

Effect of Mentoring Program on Nurses Interns' knowledge, Attitudes, Safety Practices, and Psychological Readiness Toward COVID-19 Pandemic

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Abstract

COVID-19 was and still one of the most serious global health care burden on patients, families, communities as well as health care workers (HCWs). All HCWs including nurses' interns has more vital role in prevention and caring of this infection. Thus, ongoing training for nurses' interns under the scope of mentoring is a corner stone in continuing effective and efficient nursing care with high quality. **Aim of the Study:** to evaluate the effect of mentoring program on nurse interns' knowledge, attitudes, safety practices, and psychological readiness toward COVID-19 pandemic. **Research Design:** Quasi experimental one group pre/post test research design was adopted. **Setting:** The present study was conducted at different training governmental and private hospitals for nurses' interns. **Subjects:** A convenient sample of 179 out of 335 nurses interns were enrolled in the study. **Tools:** Online web-based electronic self-administrated questionnaires were used for data collection; **I)** Nurses interns' knowledge regarding COVID-19 structured questionnaire, **II)** Nurses interns' attitudes regarding COVID-19 structured questionnaire, **III)** Nurses interns' safety practices towards COVID-19 observational checklist, and **IV)** Depression Anxiety Stress Scale (DASS-21)". **Results:** statistically significant improvement in nurses' interns' knowledge, attitudes, safety practices levels and psychological readiness toward COVID-19 after conducting mentorship program. **Conclusion:** Mentorship program positively affects nurses' interns' levels of knowledge, attitudes, and safety practices as well as psychological readiness **Recommendation:** Incorporates the mentoring program within nurses' internship training program as a basic tool of training, to provide continuous support and ongoing evaluation of nurses' interns' knowledge, attitudes, safety practices and psychological readiness.

Keywords: COVID-19 pandemic, nurses' interns, mentoring program, Safety Practices, Psychological Readiness

Introduction

Coronavirus disease of 2019 (COVID-19) is a relatively recent well-known acute viral respiratory infection caused by the most newly discovered coronavirus member. Its outbreak began in Wuhan, China, in December 2019. COVID-19 became pandemic as announced by World Health Organization (WHO) on 11th of March 2020 (WHO, 2020). COVID-19 has been confirmed in 154,098,279 cases worldwide, with 3,224,709 deaths and 131,412,537 recovered cases, according to the World Meter (May 2021). (World Meter, 2021).

COVID-19 has unique characteristics of having unclear pathogenicity and highly transmissibility which may be the major cause that make it more difficult to control worldwide. Currently, some clinical trials for COVID-19 vaccine are announced, its medical treatment is mainly symptomatic and preventive for the common complications. Accordingly, the vital role of all HCWs as they are the frontline of contacting and caring of COVID-19 patients either in primary health care setting or in hospital became more and more crucial. (Fernandez, et al., 2020) (Nemati, et al., 2020) (Aksoy & Koçak, 2020).

World Health Organization (September 2020) reported that around 14% of COVID-19 cases globally

are among health workers, and in some countries, it's as much as 35% (WHO, 2020). In Egypt, the Ministry of Health and Population on 14 February 2020, announced the first infection of COVID-19 (Medhat, 2020). There were 750 verified cases and 56 deaths among health-care professionals in October 2020. (Erdem, 2021).

Pandemic of COVID-19 was and still one of the most serious global health care burden on patients, families, communities as well as health care workers (HCWs). This burden is not only physical but psychological, social, and financial as well (Temsah et al, 2020). All HCWs are at a great risk of exposure to different highly infectious pathogens while they are caring of patients, patient's environment and during different health care activities mainly in basic bedside nursing care of infected patients side by side with their possibility to transmit infection to their families unintentionally including COVID-19 infection. HCWs usually includes fresh graduates and experienced staff with different clinical experience and training (Hammen, 2018), (Zhang, Zhou, Tang, Wang, Nie, et al, 2020).

Generally, HCWs including nurses' interns are at a significant risk of adverse mental health outcomes during the COVID-19 outbreak. (Hammen, 2018), (Zhang, et al., 2020). Psychological reactions to this pandemic include emotional distress, maladaptive behaviors, and

defensive responses. (Taylor, 2019). Unfortunately, hospital experience can be a highly stressful experience to patient, family, community, HCWs and the administrative authorities which may be a possible cause of adverse mental health. (World Health Organization, 2020). In this respect Zandifar & Badrfam, (2020) highlighted the role of unpredictability, uncertainty, seriousness of the disease, misinformation, and social isolation in contributing to stress and mental morbidity. This exhausting experience can cause negative impact on HCWs and nurses' interns unless it is managed properly. Therefore, poor management can accelerate feeling of anxiety, fear or depression and may affect quality of work of HCWs and nurses' interns. (World Health Organization, 2020).

The need to assure an ongoing supply of competent nurses who are prepared to practice in primary health care, acute care settings, or hospitals and who will remain in those settings requires a change in how new graduate nurses are transitioned into professional nurses (Sana A. Al-Mahmoud, 2013)

Furthermore, nursing students and interns who are the future nurses faces many challenges regarding training during COVID-19 pandemic where it may be the first experience with such critical situation where the outbreak is global not only within the Egyptian community but among all the health care workers worldwide. Hence, the need of ongoing training is a major source of prevention of COVID-19 as well as effective dealing with this crisis as mentioned in studies conducted in hospital by Devrim & Bayram (2020) and Olum, et al., (2020). They emphasized the importance of developing comprehensive tailored training and mentoring program to improve knowledge, attitudes and practices regarding COVID-19.

Thus, ongoing training for nurses' interns is a corner stone in continuing effective and efficient nursing care with high quality. This training under the scope of mentoring (guiding) gives positive effect mainly during this COVID-19 pandemic in which clinical experience is transmitted from the more expert (mentors) to the novice (mentees) to enrich their experience. Mentoring enhances the actual day to day clinical experience of the novices by increasing their knowledge, improve practices as well as attitudes and strengthening interns' psychological readiness (Stirling, 2015). Along the same line, Bao, et al., (2020) & Ho, et al., (2020) illustrated a list of effective strategies to minimize outbreak-related consequences including assessment and evaluation of the accuracy of information, competency of skills, enhancing social support, reducing stigma and negative attitude associated with the disease, maintaining as normal life as feasible while adhering to safety measures, and use of available psychosocial services. Such methods would empower nurses' interns to handle the COVID-19 outbreak in an adaptive manner. The more the nurses' interns became more knowledgeable and skillful, the more they integrate positive attitude and

psychological readiness during COVID-19 pandemic inside the hospitals or outside in the community.

Mentorship allows opportunity for nursing interns to learn critical thinking, clinical judgment and decision-making side by side with the manual skills especially in the new experience of caring of COVID-19 pandemic. Mentoring also provides immediate evaluation which improve patients care, decrease risk of infection, and improve problem-solving abilities.

