



Knowledge, Anxiety, and Protective Behaviors Regarding Omicron among Secondary School Students

Shaimaa Mohamed Amin¹, Nadia Waheed Elzohairy², Amira A. Elbially^{3*}

¹Lecturer of Community Health Nursing, Faculty of Nursing, Damanhour University, Egypt

²Lecturer of Psychiatric Nursing and Mental Health, Faculty of Nursing, Damanhour University, Egypt

³Lecturer of Community Health Nursing, Faculty of Nursing, Tanta University, Egypt.

*Corresponding author: amira_elbially@nursing.tanta.edu.eg

Abstract:

Background: COVID-19 Omicron variant is spreading in alarming way universally. Thus, assessing knowledge, anxiety and preventive behaviors of every individual is essential in handling the outbreak effectively. **Aim of the study:** To assess knowledge, level of anxiety and protective behaviors regarding Omicron among secondary school students. **Design:** A descriptive cross sectional study design was utilized. **Setting:** This study was conducted in five secondary schools allocated in five educational directorates in El-Beheira governorate, Egypt. **Subjects:** Convenient sample of five hundred students were selected from the previous settings. **Tools for data collection:** Two tools were used. Tool I: Structured self-administered questionnaire including two parts. Tool II: COVID-19 Induced Anxiety and Protective Behaviors during COVID-19 Outbreak Scale. **Results:** More than half of the students had poor knowledge and low protective behaviors towards omicron (52.6% and 52.4% respectively). Additionally, more than half of the studied sample reported high level of anxiety regarding omicron. Moreover, age from 14 to less than 16 years, being female, living in rural area, their parents not working, having no previous infection of COVID-19, having a family member infected with COVID-19, poor knowledge concerning omicron and displaying high protective behaviors toward COVID-19 are associated with anxiety. **Conclusion:** It can be concluded that, the highest percentage of the students reported poor knowledge, high anxiety level and displayed low protective behaviors toward Omicron. **Recommendations:** Conducting digital based and traditional educational interventions to raise the student's awareness concerning omicron and reduce their anxiety.

Keywords: Anxiety; COVID-19 Omicron variant; Secondary School students; Protective behaviors, knowledge.

Introduction

Omicron COVID-19 variant is a variant of concern as announced by WHO. It has several mutations making it difficult to control. Several studies have been conducted all over the world to understand its severity and transmissibility as well as its ability to resist vaccines and re-infect people. WHO suggested that people

infected with COVID-19 previously may become re-infected easily Omicron variant (WHO, 2021). According to WHO (2022), Omicron had also been announced in 149 countries across WHO Regions. It was first announced in November 2021 in south Africa, china, Belgium, Bostwana, Netherland, United kingdom, ..ect. The first case was announced in Egypt by the

ministry of health in December 2021. Moreover, Omicron proved a significant ability for spreading over Delta. In countries where community transmission is documented, the Omicron is spreading faster than the Delta variant (WHO, 2022).

Omicron has become the dominant variant of the coronavirus. It's more transmissible through inhalation of the virus from infected person or touching eye, nose and mouth with unclean hands. However, it causes less severe disease than earlier variants, like Delta variant. Symptoms associated with Omicron variant can be milder than those associated with other variants. These symptoms looks like those of COVID-19 such as sore throat, fever, cough as well as runny nose (CDC, 2022). According to WHO, over 350 million cases had been confirmed with Omicron, with over 5.6 million deaths (WHO, 2022).

Young population is growing rapidly in Egypt. Adolescents aging 10-19 years, who represents 19% of the total Egyptian population (UNICEF, 2020). In the educational year (2019/ 2020), about 1,753, 912 secondary school students were enrolled in general secondary schools (Galal, 2021). Secondary school students are in the critical period of early adolescence, when they face developmental challenges and personality gradually reaches maturity (Alazzam et al., 2021). In Egypt, secondary school students ranged between 16-18 years. It is the period of physical and intellectual growth of adolescents (UNICEF, 2021).

Adolescents usually have emotional instability due to personality immaturity, which make them a vulnerable group for stress and anxiety. Also, the emergence of any infectious disease can be associated with, fear, psychological distress, anxiety and other symptoms of mental illness (Islam et al., 2020). In addition, lack of knowledge and protective behaviors associated the Omicron variant may also

result in distress and high level of anxiety among the students (Alzoubi et al., 2020). Thus, providing education and training for secondary school students will help them to have skills necessary to reduce anxiety (UNICEF, 2021).

