COVID-19: Knowledge and Precautionary Measures among Nursing Students

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Abstract

Background: COVID-19 pandemic is considered as the most crucial global health calamity of the century and the greatest challenge that the humankind faced since the 2nd World War. Egypt is one of the five African countries with the largest number of cases, with 415,468 confirmed cases of COVID-19 and 22,460 deaths. ***Aim:*** this study aimed to assess the nursing students' knowledge regarding COVID-19 & precautionary measures regarding COVID-19. ***Design: A*** descriptive analytical study was used. ***Sample:*** A stratified simple random sample of 334 nursing students. ***Setting:*** faculty of nursing, Sohag university. ***Tools:*** two tools were used for data collection. ***1st tool*** was electronic questionnaire to assess the nursing students' knowledge regarding COVID-19 & precautionary measures regarding COVID-19. ***part I:*** demographic data of nursing students, ***part II:*** **(A)** assessment of nursing students' knowledge regarding COVID-19, **(B)** Source of information regarding COVID-19. ***part III:*** Assessment of nursing student's knowledge regarding precautionary measures toward COVID-19.***2ed tool*** was observational checklist for the precautionary measures implemented by the nursing students. ***Results***: results of this study indicated that 53.9% of them were male. 67.7% of them were living in rural area.31.1% at first academic year. Total nursing students' knowledge regarding COVID-19 was 64%, precautionary measures was 95%, and their total practice was 80%. ***Conclusion:*** Slightly less than two-third of nursing students had a satisfactory knowledge about COVID-19 and majority of them had a satisfactory knowledge about precautionary measures, also most of them had satisfactory practice related to precautionary measures toward COVID-19, and there is a highly statistical correlation between total knowledge of nursing students and their total practice. ***Recommendation:*** Instructions about proper use of face mask should be written on the packages.

Key words: COVID-19, Knowledge, precautionary measures, Nursing student**.**

Introduction:

Coronaviruses are a large family of viruses with single stranded RNA that are known to cause illness ranging from the common cold to more severe diseases. It takes their names from crown- like spikes on their surfaces **(Cascella et al., 2022)**

A novel coronavirus (COVID-19) was identified in 2019 in Wuhan, China. This is a new coronavirus that has not been previously identified in humans. COVID-19 defined as an infectious disease caused by a newly discovered coronavirus. **(WHO,2020a)**

COVID-19 transmitted through inhalation of respiratory droplets or touching a contaminated objects or surfaces. Its incubation period ranges from 2 to 14 days **(National Center for Immunization and Respiratory Disease (NCIRD), 2020).**

The life cycle of COVID-19 consists of five steps: attachment, penetration, biosynthesis, maturation and release. **(Yuki et al., 2020).**

The COVID-19 affect people of all ages, however certain people are at a larger risk than others include pregnant, old age, male gender,

Long hospital staying persons, health care workers, persons have chronic diseases and Smokers **(Rahman & Jahan, 2020).**

The most common signs and symptoms are fever, cough, shortness of breath, fatigue, muscle pain, dyspnea, headache, hemoptysis, and diarrhea. Some patients developed further fatal complications including sepsis, septic shock, pulmonary edema, severe pneumonia, and acute respiratory distress syndrome **(Wolff et al., 2021 & Huang et al.,2020).**

The COVID-19 infection diagnosed with polymerase chain reaction (PCR) D-dimer, and lung CT scan. Currently, different vaccines became available for human using as Pfizer-BioNTech, Moderna, Johnson; Johnson, Oxford-AstraZeneca, Novavax, Sinopharm and Sinovac. **(WHO, 2021)**

The COVID-19 can be prevented through some precautionary measures as wash hands frequently, avoid touching face (Eyes, Nose and Mouth), keep distance (approx. six feet) to the other person **(WHO, 2020a)**

The family health nurse plays an important role in prevention of COVID-19 through giving health education for families, provide psychological support, provide physical Care, taking care for high risk group, and provide rehabilitation after COVID-19 infection. **(Simon, 2020)**

Universities are likely to become explosive, infected, and epidemic places due to their large young students, high levels of close social contact and permeable restrictions because of these It is very important to know the knowledge and practices of university nursing students toward COVID-19. **(Alasmee,2021&Emergency Nurses Association, 2020)**

Significance of the study:

Egypt is one of the five African countries with the largest number of cases, with (415,468) confirmed cases of COVID-19 and (22,460) deaths. **(Egyptian ministry of health, 2022).**

Aim of the study:

The aim of this study to assess nursing students' knowledge& precautionary measures regarding COVID-19 through:

1-Assessing nursing students' knowledge regarding COVID-19 &their knowledge about precautionary measures toward COVID-19
2-Assessing nursing students' practice related to precautionary measures toward COVID-19.

