheses that nurses working in Isolation Units who exposed to COVID -19 EB guidelines will have a higher knowledge, practice score, and positive attitude after the test (posttest) than before (pretest).

Conclusion

Concerning the results of the current study, it can be concluded that the implementation of evidence-based guidelines regarding COVID-19 had a statistically significant effect in improving knowledge, practices and attitudes of nurses. Additionally, there was a highly statistically significant positive correlation between nurses' knowledge, practices, and their attitudes towards COVID-19 before and after the intervention, supporting the proposed hypotheses.

Recommendations

Based on the results of the current study, it can be recommended that:

- Develop a regular evaluation system to identify nurses' needs to update their knowledge and improve their practice.
- Regular training programs should be

in place for nurses caring for patients with COVID-19.

- The illustrated developed booklet should be accessible to all nurses caring for people with COVID-19 to use as a reference guide in their practice.
- Further studies with larger sample sizes are needed to achieve greater generalizability.

Limitation of the study:

- 1- Lack of cooperation from some nurses during the data collection phase.
- 2- The psychological aspect in these nurses was affected by pandemic COVID. This affected data collection.

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