Anxiety is felt when an individual is confronted with a life event, such as attending an interview or taking an examination or a disease. Omicron induced anxiety can be defined as anxiety caused by omicron. It can be manifested as a sense of helplessness, loss of self-esteem and inability to confront external factors associated with omicron. Prolonged stress can have an impact on students' academic lives by causing memory problems, physical problems, and an inability to concentrate in class, which can lead to academic failure. Likewise, the students need to be educated and trained on coping mechanisms to manage fear and anxiety and reduce physical and psychological distress as well (Siddiquea et al., 2021).

Health literacy is one of factors associated with omicron induced anxiety. If the students acquired knowledge, they will engage in health-promoting behaviors that will help them improve or maintain their health (Gautam et al., 2021). Lack of knowledge is one of the factors inducing health behaviors. It has an indirect influence on the related behavior. Also, other factors such as social factors and having a mild level of fear and anxiety motivates people to take protective measures, but when this level is extreme, people tend to engage in risky behaviors (Lodge et al., 2021).

Omicron may not cause severe sickness as other COVID-19 variants according to CDC. However, it is spreading faster. That's why, it is more critical to control it and prevent its spread in the community (CDC, 2022). Community health nurse (CHN) has a vital role in helping secondary school students to improve their knowledge about omicron. This can help students to adopt protective

behaviors and reduce anxiety level (Lunsford, et al. 2018). It is believed that the more health knowledge a person possesses, the better healthy behaviors they will adopt (Siddiquea et al., 2021). In this respect, CHN can educate students and school teachers about protective behaviors of Omicron such as wearing mask while being outside home or dealing with infected individuals as well as keeping 1m distance at least apart from others. Also, washing hands frequently for at least 20 seconds, avoiding overcrowded places and avoiding sharing personal items (WHO, 2022). Psychiatric health nurse also has a challenging role in helping students to manage stress and learn new anxiety coping mechanisms. This will help to reduce extreme anxiety levels, to motivate them using protective behaviors regarding Omicron.

Significance of the study:

In Egypt, the Ministry of Health (MOH) announced that Omicron COVID-19 variant is responsible for the vast majority of infections in Egypt. The first case of omicron variant was detected in December 2021. In January 2022, Egypt has a rapid rise in the number of infections with the Omicron variant. According to WHO, from January 2020 to June 2022, there have been 513,944 confirmed cases of COVID-19 with 24,718 deaths in Egypt. It is highly transmissible and can be transmitted rapidly among school students. Secondary school students are a particularly high-risk group this may be due to their exposure anxiety and in risky behaviors (Wang et al., 2020; Hu et al., 2020;). In addition, most of them may have no or fake information about protective behaviors and anxiety coping mechanisms. This can negatively influence their attendance to school and academic achievement. Thus, the aim of this study was to assess the level of knowledge, anxiety and protective behaviors regarding Omicron among secondary school students.

Aim of the study: To assess the level of knowledge, anxiety and protective behaviors regarding Omicron among secondary school students.

The research questions:

- What is the level of knowledge regarding Omicron among secondary school students?
- What is the level of anxiety toward Omicron among secondary school students?
- What are protective behaviors adopted by secondary school students regarding Omicron?

Subjects and Method

Research design

A descriptive cross sectional study design was used in this study.

Setting of Study

The study was conducted in five secondary schools allocated in five educational directorates in El-Beheira governorate, Egypt. These educational directorates namely: Kafr-Eldawar, Damanhour, Itay El Baroud, Abo Homos and Eldelengat. These schools are Al-Saranyah secondary mixed school, Abo-Homos secondary mixed school, jabaris secondary mixed school, Al-Abaadiya secondary mixed school, Imam Al-Hussein Secondary mixed School.

Subjects

Five hundred secondary school students were selected from the previously mentioned settings, who meet the following inclusion criteria:

- Willing to participation in the study
- Had no chronic diseases or disability.

Sample size

The sample size was calculated using the EPI info7 software, according to the number of total population (43.000), expected frequency of 50%, 5% margin of error and 95% confidence interval. The calculated was found to be 500 students.

Sampling technique

A multistage sampling technique was used as the follows:

- El-Beheira governorate consisted of 18 educational directorates, five educational directorate (25%) were chosen randomly namely (Kafr-Eldawar, Damanhour, Itay El Baroud ,Abo Homos and Eldelengat).
- One secondary school was selected randomly from the previous five educational directorates.
- A total number of 100 students were chosen from each school using equal allocation technique.
- From each school, students were selected conveniently from both sexes.

