Preventive Health Behaviors among Faculty of Nursing Students Regarding Coronavirus Disease 2019

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Abstract

Background: Nursing students are the future of health care providers, their quality of training and teaching will definitely affect the outcomes of their clinical services provided to patients, so their knowledge, attitude and health preventive behaviors will definitely affect the prevention of COVID19. **Aim of the study:** to assess the preventive health behaviors among faculty of nursing students regarding COVID19. **Research design:** A descriptive exploratory research design was utilized. **Setting:** The study was conducted in seven different scientific department of faculty of nursing affiliated to Ain Shams University. **Study subjects:** A stratified sample of all faculty (360) nursing students of different specialties during academic year 2020-2021. **Data collection tools:** Nursing Students self-administered questionnaire which composed of (demographic characteristics and nursing Students knowledge regarding COVID19), COVID19 preventive health behaviors scale Tool &Attitude scale regarding corona virus. **Results:** 47.8% of the studied students had average level of total knowledge about the COVID19. 50.5% of the studied students had average performance of total preventive health behaviors regarding COVID19,55% of the studied students had positive attitude regarding COVID19. **Conclusion:** there was highly significant positive correlation between students' knowledge, preventive health behaviors and their attitude regarding COVID19.**Recommendation:** Preventive health behavior courses should be included in the curriculum of all departments at faculty, educational programs and workshops about the preventive health behavior about COVID-19 for faculty students at certain intervals, the study should be replicated on different universities in order to generalize the results.

Keywords: Preventive health behaviors, Nursing students, COVID19.

Introduction

Coronavirus disease 2019 (COVID-19) is a highly contagious respiratory disease that is caused by a novel coronavirus it first detected in December 2019 in Wuhan, China .The Incubation Period (IP) of COVID-19 is about 1–14 days, and the period from the onset of symptoms to death was estimated to range from 6 to 41 days .Interpersonal transmission of COVID-19 occurs through respiratory droplets and contact transmission **(CCDCP, 2020).**

Corona virus disease 2019 is characterized by rapid transmission, and can occur by close contact with an infected person. As such, this may not be the only way of transmission that occurring. COVID-19 has spread widely and rapidly, from Wuhan city, to other parts of the world, threatening the lives of many people. By the end of January 2020, the World Health Organization (WHO) announced a public health emergency of international concern and called for the collaborative effort of all countries, to prevent its rapid spread. Later, the WHO declared COVID-19 a "global pandemic" **(Zhou,et al., 2020)**.

The most common signs and symptoms of COVID-19 are fever, tiredness, and dry cough. Some patients may have aches and pains, nasal congestion, runny nose, or sore throat. These symptoms are usually mild and begin gradually most people (about 80%) recover from the disease without needing special treatment, and for the majority – especially for children and

young adults – illness due to COVID-19 is generally minor. However, for some people it can cause serious illness **(Cucinotta & Vanelli, 2020).**

There are many risk groups for COVID 19 include: serious heart conditions, such as heart failure, coronary artery disease, or cardiomyopathies, kidney disease, chronic obstructive pulmonary disease (COPD) ,obesity which occurs in people with a body mass index (BMI) of 30 or higher, a sickle cell disease weakened immune system from a solid organ transplant, type 2 diabetes and hypertension.**(WHO.2019)**.

The main clinical symptoms include Some common symptoms that have been specifically linked to COVID-19 include: shortness of breath, cough that gets more severe over time low-grade fever that gradually increases in temperature ,fatigue . The condition may range from asymptomatic mild to severe life threatening. The prognosis is bad mostly among those suffering from any pre-existing chronic illness and age above 50 yrs. **(Li Q, et al., 2020)**.

Preventive measures are defined as the recent strategy to decrease the transmission of infection. These measures include early screening, diagnosis, isolation, and treatment to prevent recurrent spread. Preventive strategies are focused on the isolation of patients and the application of infection control precautions. One of the most important measures is environmental measures. These measures are aimed at reducing the risk of transmission of infection to individuals within the environment **(Aldowyan, et al., 2019).**

The prevention occurs through, firstly, avoiding contact with an infected person, with objects, equipment, or contaminated environmental surfaces. Secondly, reduce direct physical contact such as shaking hands. Thirdly, avoid direct unprotected contact with personal secretions especially coughing, sneezing and when touching the individual should use paper tissues with bare hands. Fourthly, avoid direct contact and let space between persons as 2 meters. Fifthly, reduce contact with people in a closed environment such as hospital waiting areas beyond 15 min and at a distance of fewer than 2 meters in addition to the application of personal protective measures **(Omer, et al., 2020).**

The success of implementation of these measures are largely dependent on the high awareness and knowledge of the population. Nursing is an essential component of health care, and nurses' knowledge about disease directly affects patients outcome. Similarly, during an outbreak, nursing students' Knowledge, practices, and attitudes (KAP) play a positive role in improving the patients' recovery rate, reducing the length of the hospital stay and mortality, and preventing in-hospital infection and occupational exposure.

