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Nursing Students' Awareness of Droplet and Airborne Isolation Precautions for Geriatric Patients during Outbreak of Coronavirus

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1.ABSTRACT

Background: Coronavirus disease 2019 is the third coronavirus outbreak in the last two decades. The virus is thought to spread through respiratory aerosol from infected people's coughing and sneezing, or through close personal contact. Older people are at highest risk for COVID-19 due to physiological changes associated with ageing, decreased immune function, and multi-morbidity. **Aim**: The study aimed to assess nursing students' awareness of droplet and airborne isolation precautions for geriatric patients during outbreak of coronavirus. **Method:** A descriptive study was utilized with a convenient sample of 356 students. **Setting:** The study was conducted at Mansoura University's Faculty of Nursing and Technical Institute of Nursing. **Tools of data collection**: Two tools were used, demographic data structured interview questionnaire and nursing students' awareness of droplet and airborne isolation precautions for geriatric patients' questionnaire. **Results:** There was a mild positive significant correlation between knowledge, attitude, and practices score. There was a mild positive significant correlation between knowledge and attitude score ($r = 0.487$, $P < 0.001$), and between knowledge and practices score ($r = 0.393$, $P < 0.001$). **Conclusion:** The majority of the studied nursing students had a positive awareness regarding droplet and airborne isolation precautions for geriatric patients**.** **Recommendations:** Develop of educational and training program to nursing students to raise their awareness about droplet and airborne isolation precautions for geriatric patients.

Keywords: Nursing Students, Awareness, Isolation Precautions, Geriatric Patients, Coronavirus.

2.Introduction:

After Severe Acute Respiratory Syndrome (SARS) and Middle East Respiratory Syndrome (MERS), the "novel" coronavirus disease 2019 (abbreviated "COVID-19") is the third coronavirus outbreak in the last two decades. This disease is caused by a Coronaviridae virus known as Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2) according to the International Committee on Virus Taxonomy [1]. The World Health Organization (WHO) declared the COVID-19 outbreak a global pandemic on March 11, 2020, and there are more than 118, 000 confirmed cases and 4291 deaths in 114 countries and regions worldwide. In just a few months, COVID-19 outbreak has converted into a severe global acute respiratory pandemic, with an increasing number of infections and deaths. The pathogen responsible for the new coronavirus disease is a new type of coronavirus that belongs to the beta-type coronavirus family and has a cell-like structure [2].

The virus is thought to spread through respiratory aerosol from infected people's coughing and sneezing, or through close personal contact. Infection can spread by touching contaminated objects [3]. The coronavirus disease 2019 pandemic has caused a sudden significant increase in hospitalizations for pneumonia with multi organ disease [4]. **Fever, dry cough, and fatigue are among the COVID-19's clinical symptoms. Symptoms such as nasal congestion, runny nose, sore throat, myalgia, and diarrhea are common in some patients** [2].

Older people are at highest risk from COVID-19 and have a significant impact on older people because of physiological changes associated with ageing, decreased immune function, and multi-morbidity, all of which make older adults more susceptible to the infection and make them more likely to suffer

severely from COVID-19 disease and more serious complications [5]. It affects elderly patients and causes a delay in recovery. It is critical to take steps to treat them so that their health does not deteriorate, and to take care of them in order to promote their health, prevent illness, and limit the spread of infection, encourage independence, and improve their quality of life [6].

More than half of all deaths were people aged 80 years or older and over 95% of these deaths occurred in those older than 60 years. Eight out of ten deaths are caused by people who have one underlying comorbidity at least, such as cardiovascular disease, hypertension, or diabetes [7]. Management focuses on providing supportive care, treating symptoms, and preventing complications. Most of the pharmacological treatment drugs are based on vitro antiviral activity, anti-inflammatory effects, immunemodulatory drugs [8].

Knowledge, attitude, and practices are the three pillars that support life's dynamic system. Knowledge is information that has been gained or acquired. There are many ways to acquire knowledge, including reading, sagacity, and so on. In addition, having the right attitude means thinking about the right situation. There are a variety of ways to empathize with a situation, but it all depends on how an individual reacts to it. Practices are defined as the contemplation of rules and knowledge that leads to action. To guide and serve the patients, proper knowledge, a positive attitude, and good practice are required [9].