Research Questions:

1. What are the nursing students' knowledge regarding COVID-19?
2. What are the precautionary measures implemented by nursing students to prevent COVID-19?
3. Is there relation between nursing students' knowledge and their practice related to precautionary measures toward COVID-19?

Subjects and methods

I-Technical Design:

The technical design included research design, setting, subject and tools of data collection.

Research design:

A descriptive analytical design was used to achieve the objectives of the study.

Setting: -

This study was conducted at faculty of nursing, Sohag university

Study Subject:

A sample composed from 23.5% (334) of total 1423 nursing students.

Sampling technique:

A stratified simple random sample was used.

Tools of data collection:

Data was collected through the following tools.

1- An Electronic questionnaire which was online self-reported questionnaire that developed by the investigator after reviewing

the relevant literature and written in a simple Arabic language. It included the following parts:

Part I:

Demographic data of the nursing students; this part is composed of 5 questions covering: name, gender, residence and academic level/year.

Part II:

a) Assessment of nursing students' knowledge regarding COVID-19: it included information about concept of COVID-19, modes of transmission, clinical symptoms, risk groups, vaccine and treatment**. (Al-Hanawi et al.,2020).**
b) Source of information regarding COVID-19 which included social media and the internet, TV/video and radio, magazines & newspapers, family and friends, scientific journals and articles, and health-care providers such as physicians and nurses. **(Erfani et al.,2020).**

Part III:

Assessment nursing student's knowledge regarding prevention and precautions measures toward COVID-19 which include information about (wearing a face mask, washing hands regularly, using disinfectants, paying more attention to personal hygiene, closely monitor the physical health of the people around, staying at home and avoiding gatherings, follow social distancing procedures, paying attention to a balanced diet, avoiding using public transportation and eating outside, avoiding shaking hands and kissing others when greeting them, make sure to cover nose and mouth while coughing or sneezing with tissues, avoid direct contact with possible or +ve COVID-19 patients, avoid direct contact with health workers, avoid touching the nose, mouth and eyes with contaminated hands, getting sufficient sleep and fluid intake, monitoring personal physical health, and persuading people to follow the precautionary measures, Isolation and treatment of people infected with the COVID-19 are effective ways to reduce the spread of virus, People in contact with someone infected with COVID-19 should be immediately quarantined, in an appropriate location, for a general observation period of 14 days.) **(Khasawneh et al., 2020 & Mohamed et al., 2021).**

❖ **Scoring system:**

Correct answers were predetermined according to literature review. The complete correct answer (2), incomplete answer (1), and the incorrect answer score (zero), the total knowledge satisfaction level will be categorized into two categories; satisfactory level for 60% or more of the total correct answers and unsatisfactory level for less than 60% of the total correct answers.

2- Observational checklists: for assessing nursing students' performances, it was constructed according to WHO which contained the following: standard practice list for hand washing, wearing and removing sterile gloves, wearing and removing face mask procedure **(WHO,2020b)**

❖ **Scoring system for observational checklist**:

For practical evaluation for all procedures by the following; that interpreted step was done scored "1" and steps not done was scored "0". For each performance, the practical performance summed-up and the total evaluation divided by the number for the steps, gave a mean score for the practice. These scores changed into a percentage, and means computed. The satisfactory practice considered 80% or more and unsatisfactory practice if less than 80% operational.

-Content Validity and Reliability:

A group of experts from Faculty of Nursing Staff ascertained the content's validity; their opinions were elicited regarding the format, layout, consistency, accuracy, and relevancy of the tools. Reliability analysis by measuring of internal consistency of the tool through Cronbach's alpha test.

II -Operational Design:

The operational design included preparatory phase, content validity, pilot study and field work.

Preparatory phase:

It includes reviewing the current, past, local and international related literature and theoretical knowledge of various aspects of the study using books, articles, internet, periodicals and magazines to develop the study tools for data collection.

Ethical Considerations:

Written approval obtained from the studied students before inclusion in the study, a clear and simple explanation was given. They secured that all the gathered data was confidential and used for research purpose only.