The knowledge, attitude and practice (KAP) are considered vital health education theoretical part that explains the part of knowledge in behavior are a product of knowledge and attitudes. This KAP proposes that human health behavior can be modified through three continuous process of change, namely, gaining of knowledge, formation of beliefs, and development of behavior .KAP emphasizes that the knowledge of a person can directly affect attitude and indirectly affect behavior through attitude. Providing students with health information and knowledge through various sources is intended to enhance the health related behavior, attitudes and practice of nursing students with regard to the prevention and control of COVID19.**(Alzoubi et al., 2020).**

Corona virus disease knowledge, attitudes, and practices are important in determining a nurse's willingness to adopt

change initiatives. As a result, studies on KAP give a starting point for determining the type of intervention that may be required to modify public perceptions of the virus. It would also be beneficial to gain a better understanding of the condition in order to design preventive methods and health promotion programs **(Azlan, et al., 2020).**

Nurses and nursing students are the first line of contact with patients and a major source of infection in health-care settings; as a result, nurses are assumed to be at a high risk of infection. The WHO and the Centers for Disease Control and Prevention (CDC) published COVID-19 prevention and control recommendations for HCWs at the end of January. The WHO has also launched a number of online COVID-19 training sessions and materials in a variety of languages to help boost prevention initiatives, such as increasing awareness and training nurses in preparedness activities **(Bhagavathula, et al., 2020).**

Significance of the study:

COVID 19 is a new viral disease that has caused a pandemic in the world, Due to the lack of vaccines and definitive treatment. preventive behaviors are the only way to overcome the disease **(Chan JF-W, et al., 2020) .**COVID 19 is a pandemic which has resulted in the daily report of thousands of death globally worse still ,health authorities across the globe are struggling to control spread **(Shereen MA, et all., 2020).**

Globally, by the 1st of August 2020, there have been 20,439,814 confirmed case of COVID-19, including 744,385 deaths, reported by the dashboard statistics of World Health Organization (WHO).The first confirmed case of COVID-19 was reported in Egypt on February 14, 2020, as by the beginning of April of 2020, there were over 800 confirmed cases, with more than 50 fatalities, and a rapid tendency towards increase. Further, the government of Egypt documented on the first of October 2020 the total number of confirmed COVID 19 cases since the beginning of the outbreak as it was 103,317 including 5,946 deaths **(WHO, Egypt, 2021).**

Nursing students should know the preventive health behaviors because they attend clinical practice and may be exposed to patients and health care workers who are suspected or diagnosed with COVID19. If nursing students become infected, they will transmit the infection to their family members and will become financially burden to their family and the government.

Aim of the Study

The Aim of this study is to assess the preventive health behaviors among faculty of nursing students regarding corona virus disease through:

1- Assessing faculty of nursing students' knowledge regarding corona virus disease.

2- Assessing faculty of nursing students' practice of preventive health behaviors regarding corona virus disease.

3- Assessing faculty of nursing students' attitude regarding corona virus disease.

Research Question:

- What are the preventive health behaviors among faculty of nursing students regarding corona virus disease?
- Is there a relationship between knowledge, practice of preventive health behaviors and attitude regarding corona virus disease among faculty of nursing students?

Subject and methods:

I. **Technical Design:**

The technical design includes research design, setting, subjects and tool of data collection.

Research design:

A descriptive exploratory design was used to conduct this study.

Study Setting:

The study was conducted with the students enrolled at Faculty of Nursing affiliated to Ain Shams University. It

included seven different scientific departments are (medical surgical nursing department, critical care nursing department, pediatric nursing department, maternity & gynecological nursing department, psychiatric& mental health nursing department, community health nursing department, and nursing administration department).

Subjects

Nursing students in the first, second, third and fourth years those represent the seven departments in the Faculty of Nursing. A stratified sample was included all faculty of nursing students of different specialties during the academic year 2020-2021.

Sample size:

$$N = \frac{N \times p\,(1-p)}{\{N-1 \times (d^2 \div z^2)\} + p\,(1-P)}$$

- Type I error with significant level (α) = 0.5.
- Type II error by power test (1-B) = 95%.

(Suresh & Chandrashekara, 2012).

A stratified sample, the estimated sample size is 360 nursing student out from 1100 student**.**

Tool of data collection:

Three tools were used to collect the data for this study;

Tool I: Nursing Student's Self-Administered Questionnaire (Appendix I):

It was designed by the investigator after reviewing the related literature and reviewed by supervisors. It was written in an English language for gathering data in relation to the following parts:

Part I: Demographic characteristics of the studied students: as age, gender, marital status, academic year, Cigarettes smoking, Have any chronic diseases, have vaccination of COVID19 and residence.

Part II: Faculty Nursing Students' knowledge: it was developed by the investigator from **(Phan LT, et al., 2020)** to assess the faculty nursing students' knowledge level about COVID19 .This part consisted of twenty closed ended questions in the form of eighteen questions Yes or No such as: (definition , Causative agent, mode of transmission, signs and symptoms, incubation period, risk factors ,prognosis and preventive measures) and two questions multiple choice about: (diagnosis and complication) .