Bridging the gap between theory and reality in the actual situation can be easily achieved by proper applying of mentorship program. Mentorship also creates strong mutual support during this clinical experience either physically or psychologically and even socially between mentors and mentees where the experience, reasoning and practice are mixed with power, motivation, eagerness, and learnability of the novices. This perfect mix is advantageous for both experienced and novices' nurses, patients, health institution and the whole community (Alzahrani, 2014, (Foster, et al., 2015 and Nowell, et al., 2017).

For effective mentoring practice, mentor and mentee should have the minimum competence in role-specific knowledge, skills, and attitudes to achieve the required standard academic goals (Agarwal, 2020). Conclusively, because COVID-19 pandemic infection, almost all interns will be in close contact which expose them to the risk of getting the infection. Now, more than ever, nurses interns need the support of mentors to deal with the unique features of the COVID challenge. Mentoring can lead to improved and enhanced clinical competence for future hospital and community health nurse who often function in very independent and diverse roles. Also, the role mentoring plays for community health nurse becomes critical to the future of the public health system. (Linda S. Smith, et al. 2001)

Prevention of infection and proper caring depends on comprehensive updated knowledge, attitudes, skillful practices, and psychological readiness. Consequently, training by mentoring magnificent method to achieve these qualities.

Aim of the study

This study aimed to:

Evaluate the effect of mentoring program on nurses' interns' knowledge, attitudes, safety practices, and psychological readiness toward COVID-19 pandemic.

Research hypothesis:

Nurses' interns who engage in mentoring program demonstrate higher level of knowledge, attitudes, safety practices, and psychological readiness toward COVID-19 pandemic after program implementation than before.

Materials & Methods

Materials

Research design:

Quasi experimental one group pre/post-test research design was adopted to conduct this study.

Setting:

The present study was conducted at different training governmental and private hospitals for nurses' interns including National Medical Institution at Damanhour, Albeheira Governorate, Andalusia hospitals, Mabaret Al-Asafra hospitals, and International cardiac Center (ICC) hospital at Alexandria Governorate, 57357 Children's Cancer Hospital Foundation at Cairo Governorate, and Magdi Yacoub Heart Foundation Aswan Heart Center at Aswan Governorates.

Subjects:

A convenient sample of nurses' interns who starting their internship year (2020/2021) in the previously mentioned setting in September 2020.

The nurses' interns included in the study fulfilled the following eligibility criteria:

1. Those did not attend any mentoring/ training program about COVID 19 prior to the study.
2. Students who were currently on work site.
3. Willing to participate in the study.

Sample size:

The representative target sample size needed to achieve the study aim and sufficient statistical power, was calculated with Epi Info Program version 7. The sample size calculator arrived at minimum size=179, using a margin of error of 5 %, a confidence level of 95%, a 50% expected frequency, and 335 population size.

Tools: The four tools described below were used to collect the necessary data for the study: -

Tool I "Tool I: Nurses interns' knowledge about COVID-19 self-administered questionnaire: It includes two parts as follows: -

Part I: "Nurses interns' personal data" It included questions regarding age, gender, current hospital for training, previous private work, exposure to COVID-19 infection, possible causes of this infection, and sources of information about COVID-19.

Part II: "Nurses interns' knowledge regarding COVID-19" structured questionnaire sheet, it was adopted from Olaimat, Aolymat, Shahbaz, Holley (2020). It composed 50 items that covered students' general knowledge about Covid 19, high risk groups, mode of transmission, manifestations, screening, diagnostic measures, case management, care of contact and family home care, isolation, treatment regimen, complications, and protective behaviors. A score of 1 was assigned to the correct answer for each knowledge item, while a score of 0 was assigned to the incorrect or unknown response.

Scoring system: The overall knowledge score ranged from **0 to 50**, with the following levels:

1. Unsatisfied knowledge level: (< 37.5) (< 75%),
2. Satisfied knowledge level: (≥ 37.5) ($\geq 75\%$).

Tool II: "Nurses interns' attitudes regarding Covid-19" structured questionnaire sheet, it was adopted from Al-Hanawi, Angawi, Alshareef,

Qattan, Helmy, Abudawood et al., (2020)., This tool contains 13 items with responses on a 5-point likert scale ranging from strongly disagree (1 point) to strongly agree (5 points). The total attitude score ranged from **"1 to 65"**, with the following levels:

1. Negative attitude: (< 32.5) (<50%),
2. Positive attitude: (> 32.5) ($\geq 50\%$).

Tool III: Observational checklist for students' practices related to COVID-19:

It was adopted from World Health Organization, (2020) for infection control practices of COVID-19, it consisted of two parts:

Part I "Nurses' interns' Infection prevention and control (IPC) practices"

The mentors used this observational checklist to assess the studied nurses' interns' COVID-19 prevention and infection control measures, which included donning and removing personal protective equipment, isolation measures, hand washing, cleaning and disinfection of surfaces, and waste management.

Scoring system: This part was graded based on ten questions. The following were used to categorise and score each item: always, as recommended = 3, most of the time = 2, occasionally = 1, or rarely = 0.

Each student was assessed twice using the observational checklist, with an average score computed. The total score for Nurses interns' infection prevention and control (IPC) practices ranged from **0 to 30**. After that, it was levelled as follows:

1. Incompetent practices level (< 22.5) (<75%),
2. Competent practices level (≥ 22.5) ($\geq 75\%$).

Part II "Nurses' interns personal and social practices" also contains nine questions completed by the interns related to their personal and social safety practices and behaviors, including (a) going to social events with large numbers of people, (b) going to crowded places, (c) avoiding cultural behaviors, such as shaking hands (d) practicing social distancing, (e) washing hands after sneezing, coughing, nose-blowing, and, recently, being in a public place.

Scoring system: Each item was categorized and scored into either done correctly =2, done incorrectly =1 or not done =0 .

The total score for Nurses' interns personal and social practices ranged from **0 - 18** and classified into two levels:

1. Unsatisfied practices level (< 13.5) (<75%),
2. Satisfied practices level (≥ 13.5) ($\geq 75\%$).

The total score for **part I and Part II** ranged from **0 – 48**.

Tool IV: "Depression Anxiety Stress Scale (DASS-21)" structured questionnaire sheet:

The Depression, Anxiety and Stress Scale - 21 Items (DASS-21) is a set of three self-report scales designed to measure the emotional states of depression, anxiety and stress and was developed by Lovibond & Lovibond (1995). The scale was adopted by the researchers to assess depression, anxiety, and stress among studied interns. The depression scale evaluates

symptoms like dysphoria, hopelessness, self-worthlessness, and lack of interest, while the anxiety scale assesses somatic symptoms, situational anxiety, and the subjective experience of anxious affect, and the stress scale evaluates a state of persistent arousal and tension that includes symptoms like difficulty relaxing, agitation, irritability, and impatience. The rating scale is summarized as follows:

- "0" Did not apply at all "Never".
- "1" Applied to some of the time or some degree "Sometimes".
- "2" Applied to a good part of time, or a considerable degree "Often".
- "3" Applied most of the time, or very much "Almost Always".

