Nursing Technical Institute Students Perception Regarding Coronavirus

Shimaa Hassan El Sayed [1], Tahany El senousy [2], Amira Hedaia [3]
1) Nursing Specialist at Technical Institute of Nursing, Sohag University
2) Professor of Critical Care and Emergency Nursing, Faculty of Nursing, Ain Shams University
3) Lecturer of Critical Care and Emergency Nursing, Faculty of Nursing, Ain Shams University

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. *Aim:* This study aimed to identify nursing technical institute students' perception regarding coronavirus. *Design:* Descriptive research design was utilized to achieve the aim of this study. *Sample:* A convenience sample of 138 nursing students. *Setting:* Nursing Technical Institute, Sohag University.*Tools of data collection:*(1): **Self-administered Questionnaire** including two parts: **Part 1:**Demographic characteristics **Part 2 :**Students' knowledge regarding coronavirus. **(2): Students Health Practices Tool:** It consists of two parts: **Part (1):** Assessment of student's health practices regarding coronavirus**. Part (2):** Observational checklist. **(3): Students attitude towards COVID-19 scale.** *Results* : Indicated that more than half of studied students were males, more than two fifth of them their ages were 19 years old, less than two third were in first year. Also, it was found that less than three quarters of them were living in rural areas. there was a statistically significant positive correlation between the total knowledge of studied students and their total attitude. Also there was a statistically significant positive correlation between total knowledge of studied students and their total practices. In addition, there was a high statistically significant positive correlation between the total practice of studied students and their total attitude. *Conclusion:* More than half of the studied students had satisfactory total level of knowledge about COVID 19.Also, most of the studied students had satisfactory level of total practices regarding prevention of COVID 19. In addition more than three quarters of the studied students had positive total attitude regarding COVID 19. *Recommendation:* Developing educational programs about COVID-19 for nursing students to improve their knowledge regarding COVID-19.

Key words: COVID-19, Nursing students, Perception

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 such as Middle East Respiratory Syndrome (MERS) and Severe Acute Respiratory Syndrome (SARS). It takes their names from crown-likespikes on their surfaces *(Cascella et al., 2022).*

According to current evidence, COVID-19 virus is primarily transmitted between people through respiratory droplets and contact routes. Droplet transmission occurs when a person is in close contact (within one m) with someone who has respiratory symptoms (e.g., coughing or sneezing) , Transmission can also occur if splashed or sprayed with contaminated fluids in the eyes, nose or mouth and, via contaminated surfaces, People remain contagious for up to 20 days and can spread the virus even if they do not develop symptoms **(Zhang et al., 2020) & (Liu et al., 2020).**

The COVID-19 pandemic is impacting the global population in drastic ways. It can 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 disease is highly infectious with a clinical symptom including dry cough, fever, fatigue and dyspnea, It may reach the severe stage, characterized by acute respiratory distress syndrome, metabolic acidosis, bleeding, coagulation dysfunction and septic shock **(Chen**

et al., 2020).

The COVID-19 infection diagnosed with polymerase chain reaction (PCR) which consider the most accurate and reliable diagnostic test for COVID-19, antigen test, D-dimer,and CT scan. Currently, different vaccines became available for human using as Pfizer-BioNTech, Moderna, Johnson; Johnson, Oxford-AstraZeneca, Novavax, Sinopharm and Sinovac. Now Egypt is manufacturing Sinovac vaccine at VACSERA factories through cooperation with china. *(WHO,2021).*

The COVID-19 produces a significant influence on world health, economics, and social life. Massive medical resources and labor have been devoted to the prevention and treatment of severe pneumonia, putting further strains on healthcare systems around the world and even threatening their exhaustion. It effects on psychological health producing fear of infection, anxiety, and panic have been recorded widely, in addition to financial woes. *(Anzai et al., 2020)&(Maffioli, 2020).*

The COVID-19 infection 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, avoid greet others with hand, wearing face mask, practice respiratory hygiene, cleaning surfaces, keep the windows and doors open for fresh air. Furthermore, light exercise, sleep adequate time, reduce stress and stay away from toxins are an important tip to boost immunity *(WHO, 2020).*