❖ **Scoring system**

These questions were responded on a Yes/NO .The correct answer was assigned with one point and incorrect answers were assigned with zero point. Higher scores represented a better knowledge of COVID-19.the total score of knowledge is represent 20 degree that constitute 100% .it was classified into three categories:

- Good knowledge if score ≥ 80%.
- Average knowledge if score 60-<80%.
- Poor knowledge if score <60%.

Tool II: COVID 19 preventive health behaviors scale (Appendix II).

This tool was adapted from **(Jang, 2019& Kim, 2019)**. To assess the basic practice level of preventive health behaviors for COVID19 and modified by the investigator after reviewing the related literature and reviewed by supervisors. It was used for gathering data about preventive health behaviors among faculty of nursing students regarding COVD19. The scale was contained of 19 items, the scale measures preventive health behaviors on a 3 point likert scale; Always, sometimes and never. Each item was scored by a fixed 3-point likert-type format where: "never" was coded

as one, "sometimes" as two, and "always" as three.

❖ **Scoring system:**

A scoring system was followed to assess preventive health behaviors among faculty of nursing students. These scores were summed up and were converted into a percentage score .The total score is represent 57 degree that constitute 100% .It was classified into 3 categories:

- High performance if score ≥ 80%.
- Average performance if score 60-<80%.
- Low performance if score <60%.

Tool III: Attitude scale regarding corona virus(Appendix III): This tool adapted by investigator from (Wang D, et al.,2020)and modified by the investigator after reviewing the related literature and reviewed by supervisors.to assess attitude of faculty nursing student regarding COVID-19.This scale consists of twenty five items.. Each item was scored by a fixed 3-point likert-type format where: "agree" was coded as three, "not sure" as two, and "disagree" as one.

❖ **Scoring system:**

A scoring system was followed to assess attitude of faculty nursing student regarding COVID-19. These scores were summed up and were converted into a percentage score. The total score of attitude equal 75 degree which constitute 100% .It was classified into 2 categories:

- Positive attitude if score ≥ 60%.
- Negative attitude if score <60%.

II. Operational Design

The operational design for this study consisted of four phases, namely preparatory phase, ethical considerations, pilot study, and fieldwork.

Preparatory Phase

This phase included reviewing of literature related to preventive health behaviors among faculty of nursing students regarding corona virus disease. This served to develop the study tools for data collection. Development of the tools was under supervisors' guidance and also experts' opinions were considered.

Validity and Reliability: (Appendix IV)

Testing validity:

It was ascertained by a group of experts (5) from different academic categories (professors and assistant professors) of the medical–surgical nursing at the faculty of nursing, Ain Shams University. Their opinions elicited regarding the format, layout, consistency, accuracy and relevancy of the tools.

Testing reliability:

It was referred to the extent to which the same answers can be obtained by using the same instruments more than one time and it was done for proposed tool and reported statistically by test-retest reliability analysis

Reliability analysis by measuring of internal consistency of the tool through Cronbach's Alpha test.

B. Ethical Considerations

The research approval was obtained from the faculty ethical scientific research committee before starting the study.

The ethical research considerations include the following:

- The investigator was clarified the objectives and aim of the study to nursing students included in the study before starting.
- Verbal approval was obtained from the nursing students before beginning the study; a clear and simple explanation was given according to their level of understanding. They secured that all the gathered data was confidential and used for research purpose only.
- The investigator was assuring maintaining anonymity and confidentiality of subjects' data included in the study.

- The subjects were informed that they are allowed to choose to participate or not in the study and they have the right to withdrawal from the study at any time.

Pilot Study

Before performing the actual study, a pilot study carried out on 38 student those represent 10% of the sample, Ain Shams University in order to test the applicability of the constructed tools and the clarity of the included questions related to preventive health behaviors among faculty of nursing students. The pilot has also served to estimate the time needed for each subject to fill in the questionnaire. According to the results of the pilot, no corrections and no omissions of items were performed, so the pilot study was included in the sample.

Fieldwork

An approval was obtained from the Dean of Faculty of Nursing, Ain Shams University. Data were collected in three months from the beginning of May 2021 to the end of July 2021

The investigator first met with the students at the previously mentioned setting at the end day of the clinical area and explained the purpose of the study after introducing herself. Each academic year student classified into subgroups. Each subgroup consisted of 15-18 students. The questionnaire distributed for each subgroup from each academic year. The questionnaire for socio-demographic data and scale for preventive health behavior and attitude regarding COVID-19 was filled by all nursing students at the same time which take 20-25 minutes in the presence of the investigator and simple explanation given for questions as needed. The investigator was present 4 days / weekly (Sunday, Monday, Tuesday and Wednesday) at morning (12p.m-3p.m) to collect data.

III. Administrative Design

The investigator met the Dean of faculty of nursing for explaining the purpose and the methods of the data collection. The official permission to conduct the study was obtained from the Dean of faculty of nursing, Ain Shams University.

