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Effect of educational intervention on nurses' perception and performance related to infection control measures of Covid-19 pandemic at the Pediatric Unit

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Abstract

The current Corona virus (COVID-19) pandemic has impacted and changed lives on a global scale since its emergence and spread from China in late 2019. It has caused millions of infections and thousands of deaths worldwide. However, the control of this pandemic still remains unachievable in most countries including Egypt, despite the application of some strict preventive and control measures for pandemic. The aim of the study was to assess perceptions and performance of nurses working at pediatric care units towards the COVID-19 crisis. Subjects and method: A conveniences sampling composed of 80 nurses using a quasi-experimental research design. Two tools were used: sociodemographic characteristic of nurses, structured interview, perception and nurses' performance using observational check list.

The results revealed that after implementation of the educational program significant improvement in nursing perception and decrease in practice in second wave.

Conclusion: nurses have a good knowledge and perceptions and all of the nurses were sure that face mask protect against infection and effectively apply standard infection control measures, while in second wave nurses have good knowledge and they were not strictly apply standard precaution effectively.

Recommendation; it was recommended that nurses should continuously provision of infection control, personal protective equipment and the importance periodic of training of all health care workers on proper infection control measures.

Keywords: Educational Intervention, perception, covid-19, Crisis, personal protective equipment

Introduction

Corona-virus was identified following a cluster of cases in Wuhan, China, in December 2019. WHO designated the disease as corona virus disease and the causative agent severe acute respiratory syndrome corona virus 2 (SARS-CoV-2) in February 2020 [1]. Egypt reported its first confirmed COVID-19 case as the first reported case in Africa [2]. On the 14th of February 2020 and early March, multiple foreign COVID-19 cases associated with travel to Egypt were reported. On the 16th to 25th of March, the minister of aviation decided to close the airport, all restaurants, cafes, nightclubs, public places and prayers in all Egypt's mosques [3, 6]. WHO Regional Office and mission team lead "considerable efforts are made to control outburst in the fields of early detection, laboratory testing, isolation, contact tracing and referral of patients [7]. The WHO recommends prevention of spread by protecting health care workers (HCWs) and patient's close contacts. Primary preventive measures include regular hand washing, social distancing, and respiratory hygiene (covering mouth and nose while coughing or sneezing) [8].

Nurses obtained their information through various social media such as credible websites, WhatsApp, and TV. The widespread use of the internet and its availability to wider sectors of society have made it a primary source of information for the population and nurses. In this regard, the generalized overbreak and high rate transmission in the world might have increased the nurse's attention and knowledge of this pandemic disease [9-11]. On Monday Egypt declared the successful recovery of its first child infected with coronavirus, and his subsequent discharge from the quarantine hospital. Adam Mohamed is a student nine year at the City International School in Zamalek who tested positive for coronavirus earlier this month after being infected from his father and the first A baby girl aged 16 months has died of COVID-19 at an isolation hospital in the Mediterranean city of Alexandria who tested positive for the virus. She had reportedly contracted the contagious disease from her mother, who is a nurse [12, 13].

Children will be classified according to these different grades of severity; Mild cases are either asymptomatic or symptomatic with Leucopenia and/or lymphopenia with no radiological evidence of pneumonia, fever < 38, cough, GIT symptoms, myalgia and arthralgia. Moderate cases include, cough and tachypnea. Severe cases include, O_2 saturation $\leq$ 92% or Pa O_2/FiO$_2$ < 200 despite escalating O_2 therapy to maximal allowed 6 L/min. O_2 saturation $\leq$ 90 % or Pa O_2/FiO$_2$ < 300 at room air. Diagnosis by Nasopharyngeal

swab for PCR, Serum ferritin, D dimer, LDH, and CRP Currently, there are no Food and Drug Administration [14:20]. No specific anti-COVID-19 treatment in children, supportive treatment including sufficient fluid and calories intake, and additional oxygen supplementation should be used [11]. All elite of health care workers are also instructed to have at least surgical mask, decrease the duration of exposure, and away 1–2 meter as possible to decrease risk of infection [8].

The examiner doctor and nurse who will be taking vitals and assessing children's also must follow the standard and droplet precautions during the examination by wearing their personal protective equipment including a respirator facemask, eye protection and gloves for the primary evaluation of all childrens presenting for care until COVID-19 is proved unlikely [9]. Nurses play crucial role so should follow standard precaution as; hand hygiene, cough etiquette, personal protective equipment, clean and disinfect the environmental surfaces, sterile instrument and devices, sharp safety, isolation & safe injection practices [14].