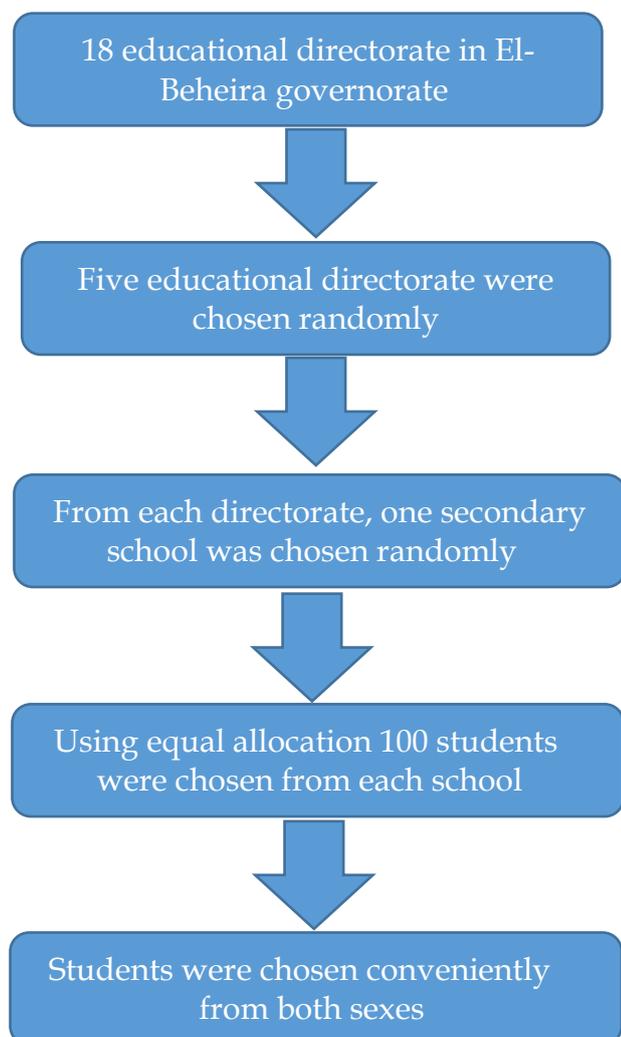


Figure (1): Sampling technique flow chart

Tool of data collection: two tools were used to collect the necessary data.

Tool I: Structured self-administered questionnaire: It includes two parts as follows:

Part I: Socio-demographic data and COVID-19 history of the studied students such as age, sex, place of residence, Father's job and level of education, Mother's job and level of education, Previously infected with COVID-19 and Family history of COVID-19.

Part II: knowledge of the students concerning Omicron: It was developed by the researchers after reading the updated literatures (CDC 2022; WHO 2021). It involved 15 questions covering the students' knowledge regarding omicron manifestations, incubation period, and mode of transmission, high risk groups, severity, complications, treatment, and protective measures. The correct answer took (1) and the incorrect answer took (0). The total knowledge score range was (0-15) and categorized as:

- Poor knowledge score: < 50% (< 7.5)
 - Fair knowledge score: 50% < 75% (7.5 < 11.25)
 - Good knowledge score: $\geq 75\%$ (≥ 11.25)
- An Additional question (not involved in the total score) was added regarding sources of information concerning Omicron.

Tool II: COVID-19 Induced Anxiety and Protective Behaviors During COVID-19 Outbreak: Scale:

It was developed by Riad et al., (2020), for measuring COVID-19 induced anxiety and protective behaviors. It was adopted by the researchers. It included two parts:

Part I: Omicron induced anxiety scale. It was adopted to measure the participants' anxiety level caused by Omicron illustrating the potential sources of stress and anxious emotions such as surrounding anxiety and

worries of others can increase your fear of omicron outbreak. It involved 10 items such as when I or any family member go outside home during omicron outbreak I feel anxious . All items were rated using a five point likert scale, ranging from totally disagree (1) to and totally agree (5). The total score ranged from 10 to 50 and categorized as the following:

- Low anxiety level: from 10 to less than 25
- Moderate anxiety level: from 25 to less than 38
- High anxiety level: from 38 to 50