IV. Statistical Analysis

Data collected from the studied sample was revised, coded and entered using Personal Computer (PC). Computerized data entry and Statistical analysis were fulfilled using the Statistical Package for Social Sciences (SPSS) version 22. Data were presented using descriptive statistics in the form of frequencies, percentages. Chi-square test (X2) was used for comparisons between qualitative variables. Spearman correlation measures the strength and direction of association between two ranked variables.

- Highly significant at p-value < 0.01.
- Statistically significant at p-value < 0.05.
- Non-significant at p-value > 0.05.

Result:

Table (1): shows that, 45% of the studied students their age ranged between 20-<22 years, with mean SD of age was 21.4±2.4 years. As regard to marital status, 95% of the studied students were single. Moreover, 93.9% of them didn't smoke. In addition, 53.3% of the studied students had information about COVID19, 41.7% of them had their information from television & social media. Also, 4.4% of them had chronic diseases, 62.5% of them suffered from obesity.

Table (2): shows that, 31.3% of the studied students had good level of total knowledge. Also, 47.8% of them had average level of total knowledge. While, 21.1% of the studied students had poor level of total knowledge about COVID19 and preventive measures of COVID19.

Table (3a): illustrate that, 46.1% and 55.6% of the studied students sometimes wash hands properly and maintain an appropriate distance with anyone with symptoms, respectively. Also, 50% and 41.7% of them sometimes put on facemasks

in public place and change their clothes after entering the house and had contact with family. While, 45.6% and 69.4% of the studied students never took antibiotics and never ate garlic.

Table (3b): illustrate that, 68% of the studied students always avoid sharing utensils during meal. Also, 50% and 52.8% of them sometimes increase the frequency of washing hands and sometimes use the protective personal equipment than usual. While, 50.8% of the study students don't avoid unnecessary travelling or social party.

Figure (1): shows that, 50.5% of the studied students had average performance of total preventive health behaviors regarding COVID19. Also, 26.7% of them had high performance. While, 22.8% of the studied students had low performance of total preventive health behaviors regarding COVID19.

Figure (2): shows that, 55% of the studied students had positive attitude regarding COVID19. While, 45% of them had negative attitude regarding COVID19.

Table (4): reveal that, there was highly statistically significant relation between students' knowledge about COVID19 and their socio- demographic characteristics as regarding age, academic year, attendance lectures or seminar about COVID19, had information about COVID19 and have vaccination of COVID19 at (P= < 0.01). While, there was no statistically significant relation with their gender, marital status, residence, cigarette's smoking and history of chronic diseases at (P= > 0.05).

Table (5): shows that, there was highly statistically significant relation

between students' preventive health behaviors regarding COVID19 and their socio- demographic characteristics as academic year, attendance lectures or seminar about COVID19, and had vaccination of COVID19 at (P= < 0.01). Also, there was statistically significant relation with their age, and had information about COVID19 at (P= < 0.05). While, there was no statistically significant relation with their gender, marital status, residence, cigarette's smoking and history of chronic diseases at (P= > 0.05).

Table (6): displays that, there was highly statistically significant relation between students' attitude regarding COVID19 and their socio- demographic characteristics related to academic year, attendance lectures or seminar about COVID19, had information about COVID19 and had vaccination of COVID19 at (P= < 0.01). also, there was statistically significant relation with their age and at (P= < 0.05). While, there was no statistically significant relation with their gender, marital status, residence, cigarette's smoking and history of chronic diseases at (P= > 0.05).

Table (7): indicate that, there was highly significant positive correlation between students' knowledge, preventive health behaviors and their attitude regarding COVID19 at (P= < 0.01).

Table (1): Number and percentage distribution of the studied students according to their demographic characteristics.

Demographic characteristics		Studied students (n = 360)	
		N	%
Age			
	19-<20 yrs.	108	30
	20-<22 yrs.	162	45
	22-<24 yrs.	90	25
Mean SD	**21.4±2.4**		
Gender			
	Male	125	34.7
	Female	235	65.3
Marital status			
	Single	342	95
	Married	18	5
Cigarette's smoking			
Yes		22	6.1
No		338	93.9
Attend lectures or seminar about COVID 19			
Yes		88	24.4
No		272	75.6
Do you have information about COVID19			
Yes		192	53.3
No		168	46.7
If yes What is the source of your information? (n=192)			
Faculty staff		40	20.8
Television& social media		80	41.7
Websites of WHO /hospitals		22	11.5
Relatives and friends		50	26
Have any chronic diseases			
Yes		16	4.4
No		344	95.6
If yes, mention (n=16)			
Bronchial asthma		4	25
Diabetes mellitus		2	12.5
Obesity		10	62.5
Have vaccination of COVID19			
Yes		88	24.4
No		272	75.6

Table (2): Number and percentage distribution of the students according to their total knowledge about COVID19.