Scoring system: Negative mood symptoms can be evaluated according to the table below:

Negative mood symptoms	Level	Total score		
		Depression	Anxiety	Stress
Symptomatic level	Absent	0-9	0-7	0-14
	Mild	10-13	8-9	15-18
	Moderate	14-20	10-14	19-25
Comorbid level	Severe	21-27	15-19	26-33
	Extremely severe	28+	20+	34+

Methods

An official approval to conduct the study was obtained from the Dean of the Faculty of Nursing, Damanhour University.

Preparation of study tools:

1. Tools were designed by the researcher after thorough review of literatures based on World Health Organization, the Center for Disease Control and Prevention (CDC), Zhong, et al., (2020), and the Egypt Ministry of Health. to collect the required data.
2. Tools were checked and validated for content and relevance by a jury of five experts in medical-surgical nursing, community health nursing and psychiatric nursing; their opinions and suggestions were taken into consideration.
3. Pilot study was carried out on 10% of the sample (N=18 nurse interns) who were chosen randomly out of the sample to assure the clarity, applicability, and comprehension of the study tool, to estimate average time needed to collect the required data, and to identify obstacles that may be encountered during data collection. Accordingly, the necessary modifications were done.
4. The internal consistency of the study tools was assessed by calculating the Cronbach alpha. The values were 0.864 (knowledge section), 0.793 (attitudes section), and 0.730 (safety practices section), and for psychological readiness (stress = 0.852, anxiety= 0.835, and depression = 0.837) to ensure tools reliability.
5. Data was collected between first of August 2020 till the end of February 2021.

Mentoring program was conducted through the following phases as follows:

A. Assessment phase:

1. Given the physical and social distancing measures and restricted movement and lockdowns, data were collected using online web-based electronic (Microsoft form) self-administrated questionnaires (tool I, II, tool III part II, and IV),

Data for tool III part I were collected by the mentors using observational checklist during the clinical training at hospital.

2. A link was created and distributed to subjects via Microsoft team chat and WhatsApp groups of nurses interns. The subjects were invited to complete and submit it after explaining the purpose of the study.
3. Assessment took place for one week.

B. Preparation phase:

1. The mentoring program was developed by the researchers based on results of assessment as well as characteristics of subjects and their needs, and after extensive review of the related literature (Hammen, 2018, Zhang, et al., 2020, World Health Organization, 2020, Stirling, 2015, Bao, et al., 2020 & Ho, et al., 2020). Also, program ascertained through coordination with experts in different nursing specialties (medical-surgical, critical care and emergency, pediatric and obstetric, psychiatric, community and nursing education).
2. The educational material of the program prepared
3. Mentors were chosen based on personal and professional characteristics to be part of mentoring program. These qualities are necessary for mentors to perform in a way that supports and nurtures young professionals, as well as to feel satisfied and intend to stay in the role.
4. At the first two weeks of August 2020, the researchers and previously chosen mentors started online meeting to explain the purpose of the program for mentors and clarifying their role in conducting it. As well as, to discuss mentorship aspects and exchanging experience and educational materials about COVID-19 pandemic.
5. Also, mentors attended three COVID -19 workshops with researchers as a preparation for the program.

C. Implementation phase:

The mentorship program was implemented in **four phases** namely: **Initiation, planning, development, and closure and separation** over six months as follows:

1. Initiation

At the third week of August, both mentors and mentees attended an extensive online orientation session, which involved the initial introduction of mentoring program, ice-breaking activities, a brief description of the program. The orientation covered the following activities:

- Identifying learning goals
- Establishing commitments and expectations
- Clarifying roles for both mentors and mentees
- Pairing or matching of mentors and mentees: the students were divided into small groups, each group constituted of 20 students approximately. Each one of previously trained mentors was assigned to each group of students to facilitate students' guidance, follow up, and support.
- Take time to get to know each other before begin working together.

2. Planning: During the last week of August, both mentors and mentees attend live event presentations via online Microsoft team meetings. The educational training was delivered for all studied subjects on five days from 10 am to 3 pm. All educational materials as PDF articles, power point presentation and videos were sent for the mentees via their academic e-mails.

A. The training covered the following topics:

- I. Mentoring program basics, essential mentorship aspects, communication, and employability.
- II. COVID-19 Awareness, which include:
 - Definition, pathology, manifestation, transmission, treatment, nursing care, complication COVID -19.
 - Proper dealing with patient with Covid-19 or suspected patients in the different nursing specialties mainly medical-surgical, intensive care-pediatric and obstetric units.
 - Infection prevention and control (IPC) measures towards the COVID-19 in clinical areas including using personal protective equipment safely (donning and doffing), isolation measures, frequency of performing hand hygiene in different procedures, cleaning and disinfection of surfaces and wastes management. In addition to, the personal and social safety practices.
 - The training also covers psychological aspects of dealing with patients infected with Corona virus, students' common fears, anxiety, and emotional reactions toward this critical period of their live and how to cope effectively with it.

B. Additionally, mentors and mentees participated in the following activities:

- Establishing mentor and mentee needs and desires
- Assisting mentees with goal setting:
 - Write down the mentees' short and long-term goals.
 - Make a list of skills the mentees want to work on.
- Structuring the mentoring relationship (frequency of meeting, time, place, events).

- Establishing communication strategies.
- Identify each person's rights and responsibilities.
- Review the plan together and have both parties sign it.

3. Development: This phase lasted 5 months at the training hospitals.

I. Ensuring on-going communication by engaging in the following activities:

- Each mentor scheduled to meet their assigned mentees once a week for an hour in hospital, with a specific focus on helping mentees work towards clinical COVID-19 safety practice goals as identified in the COVID-19 training.
- All nurses' interns' questions were answered, and ongoing psychological support was provided by each mentor to their mentees through online meeting, face to face communication, WhatsApp groups, Facebook chats, posts, and audios.
- Several WhatsApp groups were created for mentees and their assigned mentors. In addition to YouTube channel of internship and all educational materials about COVID-19, videos, and supporting messages were available on these groups.
- The researchers follow up the WhatsApp groups to make sure that the used materials (videos, power-point, and pdf presentations were distributed, and be available all the period of training program for interns.

II. Provide suitable feedback to them to help them achieve their desired learning goals.

III. Follow up was carried out throughout the week by mentors to guide the interns with the needed instructions, proper practices, and effective dealing with challenging psychological situations.

IV. Resending all the updated related materials every two months for refreshment, masculinization and to orient the students with what is new in the field through the same channels.

V. Monthly evaluation for the mentees was done to check on their progress.

4. Closure and Separation:

- Reviewing accomplishments and achievements
- Assessing the next phase of activities and possibilities
- Identify areas of growth and learning

D. Evaluation phase conducted at the end of February 2021 as follows:

1. Reassessment was to determine the effect of COVID 19 mentoring program on nurses' intern knowledge, attitudes, safety practices and psychological readiness using the same tools as in the pre-program tests.
2. After completing pretest and posttest of data collection, the necessary statistical analysis was done.