Part II: Protective behavior towards Omicron Scale: It was adopted to assess the student's use of protective behaviors regarding Omicron. It consisted of 3 dimensions including: Routine Protective Behaviors (RPB), Post-exposure Protective Behaviors (PPB), and Post-exposure Risky Behaviors (PRB). It consisted of 14 items and a five point likert scale was used ranging from Not at all like me (1) to Just like me (5). Items of routine protective behaviors subscale was used to assess individuals' daily use of protective behaviors during the epidemic, such as "I keep my hands clean during the outbreak". The post exposure protective behaviors subscale, assessed individual's use of protective behaviors after being exposed to possible infection such as "If I get in contact with someone from omicron outbreak area, I should isolate myself". The post exposure risky behaviors (PRB) subscale, examines person's risky behaviors after possible exposure to infection such as " In my opinion, quarantine can be terminated, when there are no symptoms". The total score ranged from 14 to 70 and categorized as the following:

- Low protective behaviors : from 14 to 34
- Moderate protective behaviors :from 35 to 55
- High protective behaviors: from 56 to 70

Method

I. Administrative process:

Official letter was directed to undersecretary of the Ministry of Education in El-Beheira Governorate from the Faculty of Nursing, Damanhour University to get permission to conduct the study in selected settings. Official letter from the Faculty of Nursing was directed to selected schools' directors to facilitate conducting the study.

II. Development of the study tools:

Tool I was developed by the researchers based on the updated literature, whereas tool II was adopted. Content validity was checked by five experts in the field of community and psychiatric health nursing and their modifications were considered. The reliability of the tool after translation into Arabic language was done using the Cronbach Alpha Coefficient test. It was found to be reliable ($r=0.79$, 0.911 of tool I&, II respectively).

III. Pilot study

A pilot of fifty students (10% of the estimated sample) was done to ensure the clarity, applicability and feasibility of the tool and to find the obstacles that might impede the data collection process. Those students were excluded from the study.

IV. Process of data collection:

Data were collected over a period of three months (from February2022 to April 2022).

The questionnaire completion took about 15-20 minutes. The researchers distributed the questionnaire to the students during regular class periods from Saturday to Thursday.

V. Ethical consideration

Approval was obtained from the ethical committee in the Faculty of Nursing, Damanhour University in December 2021. Approval was obtained from the directors of the selected settings to collect the data. A written consent was obtained from every student participating

in the study after explaining the aim of the study. They were assured that the collected data will be secret. Confidentiality of students were assured by statement in the cover page of the questionnaire, a code number was used instead of names. Each student was informed that she/ he can withdraw from the study at any time.

VI. Statistical analysis

Data were organized, tabulated and statistically analyzed using statistical package for social studies (SPSS) version 20.0. Qualitative data were described using number and percent. Quantitative data was described by calculating the mean and standard deviation. Significance was adopted at $P < 0.05$ for interpretation of obtained results. Regression analysis was utilized to detect factors affecting omicron induced anxiety. Also, Pearson correlation coefficient test was used to appraise correlation between the studied variables.

Results

Table (1): illustrates distribution of the studied students in relation to their socio-demographic characteristics & COVID-19 history. It revealed that more than half (54.4%, 53.2%, 51.8%, 56.4%) of the studied sample aged from 16 to less than 18 years with a mean of 16.5 ± 1.15 , they were females, urban dwellers and their fathers had secondary education respectively. Additionally, the majority (83.2%) of their fathers were working. On the other hand, the highest percent of the student's mother (60.4%) had secondary education and 67.4 % of them were not working. Moreover, more than half (58.4%) of the students had no previous COVID-19 infection and more than two thirds (68.8%) of them reported family history of COVID-19 infection.

Table (2): shows distribution of the studied students in relation to their knowledge concerning Omicron. It indicated that, the highest percentage of the students had incorrect knowledge regarding all items of Omicron.

Figure (1): reveals distribution of the studied students in relation to their total score of knowledge concerning Omicron. It showed that more than half (52.6%) of the students had poor knowledge concerning Omicron.

Figure (2): conveys distribution of the studied students in relation to their source of information about omicron. It illustrates that, the main source of the student's information regarding Omicron was social media (91%).

Table (3): depicts distribution of the studied students in relation to the total score of omicron induced anxiety. It is evident that, slightly more than half (50.8%) of the students had high level of anxiety towards Omicron, whereas (38.8%, 10.4%) of them had moderate and low level of anxiety respectively.

Table (4): shows distribution of the studied students in relation to total score of protective behaviors towards omicron. It indicates that slightly more than half (52.4%) of the students had low protective behaviors towards Omicron and only 9% of them had high protective behaviors.