Items	Studied students (n = 360)					
	Good		Average		Poor	
	N	%	N	%	N	%
Causative agent and risk factors of COVID19	100	27.8	187	51.9	73	20.3
Mode of transmission of COVID19	98	27.2	182	50.6	80	22.2
Signs & symptoms of COVID19	145	40.3	155	43	60	16.7
Diagnosis of COVID19	119	33.1	180	50	61	16.9
Complications and prognosis of COVID19	104	28.9	185	51.4	71	19.7
Preventive measures of COVID19	187	51.9	123	34.2	50	13.9
Total knowledge	**112**	**31.1**	**172**	**47.8**	**76**	**21.1**

Table (3a): Number and percentage distribution of the studied students according to their performance of preventive health behaviors regarding COVID19.

Items	Studied sample (n =360)					
	Always		Sometimes		Never	
	N	%	N	%	N	%
Proper hand wash.	67	18.6	166	46.1	127	35.3
Maintaining an appropriate distance between yourself and anyone with symptoms.	118	32.8	200	55.6	42	11.7
Avoiding touching eyes, nose and mouth.	70	19.1	141	39.2	150	41.7
Putting on facemasks in public place.	110	30.6	180	50	70	19.4
Taking antibiotics.	88	24.4	108	30	164	45.6
Eating garlic.	22	6.1	88	24.5	250	69.4
change clothes after entering the house and having contact with family?	158	43.9	150	41.7	52	14.4
An effective vaccine against the virus is currently available.	108	30	125	34.7	127	35.3
An effective treatment against the virus is currently available.	108	30	125	34.7	127	35.3
Good ventilation is the only way to prevent the spread of COVID-19	220	61.1	110	30.6	30	8.3

Table (3b): Number and percentage distribution of the studied students according to their preventive health behaviors regarding COVID19.

Items	Studied sample (n =360)					
	Always		Sometimes		Never	
	N	%	N	%	N	%
Avoidance of sharing utensils during meal	245	68	105	29.2	10	2.8
Outbreak of corona virus increase your frequency of washing hands?	126	35	180	50	54	15
Outbreak of corona virus make you use hand sanitizer more frequently?	133	36.9	176	48.9	51	14.2
Outbreak of corona virus make you use the protective personal equipment than usual.	138	38.3	190	52.8	32	8.9
Outbreak of corona virus make you carry hand sanitizer out of home.	140	38.9	170	47.2	50	13.9
Maintain social distance during the outbreak of corona virus.	118	32.8	185	51.4	57	15.8
Cover mouth during cough or sneezing with tissue paper or bend elbow?	109	30.3	171	47.5	80	22.2
Avoid unnecessary travelling or social party?	65	18.1	112	31.1	183	50.8
Antibiotics can treat the disease	107	29.7	146	40.6	107	29.7

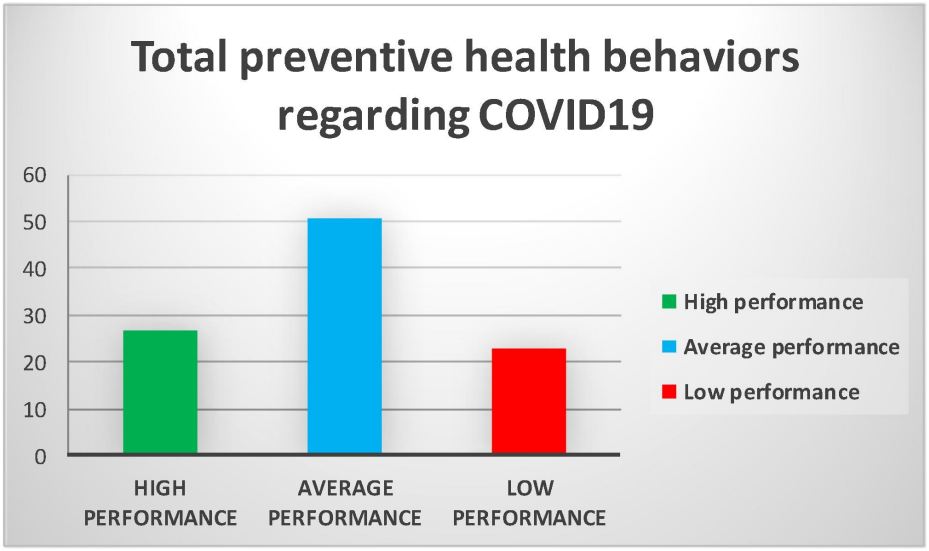

Figure (1): Percentage distribution of the studied students according to their total preventive health behaviors regarding COVID19 **(n=360).**