Nurses are facing unprecedented challenges as a result of the characteristics of COVID-19 and the characteristics of nursing procedures. Cross infection between nurses and patients is a possibility due to the high risk of exposure to droplets and aerosols from saliva and other body fluids during procedures. Every nurse must fully comprehend the characteristics of COVID-19 and strictly implement the most appropriate protective measures to reduce and control the risk of cross infection during nursing procedures [2].

Nurses have the most experience with patients in general and the elderly in particular. Plans for our students must always promote and support the health system's and healthcare workers' proper functioning. Ensure that nursing students' use of personal protective equipment has a positive impact on others' availability, both now and as the pandemic [10].

It was important to assess the extent of nursing students' knowledge, attitude, and practices of droplet and airborne isolation precautions for geriatric patients during outbreak of coronavirus. These students will work as nurses after graduation, and they will interact with patients. As a result, they should be aware enough to practice and deal with elderly patients.

Aim of the study:

The current study aimed to assess nursing students' awareness of droplet and airborne isolation precautions for geriatric patients during outbreak of coronavirus.

This aim was achieved through the following steps:

1- Assess the nursing students' knowledge of droplet and airborne isolation precautions for geriatric patients during outbreak of coronavirus.
2- Assess the nursing students' attitude toward droplet and airborne isolation precautions for geriatric patients during outbreak of coronavirus.
3- Assess the nursing students' practices of droplet and airborne isolation precautions for geriatric patients during outbreak of coronavirus.

Research questions:

- Q1: What is the level of nursing students' knowledge of droplet and airborne isolation precautions for geriatric patients during outbreak of coronavirus?
- Q2: What is the nursing students' attitude of droplet and airborne isolation precautions for geriatric patients during outbreak of coronavirus?
- Q3: What is the level of nursing students' practices of droplet and airborne isolation precautions for

geriatric patients during outbreak of coronavirus?

Method

Study Design:

A descriptive study was utilized to accomplish the aim of this study.

Setting:

This study was carried at Mansoura University's Faculty of Nursing and Technical Institute of Nursing affiliated to Ministry of higher education.

Subjects:

The study included 356 students from the Faculty of Nursing (3^{rd} and 4^{th} year) and the Technical Institute of Nursing (2^{nd} year) at Mansoura University who accept to participate in the study.

Sample size calculation:

A convenient sample of 356 students based on data from literature [12], the sample size was estimated using the following formula, a level of significance of 5% and a power of study of 80%, and based on data from the literature:

Sample size = $[(Z_{1-\alpha/2})^2.SD^2]/d^2$

Where, $Z_{1-\alpha/2}$ = is the standard normal variate, at 5% type 1 error ($p<0.05$) it is 1.96. SD = standard deviation of variable, d = absolute error or precision. So, Sample size = $[(1.96)^2.(1.19)^2]/(0.25)^2$ =355.2,

Based on the above formula, the sample size required for the study was 356.

Tools of data collection:

Two tools were used for data collection:

Tool I: Demographic data structured interview questionnaire, it was developed by the researcher based on literature review it was included personal data such as age, sex, marital status, and academic year level.

Tool II: Nursing students' awareness of droplet and airborne isolation precautions for geriatric patients' questionnaire: This tool was developed by Centers for Disease Control and Prevention (CDC) guidelines, and Jain et al., (2010). The questionnaire was divided into three parts that assessed participants' knowledge, attitudes, and practices regarding the CDC's guidelines for droplet and airborne isolation precautions. Jain et al., (2010) were appraised using 33 questions to assess respondents' knowledge, attitude, and practices levels. This tool was adapted by the researcher to be 45 questions.

Part I: Nursing students' knowledge regarding droplet and airborne isolation precautions for geriatric patients, this part assesses nursing students' knowledge on three responses (yes, no, I do not know). It has 15 questions, with a score of 1 indicating whether the answers agree with the CDC guidelines. As a result, the total knowledge score ranged from 0 (all wrong answers) to 15 (all correct answers). A score of less than 60% indicates poor knowledge, while a score of more than 60% indicates good knowledge.