Aims: To evaluate effect of educational intervention on nurses' perception and performance at time of COVID-19 during first and second waves.

Research hypothesis
- Nurses perception were afraid from dangers of disease, transmission, isolation hospital, people and unknown vaccine so
- After implementation of the educational intervention on Nurses' expected to be improving their perception and practice about Covid -19

Design
A quasi experimental design was used.

Setting
The study was conducted in Pediatric isolated rooms at Menoufia University Hospital and Tanta University hospital.

Subject
Conveniences sampling of (80) nurses in Pediatric intensive care unit (40) of them are from Tanta University Hospital and the others (40) are from Menoufia University Hospital after fulfilled the following criteria.

Inclusion criteria
- Age from 18 to 45 years

Tools for data collection: two tools were used to collect the data of the present study: Tool I: structured interview scheduled sheet:-it was included
Part a: - Nurses' Socio demographic assessment tool: it was developed by the researchers to collect information about nurses' age, gender years of experience, level of education, title position, and previous training.

Part b: Nurses' knowledge related to COVID-19 pandemic. It was collected in two waves of the study: It was designed by the researcher and was translated into Arabic language; it consisted of questions about body system affected by

Corona virus, most infect time, incubation period, radiological examination,investigation requirement,clinical manifestation of COVID 19, mode of transmission, methods of prevention and sources of knowledge about Corona virus disease.

Scoring system
The score for each item was calculated as follows
- The correct and Complete answer will be given a score (2).
- The correct and Incomplete answer will be given a score (1).
- The wrong and/or No answer will be given a score (0).

The total score of nurses' knowledge will be calculated and classified into three levels as following:
- Less than 60% will be considered poor knowledge.
- 60- 74% will be considered fair knowledge.
- 75-100 % will be considered good knowledge.

Part c: Nurses' perception related to COVID-19 pandemic.: It was designed by the researcher and was translated into Arabic native language; it consisted of questions about their perception regarding; disease dangerous, fear of transmission to their families, isolation hospital, people, media coverage, a new unknown vaccine and virus, use the personal protective equipment and Hospital transmitting.

Scoring system: Using a three point Likert scale as follow: agree, disagree and undecided, agree give (3), disagree give (2) and undecided give (1)In afraid scale reverse scored and the point (21) and susceptible (9) point. Total scores were ranged from (1-30), Good if the percent ($\geq$75%) of total crying score = $\geq$22 point, fair (60%- < 75%) score =18< 22 point and poor (< 60%) score = < 18point.

Tool II: Nurses practice related to infection control measures observational checklist which includes: Wearing of mask, gown, overhead and shoes, keeping physical distancing in the crowd, frequency hand sanitizer, washed hands with soap after going to a crowded place and changed clothes before any contact with other.

Scoring system for nurses' practice will be as follows:
Done correctly and complete will be score   (1)
Done incorrect or not done will be score   (0)

The total score of nurses' practice will calculate and classified as follow
60 to less than 74 will be considered unsatisfactory practice.
75-100 % will be considered satisfactory practice.

Methods
The study was executed according to the following steps:
1. An official permission to conduct the study was obtained from the responsible authorities Menoufia University Hospital, Pediatric Medicine and Approval number "PED1∕2020"
2. Ethical consideration: nurses were informed about the confidentiality of the information obtained from them, Privacy and she has freedom to complete or not regarding data collection and they give approval.
3. Study tools were developed by researcher based on

review of related literature to assess nurses 'perception and performance about COVID -19.

4. A pilot study was carried out on 10% of nurses to test the tool for its clarity, applicability, feasibility and theses nurses will be excluded from the study and the necessary modification was done.

5. Tools Validity: Tools of data collection were translated into Arabic and investigated for content validity by three juries (two in Pediatric nursing from the Faculty of Nursing, Tanta University, and one of Medicine, Menoufia University who are experts' in such related field and selected to test the content validity of the instruments and to judge its clarity, comprehensiveness, relevance, simplicity, and accuracy. All of the remarks were taken into consideration; some items were re-phrased to reach the final version of the tools.

