Knowledge and practice of Nursing Students and Their Families during COVID19

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Abstract

Background: Students nursing are primarily responsible for protecting and maintaining the family members. They can be a role model for their family member and affect positively their health behaviors for protection against the infection with COVID19. **The study aimed** to: assess knowledge and practice of nursing students and their families. **Data collection tools: First tool**: A structured interviewing questionnaire for the student and their families. -**Second tool**: Observational home environment checklist. **Results:** Knowledge, the current study result illustrated that 63.0% less than two thirds of studied students had unsatisfactory level of knowledge about COVID19.While,37.0% more than one third of them had.19-preventive measures of COVID - Regarding families total knowledge, the current study level of knowledge satisfactory result illustrated that 55.4% more than half of the studied families had unsatisfactory level of knowledge about health practice measures of COVID-19. While,44.6% less than half of them had satisfactory level of knowledge about COVID-19 **Conclusion**: There was a significant statistical relationship between total level of knowledge of the studied students and their age educational level, history of health problems, family history of COVID-19 and previous infection of COVID-19. There was no significant statistical relationship between total level of practice of the studied families and their income. **Recommendation**: Design educational program by family and community health nursing to increase families and students knowledge and practice about COVID-19, disseminate multiple communication approaches, digital, paper, prochures, phone messages, etc.

Keywords: COVID-19, knowledge practice

Introduction:

Corona viruses are a group of related viruses that cause diseases in mammals and birds. In humans, coronaviruses cause respiratory tract infections that can range from mild to lethal. COVID-19 is caused by infection with the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) virus strain **(XuL et al., 2020).**

COVID-19 spread quickly in all the world. People were infected 180 million and killed around 4 millions people worldwide. Common signs and symptoms of coronavirus infection include the symptoms of acute respiratory disorders such as fever, cough and shortness of breath. In severe cases, it can cause pneumonia, acute respiratory syndrome, renal failure, and even death. Given the seriousness of the impact of extraordinary events and the epidemic of infectious diseases, it is necessary to take protection measures for the community **(Yi-Chi et al., 2020).**

Health promotion measures aimed at improving access to better information and services plays a vital role in giving people more control over their health and well-being. Health promotion can make an essential contribution to fighting a global pandemic such as COVID-19 **(Tamang et al., 2020).**

Preventive measures are very important to limit injury of COVID-19. Preventive measures include limiting contacts by keeping physical distance, personal preventive measures such as hand hygiene, face masks and vaccination as well as cleaning and ventilation, cleaning and disinfection, permanent and cross ventilation, wast management, managing cases, (action protocol for cases and outbreak, isolation)and high risk groups **(Van den**

Broucke, 2020).

Nursing students are most population can exposed to COVID-19, they go to hospitals and contact patients in the hospital, or outpatients, and their relatives, they should deal with every patient as suspected person, wear precaution subjects, hand washing, alcohol and keep distance from patients, person's. They can transmitte any disease to their families especially COVID-19. They should have standard precautions and their families **(Munthali et al., 2020).**

The family is the most important primary group in society. It is the simplest and the most elementary form of society. It is the most basic of all social groupings. It is the first and the most immediate social environment to any person. It is an outstanding primary group, because everyone develops its basic attitudes **(MacDonald et al., 2018).**

There is relationship between nursing students and their families.They are source of infection to their families. They train in health care units and hospitals. They can transmitte any disease or any infection to their families Family members of nursing students are extremely exposed to COVID-19 infection. Family members are less protected than nursing students **(Lebow, 2020).**

Family health nurse has an important role to promote health and to increase community awareness by giving health education to nursing students and their families about health promotive measures and it's relationship with COVID-19, importance,and it's reaction also keep open communication channels with community members and maintain health promotion and prevention of disease **(Kaakinen et al., 2018).**

Significance of the study:

Egypt recorded 2922 person infected from each million. 208,876 infected were recorded according to the official website of the Egyptian web Egypt care.Healthcare workers including nursing students are also thought to be at risk of getting infected so it is very important to assess the nursing student's knowledge, and practices about COVID-19 virus (Egyptian MOH web, 2021).

The study aims to assess knowledge and practice of nursing students and their families during COVID-19 through:

1- Assessing nursing students knowledge of COVID-19.

2- Assessing families knowledge of COVID-19.

3- Assessing nursing students reported practices regarding COVID-19.

4- Assessing families reported practices at home regarding COVID-19.

5- Assessing safety home environment.

Research questions

1- Is there relation between nursing student's knowledge and their reported practices regarding of COVID-19?

2- Is there relation between family's knowledge and their reported practices at home ?

3- Is there relation between sociodemographic characteristics of nursing students and their

4- knowledge?