Nurses considered the frontline of healthcare, so they bear the additional responsibility of educating their patients and the general public on how to stay healthy and prevent the virus from spreading , During the COVID-19 pandemic, nursing students had a key role in supporting the healthcare sector, They can join healthcare professionals in clinical practice or provide information to increase citizens' levels of knowledge and their compliance with the restriction measures. some countries around the world employed student nurses to face the shortage of working nurses as

England who asked final and second year student nurses to join clinical practice as high-level health care assistants. they put themselves at risk to protect and support the next generation of nurses**.(May et al.,2020) (Alyssa Jordan,2020).**

It is very important to know perception of university nursing students toward COVID-19.becuase 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 *(Alasmee,2021& Emergency Nurses Association, 2020).*

Significance of the study:

Coronavirus disease 2019 (COVID-19) rapidly spread worldwide being declared a pandemic infection on March 11 by the World Health Organization (WHO). Globally, 22 November 2021, there have been two hundred fifty-six million nine hundred sixty-six thousand two hundred thirty-seven confirmed cases of COVID-19, including five million one hundred fifty-one thousand six hundred forty-three deaths, reported to WHO, As of 22 November 2021, a total of seven hundred forty million eight hundred eighty-seven thousand seventy-six vaccine doses have been administered ,while in Egypt, from 3 January 2020 to 22 November 2021, there have been three hundred fifty thousand three hundred ninety-seven confirmed cases of COVID-19 with nineteen thousand nine hundred thirty – three deaths, reported to WHO. As 22 November 2021, a total of thirty-six million nine hundred six thousand seven hundred sixty-five vaccine doses have been administered. **(WHO, 2021).**

Nursing students had a key role in supporting the healthcare sector during the COVID-19 pandemic, They can join healthcare professionals in clinical practice or provide information to increase citizens' levels of knowledge and their compliance with the restriction measures. Healthcare professionals and nursing students as a part of health care sector are more risk of contracting coronavirus because they provide care for many cases that

may lead to virus transmission, so the researcher conduct this study to assess nursing students perception regarding coronavirus .

Aim of the study

The present study aimed to identify nursing technical institute students' perception regarding coronavirus through:

1-Assessing nursing technical institute students' knowledge about (Coronavirus causes, vaccine, and isolation methods).

2-Assessing nursing technical institute students' health practices regarding prevention/control and protection of Coronavirus infection.

3-Assessing nursing g technical institute students' attitude regarding prevention/ control of Coronavirus infection.

Research Questions:

• What is the nursing technical institute students' knowledge about (Coronavirus causes, vaccine and isolation methods)?

• What is the nursing technical institute students' health practices regarding prevention/control of Coronavirus?

• What is the nursing technical institute students' attitude regarding prevention/control of Coronavirus?

Subjects and Method

The study subjects and methods were portrayed under the four main designs as the following:

1- Technical design.

2- Operational design.

3- Administration design.

4- Statistical design.

1-Technical design:

Research design:

Descriptive research design was utilized to achieve the aim of this study, descriptive research is a research method describing the characteristics of the population or phenomenon studied, this method focuses on observing and measuring without manipulating variables.

Setting:

This study was conducted at The Nursing Technical Institute, Afield to sohag University. The Institute was established in 1996, it was administratively affiliated to the faculty of medicine, sohag university. Than the Institute become administratively affiliated to the faculty of nursing, sohag university at the academic year 2012\2013 till now, with no independent building for the Institute till now but it located at terraced building in the ground floor, consisted of administrative office ,director of institute office , faculty members office and two labs only, so the institute students practical training take place at the faculty of nursing labs to accommodate the largest number of students.

The institute of nursing aims to graduate nursing technicians with degree of experience to provide high quality nursing care using the least available capabilities.

Subjects:

A convenience sample of all available Nursing Technical Institute students in the first and second year were included in the study.

The subjects of this study included 138 nursing students from 560 total number of the students .

Tool for data collection:

Data was collected through the following three tools:

(1):Self-administered Questionnaire

It was designed by the investigator based on scientific literature review including the following two parts: **(WHO, 2020).**

- Part 1: this part assessed the students demographic characteristics such as age, sex, academic year and residency.

- Part 2: this part assessed Students' knowledge regarding coronavirus it was consists of 14 questions included: definition of coronavirus, causes of Coronavirus, incubation period ,modes of transmission, risk factors, the most affected age group, manifestations, prevention/control, treatment of Coronavirus, methods of receiving vaccine , types of vaccine , the manufacturing country for each type of vaccine, exposure to side effects after getting vaccine and types of vaccine side effects.