Part II: Nursing students' attitude regarding droplet and airborne isolation precautions for geriatric patients, this part assesses a nursing student's attitude on three responses (disagree, agree, and strong agree). It has 15 questions, with disagree responses receiving a 1 point score, agree responses receiving a 2 point score, and strong agree responses receiving a 3 point score. As a result, the total score ranged from (15 – 45), 15 (all disagrees), and 45 (all strong agree score). A score of less than 60% indicates a negative attitude. If the score is equal to or higher than 60%, it indicates a positive attitude.

Part III: Nursing students' practices regarding droplet and airborne isolation precautions for geriatric patients, this part assesses nursing student practices on four levels of response (always, often, sometimes and never). It has 15 questions with a 1 for correct answers and a 0 for all other responses. As a result, the total practice score ranges from 0 (all other responses) to 15 (all correct answer). Total score ranged from (0 – 15). A score of less than 60% indicates poor practices, while a score of more than 60% indicates good practices.

Validity of the tools

The study tools were reviewed by five experts in the fields of Gerontological Nursing

and Community Health Nursing at Mansoura University. As a result, their recommended changes were implemented and minor changes in translation and the final forms were used for data collection.

Reliability

The reliability of tool II used in this study done using the Cronbach's Alpha test (r= 0.82). So, the tool was reliable.

Pilot Study

A pilot study was conducted on 10% (35)of the sample size of nursing students from the same setting to check and confirm the applicability of the study tools and make any necessary modifications. These nursing students were not included in the study's sample or research results.

Field work

After obtaining the necessary approval, the researcher began collecting data. The researcher visited the Faculty of Nursing at Mansoura University 3 times a week (Saturday, Sunday, and Wednesday) for the 3rd and 4th academic years, and the technical institute of nursing 3 times a week (Tuesday, Wednesday, and Thursday) for the 2nd academic year. The researcher started the interview by introducing herself to the students and providing a brief overview of the study's objectives. Then, using the study tools, the necessary data was collected. The researcher assessed nursing students' awareness of droplet and airborne isolation precautions for geriatric patients during outbreak of coronavirus distributed the questionnaire to the students for completion and collect it after the students complete it using tool (I and II). Data collection began in March 2021 and ended in May 2021.

Ethical Considerations:

An ethical approval was taken from the Research Ethics Committee of the Faculty of Nursing – Mansoura University. Informed written consent was obtained from each subject enrolled in the study after providing comprehensive information about the nature of the study. Privacy of the study subjects and confidentiality of the collected data was assured and were only used for the purpose of the study. Each student was assured that the participation is voluntary, and they were informed that they have the right to withdraw from the study at any time without any consequences or penalty.

Data analysis:

The collected data were coded, tabulated and analyzed using the statistical package of the social science (SPSS) version 22. Descriptive appropriate statistical tests were utilized as frequent, percentage, mean, standard deviation and Cronbach's Alpha test. Chi-square test (χ^2) was used for comparison of categorical variables, was replaced by Mont Carlo Exact test if the expected value of any cell was less than 5. Pearson's correlation was used to find correlation coefficient (r) between two quantitative variables. The difference was considered significant at $P \leq 0.05$.

Results

Table 1: shows the demographic characteristics of the studied students. The age of the studied students was ranged from 19 to 23 years with average age 20.48± 1.03 years. More than half of them (64.9%) aged 20-21 years. Out of 356 studied students; 210 (59%) are females and 146 (41%) are males. Most of students are single (82.9%). The studied students distributed into three groups: third year faculty of nursing group (22.8%), fourth year faculty of nursing group (12.4%) and technical institute students (64.9%).

Figure 1: represents the knowledge level of the studied students regarding droplet and airborne isolation precautions for geriatric patients. It was found that 94.9% of the studied students had good knowledge.

Figure 2: represents the attitude level of the studied students regarding droplet and airborne isolation precautions for geriatric patients. It was found that 93.5% of the studied students had positive attitude.

Figure 3: represents the practices level of the studied students regarding droplet and airborne isolation precautions for geriatric patients. It was found that 81.5% of the studied students had good practices.