6. The suitable statistical test was used for testing questionnaire reliability.

7. Tool (Part a, b and c) was filled in the clinical area by the studied nurses in presence of the researcher (Tool I).

8. Nurses' practice assessment tool was completed by Observation checklist and the researcher who was available 2 days per week alternatively in different study settings to assess the actual nurses' performance before(first wave), immediately and one month after implementation of the educational intervention (in second wave) (Tool II).

9. **Field Work**: The following phases were used to achieve the aim of the current study; assessment, planning, implementation, and evaluation phases. These phases were started from the earliest starting point of January, 2020 to December, 2020 covering twelve months

Assessment phase
This phase involved interviews with nurses to collect baseline data, at the beginning of interview; the researchers conducted interview with each nurse, explained the purpose, duration, and activities of the study and obtain written consent. After that a Pre-test was done to assess Socio-demographic data of studied nurses, nurses' knowledge and perception in addition to nurses practice by using pre-test tools (I & II). The average time required for finishing each questionnaire was around (15-30 min.).

Planning phase: Based on baseline data obtained from pre-test assessment and relevant review of literature, the educational program was developed by the researchers as indicated by nurses' level of comprehension in simple Arabic language

Implementation phase: Covid-19 educational intervention program was implemented through sessions. Nurses were divided into 8 groups (10 nurses in each group), the program has taken from 4-5 hours for each group, distributed as the following; three sessions, each session taken from 45-60 minutes, three days/week in the morning shift, and were implemented according to nurses work schedule. These sessions were repeated to each subgroup of nurses. In this way, the program took (4) weeks.

The first session of program focused on the general

knowledge about Covid-19 as the follows (definition, etiology, symptoms, risk factor, treatment & complications).

The second session included knowledge about Covid 19 manifestation, mode of transmission, measures to prevents COVID-19 infection, nurses sources of knowledge about COVID19and treatment.

The third session was related to the proper practice of wearing as followings mask, gown, overhead and overshoes, using of hand sanitizer washing and washing with soap.

The fourth session: health teaching and instruction about COVID 19 standard precaution as; Wear mask, Wear gown, Overhead & Overshoes. Physical distance, Hand sanitizer, Wash hand frequently & Change cloths frequently.

Evaluation phase
Evaluate Covid -19 educational program on nurses'knowledge, perception and performance regarding Covid-19 using Tool 1(part b &c) and Tool II. Each nurse was evaluated pre, immediately and one month after the program implementation by utilizing the same tools of the pre-test.

The data: Collection of data was carried out in one year starting from the beginning of January 2020 to December of 2020.

Statistical analysis: Data collected were organized, tabulated and statistically analyzed using statistical science (SPSS) version 21 for windows. Descriptive statistics were applied (e.g. frequency, percentages, mean and standard deviation). Test of significance, Chi-square "X2", were used to test the study hypothesis. 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 $p < 0.001$. No statistical significance difference was considered when $p > 0.5$.

Results
Table (1): it was reported that nearly two third (32.6% & 32.6%) of the studied group had years of experience ranged between less than 5 years and five years to less than 10 years. Regarding their age, more than half of them (65.8%) were between 20 to less than 40 years with mean &SD (2.33375 ±.50174). most of them (87.5%) were female. Majority of them (92.5%) had no previous training.

Table (2): It was observed that; all nurses (100%) had correct knowledge that the child's respiratory system is affected body system by COVID 19 before, immediately and one month (during the second wave of corona-virus) post implantation of the educational intervention. Regarding infectious time, incubation period, required radiological examination and laboratory investigation; Table 2 illustrated that nurses' knowledge were exactly the same in the pre and immediately post the intervention while it is improved one month post implantation of the educational intervention.

Table (3): It was noticed that most of the nurses 97.5% had correct knowledge about common children manifestation of

COVID 19; Fever, Dry Cough, Sore Throat& Nasal Congestion, Shortness of Breathing in the pre (First wave), which has been increased to 100% of them immediately and decreased slightly to 97.5%related to dry Cough, Sore Throat& Nasal Congestion symptom one month (Second weave) after implementation of the educational intervention. In addition; nurses' knowledge increased regarding to less common manifestation of COVID 19 to 100% correct answers in the second wave; one months after implementation of the educational intervention

Table (4): Represent the nurses' knowledge regarding mode of transmission of covid19; it was observed that all nurses focused on that the mode of transmission is droplet infection in First wave (Before Education), Immediately and Second wave (One months Later) after implementation of the educational intervention, in addition; less than half 45% of them have correct knowledge, which has been increased to 62.5% and 65% of indirect contact as a mode of transmission in the three phases of the assessment and only small percent 10% of them which has been dramatically increasedto majority of them 75% and all of them 100% who have correct regarding the direct contact as mode of transmission of COVID 19 in first wave (Before Education), Immediately and Second wave (One months Later) after implementation of the educational intervention.