Scoring System:

This part consists of 14 questions. The correct answer scored (1mark) and incorrect answer was score (zero).The total knowledge score was calculated as the following :The level of knowledge was consider Satisfactory if the percent are more than 80% and consider Unsatisfactory if less than 80% .

(2): Students Health Practices Tool: It consists of two parts

Part (1):Assessment of student's health practices regarding coronavirus:

This part consists of 9 questions. It assessed students' health practices regarding preventive or control measures of Coronavirus infection such as: avoid going out from home, avoid unnecessary vacation, avoid consuming out door food, avoid hand shaking , hugging and kissing, give more attention to personal hygiene , avoid public transportation, hand washing ,use disinfected solution and use facial mask out door **(WHO, 2020).**

Scoring System:

This part consists of 9 questions The correct performance was score (1mark) and the

incorrect performance was score (zero), The total practices score was calculated as the following : percent less than 80% will be unsatisfactory and percent 80% and more considered satisfactory.

Part (2): observational check list:

This part consists of 42 steps and it consists of two parts: **Frist** hand washing check list (11 steps).**Second**, protective equipment check list which include wearing and removing face mask (12 steps) , gowning (9 steps), gloving (10 steps) **(WHO, 2009).**

Scoring system:

This part consists of 42 steps, which were grouped into 2 subgroups i.e.: hand washing check list, protective equipment check list. The response was on scale ranged from 0 (Not done) , 1 (Done incorrect) and 2 (Done correct) . The total practices score was calculated as the following: percent less than 80% will be unsatisfactory and percent 80% and more considered satisfactory.

(3): Students attitude towards COVID-19 scale:

This tool determined the attitude of students toward COVID-19. It was adapted from (**Memish et al., 2014**) in which students' responses were evaluated via a three-point Likert scale of agreement, Student chose one of the following response: strongly agree , somehow and strongly disagree .

Scoring system: This part consists of 14 steps. The response was on point Likert scale ranged from 0 (Strongly Disagree), 1 (Somehow) & 2 (Strongly Agree). The total score was calculated as the following: percent less than 80% considered negative attitude and percent 80% and more considered positive attitude.

2- Operational design:
Preparatory phase:
It included reviewing of the related recent literature, and theoretical knowledge of various aspects of the study using textbooks,

articles, internet, periodicals and magazines to develop the data collection tools.

Tools validity:

validity was conducted to determine whether the tools cover an appropriate and necessary content as well as its relevance to the aim of the study. Validity of the developed tools was tested for its face and content validity through a jury of seven experts (1professor ,3 assistant professor and 3lecturer) from the critical care and emergency nursing department at faculty of nursing, Ain Shams University . The experts reviewed the tools for relevancy, comprehensiveness, simplicity and applicability, minor modifications were needed.

Reliability:

The developed tools were tested to determine its Reliability using Cronbach's Alpha test and was estimated as (0.72) for knowledge, (0.77) for attitude and (0.96) for practice.

Ethical consideration:

The ethical research considerations in this study include the following: -

1- The research approval was obtained from the scientific research ethical committee affiliated to the faculty of nursing at Ain shams University before starting the study as well as the director of the Technical Institute of Nursing at sohag University.

2- The researcher clarified the objectives and aim of the study to the students included in the study subjects.

3- The researcher assured maintaining confidentiality of the subject data.

4- Students was informed that they are allowed to choose to participate or not in the study and also they have the right to withdraw from the study at any time.

3-Administrative design:

An official permission was obtained from the director of Technical Institute of Nursing at sohag University and dean of faculty of nursing in which the study was conducted to obtain permission for data collection during the academic year 2022 – 2023. it ensured confidentiality of the collected data. After securing an official requirement for caring out this study.

The subjects were informed about choosing to participate or not and about their right to withdraw at any time without giving a reason. Data were anonymous, and only used for the purpose of the study. The researcher explained the aim and nature of this study to the students with assured them about confidentiality of the information given and that it will be used for research aim only.