Table 2: illustrate the correlation between the total scores of knowledge, attitude

and practices of the studied students regarding droplet and airborne isolation precautions for geriatric patients. It was found that there was mild, positive significant correlation between knowledge and attitude score (r = 0.487, P <0.001). Also, there was mild, positive significant correlation between knowledge and practices score (r = 0.393, P <0.001).

Table 3: shows the relationship between knowledge level of the studied students regarding droplet and airborne isolation precautions for geriatric patients and their demographic characteristics. The table reveals that younger students (19-20 years), females who are single or engaged, and students from technical institutes have a higher percentage of good knowledge. Only gender and marital status showed a significant difference (P<0.001).

Table 4: represents the relationship between attitude level of the studied students regarding droplet and airborne isolation precautions for geriatric patients and their demographic characteristics. The table shows that a higher percentage of positive attitudes were found among older students (21-23 years), females, divorced or engaged or married, and those from faculty of nursing. The significant difference (P = 0.015) only for gender.

Table 5: shows the relationship between practices level of the studied students regarding droplet and airborne isolation precautions for geriatric patients and their demographic characteristics. The table shows that a higher percentage of good practice was found among older students (21-23 years), females, married or single, and those from faculty of nursing. The statistic difference is not significant (P>0.05).

Table 1: Demographic characteristics of the studied students

Items	N=356	%
Age (years)		
- 19	54	15.2
- 20	158	44.4
- 21	73	20.5
- 22	61	17.1
- 23	10	2.8
Range: 19 – 23 years	Mean ± SD = 20.48 ± 1.03 years	
Gender		
- Females	210	59.0
- Male	146	41.0
Marital status:		
- Single	295	82.9
- Married	29	8.1
- Engaged	27	7.6
- Divorced	5	1.4
Academic year level:		
- Technical institute	231	64.8
- Faculty 3rd year	81	22.8
- Faculty 4th year	44	12.4

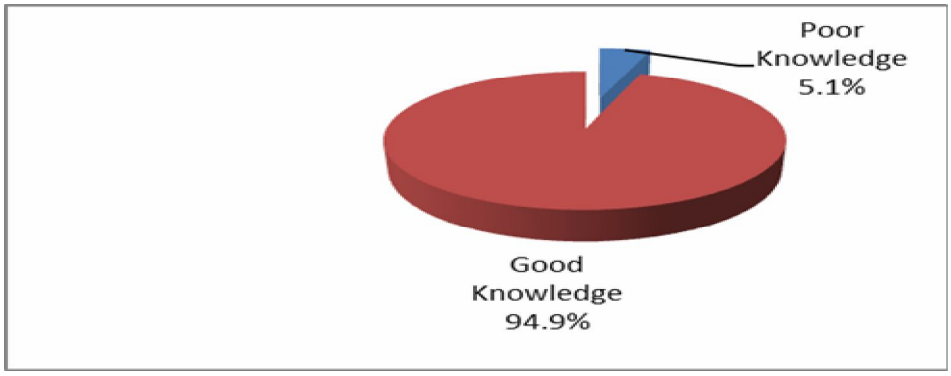

Figure 1: Knowledge level of the studied students regarding droplet and airborne isolation precautions for geriatric patients

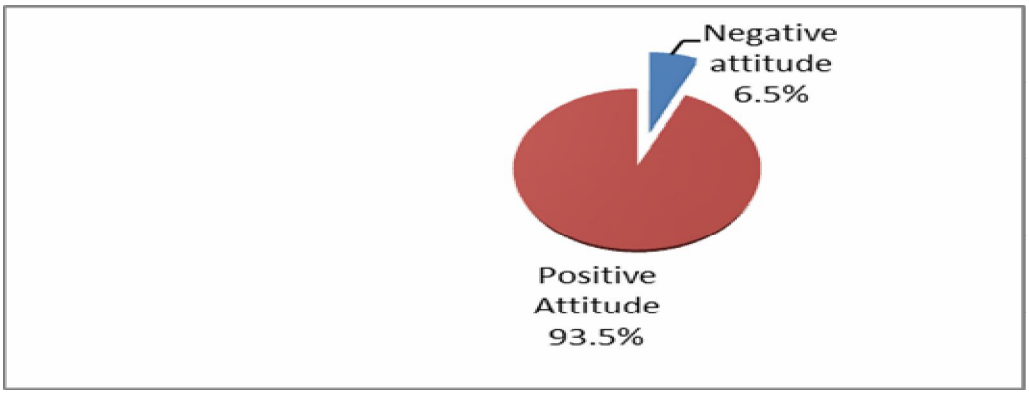

Figure 2: Attitude level of the studied students regarding droplet and airborne isolation precautions for geriatric patients