Table (5):- This table shows the nurses' knowledge regarding standard precaution of covide-19; it was observed that all nurses had correct knowledge that wash hands, cover of mouth during coughing or sneezing and keep at least one meter distance between every person were most important one in first wave,immediately and second wave one on other hand it was noticed that 26.25 % of nurse had concerned with wearing mask in the first wave improved to 83.75% and 87.5% immediately and second wave respectively.

Table (6): it was observed that most of the nurses (75%, 100%, 61.25%) sources of their knowledge throughout the educational program before (first wave, immediately and after (second wave) were television report.

Table (7): It was observed that the nurses' practice regarding COVID 19 protective measures at pediatric unit was done completely pre the educational intervention (During the first wave) and remains the same immediately after the program them decreased at the second wave either for standard precaution, physical distance, hand sanitizer, wash hands or change cloths frequently.

Table (8): It was observed that there was a significant relation between gender and only total nurses' practice one month post intervention since p =.0.001, in addition same table demonstrated that there was a significant relation between age and total nurses' knowledge and practice pre and one month post the intervention since P value ≥ 0.05 each. Regarding to level of education; highly significant relation was found between nurses' knowledge and practice pre and one month post the intervention since P value ≥ 0.05 each; moreover there was significant relation was found between nurses' title position and their knowledge and practice pre and one month post the intervention since P

value ≥ 0.05 each.

Table (9): Regarding nurses perception were afraid from dangers of disease, transmission, isolation hospital,people and unknown vaccine 88.75%,86.25%,83.75% ,75% and 87.5% respectively and most of them agree that common reasons for their higher susceptibility to infection than others were public not trained and committed to the preventive measures, they not well trained to use the personal protective and Hospital causes for transmitting COVID-19 infection 75%,56.25% and 97.5%respectively. Predictors which increased perception of afraid toward disease were age and Level of education which high significant where P value =.000.also Susceptible to be infected with COVID-19 were age and Level of education which high significant where P value equal to .013 and.003 respectively.

Discussion

In the first wave nurses are the largest group of healthcare workers in the world during the COVID-19 pandemic, nurses have been recognized worldwide as frontline warriors working hard to stem suffering, infection rates and deaths, acute shortages of staff and equipment and work overload, and suggest ongoing tasks that need to be addressed to combat the pandemic's second wave and other possible waves [21].

The current study finding of good knowledge among nurses is in agreement with the findings of. Giao *et al*., (2020) [22] Who stated that 88.4% repondents had enough knowledge regarding COVID-19.Another study found that only 56.5% of participants had sufficient knowledge regarding transmission, symptoms and treatment of COVID-19 Nemati *et al*., (2020) [23]. The current findings provide confidence in terms of the knowledge of pediatric nurses regarding the symptoms, mode of transmission and preventive measures of COVID-19. This is of particular significance in the current scenario when no vaccine exists and research is ongoing so pediatric nurses must be aware of all the updates and take precautions in treating and preventing the infection Alobuia *et al*., (2020) [24]. The total knowledge and practice score was high. In this regard, the generalized over break and high rate transmission of COVID-19 in the world might have increased the nurse's attention and knowledge of this pandemic disease Al-Mohaissen (2017) [25].

The present study in first wave finding that nurses have satisfactory performance toward infection control through personal protective equipment similar to Nemati *et al*.,(2020) [23]. Who found that pediatric nurses had good practice towards the adherence to COVID-19-related infection control principles, which is inconsistent with the findings of the review study on nurses Nasiri *et al*., (2019) [26], which indicated that nurses performed a moderate to poor practice regarding infection control. Moreover, this result confirms the findings of Al-Hanawi *et al*., (2020) [27] study conducted in Saudi Arabia.