Table (5): depicts regression analysis for the factors associated with omicron induced anxiety. It showed that factors significantly associated with Omicron induced anxiety were: age From 14 to less than 16 years, being female, living in rural area, students whose fathers had secondary education and not working, students whose mothers had secondary education and not working, having previous history of COVID-19, having family history of COVID-19, poor knowledge concerning Omicron, displaying high protective behaviors toward COVID-19.

With respect to age, it is evident from the table that the students aged from 14 to less than 16 years had 3.7 times more omicron induced anxiety compared to their older counterparts (AOR=3.7; 95% CI: 0.480–29.476). Also, female students had 4.1 times higher level of anxiety than male students

(AOR= 4.1; 95% CI: 1.934–9.049). Additionally, students living in rural areas were 3.1 times more likely to have anxiety compared to those who were living in urban areas (AOR= 3.1; 95% CI: 1.465–6.882). Furthermore, the students whose fathers had secondary education had 1.7 times higher level of anxiety compared to their counterparts whose fathers had university education (AOR=1.7; 95% CI:0.685–4.556).

Similarly, the students whose fathers were not working were 3.7 times more likely to have anxiety than the students whose fathers were working (AOR=3.7;95%CI: 0.929–14.982).In addition, the students whose mothers had secondary education had 2.1 times higher level of anxiety than the students whose mothers had university education (AOR=2.1 ;95% CI: 0.730–6.095) . Likewise, the students whose mothers were not working were 2.4 times more likely to have anxiety compared to the students whose mothers were not working (AOR= 2.4; 95% CI: 1.119–5.343). It is also clear from the table that the students who had previous COVID-19 infection were 2.6 times more likely to have anxiety than their counterparts (AOR= 2.6; 95% CI: 1.196–5.919).

Also, the participants who had family history of COVID-19 had 1.7 times higher level of anxiety than those who had not (AOR=1.7; 95% CI: 0.834–3.773). Additionally, respondents who have poor level of knowledge concerning omicron had 2.1 times higher odds of omicron induced anxiety than those who had good knowledge (AOR=2.1; 95% CI: 0.541–8.416).Moreover, respondents with high protective behaviors had about 2.6 times higher level of anxiety compared to those with low level of protective behaviors (AOR=2.6; 95% CI: 0.796–8.906).

Table (6): conveys correlation between the total scores of knowledge, anxiety and protective behaviors. It is clear from the table that, there was a statistically significant negative correlation between total anxiety score and the total knowledge score ($r = -$

0.541, $p=0.000$). On the other hand, a statistically positive correlation was found between total anxiety score and total protective behaviors score ($r=0.661$, $p=0.000$) and also between total knowledge and total protective behaviors scores ($r=0.756$, $p=0.000$).

Table (1): Distribution of the studied students in relation to their socio-demographic characteristics & COVID-19 history (n = 500)

Socio-demographic characteristics & COVID-19 history of the students	No.	%
Age		
From 14 to less than 16 years	220	44
From 16 to less than 18 years	272	54.4
18 years & more	8	1.6
Mean ± SD	16.5 ± 1.15	
Sex		
Male	234	46.8
Female	266	53.2
Place of residence		
Urban	259	51.8
Rural	241	48.2
Father's level of education		
Illiterate	16	3.2
Primary	16	3.2
Preparatory	41	8.2
Secondary	282	56.4
University	145	29.0
Father's job		
working	416	83.2
not working	84	16.8
Mother's level of education		
Illiterate	48	9.6
Primary	17	3.4
Preparatory	36	7.2
Secondary	302	60.4
University	97	19.4
Mother's job		
working	163	32.6
Not working	337	67.4
Previous COVID-19 infection		
Yes	208	41.6
No	292	58.4
Family history of COVID-19 infection		
Yes	344	68.8
No	156	31.2

Table (2): Distribution of the studied students in relation to their knowledge concerning Omicron (n = 500)

