

Knowledge and Attitude of Nursing Students about COVID-19: An Intervention Study in Egypt

Aml Ahmed Mohammed ELmetwaly¹, Ateya Megahed Ibrahim²,
Abdel-Hady El-Gilany³, Islam Mokhtar Mokhtar elsayed⁴

1Medical Surgical Nursing, Medical-Surgical Nursing Department, Faculty of Nursing, Mansoura University

2 PhD Family and Community Health Nursing, Family and Community Health Nursing Department, Faculty of Nursing, Port-said University

3Professor of public Health, Community Medicine Department, Faculty of Medicine, Mansoura University

4Medical Surgical Nursing, Medical-Surgical Nursing Department, Faculty of Nursing, Beni- Suef University

Corresponding author: Ateya Megahed Ibrahim

Email: ateyamegahed@yahoo.com

ABSTRACT

COVID-19 is one of the major pathogens that triggered a great public health threat. The study aimed to compare the level of knowledge and attitude of the nursing students about COVID-19 before and after implementation of an intervention educational guideline at four nursing faculties selected to represent different geographical regions of Egypt; namely Cairo, Mansoura, Port Said, and Beni- Suef Nursing faculties. Through using a quasi-experimental study of 1550 nursing students. A self-administered questionnaire was used composing of three parts; Nursing students' personal characteristics, Knowledge about COVID-19, and attitude towards the COVID-19 scale. The findings showed that the mean difference in scores of both knowledge and attitude was significantly higher in older students, urban residence, living in students' hostile and achieving grade C in the past year. However, the mean difference in knowledge score is significantly higher in students affiliated to Mansoura University compared to those of Port Said University. The present study concluded a good knowledge and a high attitude among the targeted students towards COVID-19 post-implementation of the guidelines.

Keywords: Attitude, Covid19, Knowledge, Nursing Students

1. Introduction

COVID-19 is an emergent respiratory infection that is caused by a novel coronavirus and was first discovered in December 2019 in Wuhan, China. It can cause clinical symptoms to include fever, dyspnea, dry cough, fatigue, and myalgia. In China, nearly a fifth of the patients

with COVID19 evolve to severe stages, in which the symptoms are distinguished by acute respiratory distress syndrome, septic shock, difficult to tackle metabolic acidosis, bleeding and coagulation dysfunction (Novel, 2020& Chen, et al., 2020).

The ongoing epidemic of COVID-19 has prevailed very

speedily. In response to this serious situation, the World Health Organization (WHO) announced it a public health emergency of international concern on January 30 and called for Gathering efforts to address this pandemic of all countries to prevent the rapid spread of COVID-19 (WHO, 2019). The Egyptian COVID-19 pandemic is part and parcel of the COVID-19 worldwide pandemic. In Egypt, the virus was proven to have accessed it on 14 February 2020 (Egypt today, 2020 & BBC news, 2020).

The virus can directly transmit between people by respiratory droplets and secretion and indirectly via contaminated inanimate surfaces (Li, et al., 2020). Based on the epidemiological investigations, the COVID-19 incubation period ranges between one to fourteen days and it was found that the virus is possible to be infected in patients without symptoms (Jin, et al., 2020).

Currently, the availability of specific antiviral treatment and preventive vaccine that does not exist. Therefore, the following guidelines are recommended to decline the spread of infection and respond to the challenges during the epidemic. As the Centers for Disease Control and Prevention (CDC) recommends, COVID-19 spreads mainly from infected person to another one by close contact within a distance of about two meters (CCDC, 2019). The best protection from exposure to

COVID-19 is done through hand washing with soap and water, face masks using and confirmed as well as suspected cases isolating (WHO, 2020).

The battle against COVID-19 is continuing in Egypt. To guarantee to reach the optimal final success, it is essential for people to follow these measures of control, which is greatly affected by their knowledge and attitudes towards COVID-19 (Ajilore, Atakiti, and Onyenankye, 2017 & Tachfouti, Slama, Berraho, and Nejjari, 2012).