5- Is there relation between sociodemographic characteristics of nursing students and their reported practice?

6- Is there relation between families knowledge of preventive Covid-19 and home environment.

Subjects and Method

The study was portrayed under the four main designs as following:

Technical design.
Operational design.
Administrative design.
Statistical design.

Technical design

The technical design used for the study

was discussed in the following four categories: research design, the setting of the study, subjects of the study and tools for data collections.

A- Research design:

A descriptive design was utilized to conduct this study.

B-Setting:

The study was conducted at secondary schools nursing in Dakhalia. There are 20 secondary school nursing in Dakhalia. The study was conducted in 4 secondary schools.

The 4 secondary schools are:

1- Manzala secondary school nursing

2- Gamilia secondary school nursing

3- El-Mattarya secondary school nursing

4- Met Salsil secondary school nursing

C-Subjects:

Sample size:

Multistage sample were used to select school name. The study conducted in secondary schools nursing in Dakhalia.There are 20 secondary school nursing in Dakhalia.The study conducted in 4 secondary nursing schools.

Sample size of total students 360 student nurses was 155 students needs to be recruited to achieve confidence level 90%

There were home visits to nursing students families

Sample type:

A random sample was used to recruit 155 student who fulfilled study inclusion criteria.

Data collection tools:

Two tools were used for data collection to achieve the aim of the present study:

First tool. Astructured interviewing questionnaire for the student and their families:

It was designed by the investigator in the Arabic language after reviewing the related literature and consisted of 58 questions. It was utilized into five parts:

Part (1): It was designed to assess student and their families Socio demographic characteristics (22 questions).

Student Socio demographic data questions from(1-5) as {age.academic year,residence, school name.health problems.

Families data questions from(6-14) as (marital status of parents.type of family. level of education; income and occupation of mother and father).

Part (2): It was used to assess student's knowledge about promotive and preventive measures of COVID 19.It included questions from(23 -31)as definition. sign. symptoms. mode of transmission and promtive and preventive measures of COVID 19.

Scoring system:

Each question was evaluated as 2 score for correct complete answer, 1 for correct incomplete answer and 0 score for incorrect.The total score will be summed up and classified into:

Satisfactory: 60% or more.

Unsatisfactory: less than 60%.

Part (3): It was used to assess families' knowledge about promotive and preventive measures of COVID 19.It included questions from(32 -48)as definition, sign, symptoms, mode of transmission and promtive and preventive measures of COVID 19.

Scoring system:

Each question was evaluated as 2 score for correct complete answer,1 for correct incomplete answer and 0 score for incorrect.The total score will be summed up and classified into:

Satisfactory: 50% or more.

- Unsatisfactory: less than 50%.

Part (4): Student's reported practices regarding promotive and preventive measures of COVID 19. it included questions from (49-58) as hand washing,face mask, keeping physical distance and vaccination etc.

Scoring system: each statement will be evaluated as 1 score for proper practice and 0 score for improper practice. The total reported practices will be summed up and classified into:

-Correct practice: 60 % or more.

-Incorrect practice: less than 60%.

This tool is adapted form **Musa (2018)**.

Part (5): Family's reported practices regarding promotive and preventive measures of COVID 19. it included questions from (49-58) as hand washing,face mask, keeping physical distance and vaccination etc.

Scoring system: each statement will be evaluated as 1 score for proper practice and 0 score for improper practice. The total reported practices will be summed up and classified into:

-Correct practice: 50 % or more.

-Incorrect practice: less than 50%.

This tool is adapted form **Musa (2018)**.

Second tool: Observational home environment checklist to assess home,safety environment, ventilation, crowded and waste disposal. This tool is adapted form **Musa (2018)**.

Operational design:

The operational design includes elaboration of the phases of the study, namely preparatory phase, ethical considerations, pilot study, and fieldwork.

A-Preparatory phase: it is first phase of the study,which included review of recent, current, national and international related knowledge and practice about COVID-19.It aims to design the study tools and prepare the theoretical part to be acquainted with various aspects of the problem.

Content validity

The validity of the tools was done through seeking the opinions of a jury group consisting of three proffesors of community health nursing department who judged their clarity, comprehensivenes, accuracy, relevance and whether it elicited the type of information sought; thus the tools were the content-validated. The tools were modified and rephrashed based on the jurys opinions. This phase took two weeks duration.

Reliability of the study tools

It was conducted for the developed tool to achieve the criteria of trust-worthiness of the tool reliability. The test used for tool reliability was Coronbach alpha test and the result was:

Ethical considerations:

Official permission was obtained from the Scientific Research and Ethical Committee in the Faculty of Nursing at Ain Shams University before starting the study.The investegator was clarified the importance and aim of the study to all mothers included in the study.