Providing Health Care Workers with COVID-19-related training programs as well as with the personal protective equipment and the required practical skills and taking part in online webinars to increase the level of knowledge towards COVID-19 were among the most important clinical

recommendations to improve health care workers towards COVID-19. The clinical recommendations presented are consistent with the results of previous studies Nasiri *et al*., (2019) [26], Sogut *et al*., (2020) [28] and Abdelhafiz *et al*., (2020) [29]. The most important source of information for health care workers to improve knowledge, attitude and practice were social networks. With due attention to the increasing prevalence of the disease and the lack of definitive treatment and since the only way to control the disease is to create social distance and be quarantined, social networks play a substantial role in increasing the level of knowledge towards COVID-19 Courtney (2013) [30], Farnan *et al*., (2013) [31], Wilder and Freedman (2020) [32]. Since the outbreak of the corona-virus, countries have applied various social networks such as Facebook, Twitter, Instagram, and WhatsApp to raise the level of knowledge among HCWs and the general population Elhadi *et al*., (2020) [33] and Sahni and Sharma (2020) [34].

In second wave most of nurses were aware of the clinical symptoms, and system of body affected, sings, system and knew that there is no clinically approved treatment for COVID-19 Viral infections have been documented and Ranges between 5 to percent 10 less use personal protective equipment. It was also reported that the current general population (44%) had less knowledge of when and whom wearing masks to prevent infection. According to the WHO and the central diseases control, faces mask should only be worn by those who are sick or caring for people suspected of having COVID-19 Tork and Mersal., (2018) [35].

These findings highlight the need to continue, promote, emphasize and keeping social distancing to preventing the spread of the virusCOVID-19 and Health workers especially nurses have close contact with infected patients and have a decisive role in infection control.

The present study showed that the awareness of nurses was good regarding COVID-19 infection during the current outbreak so that most of the nurses had good knowledge). Having sufficient knowledge may reflect the successful distribution of information about COVID-19 by different media. This study stat that nurses receive all information through various media such as credible websites, WhatsApp, and TV. The widespread use of the internet and its availability to wider sectors of information for the population and nurses as a member of the population. Similar to this study reported that participants usually obtained their information about infectious diseases through the internet and watching TV Kim and Choi (2016) [36] and Chang (2015) [37]. The total knowledge score was not affected by age and education level and it was not significantly different between nurses with less or more work experience. This result similar to study of Saudi Arabian research on students no significant effect of age and educational level on their information Al-Mohasissen (2017) [25]. In this regard, the generalized over break and

high rate transmission of COVID-19 in the world might have increased the nurse's attention and knowledge of this pandemic disease.

In second wave this study found decrease in specific aspects of knowledge and practice that should be focused on in future awareness and educational campaigns. The findings also stated that HCWs were using less authentic sources for information; this should be addressed immediately as it ultimately affects knowledge and is reflected in attitude and practice. The study recommends that health ministry's should suppply a comprehensive training programme, aiming all HCWs, to improve all precautionary and preventive measures of COVID-19,to achieve equilibrium in terms of clinical knowledge about COVID-19 but the later noted some reluctance in following some recommendations such as the use of a face mask.

In another study stated in China, alot of the participants followed health recommendations and less than 4% went to crowded places or went outside without a facemask Finset *et al*., (2020) [38]. Both governments need to strengthen their health systems, and promote their surveillance activities, to be able to estimate and detect cases, trace contacts, good isolate infected patients and effectively apply standard infection prevention and control measures. Besides, they should continuously provide and save accurate and timely information to their masses.

Table 1: Percentage distribution of nurse's related to their socio-demographic-characteristics

socio-demographic-characteristics	N=80	%
Years of Experience		.
< 5 years	28	32.6%
5 -10 years	28	32.6%
10 - 15 years	20	23.3%
15 - 20 years	24	4.7%
Age		
< 20 years	1	1.2%
20 - 40 years	51	65.8%
> 40 years	28	35%
Mean &SD	2.33375 ±.50174	
Level of education		
Technical degree in nursing	38	47.5%
Bachelor in nursing	36	45%
Master in nursing	5	6.8%
PhD in nursing	1	1.3%
Position		
Staff nursing	60	75%
Technical nursing	16	20
Head of unit nursing	4	5%
Gender		
Male	10	12.5%
Female	70	87.5%
COVID 19 Previous Training		
Yes	6	7.5%
No	74	92.5%