It is known that, nursing is the main active associate in any primary and secondary infectious disease prevention efforts. Regardless of any country's socioeconomic development, nursing is considered to be the first top line in the diseases prevention and diminishing of suffering during and after a treatment of any disease, and among them COVID-19 (WHO, 2020).

Nurses play a main known role during the global response to COVID-19, which is helping patients and address their concerns. However, nurses are expected to play an even more vital role in preparing for and management of this pandemic. The role of nurses in pandemic starts even before the disease has an opportunity to give rise to widespread destruction. In a political summary for 2018, the American Nurses Association (ANA) stated that nurse leaders are the key to preventing and containing widespread

illnesses. Nurses are qualified and educated to develop coordinated global networking and identifying infectious diseases in an appropriate manner (ANA,2020).

Despite the important contribution of nurses and nursing students into the prevention and control activities of COVID-19, there are no studies in Egypt that measured their knowledge and attitude about this emerging disease as its epidemiology and management are not included in educational curricula.

2. Aim of the Study

This study aims to compare the level of knowledge and attitude of the nursing students about COVID-19 before and after implementation of an intervention educational guideline.

2.1. Research Hypothesis

H1. The level of knowledge among nursing students about COVID-19 will be improved after applying COVID-19 instructional guidelines.

H2. The attitude of nursing students toward COVID-19 will be improved after applying COVID-19 instructional guidelines.

3. Population and Methods

3.1. Study Design

A quasi-experimental research design was applied in this study.

3.2. Settings

This study was accomplished at four nursing faculties selected to

represent different geographical regions of Egypt. Namely Faculties of Nursing affiliated to Cairo, Mansoura, Port Said, and Beni-Suef Universities.

3.3. Subjects

Convenience Sample of about 1550 students. Half of the total number of target students (3100) was included to compensate for any possible attrition. They are targeted to be at a study response rate 100% and there is no dropout.

Sampling method: students were selected through a stratified cluster sampling method. Four faculties were selected to represent different geographical regions of Egypt. From each faculty 2nd and 4th-year students were included (medical, surgical, and community health nursing students). Then clusters (section or clinical round) were selected by a systematic random sample from the available lists of clusters (every other cluster starting with the first on). All students in the selected clusters were included. The total sample was distributed proportionally between the four faculties and two academic levels in each faculty.

3.4. Tools of Data Collection

Data collection was done through a self-administered questionnaire: which is composed of three parts:

3.4.1. Part I: Nursing students Personal Characteristics:

It was developed to collect personal data of the students, such as age, Academic level, residence, living with whom, and grade of the last year.

3.4.2. Part II: Knowledge about COVID-19:

It was developed following the instructions and guidelines of WHO Egyptian Ministry of Health and Population, the kingdom of Saudi Arabia Ministry of Health and State of Kuwait Ministry of health, and included: General information for students on COVID-19, Knowledge on methods of transmission and signs& symptoms of COVID-19, and Knowledge on the treatment and prevention of COVID-19.

The subsequent COVID-19 knowledge questions (34 items) were released in which the answers were either Yes, No, or don't know.

Scoring system: a value of one was assigned to a correct answer while a value of zero was given for an incorrect or don't know. The total score ranged from 0 to 34. The Mean and SD were used to determine the Difference in Knowledge score.

3.4.3. Part III: Attitude towards COVID-19 scale:

It determines the attitude of students toward COVID-19. It was adapted from Memish et al., (2014) in which students' responses were evaluated via a five-point Likert scale of agreement.

Scoring system: Assessment of attitude was carried out through 17 item questions. A score of one was given to strongly agree, two to agree, three to undecided, four to disagree, and five to strongly disagree. The Mean and SD were used to determine the Difference in attitude score.

3.5. Content Validity:

A jury was done to measure the content validity of the study tool. The knowledge and attitude scales were distributed to five experts in public health & preventive medicine and five medical-surgical nursing experts in the Nursing Faculty affiliated to Mansoura and Aswan Universities to assess the relevance and clearance of each item on 3-points Likert scales. The content validity index per item ranged from 0.8 to 1.0 for both relevance and clarity.