Oral consents were obtained from all families. a clear and simple explanation was given according to their level of understanding, physical and mental readiness.The questionnaire didn't include any immoral statements that touch family's beliefs, dignity, culture, tradition and religious issues.all families were informed that they are allowed to choose to participate or not in the study and that they have the right to withdraw from the study at any time without giving any reason and confidentiality of the information was assured. All families were informed that the collected data would be used only for the present study, as well as for their benefits.

Ethical code : 24.12.452

Pilot study:

The pilot study was carried out for one week to evaluate the reliability and applicability of the tools to find the possible obstacles that might be faced during data collection. 10% from the total sample was included and chosen randomly from the previously mentioned setting and not excluded from the sample. There were no major modifications found after the pilot study. The pilot also served to assess the reliability of the scale by examining its internal consistency.

Field of work:

The previously mentioned setting was attended by the investigator two days/week (Sunday and Wednesday) from 9.00 a.m. to 1 p.m.

Data collection was started from beginning of January 2024, till the end of June 2024, covering six months for data collection about three students per day.The investigator introduced herself and explained the purpose of the study to the families and students before starting the interview. The investigator distributed questionnaire to families who can read and write after clear explaing the way to fill it out and read questions to illiterate families in order to collect the required data to assess health promotive and preventive measures of nursing students and their families during COVID19. The interviewing tools took about maximum 30 minutes for every family.All families were not present, 35 families attended.The investigator trained the students to fill out the form.

3-Administrative design:

An official permission was issued from the Dean of the Faculty of Nursing at Ain Shams University to the Director of nursing schools in dakhalia, and Scientific Research Ethical Committee in the Faculty of Nursing as an approval to conduct this study.

4-Statistical design:

Data collected from the studied sample was revised, coded and entered using Personal Computer (PC) using Statistical Package for Social Sciences (SPSS) version. Computerized data entry and statistical analysis were fulfilled using the SPSS version 22. Data were presented using descriptive statistics in the form of frequencies, percentages and Mean Standard Deviation (SD). The Chi Square statistic is used for testing relationships between categorical variables.

Significance of the results:

Highly significant at p-value < 0.01.

Statistical significant was considered at p-value <0.05.

Non-significant at p-value > 0.05.

Results:

Table (1) shows that, 44.5% of the studied students were in age group >16 years and 47.1% of them were in the second educational level. Also, 62.2 of the studied students were from rural residence.Also 65.1% of them had anemia.

Table (2) shows that 98.1% of the studied families were married. Also, 50.3% of students fathers were occupied in governmental job while 72.3% students mothers were housewives. Additionally, 50.3% of the sample reported are not enough monthly income.

Table (3) shows that, 64.1% of the studied students had incomplete correct answer regarding definition of COVID-19 and 57.6% of them had incomplete correct answer regarding complications of COVID-19. Also, 56.5% of them had incomplete correct answer regarding mood of infection of COVID-19 spreads. While, 56.5% of them had incorrect/ don't know answer regarding symptoms of COVID-19 and 50.0% of them had incorrect/ don't know answer regarding types of vaccinations for CO VID19.

Table (4) shows that 52.3%of the studied families had incomplete correct answer regarding definition of COVID-19 and 49.7% of them had incomplete correct answer regarding complications of COVID-19. 60.0%of them had incomplete correct answer regarding mode of infection of COVID-19,also 43.2 of them had incomplete correct answer regarding treatment of COVID-19.

Table (5) shows that, 96.1% of the studied students maintain distancing in hospitals and 94.2% of them keep and take care of personal tools and work clothes When returning home from practical training. While, 62.9% of them didn't deal directly with patients and 59.1% of them didn't wear personal protective equipment when dealing with cases: a gown, mask, gloves, and face covering.

Table (5) continue shows that, 71.6% of the studied students were careful when dealing with family and reduce mingling and 67.7% of them wash hands with soap and water when returning home. Also, 63.9% of them use chlorine on handles and doors. While, 80.6% of them didn't wash practical training clothes with family clothes.

Table (6) shows that, 64.5% ofstudent's family clean, disinfect surfaces in general and 61.9% of them expose covering and clothing directly to the sun. Also, 63.9% of them use chlorine on handles and doors. While, 56.1% of them didn't dispose of waste safely and regularly and 51.0% of them didn't use disinfectants at

Table (6) continue shows that, 100.0% of the studied family avoid sharing personal tools with the injured person and 96.1% of them disinfect the containers used by the infected person immediately after finishing them, and handle them with caution while cleaning. Also, 92.9% of them disinfect and clean surfaces and the infected person's room regularly and 91.6% of them work to ventilate the patient's room. Also, 63.9% of them use chlorine on handles and doors.