Ethical consideration

- Before embarking on the actual study, online informed consent was obtained from the nurses

intern to participate in the study and before proceeding with the questionnaire. On the first page of the online questionnaire, subjects were clearly informed about the background and objectives of the study. Their rights to withdraw from study at any time, without any drawbacks,

- Confidentiality and privacy were maintained.

Statistical analysis of the data

Data were fed to the computer and analyzed using IBM SPSS software package version 20.0. (Armonk, NY: IBM Corp) Qualitative data were described using number and percent. The Kolmogorov-Smirnov test was used to verify the normality of distribution. Quantitative data were described using mean and standard deviation. Significance of the obtained results was judged at the 5% level.

The used tests were:

- 1- **Chi-square test:** For categorical variables, to compare between different groups.
- 2- **Fisher's Exact or Monte Carlo correction:** Correction for chi-square when more than 20% of the cells have expected count less than 5.
- 3- **McNemar and Marginal Homogeneity Test:** Used to analyze the significance between the different stages.

4 –Wilcoxon signed ranks test: For abnormally distributed quantitative variables and to compare between two periods.

5 - Spearman coefficient

To correlate between two distributed abnormally quantitative variables.

Results

(Table 1) displays the distribution of the studied subjects according to their personal data. Out of 179 nurses' interns who participate in the study, more than half (52.0%) of them were ≥ 23 years with mean age of 22.61 ± 0.90 . Concerning their gender, 58.7% were female and 41.3% were male. Regarding their current hospital for training, more than half (59.2%) of the participants were in private hospitals while 40.8% of them attend their training in governmental hospital. More than three quarters (79.3%) of the interns had not been exposed to the COVID 19 infection, compared to only 20.7% of them had been exposed. Regarding interns who exposed, 12.8% of them their point of view about the causes for infection were work stress and lack of rest followed by 8.9% reported that prolonged exposure to large numbers of infected patients were the cause for getting infection.

Table (1): Distribution of the studied subjects according to their personal data (n =179)

Personal data	No.	%
Age		
Age (years)		
<23	86	48.0
≥ 23	93	52.0
Min. –Max.	21.0 – 25.0	
Mean \pm SD.	22.61 \pm 0.90	
Gender		
Male	74	41.3
Female	105	58.7
Current hospital for training		
Governmental	73	40.8
Private	106	59.2
Previous private work		
No	81	45.3
Yes	98	54.7
Duration of previous private work	(n = 98)	
Less than one year	40	40.8
One to 2 years	30	30.6
Three years or more	28	28.6
Have been exposed to the COVID 19 infection?		
No	142	79.3
Yes	37	20.7
If you have been exposed to COVID 19 infection - from your point of view, what was the cause?#		
Not applicable	142	79.3
• Handling of patients whose case of COVID-19 has not been announced	15	8.4
• Prolonged exposure to large numbers of infected patients	16	8.9
• Work stress and lack of rest	23	12.8
• Contact with family and relatives - in the community outside the hospital	4	2.2
• State of weakened immunity, such as pregnancy or chronic disease	4	2.2
• Students' nonadherence to infection prevention and control measures.	7	3.9
• Insufficient supplies of personal protective equipment	9	5.0

Multiple answers.

Regarding participants' sources of information about corvid-19, the results indicated that the main source of information about COVID-19 was social media (73.2%), followed by doctors and nurses (67.6%). Unsurprisingly, 36.3% of the studied subjects used scientific websites as world health organization (WHO) and articles as a source of information about COVID-19 (Figure 1).

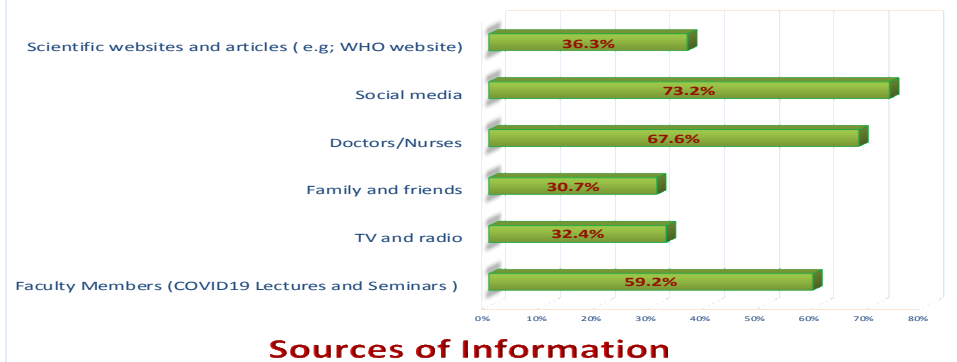


Figure (1): Distribution of the studied subjects according to their sources of information about COVID 19 (n =179)

Table (2) shows the nurses' interns' knowledge levels regarding COVID 19 before and after the implementation of the program. Regarding people at risk for COVID 19 infection, 34.6% of the studied subjects had satisfied knowledge at pre -program phase, while this percent elevated to 69.8% post program with a statistically significant difference between the two phases (McN p <0.001).

Concerning the protective behaviors to avoid COVID19 infection, 43.6% of the participants had unsatisfied knowledge and declined to 12.3% after the program with a statistically significant difference between the two phases (McN p <0.001).

Referring to the mode of COVID-19 transmission, the table shows that 11.7% of the interns have satisfied knowledge pre-program and elevated to 72.1% post program. with a statistically significant difference between the two phases (McN p <0.001).

Additionally, the results denoting that 68.7% of the interns had satisfied knowledge about manifestations and course of COVID-19 after the program in comparison to 31.8% of them before the program. with a statistically significant difference between the two phases (McN p <0.001).

Likewise, the results revealed that improvement was noticed in the knowledge level of the interns regarding treatment and complications of COVID-19 infection (72.6%, 83.8% had satisfied knowledge) respectively after the program. with a statistically significant difference between the two phases (McN p <0.001).

Conclusively, an obvious improvement in the interns' total level of knowledge was noticed, as more than one fifth of them (11.7%) in pre-program with percent score of 55.73 ± 16.31, while 78.8% in post program with percent score of 81.43 ± 10.77, had satisfied level of knowledge, with a statistically significant difference between the two phases (McN p <0.001).