Table 2: Nurses' Knowledge about Covid-19 & Its Effect on Body System Pre, Immediately and One Month Post the Educational Intervention

Nurses' Knowledge of Covid-19	First wave (Before Education)		Immediately		Second wave (One months Later)		P - Value
	Correct		Correct		Correct		
	N	%	N	%	N	%	
Body system affected							
• Respiratory system	80	100%	80	100%	80	100%	-----
• Nervous system	0	0%	0	0%	0	0%	
• Digestive system.	0	0%	0	0%	0	0%	
• Muscular system	0	0%	0	0%	0	0%	
• Genitourinary system	0	0%	0	0%	0	0%	
Most infectious time	48	60%	48	60%	60	75%	.000
Incubation period	40	50%	40	50%	70	87.5%	.000
Radiological examination							
• Time for CT scan chest.	43	53.75	43	53.75	80	100%	.000
Plain x-rays	75	93.75	75	93.75	80	100%	.000
Laboratory Investigation	70	87.5%	70	87.5%	80	100%	.000

*Statistical significant difference ($p<0.05$)
**A highly statistical significant difference ($P \leq 0.001$)

Table 3: Nurses' Knowledge about manifestations of Covid-19 at the Pediatric Unit Pre, Immediately and One Month Post the Educational Intervention

Manifestation of COVID 19 In Children	First wave (Before Education)		Immediately		Second wave (One months Later)	
	Correct		correct		Correct	
	No.	%	No.	%	No.	%
Most common symptoms:						
• Fever	78	97.5%	80	100%	80	100%
• Dry Cough, Sore Throat& Nasal Congestion.	78	97.5%	80	100%	78	97.5%
• Shortness of Breathing	78	97.5%	80	100%	80	100%
• Fatigue &Myalgia	48	60.%	80	100%	58	72.5%
• Nausea or Vomiting	36	45%	68	85%	63	78.75%
• Diarrhea	30	37.5	75	93.75	70	87.5%
Less common symptoms :-						
• Loss of smell and/or taste	80	100%	80	100%	80	100%
• Conjunctivitis	70	87.5%	80	100%	80	100%
• Skin rash	40	50%	80	100%	80	100%
• Anxiety, depression	56	70%	80	100%	80	100%
• Sleep disorders	40	50%	68	85%	80	100%
• Irritability	40	50%	80	100%	80	100%

Table 4: Nurses' Knowledge about Mode of Transmission of Covid-19 at the Pediatric Unit Pre, Immediately and One Month Post the Educational Intervention

Mode of Transmission	First wave (Before Education)		Immediately		Second wave (One months Later)		P Value
	Correct		Correct		Correct		
	No.	%	No.	%	No.	%	
• Droplet infection	80	100%	80	100%	80	100%	----
• Indirect contact	36	45%	50	62.5%	52	65%	.025
• Direct contact	8	10%	60	75%	80	100%	.085
• Fecal-oral route	28	35%	45	56.25%	60	75%	.000

*Statistical significant difference ($p<0.05$)
**A highly statistical significant difference ($P \leq 0.001$)

Table 5: Nurses' Knowledge about Prevention of Covid-19 Virus at the Pediatric Unit Pre, Immediately and One Month Post the Educational Intervention

Prevention Of Covid-19	First wave (Before Education) Correct		Immediately Correct		Second wave (One months Later) Correct	
	No.	%	No.	%	No.	%
Teach &Reinforce Everyday Preventive Action						
• Wash Hands at Least 20 Second	4	5%	50	62.5%	42	52.5%
• Wear A Mask	21	26.25%	67	83.75%	70	87.5%
• Avoid Close Contact.	59	73.7 %	75	93	80	100%
Cover Coughs & Sneezes	80	100%	80	100%	80	100%
Take the Flu Vaccine.	80	100%	80	100%	80	100%
Help The Child Stay Active	60	75%	76	95%	80	100%
Help The Child Stay Socialized	50	62.5%	70	87.5%	70	87.5%
Help the Child Deal With Stress.	70	87.5%	80	100%	80	100%
Vitamin Supplements						
• Vitamin C	80	100%	80	100%	80	100%
• Vitamin D3	80	100%	80	100%	80	100%
• Zinc	80	100%	80	100%	80	100%