Table (7) shows that, the house is clean among 78.7% of the studied homes and disinfecting and sterilizing doors and keys were done among 69.0% of them. Using soap, chlorine, disinfectants and detergents are not mixed together were done among 51,6 of the studied homes. Also, there is a suitable and clean water source in 65.8% of the studied homes and there is adequate sanitation among61.9% of them. While, soap, chlorine, and disinfectants are not used, and detergents are mixed together among 51.6% of them.

Tables (7) continue shows that, in the case of an infected person, waste should be disposed of correctly among 87.1%of the families homes and disposal of the infected person's waste first and the necessity of defining it among 57.4% of them.. While, mix the infected person's waste with other waste among 57.4% of them.

Table (8) shows that,there was a significant statistical relationship between total level of knowledge of the studied students and their age, educational level, history of health problems, family history of COVID-19 and previous infection of COVID-19 at P-value = 0.002, 0.000, 0.043, 0.021 and 0.053 respectively.

Table (9) shows that, there was a significant statistical relationship between total level of practice of the studied students and their residence, history of health problems, family history of COVID-19andpreviousinfection of COVID-19 at P-value = 0.007, 0.001, 0.013 and 0.046 respectively.

Table (10) shows that, there was non-significant statistical correlation between total level of practice and total level of knowledge among the studied students at P- value = 0.072. Also, there was non-significant statistical correlation between total level of practice and total level of knowledge among the studied family at P - value = 0.096

Table (11) shows that, there was a significant statistical relationship between families knowledge of preventive measures and home environment among the studied family at P- value=0.016.

Table (1): Distribution of the studied students according to their socio-demographic characteristics (n=155).

Demographic characteristics	N	%
Age(in years)		
≥15	47	30.3
≥16	69	44.5
≥17	39	25.2
Acadmic year		
First	47	30.3
Second	73	47.1
Third	35	22.6
Residence		
Rural	97	62.6
Urban	46	29.7
Other	12	7.7
School name work		
Met Sasil	50	32.3
Gamalia	25	16.1
Mattria	50	32.3
Manzala	30	19.4
Health status		
Anemia	54	65.1
DM	0	0.0
HTN	0	0.0

Table (2): Distribution of the studied families according to their sociodemographic characteristics (n=155).

Demographic characteristics	N	%
Marital status of parents		
Married	152	98.1
Divorced	3	1.9
Types of students families		
Nuclear	83	53.5
Extend	72	46.5
Single	0	0.0
Educational level of father		
Read\write	14	9.0
Elementary	31	20.0
Secondary	51	32.9
University\higher	59	38.1
Educational level of mother		
Read\Write	8	5.2
Elementary	23	14.8
Secondary	89	57.4
University\higher	35	22.6
Fathers occupation		
Governmental job	78	50.3
Private job	24	15.5
Handcraft	42	27.1
Retirement	11	7.1
Mothers occupation		
Housewife	112	72.3
Technical work	19	12.3
Administrative work	24	15.5
Crowding index		
Uncrowded	81	52.3
Crowded	53	34.2
Overcrowded	21	13.5
Monthlyincome		
Enough	51	32.9
Enoughandsave	26	16.8
Not enough	78	50.3

Table (3):Distribution of studied students according to their Knowledge aboutCOVID-19(n=155).

Items	**Complete correct**		**Incomplete correct**		**Incorrect/ don'tknow**	
	N	**%**	**N**	**%**	**N**	**%**
Definition of COVID-19	20	13	99	64.1	35	22.8
Mode of infection of COVID-19 spreads	34	21.7	88	56.5	34	21.7
Symptoms of COVID-19	35	22.8	32	20.7	88	56.5
Complications of COVID-19	0	0.0	89	57.6	66	42.4
Vulnerable group to COVID-19infection	15	9.8	81	52.2	59	38.0
Investigations of COVID-19 diagnosis	40	26.1	45	29.3	69	44.6
Types of vaccination for covid	5	3.3	72	46.7	78	50.0
Treatment of COVID19	13	8.7	74	47.8	67	43.5

Table (4): Distribution of studied families according to their Knowledge about COVID-19(n=155).

Family knowledge about COVID-19	Complete correct		Incomplete correct		Incorrect/ don't know	
	N	%	N	%	N	%
Definition of COVID-19	32	20.6	81	52.3	42	27.1
Mode of infection of COVID-19 spreads	41	26.5	93	60.0	21	13.5
Symptoms of COVID-19	49	31.6	56	36.1	50	32.3
Complications of COVID-19	32	20.6	77	49.7	46	29.7
Vulnerable group to COVID-19infection	55	35.5	41	26.5	59	38.1
Investigations of COVID-19 diagnosis	29	18.7	37	23.9	89	57.4
Types of vaccination for covid	17	11.0	54	34.8	84	54.2
Treatment of COVID19	34	21.9	67	43.2	54	34.8

Table (5): Distribution of studied students according to their reported practices regarding promotive and preventive measures of COVID-19 (n=155).