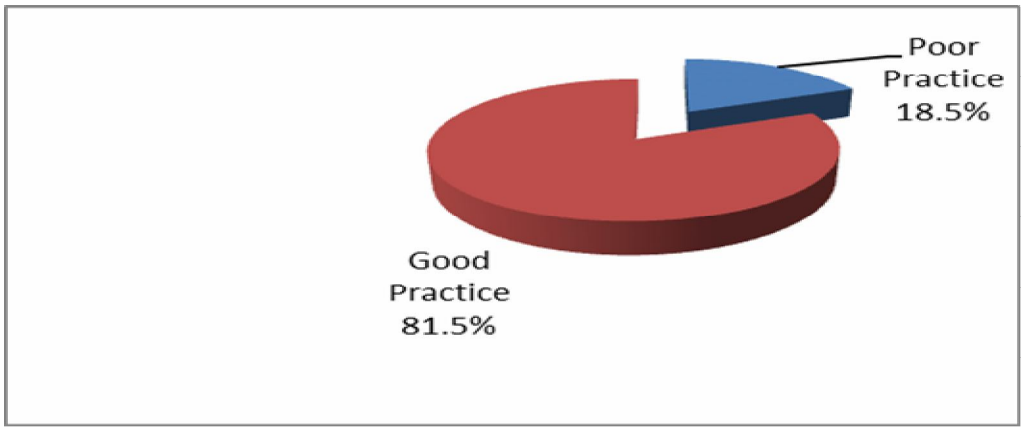

Figure 3: Practices level of the studied students regarding droplet and airborne isolation precautions for geriatric patients

Table 2: Correlation between scores of knowledge, attitude and practices of the studied nurses regarding droplet and airborne isolation precautions for geriatric patients

Items	Knowledge	Attitude	Practice
Knowledge		r = 0.487, P = <0.001	r = 0.393, P = <0.001
Attitude			r = 0.499, P = <0.001

Table 3: Relationship between knowledge level of the studied students regarding droplet and airborne isolation precautions for geriatric patients and their demographic characteristics

Characters	N	Knowledge Level				Significance test
		Poor (<9)(18)		Good (≥9)(238)		
		N	%	N	%	
Age (years):						
- 19 - 20	212	8	3.8	204	96.2	$\chi^2 = 1.796$, P = 0.180
- 21 - 23	144	10	6.9	134	93.1	
Gender						
- Females	210	3	1.4	207	98.6	$\chi^2 = 14.037$, P = <0.001
- Males	146	15	10.3	131	89.7	
Marital status:						
- Single	295	12	4.1	283	95.9	
- Married	29	2	6.9	27	93.1	$\chi^2 = 32.350$, MEP = <0.001
- Engaged	27	1	3.7	26	96.3	
- Divorced	5	3	60.0	2	40.0	
Students group:						
- Technical institute	231	9	3.9	222	96.1	$\chi^2 = 1.844$, P = 0.174
- Faculty students	125	9	7.2	116	92.8	

Table 4: Relationship between attitude level of the studied students regarding droplet and airborne isolation precautions for geriatric patients and their demographic characteristics

Characters	N	Attitude Level				Significance test
		Negative (<27) (23)		Positive (≥27) (333)		
		N	%	N	%	
Age (years):						
- 19 - 20	212	15	7.1	197	92.9	$\chi^2 = 0.328$,
- 21 – 23	144	8	5.6	136	94.4	P = 0.567
Gender						
- Females	210	8	3.8	202	96.2	$\chi^2 = 5.955$,
- Males	146	15	10.3	131	89.7	P = 0.015
Marital status:						
- Single	295	21	7.1	274	92.9	
- Married	29	1	3.4	28	96.6	$\chi^2 = 1.332$,
- Engaged	27	1	3.7	26	96.3	MEP = 0.780
- Divorced	5	0	0.0	5	100.0	
Students group:						
- Technical institute	231	18	7.8	213	92.2	$\chi^2 = 1.930$, P = 0.165
- Faculty students	125	5	4.0	120	96.0	