Table (2): Distribution of the studied subjects according to their knowledge levels regarding Covid-19 pre and post program (n = 179)

Knowledge level	Pre		Post		P
	No.	%	No.	%	
People at Risk for COVID-19	(0 –5)				
Unsatisfied knowledge (<75%)	117	65.4	54	30.2	McN _p
Satisfied knowledge (≥ 75%)	62	34.6	125	69.8	<0.001*
Total Score.	2.87 ± 1.12		3.72 ± 0.81		z _p <0.001*
Mean score	0.57 ± 0.22		0.74 ± 0.16		
% Score	57.43 ± 22.34		74.41 ± 16.29		
Protective behaviors	(0 –8)				
Unsatisfied knowledge (<75%)	78	43.6	22	12.3	McN _p
Satisfied knowledge (≥ 75%)	101	56.4	157	87.7	<0.001*
Total Score.	5.42 ± 1.72		6.61 ± 0.95		z _p <0.001*
Mean score	0.68 ± 0.21		0.83 ± 0.12		
% Score	67.81 ± 21.44		82.61 ± 11.87		
Mode of COVID-19 transmission	(0 –11)				
Unsatisfied knowledge (<75%)	158	88.3	50	27.9	McN _p
Satisfied knowledge (≥ 75%)	21	11.7	129	72.1	<0.001*
Total Score.	5.99 ± 2.07		9.32 ± 1.83		z _p

Knowledge level	Pre		Post		P
	No.	%	No.	%	
Mean score	0.54 ± 0.19		0.85 ± 0.17		<0.001*
% Score	54.44 ± 18.78		84.76 ± 16.60		
Manifestations of COVID-19	(0 –14)				
Unsatisfied knowledge (<75%)	123	68.7	57	31.8	McN _p
Satisfied knowledge (≥ 75%)	56	31.3	122	68.2	<0.001*
Total Score.	8.32 ± 3.35		11.34 ± 1.99		z _p <0.001*
Mean score	0.59 ± 0.24		0.81 ± 0.14		
% Score	59.42 ± 23.94		80.97 ± 14.18		
Treatment of COVID-19	(0 –5)				
Unsatisfied knowledge (<75%)	155	86.6	49	27.4	McN _p =
Satisfied knowledge (≥ 75%)	24	13.4	130	72.6	0.001*
Total Score.	1.92 ± 1.33		3.72 ± 1.34		z _p <0.001*
Mean score	0.38 ± 0.27		0.74 ± 0.27		
% Score	38.44 ± 26.69		74.41 ± 26.82		
Complications of COVID-19 infection	(0 –7)				
Unsatisfied knowledge (<75%)	154	86.0	29	16.2	McN _p
Satisfied knowledge (≥ 75%)	25	14.0	150	83.8	<0.001*
Total Score.	3.34 ± 1.88		6.01 ± 1.21		z _p <0.001*
Mean score	0.48 ± 0.27		0.86 ± 0.17		
% Score	47.73 ± 26.92		85.79 ± 17.30		
Total Knowledge level regarding Covid-19.	(0 – 50)				
Unsatisfied knowledge (<75%)	158	88.3	38	21.2	McN _p
Satisfied knowledge (≥ 75%)	21	11.7	141	78.8	<0.001*
Total Score.	27.87 ± 8.15		40.72 ± 5.39		z _p <0.001*
Mean score	0.56 ± 0.16		0.81 ± 0.11		
% Score	55.73 ± 16.31		81.43 ± 10.77		

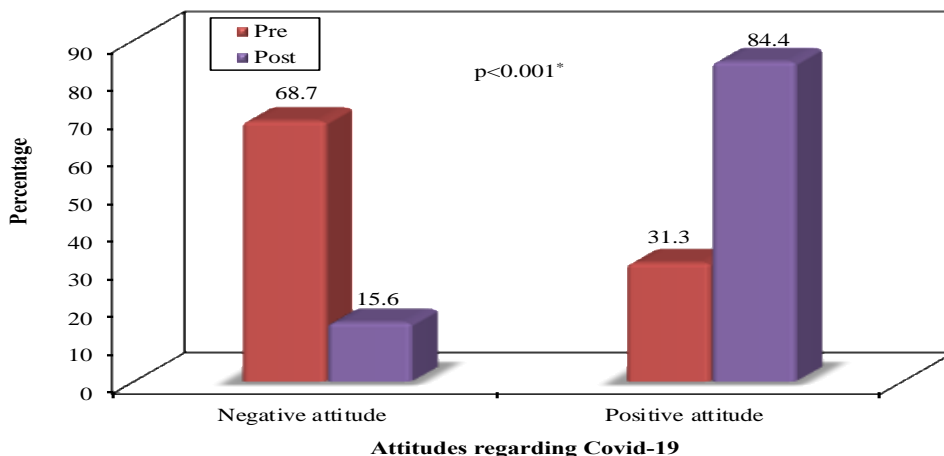
McN: McNemar test

Z: Wilcoxon signed ranks test

p: p value for comparing between the pre and post

*: Statistically significant at p ≤ 0.05

A statistically significant difference was found in relation to studied subjects’ attitudes levels regarding Covid-19 infection in pre and post program phases (p <0.001), as 31.3% of nurses interns had positive attitude in pre-program phase while this precents increased to 84.4% of them in post program phase. **Figure (2)**



Z: Wilcoxon signed ranks test

p: p value for comparing between the pre and post

*: Statistically significant at p ≤ 0.05

Figure (2): Distribution of the studied subjects according to their attitudes’ levels regarding Covid-19 pre and post program (n = 179)

Table (3): Portrays the distribution of the studied subjects according to nurses’ interns’ safety practices pre and post program. In respect to nurses’ interns’ total practices level, a remarkable improvement was noticed among the studied subjects through the stages of the study. Less than one fifth (9.5%) of them had competent practices in the pre-program stage while 71.5% had competent practices level in post program with a statistically significant difference between the two phases (McN_P=0.063).

Regarding the use of personal protective equipment to avoid COVID19 infection, the majority of the participants (85.5%) had incompetent practices pre-program and declined to 16.8% after the program with a statistically significant difference between the two phases ($^{McN} p < 0.001$).

About the nurses' interns' IPC clinical practices, the table shows that 43.6% of the interns had competent practices pre-program and elevated to 71.5 % post program with a statistically significant difference between the two phases ($^{McN} p < 0.001$).

Also, results denoting that 73.7% of the interns had satisfied personal and social safety practices after the program in comparison to 41.3% before the program with a statistically significant difference between the two phases ($^{McN} p < 0.001$).

Table (3): Distribution of the studied subjects according to safety practices pre and post program (n = 179)

Nurses Interns' safety practices regarding Covid-19	Pre		Post		P
	No.	%	No.	%	
Part I (Total score = 0 – 30):					
1. Use and replace of personal protective equipment. (0 – 12)					
Incompetent practices level (<75%)	153	85.5	30	16.8	$^{McN} p = 0.063$
Competent practices level ($\geq 75\%$)	26	14.5	149	83.2	
Total Score.	5.51 \pm 2.39		8.85 \pm 2.12		$z_p < 0.001^*$
Mean score	1.38 \pm 0.60		2.20 \pm 0.53		
% Score	45.95 \pm 19.94		73.75 \pm 17.67		
2. Nurses Interns' IPC clinical practices. (0 – 18)					
Incompetent practices level (<75%)	101	56.4	51	28.5	$^{McN} p < 0.001^*$
Competent practices level ($\geq 75\%$)	78	43.6	128	71.5	
Total Score.	12.10 \pm 3.53		14.61 \pm 2.63		$z_p < 0.001^*$
Mean score	2.02 \pm 0.59		2.42 \pm 0.45		
% Score	67.23 \pm 19.61		81.21 \pm 14.61		
Part II (Total score = 0 – 18):					
3. Nurses Interns' personal and social safety practices. (0 – 18)					
Unsatisfied practices level (<75%)	105	58.7	47	26.3	$^{McN} p = 1.000$
Satisfied practices level ($\geq 75\%$)	74	41.3	132	73.7	
Total Score.	4.20 \pm 1.32		4.51 \pm 1.40		$z_p < 0.001^*$
Mean score	0.70 \pm 0.22		0.75 \pm 0.23		
% Score	70.02 \pm 22.02		75.12 \pm 23.33		
Total practices levels (Total score = 0 – 48)					
Incompetent practices level (<75%)	162	90.5	51	28.5	$^{McN} p < 0.001^*$
Competent practices level ($\geq 75\%$)	17	9.5	128	71.5	
Total Score.	21.82 \pm 4.86		27.97 \pm 4.40		$z_p < 0.001^*$
Mean score	1.34 \pm 0.36		1.79 \pm 0.29		
% Score	61.07 \pm 12.32		76.69 \pm 13.13		