Practices during training in hospitals	Done		Notdone	
	N	%	N	%
1-Maintaining distancing in hospitals	149	**96.1**	6	3.9
2-Bring alcohol and soap for students, and Wash hands frequently	69	44.8	86	55.2
3-Do not deal directly with patients	58	37.1	97	**62.9**
4-Wear a surgical mask	99	63.9	56	36.1
5-Wear personal protective equipment when dealing with cases: a gown, mask, gloves, And face covering	63	40.9	92	**59.1**
6-Taking special vaccinations for the virus	128	82.5	27	17.5
7-When returning home from practical Training, keep and take care of personal tools and work clothes	146	**94.2**	9	5.8

Table (5) Distribution of studied students according to their reported practices regarding promotive and preventive measures of COVID-19 (n=155).

Practices during dealingwith family	Done		Not-done	
	N	%	N	%
1-Wash hands with soap and water when returning home	105	**67.7**	50	32.3
2-Usechlorineon handles and doors	99	63.9	56	36.1
3-When returning home from practical training, keep and take care of personal tools and work clothes	89	57.4	66	42.6
4-Wash practical training Clothes with family clothes	30	19.4	125	**80.6**
5-Becarefulwithdealingwithfamily and reduce mingling	111	**71.6**	44	28.4
6-Hand washing at home	63	40.6	92	59.4
7-Gowning	0	0.0	155	100.0
8-Wearing gloves at home	14	9.0	141	91.0

Table (6): Distribution of studied families according to their reported practices regarding promotive and preventive measures of COVID-19 (n=155).

	Done		Not done	
	N	%	N	%
A-Practices of clean home				
1-Ido harmful ventilation of the house	87	56.1	68	43.9
2-Cleananddisinfectsurfacesingeneral	100	**64.5**	55	35.5
3-Iusedisinfectantsat home	76	49.0	79	**51.0**
4-Exposecoveringandclothingdirectlyto the sun	96	**61.9**	59	38.1
5-Dispose of waste safely and regularly	68	43.9	87	**56.1**
B-Personal hygiene practices:				
1-Wash hands frequently with soap and water	110	**71.0**	45	29.0
2-Wearamaskingatheringsand crowds	99	63.9	56	36.1
3-Maintaindistancingandspacebetween People	102	65.8	53	34.2
4-Avoidtouchingeyes and nose with hands	66	42.6	89	**57.4**
5-Wearthemask once	78	50.3	77	49.7
6-Dispose of the mask correctly and safely	105	67.7	50	32.3
7-Avoid touching the outside of the mask and make sure it covers the nose and ears	68	43.9	87	**56.1**
8-Washhandsbeforeputtingonandtaking off the mask	94	60.6	61	39.4
9-Use alcohol	106	68.4	49	31.6
10-Constantly rub hands with alcohol after shaking hands with people	122	78.7	33	21.3
11-Use tissues when sneezing and coughing	88	56.8	67	43.2
12-Maintainpropersneezingandcoughing etiquette and use your elbow if tissues are not available	79	51.0	76	49.0

Table (6)continue: Distribution of studied families according to their reported practices regarding promotive and preventive measures of COVID-19 (n=155).

C-Special practices for dealing with infected people	Done		Not-done	
	N	%	N	%
1-Avoidcontactwithsickpeople	130	83.9	25	16.1
2-Iisolate the injured person	125	80.6	30	19.4
3-Avoid sharing personal tools with the Injured person	155	**100.0**	0	0.0
4-Becarefulwhenthereisaninfectedperson in the house	145	**93.5**	10	6.5
5-Seekmedicalcareif any symptoms appear	100	64.5	55	35.5
6-Allocatearoomforthe injured person and A private bathroom for him	123	79.4	32	20.6
7-Allocate a specific time for the injured person to use the bathroom if no other bathroom is available	99	63.9	56	36.1
8-Avoid direct contact with the injured person	109	70.3	46	29.7
9-Place food and service for him through the door of the room without friction	131	84.5	24	15.5
10- Allocate special tools and utensils for the injured person	129	83.2	26	16.8
11-Disinfect the containers used by the infected person immediately after finishing them, and handle them with caution while cleaning, by using a mask and gloves	149	**96.1**	6	3.9
12-Dispose of his/her waste, including tissues, medicines, and all waste in a special bag	77	49.7	78	**50.3**
13-Worktoventilatethepatient'sroom	142	**91.6**	13	8.4
14-Washtheinfectedperson’sclothes and bedding without mixing other bedding and clothing	141	**91.0**	14	9.0
15-Disinfect and clean surfaces and the infected person’s room regularly	144	**92.9**	11	7.1

Table (7): Distribution of studied students according to their home environment in relation to home cleanliness, ventilation and space (n=155).