Table 5: Relationship between practices level of the studied students regarding droplet and airborne isolation precautions for geriatric patients and their demographic characteristics

Characters	N	Practices Level				Significance test
		Poor (<9) (66)		Good (≥9) (290)		
		N	%	N	%	
Age (years):						
- 19 - 20	212	41	19.3	171	80.7	$\chi^2 = 0.222$,
- 21 – 23	144	25	17.4	119	82.6	P = 0.637
Gender						
- Females	210	37	17.6	173	82.4	$\chi^2 = 0.287$,
- Males	146	29	19.9	117	80.1	P = 0.592
Marital status:						
- Single	295	52	17.6	243	82.4	
- Married	29	5	17.2	24	82.8	$\chi^2 = 2.407$,
- Engaged	27	8	29.6	19	70.4	MEP = 0.509
- Divorced	5	1	20.0	4	80.0	
Students group:						
- Technical institute	231	47	20.3	184	79.7	$\chi^2 = 1.422$, P = 0.233
- Faculty students	125	19	15.2	106	84.8	

Discussion:

There are new public health crises threatening the world with the emergence and spread of 2019 novel coronavirus (2019-nCoV) or the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) [11]. Older people are at highest risk from COVID-19. Some of the reasons older people are greatly impacted by COVID-19 include the physiological changes associated with ageing, decreased immune function and multi-morbidity which expose older adults to be more susceptible to the infection itself and make them more likely to suffer severely from

COVID-19 disease and more serious complications [5].

The current study was conducted to assess nursing students' knowledge, attitude, and practices of droplet and airborne isolation precautions for geriatric patients during outbreak of coronavirus. This study highligh **Amany Samir Abdallah** ts that nursing students' knowledge, attitude, and practices are frequent related, and they complement each other. Separately, beginning with studying nursing students' awareness, the current study represents that the most studied nursing students have good awareness.

According to characteristics of the studied students, the present study showed that most of the studied nursing students' age ranged between 20-21 years. While, the college students' age actually ranged between 18-23 years. This may be related to sample was presented to students in high academic level (3rd and 4th year). This result is in agreement with a study done in Egypt by Abd Elhameed (2013) [12], and a study was done in India by Karkada & Nayak (2011) [13], who reported that most of the studied students aged 20-21 years. Moreover, this result is contradictory with a study done in Spain by Rabano-Blanco et al. (2019) [14], who reported that most of studied students aged 18-19 years.

The present study showed that the most of the studied nursing students were females. This result may be attributed to the high number of female students enrolled in the faculty and the technical institute of nursing. This result supported the result of a study done in Jordan by Alzoubi et al. (2020) [15], who reported that most of the studied students were females. Also, a study was done in Pakistan by Ahmed et al. (2020) [16], reported that most of students were females. Regarding marital status, the present study showed that the most of the studied nursing students were single. This reflects the importance of focusing in education during this age and the most in our culture prefer marriage after graduation. This result is supported by a study done in Turkey by Uzunlar etal. (2013) [17], who reported that most of the studied students were single.

The current study showed that the most of the studied nursing students were from the technical nursing institute. This may be due to the high number of technical institute students enrolled in the study more than faculty students. This result is contradictory with a study done in Turkey by Uzunlar et al. (2013) [17], who reported that most of the studied students were from faculty students.

Knowledge is the information that is acquired or gained. The knowledge builds the attitude of an individual which forms the basis for behavior and force or prepare the individual to react in a certain manner [9]. According to the present study, it was observed that the majority of the studied students have good level of knowledge regarding droplet and airborne isolation precautions. This result may reflect that, the students are interested in knowing more about coronavirus and instructions of WHO and CDC regarding this disease through previous education during the course study and presently by social media, the internet, and news channels.

This result is consistent with a result of a study done in Saudi Arabia by Binkhamis et al. (2022) [18], who revealed that the majority of the studied students had good level of knowledge of airborne and droplet precautions. Also, this result is in agreement with a study done in Iran by Mohammadzadeh, Behnaz & Parsa (2013) [19], who represented that the majority of the studied nurses had good level of knowledge toward standard isolation precautions.