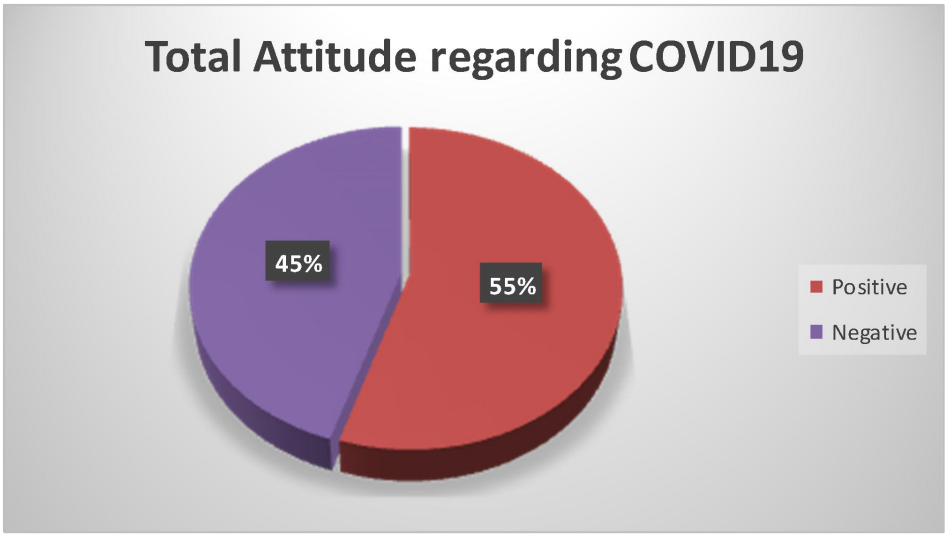

Figure (2): Percentage distribution of the studied students according to their total attitude regarding COVID19 (n=360).

Table (4): Relation between students' demographic characteristic and their total knowledge about COVID19 (n=360).

Socio- demographic characteristic		Total knowledge about COVID19						X2	P-Value
		Good (n=112)		Average (n=172)		Poor (n=76)			
		N	%	N	%	N	%		
Age	19-<20 yrs.	0	0.0	40	23.3	68	89.5	13.05	.007**
	20-<22 yrs.	32	28.6	122	70.9	8	10.5		
	22-<24 yrs.	80	71.4	10	5.8	0	0.0		
Gender	Male	42	37.5	70	40.7	13	17.1	3.367	.121
	Female	70	62.5	102	59.3	63	82.9		
Marital status	Single	100	89.3	168	97.7	74	97.4	2.308	.207
	Married	12	10.7	4	2.3	2	2.6		
Residence	Urban	55	49.1	100	58.1	50	65.8	2.699	.196
	Rural	57	50.9	72	41.9	26	34.2		
Cigarette's smoking	Yes	6	5.4	10	5.8	6	7.9	3.036	.130
	No	106	94.6	162	94.2	70	92.1		
Academic year	First	0	0.0	37	21.5	68	89.5	14.90	.005**
	Second	7	6.3	80	46.5	8	10.5		
	Third	40	35.7	35	20.3	0	0.0		
	Fourth	65	58	20	11.6	0	0.0		
Attend lectures or seminar about COVID19	Yes	80	71.4	8	4.7	0	0.0	16.08	.001**
	No	32	28.6	164	95.3	76	100		
Have information about COVID19	Yes	105	93.7	87	50.6	0	0.0	13.60	.005**
	No	7	6.3	85	49.4	76	100		
History of chronic diseases	Yes	10	8.9	4	2.3	2	2.6	4.631	.102
	No	102	91.1	168	97.7	74	97.4		
Have vaccination of COVID19	Yes	80	71.4	8	4.7	0	0.0	13.13	.007**
	No	32	28.6	164	95.3	76	100		

No significant at $p > 0.05$. *Significant at $p < 0.05$. **highly significant at $p < 0.01$.

Table (5): Relation between students' demographic characteristic and their total preventive health behaviors regarding COVID19 (n=360).

Socio- demographic characteristic		Total preventive health behaviors regarding COVID19						X2	P-Value
		High (n=96)		Average (n=182)		Low (n=82)			
		N	%	N	%	N	%		
Age	19-<20 yrs.	0	0.0	40	22	68	82.9	12.04	.011*
	20-<22 yrs.	22	22.9	126	69.2	14	17.1		
	22-<24 yrs.	74	77.1	16	8.8	0	0.0		
Gender	Male	36	37.5	75	41.2	16	19.5	3.970	.101
	Female	60	62.5	107	58.8	66	80.5		
Marital status	Single	86	89.6	178	97.8	78	95.1	2.500	.164
	Married	10	10.4	4	2.2	4	4.9		
Residence	Urban	50	52.1	105	57.7	50	61	2.430	.187
	Rural	46	47.9	77	42.3	32	39		
Cigarette's smoking	Yes	6	6.3	10	5.5	6	7.3	2.390	.141
	No	90	93.7	172	94.5	76	92.7		
Academic year	First	0	0.0	37	20.3	68	82.9	13.10	.007**
	Second	0	0.0	87	47.8	8	9.8		
	Third	31	32.3	38	20.9	6	7.3		
	Fourth	65	67.7	20	11	0	0.0		
Attend lectures or seminar about COVID19	Yes	70	72.9	18	9.9	0	0.0	15.67	.001**
	No	26	27.1	164	90.1	82	100		
Have information about COVID19	Yes	89	92.7	97	53.3	6	7.3	10.50	.025*
	No	7	7.3	85	46.7	76	92.7		
History of chronic diseases	Yes	9	9.4	5	2.7	2	2.4	3.977	.128
	No	87	90.6	177	97.3	80	97.6		
Have vaccination of COVID19	Yes	70	72.9	18	9.9	0	0.0	14.90	.005**
	No	26	27.1	164	90.1	82	100		

No significant at $p > 0.05$. *Significant at $p < 0.05$. **highly significant at $p < 0.01$.