3.6. Pilot Study

An internal pilot study was done on (30) of students representing the study sample to investigate the feasibility and clarity of the used tools; modifications were done accordingly based on the results. The Pilot study sample was excluded from the final sample of the study and only minor modifications were done.

3.7. Field Work

Data collection was spanned for two consecutive months, starting from 15 February 2020 to 15 April 2020; The study was conducted in three phases that is to say: assessment

phase, implementation phase, and evaluation phase:

3.7.1. Assessment Phase

During this phase, the researchers explained the study purpose, the different parts of the tool used, and its components, and the student's oral instructions were given.

3.7.2. Implementation Phase

Goals and expected outcomes were formulated, accordingly based on the findings of the assessment phase. Furthermore, the instructional guidelines that were developed by the researchers in simple Arabic language based on the instructions and guidelines of WHO, Egyptian Ministry of Health and Population, the kingdom of Saudi Arabia Ministry of Health, and State of Kuwait Ministry of health was given to nursing students who were included in this study. An oral instruction was used as a method of teaching and next to the data show presentation was shown to students also, a simulated booklet supported by diagrams and pictures was given.

The developed guidelines (available upon request from the corresponding author) include the following: Coronavirus definition past and present, Mode of transmission, Sign and symptoms of covid19, How to protect yourself, The correct way to wash hands, When should the hands be washed, Common questions about covid19 (Availability of Vaccination, Definite

treatment, Covid19 and pregnancy, Signs and symptoms differ from adults to children, The role of (saline Nasal wash, Gargle with mouthwash, Spray the body with alcohol or chlorine and Hands dryers in the public toilets) in eliminating infection)), Instructions for a person subject to a home quarantine and Instructions for the family and contacts of the person subjected to the household quarantine.

The self-designed questionnaire was distributed to the selected students who were enrolled in groups by the researchers' pre-intervention to collect baseline data about their demographics, COVID-19 level of knowledge, and attitude towards COVID-19. The time needed to accomplish the questionnaire ranges from 15 to 20 minutes using part (I, II, and III) of the questionnaire.

The second time to collect data after implementing the instructions was done by one month using parts II and III of the questionnaire.

We could not meet more students for post-intervention data at the university was closed for the COVID-19 outbreak in the country on 15 March 2020.

The developed questionnaire was made accessible through a link and was advertised and distributed via social media to the target students and was opened in March 2020 for 10 days. Participants were given 30 minutes to read, comprehend, and answer all the questions.

3.7.3. Evaluation Phase

This phase focus on estimating the effect of COVID-19 instructional guidelines to determine the aim of the study has been fulfilled or not, via a comparison between pre and post COVID-19 instructional guidelines intervention.

3.8. Ethical Considerations and Human Rights:

- Participation in the study was voluntary and the study purpose was explained to students before the distribution of the questionnaires.
- Written consent was acquired from each study participant by attaching a consent statement on the top of each questionnaire. However, student identification was not recorded anywhere on the distributed questionnaire.
- Data confidentiality and anonymity was assured and was used for research purposes only.

3.9. Statistical Analysis

Data were analyzed using SPSS version 23. Categorical variables were presented as numbers and percentages. Quantitative variables were found to be normally distributed by the Shapiro test. They were presented as mean and standard deviation. The paired - test was used to measure the significant change in knowledge and attitude between post- and pre-intervention. The differences in knowledge and attitude between

post and pre-scores were calculated. The unpaired test was used to compare this difference between the two groups. To compare the difference between more than two groups with Bonferroni posthoc multiple comparisons, one ANOVA (F) test was used. Where $P \leq 0.05$ was considered to be a statistically significant value.

4. Results

Table 1 shows that the total COVID-19 knowledge score increased significantly from 35.43 pre-intervention to 55.03 post-intervention. The same pattern was observed with a different domain, including general knowledge, transmission, and symptoms as well as treatment and prevention.