McN: McNemar test Z: Wilcoxon signed ranks test

p: p value for comparing between the pre and post

*: Statistically significant at $p \leq 0.05$

Figures (3,4,5) illustrate the distribution of the studied subjects regarding their stress, anxiety, and depression levels pre and post program. **Figure (3)** presents that 15.1%, and 16.2 of the nurses' interns suffered from a moderate or severe level of stress respectively in the pre-program phase, while these percentages declined to 13.4%, 11.7% in the post program phase with a statistically significant difference between the two phases ($^{McN} p < 0.001$).

Concerning anxiety level, results revealed that 26.8 % of the nurses' interns suffered from extremely severe anxiety in the pre-program phase, while it decreased to 16.2% in the post program phase with a statistically significant difference between the two phases ($^{McN} p < 0.001$). **Figure (4)**

As for depression level, it can be observed that, 22.4% of the studied subjects had either severe or extremely severe level of depression before implementing the program and this percent reduced to 10.6% after the program with a statistically significant difference between the two phases ($^{McN} p < 0.001$). **Figure (5)**

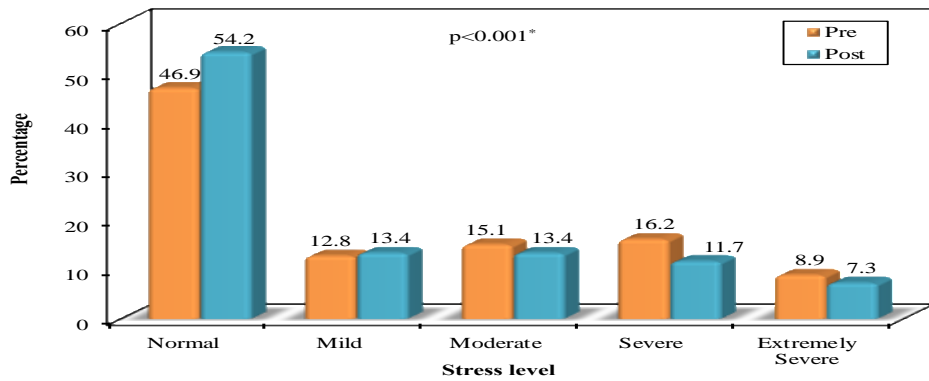


Figure (3): Distribution of the studied subjects regarding their stress level pre and post program (n = 179)

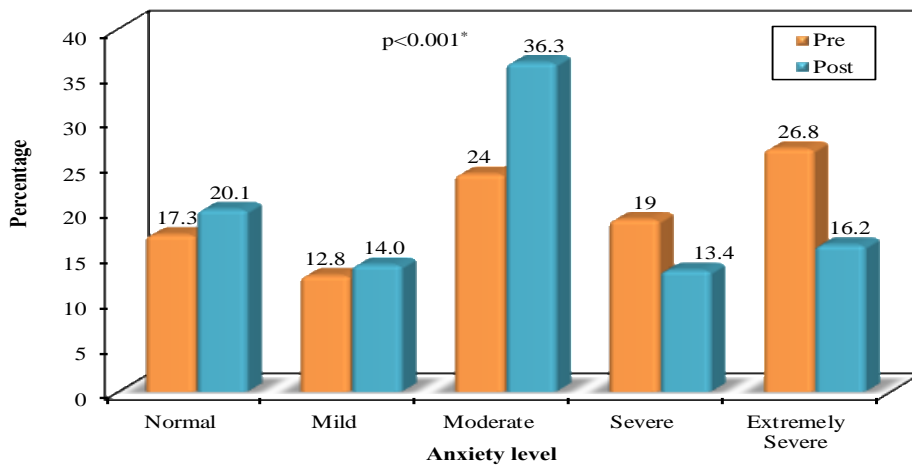


Figure (4): Distribution of the studied subjects regarding their anxiety level pre and post program (n = 179)

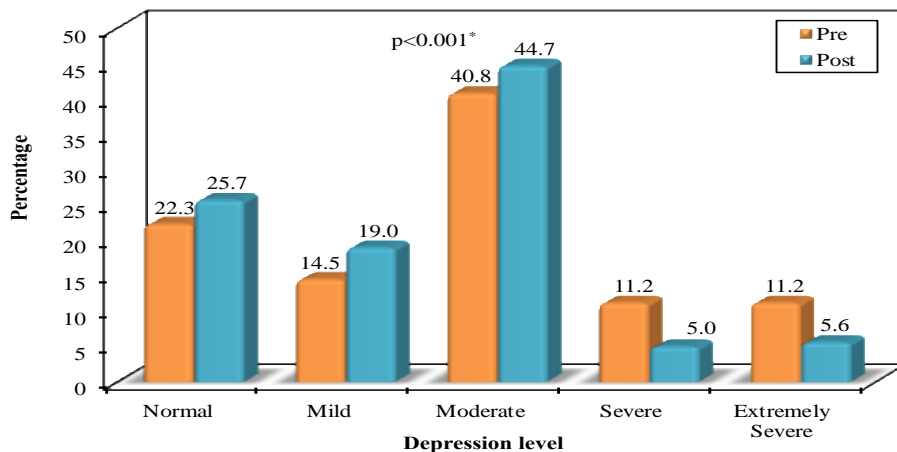


Figure (5): Distribution of the studied subjects regarding their depression level pre and post program (n = 179)

Table (4) illuminates that there was a statistically significant associative relation between nurses’ interns’ total safety practices levels regarding Covid-19 with knowledge, attitudes and depression, anxiety, stress levels in the post program phase (X^2 54.155 $P < 0.001$, X^2 40.859 $P < 0.001$, X^2 19.779 $P = 0.001$, X^2 12.498 $P = 0.014$, X^2 17.623 $P < 0.001$).

Table (4): Relation between nurses' total safety practices regarding Covid-19 With knowledge and attitudes and depression anxiety stress levels.