- **Pilot Study:**

The Pilot study was carried out for 10% (35) of the subjects (334 cases) to test the validity and reliability of the tools, and then integrate the tools with the pilot study related to there wasn't modification

-Field Work:

Data collection for this study was carried out over a period of 11 weeks from the beginning of October to end of December 2021 after the following: An official permission was obtained from the Dean of Faculty of nursing at Sohag University to conduct the study. The aim was explained to nursing students, and written consent was obtained from every nursing student who accepted to participate in the study.

For assessing the knowledge of nursing students regarding COVID-19 using an online questionnaire:

Firstly, the objective of the study was clarified to all nursing students at each academic year separately to gain their trust and confidence to participate in the study. The investigator made an online questionnaire for Sohag university nursing students using Google forms and posted on several online platforms which accessible by nursing students at all levels such as Whats App groups, Telegram groups and Facebook groups. These platforms are official channels of communication between university and nursing students, with an informed consent form for nursing students included with it. On receiving and clicking the link the nursing students directed to the information about the study and informed consent. After they accepted to take the questionnaire they filled up the demographic details. Then a set of several questions appeared consecutively, in which the nursing students answered. The electronic questionnaire took about 10-15 minutes to be completed by the nursing students.(https://forms.gle/N15ZDsC9nsBpB32NA) opened for 17 days (24h a day) from 6 to 23/10/2021 because the responses reached to the desired sample of nursing students (334 responses). Rang of responses/day were (8-25 response)

For assessing the practice of nursing students regarding preventive measures of COVID-19 using observational checklists:

The investigator assessed their practice at clinical labs of faculty of nursing. The investigator was available 4 days weekly (Saturday, Tuesday, Wednesday, and Thursday) from 9Am to_2 P.M at appropriate time for students. The investigator divided the student in five groups: (1st year students, 2nd year students, 3ed year nursing students, 4th year nursing students and 5th year nursing students (nursing internship). The investigator divided each group into subgroups (each group contained 10 students) for collecting observational performance checklist in the skills lab, and the investigator maintained the social distance between them. After that, the investigator assessed each student (in subgroups) by the quality tools of; hand washing procedure, wearing and removing sterile gloves procedure, wearing and removing mask procedures regarding preventive measures of COVID-19 using designed different quality tools.

The investigator began the observational checklist at the same time with the electronic questionnaire. The investigator evaluated (6-10 nursing students) every day each nursing student toke (10-25 minutes) to perform all required procedures (Hand washing: 3-7 min. Wearing sterile gloves: 2-6 min. Removing sterile gloves: 2-4 min. Wearing face mask: 2-3 min. Removing face mask: 1-2 min). The nursing students who filled the electronic questionnaire were the same students who performed the practice.

III-Administrative design:

An official letter requesting permission for conducting the study was obtained from the Dean of faculty of nursing at Sohag University to conduct the study.

A letter issued to them from the Faculty of Nursing, Ain-Shams University, the investigator then met the dean of faculty of nursing and explained the purpose and the methods of the data collection

IV-Statistical design:

Data collected from the studied sample was revised, coded and entered using Computerized data entry and statistical analysis were fulfilled using the statistical package for social sciences (SPSS) version 26. Data were presented using descriptive statistics in the form of frequencies, percentages. Pearson correlation to assess the linear dependence (correlation) between two variables Statistical significant was considered at p-value <0.05

Results:

Table (1): Illustrates that, 76.9% of nursing students had age ranged from 18 - 22 years, with the mean age ± SD 20.11±4.23. 53.9% of them were male while 46.1% of them were female. Concerning place of residence 67.7% of nursing students were living in rural area while 32.3% of them were living in urban area. As regard Academic year 31.1% of nursing students at first academic year comparable with 13.8% of them at third academic year.

Figure (1): Illustrates that 64% of nursing students had satisfactory knowledge toward COVID-19, 95% of them had satisfactory knowledge toward precautionary measures, and the total satisfactory level of nursing students' knowledge was 81%, and unsatisfactory was 19%.

Figure (2) Illustrates that 90.1% of them got information about the COVID-19 from social media and the internet.

Table (2): Reveals that 91%, 81%, 85%, 80%, and 61% of nursing students respectively had satisfactory practice regarding hand washing, wearing sterile gloves, removing sterile gloves, wearing mask, and removing face mask procedure.

Table (3): Shows that a highly statistically significant correlation between nursing students' knowledge regarding COVID-19 and total practice, with p-value was <0.001**

Part I: Demographic characteristics for nursing students regarding COVID-19

Table (1): Distribution of nursing students according to their demographic characteristics (n = 334).