Table 2 shows that the total COVID-19 attitude score increased significantly from 56.62 pre-intervention to 70.65 post-intervention. The same pattern was observed with different items of the scale.

Table 3 shows that the mean difference of the change in the total knowledge and attitude scores is 19.61 and 14.03; respectively. The mean difference in scores of both knowledge and attitude are significantly higher older students, urban residence, living in students' hostile and achieving grade C in the past year. However, the mean difference in knowledge score is significantly higher in students

affiliated to Mansoura University compared to those of Post Said University.

5. Discussion

COVID-19 has become a major virus of emerging respiratory disease outbreaks. It is one of a large family of single-stranded RNA viruses, that can cause serious symptoms (Cascella, et al., 2020). The virus can cause fatal pneumonia in severe cases similar to that caused by Middle East respiratory syndrome coronavirus (MERS-CoV) and severe acute respiratory syndrome coronavirus (SARS-CoV), which have appeared in the past 20years all over the world in sporadic countries (Li, Bai, & Hashikawa,2020).

The novelty of this infectious disease, besides its uncertainties, makes it of the utmost importance for health authorities to plan strategies for the preparation and management of the public properly. It is, therefore, has critical importance that the knowledge and attitudes of the nursing students be studied to guide these efforts (Azlan, Hamzah, Sern, Ayub, & Mohamad, 2020).

Egypt is considered to be one of the biggest countries in all the Arab regions, Africa, and the Middle East. Which has a population of about more than 100 million citizens, Egypt is among the most populous countries in Africa (The Central Agency for Public Mobilization and Statistics (CAPMAS), 2020). This high

number of citizens, in turn, leads to being associated with a great risk of infection spread and increase mortality. Knowledge and attitude towards COVID-19 have been increasing day by day. Here the results of the study are reviewed about the knowledge and attitudes of the Egyptian nursing students towards the COVID-19 pandemic.

To the best of our knowledge, this is the first study conducted to evaluate nursing students' knowledge and attitude towards COVID 19 through pre/ post instructional guidelines in Egypt. The result of the current study showed that the total COVID-19 knowledge score increased significantly from 35.43 pre-intervention to 55.03 post-intervention. This result is in agreement with Elnagar et al.(2017) who reported that the Mean pre-test knowledge scores were 4.91 with SD 3.033 while the Mean post-test knowledge score was 10.28 with SD 1.851.

Furthermore, Alqahtani (2017) found that the baseline knowledge regarding (MERS-CoV) among students was low before educational workshop sessions while knowledge increases after educational workshop session.This may be due to the limited access of information and there were no regular and periodic educational sessions about COVID19 offered to nurse students especially it is a new pandemic disease and spread quickly around the world, but knowledge has improved on general knowledge,

transmission and symptoms as well as treatment and prevention, after application of the instructional guidelines.

Regarding the attitude of the nursing students toward COVID 19, the present study showed that the total COVID-19 attitude score increased significantly from 56.62 pre-intervention to 70.65 post-intervention. The same pattern was observed with different items of the scale.

This is line with **Alzoubi et al, (2020)**, who stated that the study resulted in an overall high level of attitude and good practice towards the disease preventive measures and their responses if contracted infection. The attitude of the study sample reflects the right way to prevent the infection by various means for example hand washing, using alcohol rub, handshaking avoidance and following preventive etiquettes during coughing and sneezing. It is known that these measures follow has an effective role in preventing many infectious diseases particularly respiratory transmitted infections such as COVID-19 disease.

However, around two-thirds of the participants support the attitude of wearing a mask and its practice as a preventive measure against the infection. This contradicts the advice shared by the WHO that does not recommend the use of face masks in public in those individuals without respiratory symptoms (**WHO, 2020**).

These results are consistent with a study conducted by **Tork and mersal, (2018)**, who showed that positive attitudes among students in Qassim University about the disease and the majority of them believed that the disease could be prevented by using universal precautions given by WHO.