	Total safety practices levels regarding Covid-19							
	Pre				Post			
	Incompetent practices level (<75%) (n=162)		Competent practices level (≥75%) (n=17)		Incompetent practices level (<75%) (n=51)		Competent practices level (≥75%) (n=128)	
	No.	%	No.	%	No.	%	No.	%
Total Knowledge levels regarding Covid-19.								
Incompetent knowledge (<75%)	146	90.1	12	70.6	29	56.9	9	7.0
Competent knowledge (≥75%)	16	9.9	5	29.4	22	43.1	119	93.0
$\chi^2(p)$	5.670*(0.017*)				54.155*(<0.001*)			
Attitudes levels regarding Covid-19								
Negative attitude (<50%)	58	35.8	4	23.5	22	43.1	6	4.7
Positive attitude (≥50%)	104	64.2	13	76.5	29	56.9	122	95.3
$\chi^2(p)$	1.024 (0.312)				40.859*(<0.001*)			
Depression, Anxiety, and Stress levels								
Stress								
Normal (0-7)	71	43.8	13	76.5	16	31.4	81	63.3
Mild (8-9)	22	13.6	1	5.9	8	15.7	16	12.5
Moderate (10-12)	25	15.4	2	11.8	14	27.5	10	7.8
Severe (13-16)	28	17.3	1	5.9	9	17.6	12	9.4
Extremely Severe (17+)	16	9.9	0	0.0	4	7.8	9	7.0
$\chi^2(MC_p)$	5.575(0.195)				19.779*(0.001*)			
Anxiety								
Normal (0-3)	23	14.2	8	47.1	2	3.9	34	26.6
Mild (4-5)	20	12.3	3	17.6	8	15.7	17	13.3
Moderate (6-7)	42	25.9	1	5.9	22	43.1	43	33.6
Severe (8-9)	30	18.5	4	23.5	10	19.6	14	10.9
Extremely Severe (10+)	47	29.0	1	5.9	9	17.6	20	15.6
$\chi^2(MC_p)$	14.242*(0.004*)				12.498*(0.014*)			
Depression								
Normal (0-4)	30	18.5	10	58.8	3	5.9	43	33.6
Mild (5-6)	25	15.4	1	5.9	12	23.5	22	17.2
Moderate (7-10)	68	42.0	5	29.4	29	56.9	51	39.8
Severe (11-13)	19	11.7	1	5.9	5	9.8	4	3.1
Extremely Severe (14+)	20	12.3	0	0.0	2	3.9	8	6.3
$\chi^2(p)$	11.542*(0.015*)				17.623*(<0.001*)			

χ^2 : Chi square test FE: Fisher Exact MC: Monte Carlo

*: Statistically significant at $p \leq 0.05$

Table (5): present correlation between different parameters in pre and post period. Comparison Pearson's r, with < 0.05 significance level was used to compute association between the studied group total knowledge level, and attitudes score, total safety practices level, and depression, anxiety, and stress level.

Table shows that there was a statistically significant positive correlation between knowledge and attitudes, and practices level before and after conducting the program. Conversely, there was a statistically significant negative correlation between knowledge, attitudes, safety practices level and depression, anxiety, and stress level before and after conducting the program.

Table (5): Correlation between different parameters in pre and post phases (n=179)

			Knowledge	Attitude	Safety Practices	Depression, Anxiety, and Stress level		
						Stress	Anxiety	Depression
Pre	Knowledge	r_s		0.148*	0.183*	-0.283*	-0.263*	-0.288*
		p		0.048*	0.014*	<0.001*	<0.001*	<0.001*
	Attitudes	r_s			0.209*	-0.241*	-0.224*	-0.199*
		p			0.005*	0.001*	0.003*	0.008*
	Safety Practices	r_s				-0.190*	-0.140	-0.130
p					0.011*	0.062	0.082	
Depression Anxiety Stress level								
Stress	r_s					0.749*	0.770*	
	p					<0.001*	<0.001*	

			Knowledge	Attitude	Safety Practices	Depression, Anxiety, and Stress level		
						Stress	Anxiety	Depression
	Anxiety	r _s						0.882*
		p						<0.001*
	Depression	r _s						
		p						
Post	Knowledge	r _s		0.391*	0.538*	-0.419*	-0.344*	-0.353*
		p		<0.001*	<0.001*	<0.001*	<0.001*	<0.001*
	Attitudes	r _s		0.196*	0.196*	-0.305*	-0.205*	-0.246*
		p		0.009*	0.009*	<0.001*	0.006*	0.001*
	Safety Practices	r _s				-0.294*	-0.245*	-0.269*
		p				<0.001*	0.001*	<0.001*
	Depression Anxiety Stress level							
Stress	r _s						0.693*	0.712*
	p						<0.001*	<0.001*
Anxiety	r _s							0.849*
	p							<0.001*
Depression	r _s							
	p							

r_s: Spearman coefficient

*: Statistically significant at p ≤ 0.05

Discussion

Novel Coronavirus is considered a major health care challenge for HCWs in all health care settings that requires more effort coordination and cooperation for successful control of COVID-19 outbreak and to know how to avoid its adverse effects (WHO, 2020). On the other side, the mixture of an ambiguous and stressful environment and impaired support for nurses' interns is a formula that could threaten the interns learning outcomes. These unpredicted situations question the current practices of coaching and supervision during clinical placement (Shaw, 2020). This condition requires innovative solutions to preserve the quality of training (Ikhlaq, et al., 2020). Therefore, this study aimed to evaluate the effect of mentoring program on nurse interns' knowledge, attitudes, safety practices, and psychological readiness during COVID-19 pandemic.

The first main finding of the current study is the presence of statistically significant improvement in nurses intern knowledge after implementation of the mentorship program than before it. Possible explanation for this improvement may be that during program nurses interns exposed to quite large amount of knowledge about COVID-19 (mode of transmission, manifestation, and complications...etc.). This information comes from trusted and confident sources for them and presented by simple and interesting manner for nurses' interns which may affect positively on their retention for this information and widen their awareness. Moreover, the information about COVID-19 was available for nurses' interns for long period of time along the whole duration of mentorship program which may help them to revise it several times and this is also may lead to better maintenance and handling of this information.

In this respect, Shaheen, et al., (2021) reported that students may ask academic staff to gain reliable information. In addition to the effect of their experience of working at private hospitals. All these sources may

provide a lot of necessary information for students and positively impact on their level of knowledge about COVID 19.

This result goes in consistent with a previous study that is conducted at the same issue and reported that there was a highly significant difference between the total COVID-19 knowledge score pre-intervention and post intervention (ELmetwaly, et al., 2020). Moreover, this result was in agreement with Elnagar, et al., (2017), and Alqahtani, (2017) who reported that the baseline knowledge regarding (MERS-CoV) among students was low before educational workshop sessions while knowledge increases after educational workshop session. On the other hand, study done by Begum, (2020) in nursing institution in Saudi Arabia during COVID-19 outbreak found that nursing students had ordinary knowledge about COVID-19.