Knowledge of the students concerning Omicron	Incorrect		Correct	
	No.	%	No.	%
Omicron is less contagious than the delta variant.	412	82.4	88	17.6
Someone with omicron is likely to infect up to 5 people around them.	286	57.2	214	42.8
The incubation period of omicron is around 10 days	311	62.2	189	37.8
Wearing a mask in public indoor settings in areas of substantial or high community transmission ,regardless of vaccination status is highly recommended	283	56.6	217	43.4
Omicron appears to be more like a cold for some people, with common reported symptoms including a sore throat, runny nose and a headache.	271	54.2	229	45.8
Anyone with Omicron infection can spread the virus to others, even if they are vaccinated or don't have symptoms.	270	54.0	230	46.0
Being fully vaccinated is the best way to protect yourself against omicron.	332	66.4	168	33.6
Omicron may be less deadly than earlier variants of coronavirus because it is less likely to damage the lungs	379	75.8	121	24.2
Omicron variant causing unique complications in children	315	63.0	185	37.0
Infected People with mild symptoms who are otherwise healthy can manage their symptoms at home.	269	53.8	231	46.2
People who are immuno-compromised take longer to get rid of their infection	270	54.0	230	46.0
Isolation only applies to people who have tested positive. This means staying away from other people, even other household members, preferably in a "sick room" or area with its own bathroom.	269	53.8	231	46.2
A negative test around the five-day doesn't necessarily mean you're free from the infection	307	61.4	193	38.6
Regular hand washing is very essential to protect yourself against omicron	256	51.2	244	48.8
Omicron doesn't affect children	350	70	150	30

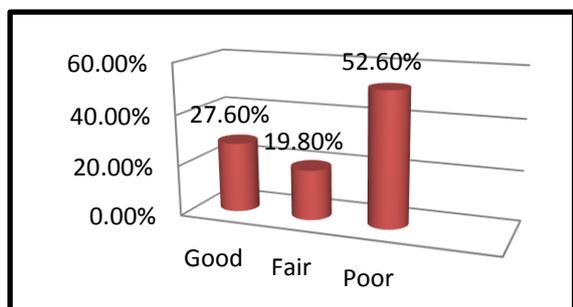


Figure (1): Distribution of the studied students in relation to their total score of knowledge concerning Omicron

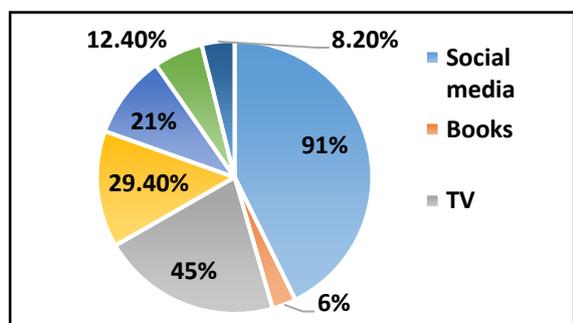


Figure (2): Distribution of the studied students in relation to their source of information about omicron#

Table (3): Distribution of the studied students in relation to total score of omicron induced anxiety (n = 500)

Total score of anxiety	No.	%
Low anxiety	52	10.4
Moderate anxiety	194	38.8
High anxiety	254	50.8

Table (4): Distribution of the studied students in relation to total score of protective behaviors towards Omicron (n = 500)

Total score of protective behaviors	No.	%
Low protective behaviors	262	52.4
Moderate protective behaviors	193	38.6
High protective behaviors	45	9.0

Table (5): Regression analysis for factors associated with omicron induced anxiety.