Furthermore, these results are consistent with a study conducted in the same region and revealed a positive attitude among health care workers towards MERS (**Khan, Shah, Ahmad, &Fatokun, 2014**). Also, this result consistent with another study, which done by **Alqahtani (2017)** in the Najran city among 418 health colleges 'students. Despite that, the current results are inconsistent with previous research which done among nursing students at Hail University and reported a negative attitude about the disease MRS CoV (**Alshammari, Sallam, &Abd El-kader, 2018**).

This study shows that the mean difference of the change in the total knowledge and attitude scores is 19.61and 14.03; respectively. The mean difference in scores of both knowledge and attitude is significantly higher older students, urban residence, living in students' hostile and achieving grade C in the past year. However, the mean difference in knowledge score is significantly higher in students affiliated to Mansoura University compared to those of Post Said University.

This might be due to the older students received knowledge and attitude from the previous years of study, urban students had more opportunity to obtain information than rural students, received some orientation and education program regarding the new events especially pandemic diseases in students' hostile plus, they spent time together and talked about the epidemic and what was new about it and Mansoura University was considered one of the mother and ancient universities, and its students entered the highest grades, and they are of a distinguished level and high knowledge.

This result is in agreement with *Nooh et al, (2020)* who studied Public awareness of coronavirus in the Al - gulf region, Saudi Arabia, and found that there was a significant difference in MERS-CoV knowledge regarding age, level of education, and employment. This finding disagrees with what observed by (**Khan et al., 2014**) where there is no significant difference in health workers across their study. Also, this is a disagreement with the study done by **Tork and Mersal (2018)** who mentioned that there is no relationship between personal characteristics and attitude toward Corona $p \leq (0.05)$.

Post-hoc power analysis:

The sample size was not calculated before data collection as there are no previous studies using the same tools. However, post-hoc power analysis was done online using

Open Epi (<https://www.openepi.com/Power>). With alpha error 5%, mean knowledge score (SD) of 45.43(6.29) pre-intervention vs. 55.03(2.93) post-intervention and sample of 1550, study power is found to be 100%. Thus the sample size is adequate and the study has a high power.

6. Conclusion

The present study concluded a good knowledge and a high attitude among the targeted students towards COVID-19 post-implementation of the guidelines.

7. Recommendation

To effectively control infection spread, a well structured training programs must be launched targeting all other nursing faculties in Egypt to raise their knowledge and enhance their attitude.

8. Limitation of the study

There is no study similar to ours in terms of using different methods approach in pre and post the intervention phases with nursing students due to lockdown of COVID19, so we could not cover some points in discussing the results related to similar studies.

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Tables

Table 1: Difference in Knowledge scores about COVID19 of Studied Sample pre and post-intervention (N= 1550).

Parameter	Pre	Post	Paired t-Test	P Value
	Mean and SD	Mean and SD		
COVID19 General Knowledge	7.14±2.07	13.26±1.22	101.13	≤0.001
COVID19 Methods of Transmission and symptoms	13.0±3.11	19.50±2.07	70.66	≤0.001
Treatment and Prevention of COVID19	15.29±3.73	22.2703±1.12	73.44	≤0.001
Total COVID19 knowledge	35.43±6.29	55.03±2.93	117.56	≤0.001

Table 2: Difference in attitude scores of the studied sample toward COVID19 pre and post-intervention (N= 1550).