Items	**N**	**%**
Age		
18 < 22 Y	257	**76.9**
22-24 Y	77	23.1
Mean ±SD		20.11±4.23
Gender		
Male	180	**53.9**
Female	154	46.1
Residence		
Rural	226	**67.7**
Urban	108	32.3
Academic year		
1st year	104	**31.1**
2ed year	75	22.5
3rd year	46	**13.8**

4th year	62	18.6
5th year	47	14.1

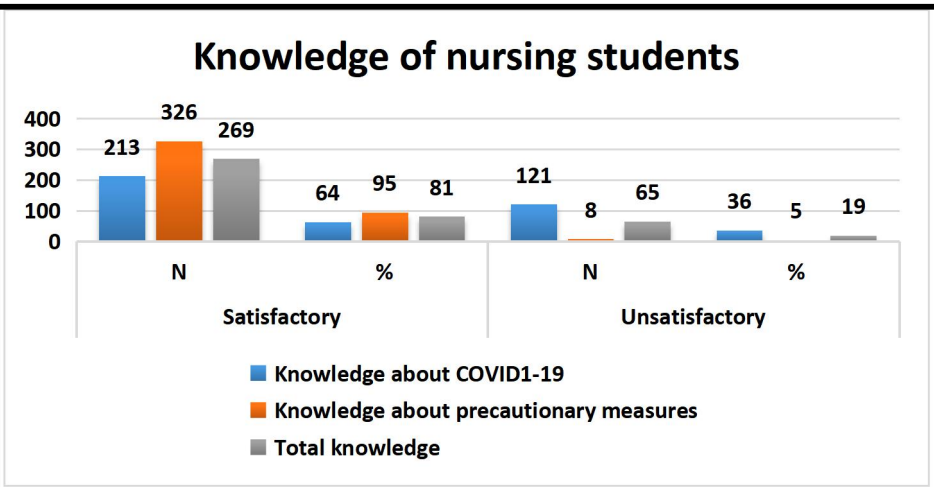

Figure (1): Total knowledge of nursing students

Part II: (B): Source of information o f nursing students regarding COVID-19 (n=334)

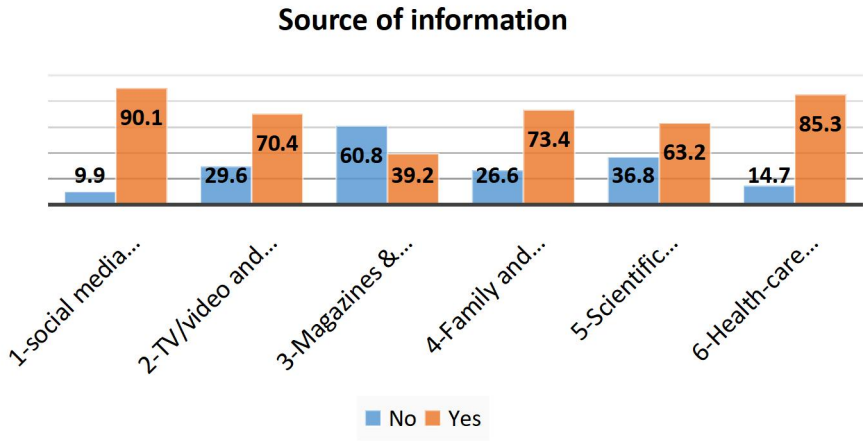

Figure (2): Distribution of nursing students according to their Source of information.

Table (2): Distribution of the nursing students according to their satisfactory and unsatisfactory practice about prevention and precautionary measures toward COVID-19

Dimensions	Satisfactory		Un satisfactory	
	N	%	N	%
Hand washing procedure	304	**91**	30	9
Wearing sterile gloves procedures	271	**81**	63	19
Removing sterile gloves procedures	285	**85**	48	15
Wearing face mask procedure	267	**80**	67	20
Removing face mask procedure	205	**61**	29	39
Total practice	**266**	**80**	**68**	**20**

Table (3): Correlation between knowledge and practice of nursing students about COVID-19

Variables	
Knowledge	**Total practice**
Knowledge regarding COVID-19	
R	0.190**
P-value	<0.002
Knowledge regarding precautionary measures	
R	0.230**
P-value	<0.000
Total knowledge	
R	0.211**
P-value	<0.002

Discussion:

COVID-19 is a serious pandemic which affect all the world. It is truly that corona viruses have already been existed before, however COVID-19 is a newly virus which can spread faster through inhaling droplet or touching surfaces then touch mouth, nose or eyes after the virus entering human body it causes altered function of organs specially lungs, liver, kidney and heart which could lead to death. ***(Van Doremalen et al., 2020)***