Table (6): Relation between students' demographic characteristic and their total attitude regarding COVID19 (n=360).

Socio- demographic characteristic		Total knowledge about COVID19 Positive (n=198) N	%	Negative (n=162) N	%	X2	P-Value
Age	19-<20 yrs.	13	6.6	95	58.6	10.96	.027*
	20-<22 yrs.	100	50.5	62	38.3		
	22-<24 yrs.	85	42.9	5	3.1		
Gender	Male	90	45.5	35	21.6	2.031	.209
	Female	108	55.5	127	78.4		
Marital status	Single	188	94.9	154	95.1	1.964	.297
	Married	10	5.1	8	4.9		
Residence	Urban	100	50.5	105	64.8	1.797	.308
	Rural	98	49.5	57	35.2		
Cigarette's smoking	Yes	12	6.1	10	6.2	1.327	.411
	No	186	93.9	152	93.8		
Academic year	First	5	2.5	100	61.7	12.93	.008**
	Second	45	22.7	50	30.9		
	Third	63	31.8	12	7.4		
	Fourth	85	42.9	0	0.0		
Attend lectures or seminar about COVID19	Yes	85	42.9	3	1.9	15.60	.000**
	No	113	57.1	159	98.1		
Have information about COVID19	Yes	180	90.9	12	7.4	14.37	.001**
	No	18	9.1	150	92.6		
History of chronic diseases	Yes	10	5.1	6	3.7	2.580	.167
	No	188	94.9	156	96.3		
Have vaccination of COVID19	Yes	88	44.4	0	0.0	17.62	.000**
	No	110	55.6	162	100		

No significant at p > 0.05. *Significant at p ‹ 0.05. **highly significant at p ‹ 0.01.

Table (7): Correlation between students' knowledge, performance of preventive health behaviors and their attitude regarding COVID19 (n=360).

Items	Total knowledge	Total performance of preventive health behaviors
Total performance of preventive health behaviors	r = .378 P = .001**	
Total attitude	r = .204 P = 0.017*	r = .215 P = 0.01*

Discussion

Preventive measures are defined as the recent strategy to decrease the transmission of infection. These measures include early screening, diagnosis, isolation, and treatment to prevent recurrent spread. Preventive strategies are focused on the isolation of patients and the application of infection control precautions. One of the most important measures is environmental measures. These measures are aimed at reducing the risk of transmission of infection to individuals within the environment **(Aldowyan, et al., 2019).**

Nursing students are the future health care providers, their quality training and teaching will definitely affect the outcomes of their clinical services, which offered to their patients, so their knowledge ,attitude and preventive health behaviors will definitely affect the prevention of COVID19**(Davis, et al., 2020)**.

Regarding the demographic data of the studied students the finding of the current study revealed that, about half of the studied students their age ranged between 20-21 years, with mean age of them was 21.4±2.4 years. This result may be due to age of college students ranges between 18-24 years. These results similar with the result of study performed by **Azlan ,et al. (2020)** who found that, the mean age of studied students was 20.3±2.3 years.

In relation to gender and marital status of the studied students, the results of the current study indicated that more than two third of the studied students were female and the majority of them were single. This could be explained that nursing is more dependent on female. These results approved with the study performed by **Ahmed(2019)** which entitled "Assessment of health promoting behaviors among faculty of nursing students" who stated that the majority of students were female and single.

Regarding to cigarette smoking the result of the current study indicated that the majority of studied students were not smoker .This result could be due to the majority of the student were female and smoking not common in female in Egypt . These result approved with **Chen, et al. (2020)** who mentioned that more than two third of the students were not smoker .

According to studied students information about COVID19 the result of the current study indicated that half of them were had information about COVID19 and the source of information from the television and social media. These results may be due to that at the first period of pandemic, the people was stay at home and keen to learn more about the pandemic and young people such as participants, tend to use social media more frequently. This result supported by **Abdelhafiz ,et al.(2020)**who stated that the first source of information about COVID-19 was social networks for nearly more than half of the participants of this study.

The results of the current study showed that the majority of studied students were not had any chronic diseases. These results may be due to the young age of the study sample. These results supported with **Abdelhafiz, et al. (2020)** who mentioned that most of the students were not have any health problems.

In relation to attend lectures about COVID19 the current study revealed that three quarters of the students not attended lecture about COVID19.These results may be due to the students taken all information from social media and TV. these result in similarity with **Thevarajan, et al. (2020)** who mentioned that nearly three quarter of the participant students not attended any group discussion or any seminar about COVID19 pandemic and these result in disagreement with **Roy et al. (2020)** who stated that two third of the participant had received a specific training on COVID-19 pandemic.

According to vaccination of COVID 19 the results of the current study showed that more than three quarters of the students not vaccinated. This may be due to the vaccine about COVID19 were not approved at the time of data collection. These results supported with the study done by **Zhang et al. (2020)** who stated that two third of the participant were not received the vaccine for COVD19 and these result in disagreement with **Roy et al. (2020)** who stated that two third of the students were vaccinated.