Table 6: Sources of Nurses' knowledge about COVID 19 at the Pediatric Unit Pre, Immediately and one Month Post the Educational Intervention

Sources of Nurses' knowledge	First wave (Before Education) Correct		Immediately Correct		Second wave (One months Later) Correct	
	No.	%	No.	%	No.	%
• TV news	60	75%	80	100%	47	61.25%
• Newspapers	12	15%	16	20%	12	15%
• General websites	20	25%	20	25%	34	42.5%
• Website of the Ministry of Health.	49	61.25%	70	87.5%	62	77.5%
• Family members and friends	6	7.5%	10	12.5%	10	12.5%
• Social media: Face book, Tweeter, Instagram	26	32.5%	40	50%	36	45%

Table 7: Nurses' Practice Regarding COVID 19 Protective Measures at pediatric unit Pre, Immediately and One Month Post the Educational Intervention.

Nurses' Practice Regarding COVID 19 Protective Measures	First wave (Before Education) Done completely		Immediately Done completely		Second wave (One months Later) Done completely	
	N0.	%	N0.	%	N0.	%
Standard precaution						
• Wear Mask	80	100	80	100	70	87.5
• Wear Gown	76	95	80	100	62	77.5
• Over Head	70	87.5	80	100	54	67.5
• Overshoes	67	83.75	80	100	47	58.75
• Physical Distance	74	92.5	74	92.5	53	66.25
• Hand Sanitizer	72	90	74	92.5	70	87.5
• Wash Hand Frequently	72	90	78	97.5	70	87.5
• Change Cloths Frequently	74	92.5	78	97.5	42	52.5

Table 8: Relation between Total Nurses Knowledge and Practice with Gender, Age, Level of Education and Title Position.

Variable	Gender		Age		Level of Education		Title Position	
	R	p-value	R	p-value	R	p-value	R	p-value
Total Nurse' Knowledge Pre Intervention	.082	.472	.861	0.00**	.871	0.00**	.780	0.00**
Total Nurse' Practice Pre Intervention	.132	.258	.439	0.00**	.383	.001*	.262	.023*
Total Nurse' Knowledge one Month Post Intervention	.073	.518	.789	0.00**	.844	0.00**	.713	0.00**
Total Nurse' practice one Month Post Intervention	.364	0.001*	.369	0.001*	.332	.003*	.218	.053*

*Statistical significant difference ($p<0.05$)
**A highly statistical significant difference ($P \leq 0.001$)

Table 9: Perception and predictors of nurses toward COVID- 19 disease (N=80)

Nurses perception	Agree		Disagree		undecided	
	N	%	N	%	N	%
Nurses afraid of being infected with Covid -19						
This new dangers disease and not know	71	88.75	7	8.75	2	2.5
fear of transmission of infection to their families	69	86.25	8	10	3	3.75
You fear from entering isolation hospital	67	83.75	7	8.75	6	7.5
You think people are afraid and avoid you as infected person	60	75	8	10	12	15
You think the media coverage about this disease is exaggerated	75	93.75	1	1.25	4	5
It is a new fatal disease with unknown vaccine	70	87.5	4	5	6	7.5
You think this virus was a biological weapon	29	36.25	30	37.5	21	26.25
Nurses susceptible to be infected						
public is not trained and committed to the preventive measures	60	75	15	18.75	5	6.25
not well trained to use the personal protective equipment to protect from infection and not saved	45	56.25	10	12.5	25	31.25
Hospital is suitable for transmitting infection	78	97.5	1	1.25	1	1.25
Predictors of increased perception toward disease	Level of education		Age		Gender	
	p-value	R	p-value	R	p-value	r
Afraid of being infected	-.458-**	.000	-.592-**	.000	.055	.626
Susceptible to be infected	-.325-**	.003	-.275-*	.013	-.126-	.265

*Statistical significant difference (*p*<0.05)

**A highly statistical significant difference (*P* ≤0 .001)

Conclusion
There was appositive correlation between total knowledge scores among studied nurses and total practices scores of nursing intervention for children with covid -19 in first wave but in second about nurses practice decrease

Recommendation
- Improve and update nurse's information and aptitudes about infection control of Covid -19 through going to meetings and workshops.
- Developing arrangement of periodical attendant's assessment to decide techniques for refreshing their insight and improving their training.
- Providing continuous training programs about infection control of Covid -19 and other communicable diseases.

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