Concerning the characteristics of studied students (Table 1)

This result revealed that more than three-quarters of nursing students had age ranged between18-22years, from the investigator point of view this result may be due to the nursing student inter the college at the age of 18 years old and the highest number of nursing student were at 1st and 2ed academic year. These findings were in line with ***Shaheen et al., (2021)*** who studied Knowledge and Attitude of Undergraduate Nursing Students Toward COVID 19 and their Correlation with Stress and Hope Level, at Faculties of Nursing of Alexandria University, Damanhour University, and Modern University for Technology and Information, Egypt, that study illustrated that more than two thirds of students (70%) were less than 22 years old.

Concerning the gender of the study sample at the same table, the results revealed that the more than half of them were males, from the investigator opinion this may be due to males spend more time on internet and the investigator use an electronic questionnaire. This finding inconsistent with the result of ***Alshdefat et al., (2021)*** who studied Knowledge, Attitude and Practice of Nursing Students towards COVID-19 Pandemic in Oman in which most of the participants were female (67.5%).

Regarding the place of residence at the same table, the results revealed that the residence more than two- third of them were living in the rural areas while less than one-third were living in urban area, from the investigator opinion this may be due to the nature of Sohag governorate where most of people live in rural area. This finding is in the same line with the result of ***Alasmee, (2021*)**, who studied " Knowledge, Attitudes and Practices of King Abdulaziz Undergraduate Nursing towards Novel Corona Virus (COVID 19)." Saudi Arabia, and found that (70%) of study participants were living in rural area.

Regarding academic year at the same table, the current study showed that less than one third of study sample were in the first year in nursing college compared to less than one-sixth were in the third year this may be due to changing the society's view for nursing and this increase the demand for nursing college. The current result is inconsistent with the study of ***Ayed and Zabn,***

(2021) study which, conducted on Knowledge and Attitude Towards COVID-19 Among Nursing Students, in Palestine and revealed that (60.6%) of the nursing students were in the third academic year level.

Concerning studied students' knowledge about COVID-19 (Figure1)

The result of this study revealed that slightly less than two third of nursing students had satisfactory knowledge about COVID-19 from the investigator point of view this may be due to the serious situation of the epidemic and the overwhelming news reports on this public health emergency, nursing students actively learned knowledge of this infectious disease from various channels of information such as TV, social media, and the official website of the Egyptian ministry of health.

This finding agree with ***Reuben et al., (2021)***, who studied " Knowledge, Attitudes and Practices Towards COVID-19" in Nigeria, and reported that (99.7%) of participants had satisfactory knowledge about COVID-19, and with ***Kassie et al., (2020***), who study " Knowledge and attitude towards COVID-19 and associated factors among health care providers in Northwest Ethiopia" and reported that (73.8%) participants had satisfactory knowledge regarding COVID-19, also agreed with ***Prasad Singh et al., (2020)*** in India, who study "Assessing the knowledge, attitude and practices of students regarding the COVID-19 pandemic" and found that (70%) of students had good knowledge about COVID-19, and also supported by ***Khalil et al., (2020***) in Iraq, who studied " COVID-19 knowledge, attitude and practice among medical undergraduate students in Baghdad City" and reported that (91.8%) of students possessed adequate knowledge about COVID-19

As regard Source of information (Figure2). It is interesting to note that the majority of nursing students use social media to gain their knowledge. From the investigator point of view this finding may be due to the social media is the easiest, most available and contain a lot of information.

This result similar to ***El Ashery et al., (2021)***, who studied "Academic Nursing Students Awareness about Preventive Measures regarding COVID-19 at the Faculty of Nursing, Beni-Suef and El-Fayoum Universities, in Egypt" and found that the major source of information among academic nursing students for COVID-19 was social media (70%) in Fayoum and (74 %) in Beni-Suef.

Also the result of current study is in line with ***Albaqawi et al., (2020***) their study focused on "assessing the Saudi nursing students' perceptions, knowledge, and preventive behavior toward COVID-19". Their findings indicated that (71%) of students primarily use social media to gather information on COVID-19. As well as the current study result is similar to that of ***Huynh and Nguyen, (2020)***, study which reported that social media is the first source of COVID-19 information among healthcare workers in Vietnam (91.1%).