Home environment	Yes		No	
	N	%	N	%
A-Home cleanliness:				
The house is clean	122	**78.7**	33	21.3
Surfaces are constantly cleaned and Disinfected	99	63.9	56	36.1
Soap, chlorine, and disinfectants are used, and detergents are not mixed together	75	48.4	80	**51.6**
Cook food well and wash utensils and tools with soap and water	78	50.3	77	49.7
Disinfecting and sterilizing doors and keys	107	**69.0**	48	31.0
Disinfection, sterilization and cleaning are done.	101	65.2	54	34.8
There is a suitable and clean water source	102	**65.8**	53	34.2
There is adequate sanitation	96	**61.9**	59	38.1
B-Ventilation:				
The house is exposed to the sun	122	**78.7**	33	21.3
Ventilation is good	94	**60.6**	61	39.4
C-Space				
The space is suitable for the number of people and there is no crowding	88	**56.8**	67	43.2
There is a suitable place to isolate patients	113	**72.9**	42	27.1
There is a private bathroom for patients in case of infection	68	43.9	87	**56.1**

Table (7)continue: Distribution of studied students according to their home environment (n=155).

Home environment	Yes		No	
	N	%	N	%
D-Waste disposal:				
Waste disposed is well	79	51.0	76	49.0
In the case of an infected person, waste should be disposed of correctly	135	**87.1**	20	12.9
Do not mix the infected person's waste with other waste	66	42.6	89	**57.4**
Disposal of the infected person's waste first and the necessity to define it	89	**57.4**	66	42.6
E-Receiving visitors:				
Visitors are treated with care and personal protective equipment is observed	102	65.8	53	34.2
Personal tools must be taken into account and not used or shared with others	145	**93.5**	10	6.5
Do not deal with the infected person at all	84	54.2	71	45.8
Take care not to have a large number of visitors to avoid crowding	122	**78.7**	33	21.3

Table (8): Relationship between demographic characteristics of the studied students and their total level of knowledge (n=155).

Demographic characteristics		Total level of knowledge				X^2	P-value
		Satisfactory		Unsatisfactory			
		N	%	N	%		
Age (in years)	≥15	32	20.0	15	9.7	12.408	**0.002* (S)**
	≥16	27	17.4	42	27.1		
	≥17	26	16.8	13	8.4		
Educational level	First	5	3.2	42	27.1	6.338	**0.000* (S)**
	Second	46	29.7	27	17.4		
	Third	34	21.9	1	0.6		
Residence	Rural	77	49.7	20	12.9	6.815	0.517 (NS)
	Urban	5	3.2	41	26.5		
	Other	3	1.9	9	5.8		
Educational level of father	Read/write	11	7.1	3	1.9	4.084	0.239 (NS)
	Elementary	4	2.6	27	17.4		
	Secondary	42	27.1	9	5.8		
	University /higher	28	18.1	31	20.0		
Fathers occupation	Governmental job	41	26.5	37	23.9	3.980 **FET**	0.739 (NS)
	Private job	23	14.8	1	0.6		
	Handcraft	19	12.3	23	14.8		
	Retirement	2	1.3	9	5.8		
Health problems	Yes	20	12.9	63	40.6	8.168	**0.043* (S)**
	No	65	41.9	7	4.5		
Family history ofCOVID-19	Yes	25	16.1	1	0.6	2.532 **FET**	**0.021* (S)**
	No	60	38.7	69	44.5		
Previous infection of COVID-19	Yes	20	12.9	9	5.8	2.875	**0.053* (S)**
	No	65	41.9	61	39.4		

X^2=Chi-Square Test **FET**= Fisher Exact Test P-value>0.05**Non-significant***P-value≤0.05**Significant**

Table (9): Relationship between demographic characteristics of the studied students and their total level of reported practices (n=155).