Pilot study:

A pilot study was done before starting data collection on 10% (14) of students to evaluate the tools for clarity and applicability and to estimate the time needed to fill in the study tools then necessary modifications were carried out before actual data collection. According to the results of pilot study it was revealed that, the questions were clear and applicable to complete this study. So, pilot subjects were included in the study subjects as there was no subsequent modifications in the study tools.

Field Work:

Data collection took about 8 weeks started from the beginning of October to the end of November 2022. The investigator was available in the study settings 3 days per week from 10 Am to 1 Pm by scheduled rotation. Data collection from students who were accepted to be included in the study after explaining the aim of the study. Students was asked to fulfill the study tools according to their free time throughout the university day.

Assessing Students' knowledge, practice

and attitude regarding coronavirus by using Self-administered Questionnaire, students health practices regarding coronavirus observational check list and Likert scale as the following :

-Self-administered Questionnaire was filled by the students, it took about 7 to 10 minutes for every student to be fulfilled.

-students' health practices was filled by the students, it took about 5 to 7 minutes for every student to be fulfilled.

-Likert scale took about 5 to10 minutes for every student to be fulfilled.

-observational check list: the investigator evaluated around (6-8 students) per day, each student took about 15 to 20 minutes to perform all required procedures, each procedure took (3-5mins) .the investigator assessed student practice at the clinical labs of the Technical Institute of Nursing. Nursing students who filled the questionnaire were the same students who performed the procedures.

4-Statistical design:

Computerized data entry and statistical analysis were fulfilled using the Statistical Package for Social Sciences (SPSS) version26. The obtained data were organized, analyzed and represented in tables and graphs as required. Data were presented using descriptive statistics in the form of Number, Percentage, Mean score, Standard deviation (SD), Chi-square (χ^2), Logistic regression (B) and Correlation

coefficient (r), were used to estimate the statistical significant that was considered at P-value < 0.05.

Results:

Table (1) illustrated that, (55.8%) of studied students were males, 43.5% of them their ages were 19 years old with the mean age ± SD 18.77 ± 0.74. Regarding academic year, it was found that 63.8% were in first year. Also, it was found that 71% of them were living in rural areas.

Figure (1) demonstrated that, 51.4% of the studied students had satisfactory total level of knowledge about COVID 19.

Figure (2) showed that, 87.7% of the studied students had satisfactory level of total practices regarding the prevention/control measures of COVID 19.

Figure (3) illustrated that, (79.7%) of the studied students had positive total attitude regarding COVID 19.

Table (2) This table clarified that, there was a statistically significant positive correlation between the total knowledge of studied students and their total attitude. Also there was a statistically significant positive correlation between total knowledge of studied students and their total practices. In addition, there was a high statistically significant positive correlation between the total practice of studied students and their total attitude

Table (1): Frequency and percentage distribution of the studied students according to their demographic characteristics (n=138)