As regard to relationship between knowledge level of the studied students regarding droplet and airborne isolation precautions for geriatric patients and their demographic characteristics, the difference was statistically significant only for gender and marital state. This may be related to the high number of females included in the study. This result is supported by a study done in Iran by Sarani et al. (2016) [20], who showed that there was a statistically significant difference between knowledge and gender. In contrast with this result, a study done in Saudi Arabia by Begum (2020) [21], reported that there was no

significant difference between the knowledge and gender.

Concerning attitude of the studied students in the current study, it was observed that the majority of the studied students have positive attitude regarding droplet and airborne isolation precautions. This may be justified as the elderly patients are more susceptible to infection and complications, so the students are interested to know the precautions and look for it, in order to help the elderly patients to face and treat coronavirus as well as avoid complication and consequences of COVID-19 [22]. This result is in agreement with a study done in Iran by Danaei et al. (2022) [23], who revealed that the majority of the studied nurses had a positive attitude toward isolation precautions. Contradictory to the result of the present study, a study done in Palestinian by Ayed & Zabn (2021) [24], reported that most of the study had a negative attitude toward COVID-19.

As regard to relationship between attitude level of the studied students regarding droplet and airborne isolation precautions for geriatric patients and their demographic characteristics, the difference was statistically significant only for gender. Moreover, there is no big difference during pandemic time among all students, due to the role of social media, the role of the university's own procedures, so all the students are close in the information and beliefs. In the same line with this study, a study was done in China by Peng et al. (2020)[25], revealed that there was statistically significant difference between attitude and gender of COVID19. Contradictory to the result of the present study, a study was done in Saudi Arabia by Abalkhail et al. (2021) [26], showed that there was no statistically significant difference in attitude of infection control standard precautions.

Regarding practices in the present study, it was observed that the majority of the studied students have good practices regarding droplet and airborne isolation precautions. This result is may be related to having a clear instruction from health agencies and a government which helps in improves understanding and skills to combat the pandemic through announcement and instructions given through media [22]. This result is in agreement with a study done in Spain by Ponce-Alonso et al. (2021) [27], who revealed that the majority of the studied nurses had good practices.

According to relationship between practices level of the studied students regarding droplet and airborne isolation precautions for geriatric patients and their demographic characteristics, there was no statistically significant difference. This result is in agreement with a study done in China by Peng et al. (2020) [25], who reported that there was no statistically significant difference between practices and demographic characteristics of the studied students. In contrast, a study done in Saudi Arabia by Abalkhail et al. (2021) [26], showed that there was a statistically significant difference between age, gender, and practices of infection control standard precautions.

The present study revealed that there is a mild positive significant correlation between knowledge, attitude, and practices score. This result could be explained that there is an integral relationship between knowledge, attitude, and practices as they complement each other. This result is supported by a study done in Iran by Danaei et al. (2022) [23], who revealed that there was a positive linear correlation between knowledge, attitude, and practices toward isolation precautions. Therefore, according to the result of the current study, it was obvious that increasing nursing students' awareness about COVID-19 will lead to a positive impact on geriatric patients in managing the pandemic, overcome and deal with the consequences of COVID-19. Which will help in improving health and quality of life of the geriatric patient.

Conclusion:

Based on findings of the present study, it was concluded that the majority of the studied nursing students had good level of knowledge and practices regarding droplet and airborne isolation precautions for geriatric patients. As well, most of the studied nursing students had positive attitude toward droplet and airborne isolation precautions for geriatric patients. In general, the majority of the studied

nursing students had a positive awareness regarding droplet and airborne isolation precautions for geriatric patients. A positive correlation was found between nursing student knowledge and practices, knowledge and attitude, as well as between attitude and practices scores regarding droplet and airborne isolation precautions for geriatric patients.

Recommendations:

1) Develop of educational and training program to nursing students to raise their awareness about droplet and airborne isolation precautions for geriatric patients.
2) Develop the courses of infection control and precaution measures regarding droplet and airborne disease in the nursing curriculum.

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