Parameter	Pre	Post	Paired t- Test	P Value
	Mean and SD	Mean and SD		
COVID19 infection can be prevented by following universal precautions	3.65±0.97	4.56±0.50	33.03	≤0.001
Prevalence of COVID19 can be eliminated by active participation	3.74±0.62	4.52±0.54	38.27	≤0.001
Any information about COVID19 should be disseminated	3.85±0.75	4.59±0.49	32.56	≤0.001
Patients should be kept in isolation	3.87±0.67	4.65±0.48	38.70	≤0.001
Intensive and emergency treatment should be given to diagnosed confirmed patients	3.84±0.77	4.63±0.48	34.86	≤0.001
Gowns, gloves, mask, and goggles must be used when coming in contact with COVID19 patients	3.82±0.54	4.65±0.48	47.78	≤0.001
Healthcare workers as a whole must acknowledge themselves with all the information about COVID19	3.88±0.59	4.61±0.49	39.30	≤0.001
Healthcare workers should constantly update their knowledge of the disease	3.86±0.64	4.55±0.53	33.61	≤0.001
You must follow preventive measures at home	3.74±.55	4.44±0.53	38.34	≤0.001
Owning a hand sanitizer lotion in a pocket or bag is important	3.43±0.53	4.39±.54	51.26	≤0.001
The mask should be used at gatherings,	3.42±0.56	4.39±0.54	51.16	≤0.001

Parameter	Pre	Post	Paired t- Test	P Value
	Mean and SD	Mean and SD		
markets, and park				
I will not sit next to an infected student or a member of her family who is infected	3.33±0.70	4.35±0.56	48.00	≤0.001
Providing care to infected patients with COVID19	3.03±0.78	3.98±0.64	40.35	≤0.001
Adherence to methods of prevention from COVID19	3.33±0.60	4.21±0.41	49.95	≤0.001
University provided enough awareness campaigns to students	2.52±0.86	3.55±0.93	33.62	≤0.001
Prevalence of COVID19 will be increased shortly	3.28±0.89	4.60±0.53	51.15	≤0.001
Total attitude scores	56.62±4.78	70.65±5.13	85.09	≤0.001

Table 3: Variation in differences of (post minus pre) knowledge and attitude score with different demographic factors.

	N	The difference in Knowledge score		The difference in attitude score	
		Mean ± SD	Significance	Mean ± SD	Significance
Overall	1550	19.61±5.57		14.03±6.49	
Age (years):	326	19.39±4.58 ^{A,B}	F=43.56, P≤0.001	12.04±6.62 ^{A,B}	F=24.19, P≤0.001
19	703	18.20±5.72 ^{A,C}		14.10±5.69 ^{A,C}	
20	521	21.64±8.02 ^{B,C}		15.17±7.11 ^{B,C}	
23					
Academic level	1029	18.58±5.41	t=8.89, P≤0.001	13.45±6.08	t=4.8, P≤0.001
Second	521	21.64±8.02		15.17±7.11	
Fourth					
Residence:	604	20.81±8.03	t=5.82, P≤0.001	15.05±6.60	t=, P≤0.001
Urban	946	18.84±5.29		13.38±6.34	
Rural					
Living with:	1253	18.90±6.26 ^{A,B}	F=51.70, P≤0.001	13.93±6.22 ^B	F=13.83, P≤0.001
Family	161	21.0±4.45 ^{A,C}		12.66±7.88 ^C	
relatives	136	24.50±8.77 ^{B,C}		16.51±6.49 ^{B,C}	
student's hostile					
Grade last year	775	18.90±6.51 ^B	F=129.91, P≤0.001	13.75±6.62 ^B	F=15.07, P≤0.001
A	711	19.30±5.50 ^C		13.94±6.12 ^C	
B	64	31.61±6.83 ^{B,C}		18.33±7.47 ^{B,C}	
C					

	N	The difference in Knowledge score		The difference in attitude score	
		Mean ± SD	Significance	Mean ± SD	Significance
<i>Faculty</i>					
Mansoura	350	20.32±6.0 ^A	F=2.82, P=0.038	14.02±5.54	F=0.29, P=0.84
Bani Suef	225	19.89±5.85		13.68±5.48	
Cairo	773	19.42±7.0		14.14±7.1	
Port Said	202	18.77±6.59 ^C		14.01±6.66	

A, B & C significant differences between the corresponding group by Bonferroni posthoc multiple comparisons

Conflict of interest

The authors declared there is no conflict of interest