Characteristics of student		No.	%
Age in year	18>19	55	39.9
	19>20	60	**43.5**
	20>21	22	15.9
	21>22	1	0.7
Mean ± SD	**18.77 ± 0.74**		
Gender	Male	77	**55.8**
	Female	61	44.2
Academic year	First year	88	**63.8**
	Second year	50	36.2
Residence	Rural	98	**71**
	Urban	40	29
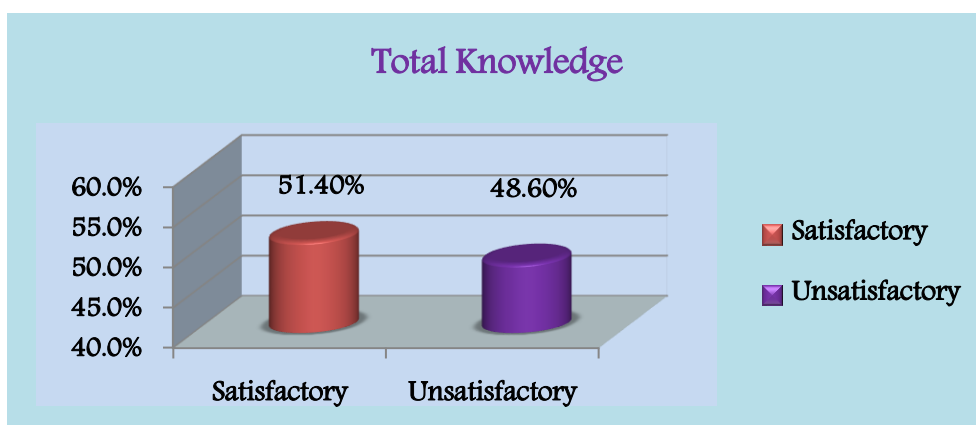
Figure (1): Frequency and percentage distribution of the studied students according to their total Level of Knowledge regarding COVID 19. (no = 138)
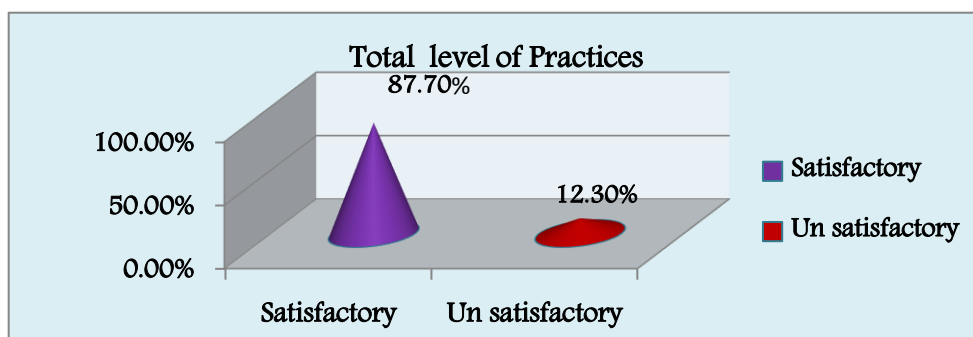
Figure (2): Frequency and percentage distribution of the studied students according to their total Level of Practices regarding Prevention of COVID 19. (no = 138)
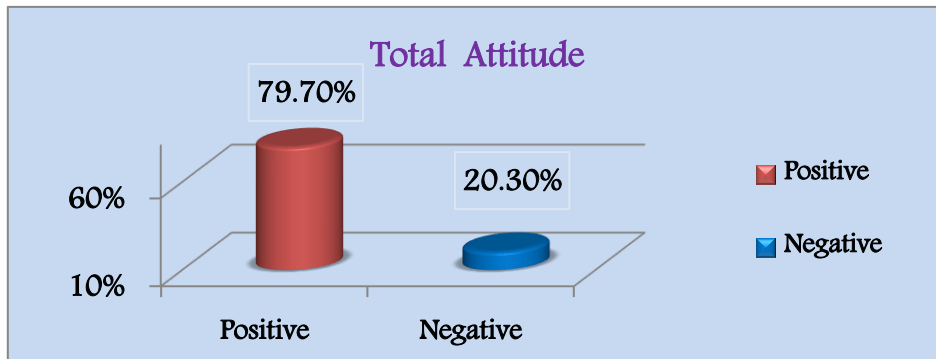
Figure (3): Frequency and percentage distribution of the studied students according to their total attitude regarding COVID 19. (no = 138)

Table (2): Correlation between total level of knowledge total attitude and total practices level regarding COVID 19 among the Studied Students.(n=138)

Studied variables	Total knowledge		Total attitude		Total practice	
	r	*p* −value	*r*	*p* −value	*r*	*p* −value
Total knowledge	---	------	0.221	0.012*	0.184	0.0338*
Total attitude	0.221	0.012*	---	-----	0.683	0.0000**
Total practice	0.184	0.0338*	0.683	0.0000**	----	------

(*) Statistically significant at p < 0.05　　　**(**) highly statistically significant at p<0.01**

Discussion

Corona viruses are a large family of viruses which may cause illness in animals or humans. In humans, several coronaviruses are known to cause respiratory infections ranging from the common cold to more severe diseases such as Middle East Respiratory Syndrome (MERS) and severe acute respiratory syndrome (SARS). The most recently discovered coronavirus causes coronavirus disease COVID-19 **(Lahariya , 2020)**.