Demographic characteristics		Total level of practices				X^2	P-value
		Adequate		Inadequate			
		N	%	N	%		
Age (in years)	≥15	14	9.0	33	21.3	9.730	0.483 (NS)
	≥16	60	38.7	9	5.8		
	≥17	21	13.5	18	11.6		
Educational level	First	47	30.3	0	0.0	4.638	0.621 (NS)
	Second	32	20.6	41	26.5		
	Third	16	10.3	19	12.3		
Residence	Rural	39	25.2	58	37.4	4.685 **FET**	**0.007* (S)**
	Urban	46	29.7	0	0.0		
	Other	10	6.5	2	1.3		
Educational level of father	Read/write	14	9.0	0	0.0	7.083	0.941 (NS)
	Elementary	31	20.0	0	0.0		
	Secondary	9	5.8	42	27.1		
	University /higher	41	26.5	18	11.6		
Fathers occupation	Governmental job	52	33.5	26	16.8	8.944	0.271 (NS)
	Private job	6	3.9	18	11.6		
	Handcraft	27	17.4	15	9.7		
	Retirement	10	6.5	1	0.6		
Health problems	Yes	77	49.7	6	3.9	7.637	**0.001* (S)**
	No	18	11.6	54	34.8		
Family history of COVID-19	Yes	1	0.6	25	16.1	4.351 **FET**	**0.013* (S)**
	No	94	60.6	35	22.6		
Previous infection of COVID-19	Yes	9	5.8	20	12.9	3.765	**0.046* (S)**
	No	86	55.5	40	25.8		

X^2=Chi-Square Test **FET** = Fisher Exact Test P-value>0.05**Non-significant***P-value≤0.05**Significant**

Table (10): Correlation between level of knowledge and level of reported practices among the studied students (N=155).

Variables	Total Level of knowledge			
	Students		Family	
	r	P-value	r	P-value
Total level of practice	0.218	0.072 (NS)	0.305	0.096 (NS)

r= Pear son correlation n co efficient ***P-value > 0.05** = Non-Significant (NS)

Table (11): Relation between families knowledge of preventive measures and home environment (n=155).

Items		Total level of families knowledge of preventive measures				X^2	P-value
		Unsatisfactory		Satisfactory			
		N	%	N	%		
Home environment	**Unsafe**	26	16.8	30	19.4	0.517	**0.016*** (S)
	Safe	47	30.3	52	33.5		

*P-value>0.05=Non-Significant (NS)

Discussion:

COVID-19 is one of the fastest spreading viral infections, which WHO declared a pandemic after affirming the high infectious levels. The disease spread from person to person through infected air droplets released through coughing or sneezing. Additionally, people spread the virus through physical contact, such as greetings or touching infected surfaces. **(Chakraborty and Maity, 2020)**

Countries have sought vaccines and treatment protocols for COVID-19 vaccines and treatments amidst the implementation of various containment measures worldwide to combat the disease. Such containment measures have

included the closure of public places, schools, universities, imposing curfews, and other physical distancing measures, such as the cancelation of large events **(Majrashi et al.,, 2021)**

As regard to age of the studied students, the current study result revealed that, more than two fifths of the studied students were in age group > 16 years **(Table 1).**

This result was supported with **Mohamed et al., (2022)** who applied study entitled " effect of educational intervention on secondary school students' knowledge, practices and attitudes regarding COVID-19 " among 260 students in Egypt and found that the studied students were in age group > 16 years.

According to sociodemographic characteristics of the studied families, the current study result revealed that 98.1%of them were married **(Table 2).**For the investigator point of this study may be due to traditions and cultures, more than half of them living in rural.

As regard to knowledge of nursing students and their families about COVID-19, the current study result revealed that less than two thirds of students had incomplete correct answer regarding definition of COVID-19 and more than half of them had incomplete correct answer regarding complications of COVID-19.Also, more than half of them had incomplete correct answer regarding mode of infection of COVID-19 spreads **(Table 3).**

This result was contrast with **Prasad et al., (2020)** who applied study entitled " assessing the knowledge, attitude and practices of students regarding the COVID-19 pandemic " among 231 studied nursing students in India and found that 67.5% of the studied students had knowledge about modes of transmission.

According to knowledge of the studied families about COVID-19, the present study result revealed that, more than half of the studied families had incomplete correct answer regarding definition of COVID-19 and about half of them had incomplete correct answer regarding complications of COVID-19 **(Table 4).**From the investigator point of view this result may be due to level of education among studied families, and highly percentage of the students mothers were housewives.

According to reported practices regarding promotive and preventive measures of COVID-19, the current study result revealed that, the majority of the studied students maintain distancing in hospitals,keep and take care of personal tools and work clothes when returning home from practical training respectively**(Table 5).**

This result was supported with **Ferdous et al., (2020**) who applied study entitled " knowledge, attitude and practice regarding COVID-19 outbreak in Bangladesh: An online based cross-sectional study " among 2.017 respondents in Bangladesh and reported that 93.5% of the studied students maintaining social distance, 84.7% of them avoid contacts with infected people and 87.2% of them using masks.

According to reported practices of studied families regarding promotive and preventive measures of COVID-19, the current study result illustrated that, less than two thirds of the studied families clean with disinfect surfaces in general and expose covering and clothing directly to the sun. While, more than half of them didn’t dispose of waste safely and didn't use disinfectants at home Table (6).