Concerning studied students' knowledge about precautionary measures (Figure1)

The result of this study revealed that the majority of nursing students had satisfactory knowledge about COVID-19 prevention and precautionary measures from the investigator point of view this could be explained by the fact that Egyptian Ministry of Health has conducted an official talk specified education channels to inform public about the COVID-19 and precautionary measures. Moreover, several reports about COVID-19 and the preventive measures to limit its spread are made from the World Health organization and Communicable Disease Centre.

This result is consistent with ***Hussein et al., (2021***) study " COVID-19 Knowledge, Risk Perception, and Precautionary Behavior among Medical Students in Egypt." Which found that (96.9%) of participants had satisfactory knowledge about COVID-19 precautionary measures. Also agreed with ***Salem et al., (2021)*** study "Assessment of knowledge, attitudes, and precautionary actions against COVID-19 among medical students in Egypt" which revealed that (93.4%) of participants reported wearing face mask, (91.2%) of them followed social distance (91.2%), and (92.2%) of participants perform hand washing which indicated that they had satisfactory knowledge toward precautionary measures.

Concerning studied students' total knowledge (Figure1). The result of this study revealed that most of nursing students had total satisfactory knowledge, from the investigator point of view this may be due COVID-19 is an epidemic disease and spread very fast also news reports on various channels of information such as TV, social media, and the official website of the Egyptian ministry of health, nursing students actively learned knowledge of this infectious disease and precautionary measures to limit its spread.

This result was similar to ***Olaimat et al., (2020)***, and ***Yesuf & Abdu, (2022***) study " Knowledge, attitude, prevention practice, and associated factors toward COVID-19 among preparatory school students in Southwest Ethiopia" which revealed that (80.1%) and (81.8) respectively of studied students had good total knowledge. Also the current finding in line with ***Umeizudike et al., (2021)*** study " Nigerian undergraduate dental students' knowledge, perception, and attitude to COVID-19 and infection control practices" which demonstrated that (50%) of participants had adequate total knowledge.

Concerning studied students total practice (Table 2)

The result of this study revealed that most of nursing students had satisfactory practice related to precautionary measures toward COVID-19, from the investigator point of view this may be due to hand washing, wearing and removing gloves procedures learned at nursing curriculum and Egyptian ministry of Health specified education channels to inform public about preventive measures and how apply it.

This result is consistent with ***Yesuf & Abdu, (2022***) study which reported (47%) of participants had good practice, and agreed with ***Peng et al., (2020***) study " A cross-sectional survey of knowledge, attitude and practice associated with COVID-19 among undergraduate students in China" which found that (87.94%) of subjects had satisfactory practice toward precautionary measures. Also the present finding consistent with ***Al-Rawajfah et al., (2021)*** study " COVID-19 knowledge, attitude, and precautionary practices among health professional students in Oman" which showed that (84.6%) of participants had satisfactory practice toward precautionary measures.

Correlation between knowledge and practice of nursing students about COVID-19 (Table 3)

On investigation the correlation between nursing students' knowledge regarding COVID-19 and their total practice. It was found that there was highly statistically significant correlation with p-value was <0.001**, where, nursing students who had more knowledge regarding COVID-19 and precautionary measures, had more practice than other students.

The present study was similar to the study done by ***Honarvar et al., (2020)*** in their study about" Knowledge, attitudes, risk perceptions, and practices of adults toward

COVID-19" in Iran, and showed that more than 80% of the sample size applying hand washing technique, more than half (70%) of their public survey implement the precautionary measures to prevent COVID-19 infection, and more than 60% of them wore a face mask and removed it correctly.

Also this study supported by ***Hasab Allah et al., (2022)*** in their study about " Knowledge, Attitudes and Practice Regarding COVID-19 amongst Nursing Students at Minia University" who showed that there is a highly statistically significant correlation between knowledge, and practices among nursing students with R= 307** and P valu .000.

Conclusion:

The findings of the current study concluded that slightly less than two-third of nursing students had a satisfactory knowledge about COVID-19 and majority of them had a satisfactory knowledge about precautionary measures toward COVID-19, also most of them had satisfactory practice related to precautionary measures toward COVID-19. Moreover, there was highly statistical significant relation between study variables and positive correlation between the nursing students' total knowledge and total practice.

Recommendation:

1- Instructions about proper use of face mask should be written on the packages. 2- Posters about correct steps of wearing and removing face mask should be placed at university.3- Increase the facilities for hand washing should be provided at Sohag faculty of nursing., 4- further researches about Effect of Social Media on Knowledge and Practices of Nursing Students regarding COVID-19.

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Conflict of interest

- No

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