COVID-19 is an infectious disease caused by the most recently discovered corona virus (SARS- COV2). This new virus and disease were unknown before the outbreak began in Wuhan, China, in December 2019, then rapidly spread around the world. SARS - COV2 primarily attack the human respiratory system, it could affect other organs as liver , kidney and heart **(Shereen et al., 2020).**

Nurses as health care providers had a vital role in fighting the COVID-19 pandemic due to their direct caring of patients with COVID-19 infection. Nurses also had a role in preventing and controlling the pandemic infection conditions. During the pandemic time and due to the sudden shortage among the healthcare providers urges nursing students to become a part of the health care team **(Elhadi et al., 2020).**

Regarding characteristics of the studied students the current study showed that more than half of the studied students were males. This finding disagreed with **(Gallè et al., 2021)** in study title "Knowledge and Acceptance of COVID-19 Vaccination among Undergraduate Students from Central and Southern Italy", as they reported that most of the sample were females.

Concerning the age of the studied students. the current study revealed that more than two fifth of studied students their ages were 19 years old. This finding disagreed with **(Shaheen et al., 2021)** who conducted a study about "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, at Egypt", thy illustrated that more than two thirds of the students were less than 22years old.

Regarding academic year it was found that less than two thirds of studied students were in first year. The current study result was inconsistent with a study conducted by **(Ayed and Zabn , 2021)** title "Knowledge and Attitude Towards COVID-19 Among Nursing Students, in Palestine" and revealed that less than two thirds of the nursing students were in the third academic year level.

Regarding the place of residence the present study revealed that less than three-quarters of the students were living in rural areas. This finding was in the same line with the result of a study done by **(Alasmee , 2021)** under the title "Knowledge, Attitudes and Practices of King Abdulaziz Undergraduate Nursing towards Novel Corona Virus (COVID 19)." In Saudi Arabia, and found that less than three-quarters of the participants were living in rural area.

As regard the total level of Knowledge ,the present study revealed that more than half of the studied students had satisfactory total level of knowledge about COVID 19. From the investigator point of view this result may be due to that the students' education in the field of health and their high level of awareness about this issue. Nursing students actively learned knowledge about the infectious diseases from various channels of information such as TV, social media, and the official website of the Egyptian Ministry of Health. This finding disagreed with **the finding of study done by (Reuben et al., 2021)**, who studied " Knowledge, Attitudes and Practices Towards COVID-19" in Nigeria, and reported that the majority of the participants had satisfactory knowledge about COVID-19 and also with **the finding of study done by (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 less than three quarters of the participants had satisfactory knowledge

regarding COVID-19.

In relation to total level of practices, the present study revealed that most of the studied students had satisfactory level of total practices regarding prevention of COVID 19. From the investigator point of view, this may be due to that Egyptian Ministry of Health informed the public about the pandemic rules, which were prepared based on the protective measures determined by the WHO after the emergence of the pandemic, and individuals were asked to obey such rules, which may had effectively contributed to this result. This finding agreed with **the finding of study done by (Peng et al., 2020)** who studied "A cross sectional survey of knowledge, attitude and practice associated with COVID-19 among undergraduate students in China" and reported that most of subjects (87.94%) had satisfactory practice toward precautionary measures. Also the present finding was consistent with **the finding of study done by (Al-Rawajfah et al., 2021)** who conducted a study about"COVID-19 knowledge, attitude, and precautionary practices among health professional students in Oman" and showed that most of participants had satisfactory practice toward the precautionary measures.

Regarding total level of attitude the present study revealed that more than three quarters of the studied students had positive total attitude regarding COVID 19.This result supported by **the finding of study done by (Mohammed ,2021)** who studied "Knowledge, Attitudes, and Practices towards COVID-19 among Health Care Workers in Primary Health Care Units Dar El Salam, Sohag, Egypt". and reported that more than three quarters of the HCWs had an accepted attitude towards successful control of COVID-19 infection.

Concerning correlation between total level of knowledge total attitude and total practices level regarding COVID 19 among the Studied Students. The present study clarified that, there was a statistically significant positive correlation between the total knowledge of studied students and their total attitude. Also there was a statistically significant positive correlation between total knowledge of studied students and their total practices. In

addition, there was a high statistically significant positive correlation between the total practice of studied students and their total attitude. this finding disagreed with **the finding of study done by (Dorji et al., 2021)** who studied "Knowledge, Attitude, and Practice Toward COVID-19 Among Sherubtse College Students in Bhutan: A Web-Based Cross-Sectional Study" and reported that A positive but weak correlation which was observed between the satisfactory knowledge level and practice with ($r = 0.1$, $p = 0.0126$), as well they having a positive attitude which led to practicing appropriately most of the time with ($r = 0.1866$, $p < 0.001$).