This result was supported with **Tawfique et al., (2021)** who applied study entitled " mothers ' knowledge and reported practices about Corona Virus Disease (COVID-19) among their children "among 100 participants in Egypt and reported that 95% of the studied mothers Cleaning and sanitizing surfaces.

According to home environment of the studied students, the current study result revealed that in case of an infected person, waste should be disposed of correctly among the majority of the studied homes and disposal of the infected person's waste first and the necessity of defining it among more than half of them **Table (7).** From the investigator point of view this result may be due to experiences acquires from social media and TV.

As regard to relationship between

demographic characteristics of the studied students and their total level of knowledge, the current study result showed that there was a significant statistical relationship between total level of knowledge of the studied students and their age, educational level, history of health problems, family history of COVID-19 and previous infectionofCOVID-19. While, there was no significant statistical relationship between total level of knowledge of the studied students and their residence, father educational level and fathers occupation **Table (8).**

This result was supported with **Adli et al., (2022)** who applied a nationwide cross-sectional study among 4870 respondents in Indonesia entitled "Knowledge, attitude, and practice related to the COVID-19 pandemic among undergraduate medical students in Indonesia" and reported that there was statistical significant relation between age, academic level, family income, and history of chronic illness with knowledge related to the COVID-19 pandemic.

As regard to relationship between demographic characteristics of the students and their total level of reported practices, the current study concluded that there was a significant statistical relationship between total level of practice of the studied students and their residence, history of health problems, family history of COVID-19 and previous infection of COVID-19 **Table (9).**

This result was contrasted with **Gazar et al., (2022)** who applied study entitled " Effect of Guidelines for Students on Prevention and Combatting COVID-19 " among 605 students in Egypt and reported that there was highly significant associations between the practice of preventive behavior scores of studied students with their age and gender

Regarding correlation between level of knowledge and level of reported practices among the studied students, the current study result showed that, there was non-significant statistical correlation between total level of practice and total level of knowledge among the studied students. Also, there was non-significant statistical correlation between total level of practice and total level of knowledge among the studied family **Table (10).**

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 " among 200 students in Egypt and revealed that there is a highly statistically significant correlation between knowledge and practices among nursing students.

This result contrasted with **Mohamed et al., (2023)** who found that there was highly statistically significant correlation between total level of practice and total level of knowledge among the studied students.

As regard relation between families knowledge of preventive measures and home environment, the current study revealed that there was a significant statistical relationship between families knowledge of preventive measures and home environment among the studied family **Table (11).**

This result was similar with **Faisal & Suryanis, (2022)** who applied study entitled " the relationship between the level of parental knowledge about Covid-19 and the application of clean and healthy living behavior during the pandemic " among 35 studied subjects in Indonesia and reported that there is a correlation between the level of parental knowledge about Covid-19 and the application of clean and healthy living behavior by the mother.

Conclusion:

In the light of the current study findings, it can be concluded that,

- Regarding students total knowledge, the current study result illustrated that 63.2% less than two thirds of the studied students had unsatisfactory level of knowledge about COVID-19. While, 51.6% more than half the studied students had satisfactory level of knowledge about health promotive and preventive measures of COVID-19.

- Regarding families total knowledge, the current study result illustrated that 56.8% more than half of the studied families had unsatisfactory

level of knowledge about COVID-19. While, 52.9% more than half of them had satisfactory level of knowledge about health promotive and preventive measures of COVID-19.

- Regarding students total reported practice, the current study result illustrated that 38.7% less than half of the studied students had inproper level of practice. While, 61.3% more than half the studied students had proper level of practice.

- Regarding families total reported practice, the current study result illustrated that 34.0% less than half of the studied families had inproper level of practice. While, 66.0% more than half the studied families had proper level of practice.

- Regarding students total level of home environment 36.8% more than half of the studied families had good home environment. While 36.2% more than third of them had poor home environment

Recommendations

Based on the current study finding, the following recommendations were proposed:

Awareness programs should be conducted regularly to improving families and students promotive and preventive measures of COVID-19.

Developing in the school curriculum by integrating more environmental issues as climate change is necessary that help to enhance community awareness.

Disseminating health education booklets to increase families' and student's awareness about. COVID- 19, health promotive and preventive measures of COVID-19.

Apply further research about effect of healthy lifestyle to avoid COVID-19.

More studies are needed to examine the relation between students and their families.

Families and students need to have adequate knowledge regarding promotive and preventive measures of COVID-19. And need for regular health education programs to be carried out by nurses.

Counseling centers may be recognized by nurses to provide counseling and educate families about COVID-19.

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