The second main result of the present study is that nurses' interns' attitudes toward COVID-19 was significantly changed from negative attitudes before to positive attitudes post intervention. This change may be attributed to increase level of knowledge among interns. It is well known that high intensity of knowledge may result in positive attitudes because it increases person's awareness about everything on the disease and create positive outlook toward ability to overcome and deal effectively with this horrible outbreak. On the same direction with this justification Abdel Sattar, et al., (2018) in their study highlights the significance of education in changing the attitudes and behaviors and they reported that the changes within the attitudes of participants may be due to the raise of valuable knowledge of participants after program execution.

Another probable justification for this result could be the optimistic and hopeful view of the mentors which may be transferred to interns (mentees) along the whole period of mentorship program that may affect their attitudes in a positive way. Also, this enthusiastic view was evident in the psychological contents that covered

during orientation sessions of mentorship program. On the same line, Hasnain, et al., (2014) emphasize on the effect of thinking with hope on preventing problems and enlarging strength and emphasized that hope would have grant before and after the occurrence of problems.

Moreover, Abdelhafiz., et al., (2020) stated that personal attitudes and behaviors, which depend on the awareness of the disease along with the political efforts by the governments, are efforts that are employed to prevent the pervasion of the virus. On the same direction with the present study results, a previous study conducted by ELmetwaly, et al., (2020) showed that the total COVID-19 attitudes scores increased significantly from pre- intervention to post-intervention. This is also in line with Alzoubi, et al., (2020), who stated that the study resulted in an overall high level of attitudes and good practices towards the disease preventive measures. On the contrary, the current results are incompatible with previous research which done among nursing students at Hail University and informed a negative attitude about the disease MRS Co. (Alshammari, et al., 2018).

The third most important finding of the current study is the statistical improvement of nurses' interns' safety practices and infection control measures post mentorship program than before. This finding could be explained by the constructive effect of the presence of mentors with nurses' interns. They teach them all infection control and safety measures side by side, being role model for them, answering all interns' questions and give them chance to do things by themselves under supervision and guidance of mentors which give interns trust and confidence in their abilities to handle and deal with diverse situations effectively and efficiently in different units.

In this direction, the literature indicated that competent mentors facilitate students' acquisition of professional knowledge, technical, psychomotor, interpersonal and communication skills, attitudes, identity, professional responsibilities, and offering timely feedback and constructive criticism. (Rosenau, et al., 2015, Won & Choi 2017). In addition to respecting students' uniqueness and dissimilarities, using evidence-based practices. (Lovrić, et al., 2014) and serve as a role model for students in professional interaction with other health workers and with clinical facilities. (Scurlock-Evans, et al., 2017, Foster, et al., 2015).

In addition to the previous possible explanation, another factor was reported and may be considered, which is the effect of duration of mentorship program. The researchers chosen to implement mentorship program for long duration along six months to be enough period for nurse interns to acquire and integrate learned skills and to be part of their daily practices. Through this period the mentors interviewed individually with each intern and facilitate learning based on one-to-one and small group interactions within different clinical settings. This explanation is consistent

with what is reported by other study that in the mentoring sessions, each mentee meets his or her mentor to address specific academic matters and even personal matters. They share expectations, difficulties, explanations and specific plans about activities and opportunities offered to mentees by the mentors. (Franzoi & Martins 2020) On the same line, Bugajski, et al., (2017) found that nurses, whether novices or experts, valued assistance, on-going training, and mentorship to provide quality care to their patients.

These results were agreed with a study conducted by Tork & mersal, (2018), who showed that the majority of students in Qassim University thought that the disease could be prevented by using safety measures and universal precautions given by WHO.

Regarding the effect of mentorship program on psychological problems among interns, the present study showed that anxiety, stress, and depression levels improved significantly after program. This improvement could be partly explained by constant reassurance and psychological support that were given to interns by mentors and friendship attitudes between them that allow interns to feel free to discuss anything about their fears and anxieties with their mentors without hesitations. Similarly, another study that was conducted by Kim, et al., (2015) reported that mentoring leads new interns to feel that they have the freedom to express and communicate any of their concerns and anxieties and limiting the phenomenon of "keeping things bottled in.

Another factor that may explain this improvement is that during the whole period of program a lot of reassuring messages were sent to interns via all previously designed groups to alleviate their psychological disturbances and help them to calm down. Furthermore, the content of mentorship program involved psychological aspects and common fears and concerns of nurse interns related to COVID 19 and how to cope effectively with this terrible emotional state.

Along the same line, Kobayashi, et al., (2020) & Lin, (2020) reported that there is no doubt that fears and anxiety are justified in nurse interns, especially when talking about a dangerous virus that threatens human life. Therefore, mentors play a significant role in providing continuous professional support and guidance, encouraging students' work and ideas, building students' confidence and independence in clinical environment, (Agius, et al., 2014, Powell, et al., 2014). Moreover, Verret, (2016) was remarkable in claiming that mentorship is a powerful instrument that assists mentors and new nurses in clinical settings. Mentoring brings about a unique rapport between mentors and mentees, including teaching, guidance, sponsoring, motivating, role-modeling, support, and counseling. This rapport reinforces and strengthens nurse's loyalty to performing to the fullest potential.

Finally, the current study confirmed the research hypothesis by the previously mentioned results. Moreover, a statistically significant positive correlation

between knowledge, attitudes, and safety practices before and after conducting the program was found. In other words, high level of knowledge with the presence of positive attitude affects definitely on nurses' interns' practice. In the opposition, a statistically significant negative correlation between knowledge, attitudes, safety practices and depression, anxiety, and stress levels before and after conducting the program was detected. Which means that when nurses interns suffer from disturbed psychological status this will affect negatively on their knowledge, attitudes and practices level which magnify the importance of psychological aspect of nurses' interns and their mental wellbeing in determining their safety practices. That all of these may be part of the negative effects of corona virus pandemic on psychological status of nurses' interns reflecting their persistent needs for similar program to help them in better coping and living their life effectively. On the other side, mentoring will improve interns' knowledge, attitudes and practices which will enhance their psychological condition because all these aspects are integrated and interrelated within the actual clinical life of nurses' interns.

Conclusion:

Based on the results of the present study it can be concluded that, mentorship program positively affects nurses' interns' levels of knowledge, attitudes, and safety practices as well as their psychological readiness. Thus, endorse the momentousness of engaging nurse interns in life-long process of learning through continuous advanced academic mentorship.

Recommendations:

The following recommendations were suggested:

- Incorporates the mentoring program within nurses' internship training program as a basic tool of training, to provide continuous support and ongoing evaluation of nurses' interns' knowledge, attitude, safety practices and psychological readiness.
- Includes both expert and novices' mentors and mentees with the planning, implementation, and evaluation of the nurses' interns training program mainly in the aspects of knowledge, attitude, safety practices and psychological readiness.
- Establish mutual professional rapport between mentors and mentees and provide different mental health services and psychological counselling needed to alleviate negative emotional effects that result from this pandemic state.
- Raising public awareness through nurses' intern aiming to promote health and increase community awareness of the impact of COVID 19.
- Future further researches are needed on nurse's physical and psychological readiness to assimilate different upcoming unpredicted health related issues that may face nurses' interns in the actual field.

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