Conclusion

Based on statistical data, more than half of the studied students had satisfactory total level of knowledge about COVID 19.Also, most of the studied students had satisfactory level of total practices regarding prevention of COVID 19. In addition more than three quarters of the studied students had positive total attitude regarding COVID 19.

Recommendations

Based on the findings of this study, the following recommendations are proposed:

-Developing educational programs about COVID-19 for nursing students to improve their knowledge regarding COVID-19.

-Technical institute of nursing should provide student with sufficient knowledge about infectious diseases as COVID-19.

References

- **Alasmee, N. (2021).** Knowledge, Attitudes and Practices of King Abdulaziz Undergraduate Nursing towards Novel Corona Virus (COVID 19). *Health Science Journal*,*15*(1), 0-0.
- **Al-Rawajfah,O., Al-Mugeed,K. Alaloul, F., Al-Rajaibi, H., & Al Omari, O. (2021).** COVID-19knowledge, attitude, and precautionary practices among health professional students in Oman. *Nurse Educationin Practice*, *52*,103041.https://doi.org/10.1016/j.nepr.2021.103041
- **Alyssa Jordan (2020):** The Role of Nurses During a Pandemic.(877)6604623.(https://www.provocollege.edu/blog/on-the-   front-lines-the-role-of-nurses during-a-pandemic/)
- **Anzai, A., Kobayashi, T., Linton, N. M., Kinoshita, R.,Hayashi, K., Suzuki, A., &Nishiura, H. (2020)**.Assessing the impact of reduced travel on exportation dynamics of novel coronavirus infection (COVID-19). *Journal of clinical medicine*, *9*(2), 601.https://doi.org/10.3390/jcm9020601
- **Ayed, A., & Zabn, K. (2021).** Knowledge and Attitude Towards COVID-19 Among Nursing Students:Palestinian Perspective. *SAGE Open Nursing*, *7*,23779608211015150.https://doi.org/10.1177%2F2377960821101515
- **Cascella M, Rajnik M, Aleem A, (2022):** Features,Evaluation, and Treatment of Coronavirus (COVID-19)[Updated 2022 Feb 5]. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2022 Jan- Accessed at10 February 2022.Availableat:https://www.ncbi.nlm.nih.gov/books/NBK554776/
- **Chen, Z., Fu, J., Shu, Q., Chen, Y., Hua, C., Li, F., & Zhang, Y. (2020):** Diagnosis and treatment recommendations for pediatric respiratory infection caused by the 2019 novel coronavirus. *World journal of pediatrics*, *16*(3), 240-246.
- **Dorji T., WangmoK.,, Yezer, Wangchuk T., shokey T.,& Wangdi K. (2021):** who studied Knowledge, Attitude, and Practice Toward COVID-19 Among Sherubtse College Students in Bhutan: A Web-Based Cross-Sectional Study . Front. Public Health9:721493.doi:10.3389/fpubh.2021.721493
- **Elhadi, M., Msherghi, A., Alkeelani, M.,Zaid, A., Alsuyihili, A., Buzreg, A.,Ahmed,H., Abdelkabir, M., Gaffaz,R., (2020):** Assessment of Healthcare Workers' Levels of Preparedness and Awareness Regarding COVID-19 Infection in Low-Resource Settings. The American Journal ofTropical Medicine and Hygiene, 103(2),828833.https://doi.org/10.4269/ajtmh.20-0330.
- **Emergency Nurses Association (2020):** ENA Statement on Emergency Nurse Protection During COVID-19 Pandemic. Retrieved from https://www.ena.org/pressroom/articles/detail/2020/03/27/enastatement-onemergency-nurse-protection during-covid-19.
- **Gallè F., Sabella A., Roma P, De Giglio O , Caggiano G ,Tafuri S, Da Molin G., Ferracuti S,(2021):** Knowledge and Acceptance of COVID-19 Vaccination among Undergraduate Students from Central and Southern Italy.

Vaccines,9,638.https://doi.org/10.3390/vaccines9060638.

- **Kassie, B. A., Adane, A., Tilahun, Y., Kassahun, E. A.,Ayele, A. S., & Belew, A. K. (2020).** Knowledge and attitude towards COVID-19 and associated factors among health care providers in Northwest Ethiopia. *PloS one*,*15*(8),e0238415.https://doi.org/10.1371/journal.pone.0238415

- **Lahariya, C (2020):** Health & Weallness centers to strengthen primary health care in india: concept progress and ways forward.the indian journal of pediatrics,87(11),916-929.