Variables	Omicron induced anxiety				P	COR (95% C.I)	P	AO (95% C.I)
	No (n=52)		Yes (n= 448)					
	No.	%	No.	%				
Age:								
14-< 16 years	19	36.6	223	49.7	0.004*	10.200 (2.098 – 49.588)	0.004*	3.760(0.480–29.476)
16 <- 18 years	31	59.6	219	48.9	0.099	3.780 (0.779 – 18.337)	0.315	2.711(0.388–18.937)
≥18 years	2	3.8	6	1.4	0.063	4.108 (0.926 – 18.214)	0.058	5.477(0.942–31.856)
Sex								
Male	33	14.1	201	85.9	0.798	0.880 (0.331 – 2.339)	0.556	0.143(0.037–0.555)
Female	19	7.1	247	92.9	0.012*	2.134(1.178–3.867)	<0.001*	4.183(1.934–9.049)
Place of residence								
Urban	37	14.3	222	85.7	0.560	1.594 (0.333 – 7.626)	0.556	0.534(0.066–4.313)
Rural	15	6.2	226	93.8	0.004*	2.511 (1.340–4.705)	0.003*	3.175(1.465–6.882)
Father's level of education								
Illiterate	1	6.3	15	93.8	0.242	3.432 (0.434–27.117)	0.163	5.722(0.493–66.448)
Primary	2	12.5	14	87.5	0.549	1.602(0.344–7.467)	0.139	4.215(0.628–28.311)
Preparatory	4	9.8	37	90.2	0.187	2.117(0.695–6.442)	0.101	3.277(0.792–13.559)
Secondary	18	6.4	264	93.6	<0.001*	3.356 (1.779–6.331)	<0.001*	1.767(0.685–4.556)
University	27	18.6	118	81.4	0.798	0.880 (0.331 – 2.339)	0.556	0.143(0.037–0.555)
Father's job								
Working	49	11.8	367	88.2	0.063	4.108 (0.926 – 18.214)	0.058	5.477(0.942–31.856)
Not working	3	3.6	81	96.4	0.035*	3.605(1.096–11.853)	0.012*	3.731(0.929–14.982)
Mother's level of education								
Illiterate	7	14.6	41	85.4	0.654	1.245 (0.478 – 3.242)	0.163	0.201(0.047–0.866)
Primary	2	11.8	15	88.2	0.560	1.594 (0.333 – 7.626)	0.556	0.534(0.066–4.313)
Preparatory	7	19.4	29	80.6	0.798	0.880 (0.331 – 2.339)	0.556	0.143(0.037–0.555)
Secondary	19	6.3	283	93.7	0.001*	3.165 (1.572 – 6.373)	0.016*	2.109(0.730–6.095)
University	17	17.5	80	82.5	0.269	1.606(0.694–3.717)	0.425	2.109(0.730–6.095)
Mother' job								
working	26	16.0	137	84.0	0.242	3.432 (0.434–27.117)	0.163	5.722(0.493–66.448)
Not working	26	7.7	311	92.3	0.006*	2.270(1.272–4.053)	0.025*	2.445(1.119–5.343)
Previous COVID-19 infection								
Yes	13	6.3	195	93.8	0.012*	2.312(1.201–4.451)	0.016*	2.661(1.196–5.919)
No	39	13.4	253	86.6	0.357	0.718(0.355–1.452)	0.425	0.708(0.303–1.653)
Family history of COVID-19 infection								
Yes	26	7.6	318	92.4	0.003*	2.446(1.369–4.372)	0.016*	1.774(0.834–3.773)
No	26	16.7	130	83.3	0.269	1.606(0.694–3.717)	0.425	2.109(0.730–6.095)
Knowledge of the students concerning Omicron								
Poor	15	5.7	248	94.3	0.007*	2.640(1.296–5.377)	0.012*	2.133(0.541–8.416)
Fair	18	18.2	81	81.8	0.357	0.718(0.355–1.452)	0.425	0.708(0.303–1.653)
Good	19	13.8	119	86.2	0.798	0.880 (0.331 – 2.339)	0.425	0.143(0.037–0.555)
protective behavior towards Omicron								
Low protective behaviors	17	6.5	245	93.5	0.357	3.603 (1.494–8.690)	0.425	0.708(0.303–1.653)
Moderate protective behaviors	26	13.5	167	86.5	0.269	1.606(0.694–3.717)	0.168	2.109(0.730–6.095)
High protective behaviors	9	20.0	36	80.0	0.004*	0.718(0.355–1.452)	0.012*	2.663(0.796–8.906)

COR, crude odds ratio.

AOR, adjusted odds ratio

C.I: Confidence interval

LL: Lower limit

UL: Upper Limit

#: All variables with p<0.05 was included in the multivariate

*: Statistically significant at p ≤ 0.05

Table (6): Correlation between the total scores of knowledge, anxiety and protective behaviors

Items	Anxiety scale score		Protective behaviors score	
	r	p	r	p
Total knowledge score	-0.541	0.000*	0.756	0.000*
Total protective behaviors score	0.661	0.000*		

R= Pearson Correlation * significant at $P \leq 0.05$

DISCUSSION

The rapid increase in corona cases across the world caused a widespread panic. The accumulated unknowns and uncertainties about COVID-19 cause worry and anxiety, reducing public vigilance and adherence to protective behaviors (Nebhinani et al., 2021). Adolescence is a period in life during which adolescents undergo developmental changes that affect not only their physical health, but also psychological and social health (WHO, 2017). Therefore, adolescents could suffer more stress during the outbreak of COVID-19 and its associated quarantine and public health restrictions (Fegert et al., 2020).