In relation to total knowledge about COVID-19 the current study showed that nearly half of the students had average knowledge about COVID-19.These results may be due to the information taken from social media and television .These results in similarity with **Kim et al. (2020)** who stated that the main findings of the study showed that most of the participants had average knowledge. These results in disagreement with **Christie et al. (2021)** who found that nearly half of the students had poor knowledge about COVID19.

Regarding practice of preventive health behaviors, findings of the current study showed that nearly half of the students sometimes wash hands properly. This may be due to long time spent in lecture and transportation . These results in similarity with **Park et al. (2021)** who stated that half of the participants reported that they frequently wash their hands. While the findings of the current study in contrast with the study done by **Taghrir et al. (2020)** who reported that the majority of the students washed their hands more often than usual during the ongoing coronavirus pandemic.

The results of the current study showed that half of the students sometimes maintain an appropriate distance with others , avoid unnecessary travelling and social parties. This may be due to overcrowded transportation and the infected person usually unknown. These results in similarity with **Taghrir et al. (2020)** who stated that the majority of participants sometimes avoid visiting their families and their neighbors in this pandemic period. they also cancelled or postponed meetings with friends and travelling during this pandemic .In contrast **Azlan et al. (2020)** who showed that the majority of participants avoided going to crowded places such as weddings

The results of the current study showed that half of the students sometimes put on facemasks in public place. This may be due to the shortage of face mask products observed in the first weeks of the pandemic, as a result of huge demand. These results in similarity with the results of **Abdelhafiz et al. (2020)** who stated that nearly half of the students were wear face mask when they go to people crowded places(e.g., market ,bus stations) .and these results in disagreement with **Roy et al.(2020) w**ho stated that two third of students always wear mask in public place.

Regarding ate garlic, the current study showed that more than two third of students never ate garlic. This may be due to students depend on fast foods and more time spent outside the home. These results in similarity with **Park, et al. (2021)** who stated that more than two third of participants responded pseudoscientific practices (use garlic, ginger,.. etc) are not necessary to confront the SARS-COV-2.

The result of this study showed that nearly half of the students sometimes use hand sanitizer. This may be due to the expensive cost of the alcohol-based sanitizer which play a role in participants' access to these products and also due to shortage of hand sanitation products observed in the first weeks of the pandemic, as a result of huge demand. This in similarity with **Austrian et al., (2020).**who stated that the expensive price was a significant barrier for nearly more than half of the participants to use hand sanitizers. In contrast **Roy et al., (2020)** who confirmed that more than half high frequent use of sanitizers among their responders.

Regarding avoiding shaking hands and avoiding touching eye, nose and mouth the result of this study revealed that slightly more than two fifth of the students never avoiding touching eye, nose and mouth .This in similarity with **Zhong et al., (2020)** who mentioned that nearly half of the participants of this study reported taking many other precautions such as avoiding shaking hands and avoiding touching eye, nose and mouth with unwashed hands.

According to good ventilation the current study showed that near two third of the students maintain good ventilation. This result similar to **Christie et al.,(2021) who** mentioned that two third of the participant student reported that they always stay at good ventilated places.

Concerned with total attitude of the students regarding COVID19, the current study showed that nearly more than half of the students had positive attitude toward COVID19. These results in similarity with **Kim, et al. (2020)** who stated that the main result of the study shown that the participants had positive attitude toward

COVID19. In contrast to the findings of the current study **Roy, et al. (2020)** who reported that the participant had few unexpected negative attitude toward COVID19.

Concerned with Relation between students' demographic characteristic and their total knowledge about COVID19, the current study revealed that, there was highly statistically significant relation between students' knowledge, preventive health behavior and attitude about COVID19 and their socio- demographic characteristics. These results in similarity with **Park et al. (2020)** who stated that upon to the data obtained from the participant students there was highly significant relation between the participants socio demographic data and their knowledge, practice and attitude regarding COVID19.

Regarding to Correlation between students' knowledge, preventive health behaviors and their attitude regarding COVID19, the current study showed that there were highly significant positive correlation between students' knowledge, preventive health behaviors and their attitude regarding COVID19. These results in similarity with **Azlan et al. (2020)** who found that there was a statistically very strong significant association and correlation between knowledge , practice and attitude.

Conclusion

Based on the findings of the present study, the investigator concludes that:

Most of the nursing students participated in this study had a average level of knowledge, average level of preventive health behavior and positive attitudes towards COVID-19, the current study also showed that there were highly significant positive correlation between students' knowledge, preventive health behaviors and their attitude regarding COVID19.

Recommendations

In the light of the findings of the current study the following recommendations are suggested:

- Infection control courses about pandemic must be included in the curriculum of all faculty departments.
- Conduct educational programs and workshops about the preventive health behavior about COVID-19 for faculty students at certain intervals.
- The study should be replicated on larger sample and in different universities in order to generalize the results.

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