- **Liu, J., Liao, X., Qian, S., Yuan, J., Wang, F., Liu, Y.,& Zhang, Z. (2020):** Community transmission of severe acute respiratory syndromecoronavirus2Shenzhen,China *Emerging infectious diseases*, *26*(6), 1320.

- **Maffioli, E. (2020).** How is the world responding to the novel coronavirus disease (COVID-19) compared with the 2014 West African Ebola epidemic? The importance of China as a player in the global economy. *The American Journal of Tropical Medicine and Hygiene*,*102*(5),924.https://dx.doi.org/10.4269%2Fajtmh.20-0135

- **May, R., McQueen, F., McArdle, C., White, J., Kinnair, D., Sutcliffe, A., Webster-Henderson, B., Walton, G., (2020).** Supporting Nurses and Midwives across the UK and Nursing Associates (England only) in the event of a COVID-19 epidemic in the UK

- **Memish Z, Al-Tawfiq J, Makhdoom H, Al-Rabeeah A, Assiri A, Alrabiah F, Alhajjar S, Albarrak A, Flemban H, Barry M, Alhassan S, Alsubaie S, Zumla A (2014**). Screening for Middle East respiratory syndrome coronavirus infection in hospital patients and their healthcare worker and family contacts: a prospective descriptive study. Clin. Microbiol. Infect. 20**:**469–474.

- **Mohammed ,A (2021**):who studied Knowledge, Attitudes, and Practices towards COVID-19 among Health Care Workers in Primary Health Care Units Dar El Salam, Sohag , Egypt. Sohag Medical Journal,25(1),50-58.

- **Peng, Y., Pei, C., Zheng, Y., Wang,J.,Zhang, K., Zheng, Z., & Zhu, P. (2020).** A cross-
-

sectional survey of knowledge, attitude and practice associated with COVID-19 among undergraduate students in China.*BMC public health*, *20*(1), 1-8.https://doi.org/10.1186/s12889-020 09392-z

- **Rahman, A., & Jahan, Y. (2020).** Defining a 'risk group'and ageism in the era of COVID-19. *Journal of Loss and Trauma*, *25*(8), 631-634. https://doi.org/10.1080/15325024.2020.1757993

- **Reuben, R. C., Danladi, M., Saleh, D. A., & Ejembi, P. E.(2021).** Knowledge, Attitudes and Practices Towards COVID-19: An Epidemiological Survey in North-Central Nigeria. *Journal of community health*, *46*(3),457–470. https://doi.org/10.1007/s10900-02000881S36.https://doi.org/10.12669/pjms.36.COVID-19-S4.2636.

- **Shaheen,R., Moussa A., & Khamis, E. (2021).**Knowledge and Attitude of Undergraduate Nursing Students Toward COVID 19 and their Correlation with Stress and Hope Level. *Assiut Scientific Nursing Journal*,*9*(24),7383.https://dx.doi.org/10.21608/asnj.2021.61540.1124

- **Shereen, M. A., Khan, S., Kazmi, A., Bashir, N., & Siddique, R. (2020):**COVID-19 infection: Origin, transmission, and characteristics of human coronaviruses. Journal of Advanced Research, 24, 91–98. https://doi.org/10.1016/j.jare.2020.03.005.

- **WHO(2020):**Origin of sars-cov2, 26march2020(No.WHO\2019nCoV\FAQ\Virus-origin\2020.1).Worled Health Organization.

- **world health organization (2009):**The world health organization guidelines on hand hygiene in health care and their consensus recommendation .infection control&622-Hospital Epidemiology,30(7),611.

- **World Health Organization (WHO) (2021):** EGYPT:WHOcoronaviruses disease (COVID-19) dashboard. Accessed at 23 August 2021. Availableathttps://COVID19.who.int/region/emro/country/eg

- **Zhang Y, Chen C, Zhu S.(2020)** [Isolation of 2019-nCoV from a stool specimen of a laboratory-confirmed case of the coronavirus disease 2019 (COVID-19)]. China CDC Weekly. 2020;2(8):123–4. (In Chinese).