The present study demonstrated the level of knowledge, anxiety, and Protective behavior during the omicron outbreak in Egypt. The present study showed that more than half of studied subjects had poor knowledge concerning Omicron and the highest percent of them had incorrect knowledge regarding Omicron. This may be justified by, secondary students usually preoccupied by their studies and have no time to gain new information about this new variant of SARS-CoV-2. In addition this may be as the majority of the studied students reported that the main source of the student's information regarding Omicron was social media. Media coverage on Omicron may mislead students by spreading fabricated and unverified information. This result is consistent with (Erfani, et al., 2020; Baig

et al., 2020). In contrast to Lui et al., (2020), they revealed that most of the studied subjects had less knowledge about COVID-19 disease transmission who concluded that the participants had a good knowledge score of COVID-19 regardless of gender or age. The reason for this may be as their study was conducted in China, where COVID-19 outbreak was emerged and they had all resources necessary to improve awareness of their people and all the world about the disease and its prevention.

As regards the level of anxiety among the studied students, the present study found that half of the students had high anxiety level and more than one third had moderate anxiety level regarding Omicron. This could be attributed to several factors. First, the studying environment itself which is characterized by many sources of anxiety such as secondary school students are preoccupied with their studies, have too pressure during academic year, and more challenging to success, and lack of knowledge about coping mechanisms to manage stress. Second, anxiety from specific extra sources due to the nature of Omicron such as the need for being outside the house, stigma, dealing with other students who may be infected. Third, this may be due to transmission of anxiety from a student to another. Likewise, these results are consistent with the findings of (AlAzzam et al., 2021), who found that that the majority of the studied students reported anxiety during corona. Otherwise, this contradicts with Saravanan et al., (2020), they reported low anxiety level associated with corona. They reasoned this by the good level of knowledge about the COVID-19 safety and protective measures among their participants.

Performing protective behaviors for respiratory infections, such as hand washing, wearing masks, and keeping social distancing are challenging for infection control (Chen et al., 2020). With respect to the present study, slightly more

than half of the studied students had low protective behaviors towards Omicron. This may be rationalized by the age of the participants as young people often think that occurrence of COVID-19 and its complications are related to the elderly or people with underlying diseases only. Also may be contributed to lack of knowledge regarding preventive and safety measures, as more than half of the students had poor knowledge concerning Omicron. This is consistent with the findings of Shirahmadi et al., (2022) & Chen et al., (2020). They reported that performing protective behaviors among high school students was much lower than expected.

Results from the present study found a statistically significant and negative correlation between students anxiety and knowledge scores concerning Omicron. This also verified by the regression analysis which showed that studied student who have poor level of knowledge concerning omicron had higher odds of omicron induced anxiety 2.1 times than those who had good knowledge. This can rationalized by the finding of the present study, as the media was the main source of the information regarding Omicron among studied students. Furthermore, news about Omicron, especially on social media, may get students confused and misinterpret the seriousness of Omicron increasing their level of anxiety. Similarly, this was reflected by Olagoke et al., (2020), they dedicated that negative news can lead to mental health problems.

These findings are consistent with (Akdeniz et al., 2020; Saravanan et al., 2020; Alrubaiee et al., 2020; Roy et al., 2020), they revealed that acquiring a good level of knowledge about COVID-19 is correlated with higher attitudes and good practices toward it, contributing to lower level of anxiety. In contrast, this study disagree with Lin et al., 2020 who studied disease prevention behavior in Tiwan, and found that the level of knowledge of COVID-19 wasn't associated with anxiety

levels. However, they found that attitude was positively associated with anxiety level. The reason for this may be as the COVID-19 pandemic started in china. They exposed to high level of anxiety and they had resources to overcome it and improve awareness of their people about the disease and its prevention.

Regarding the relationship between the level of anxiety and practicing protective behavior. The findings of this study showed a statistically significant relation between the anxiety level and protective behaviors. This obtained result shows the values of anxiety of the respondents to be motivated to learn about safety precautions regarding Omicron. This is in agreement with findings of the study conducted by Roy et al., (2020), which showed that people's level of anxiety was correlated with their behavior. They concluded that anxiety induced by COVID-19 epidemics influenced the behaviors of people. On the other hand, Alrubaiee, et al 2021; Lodge et al., 2021 demonstrated that mild level of anxiety can motivate people to adopt preventive measures but when this level become extreme make them engage in faulty behaviors.

Respondents' use of protective behavior is also affected by their level of the outbreak and their knowledge about it. This was also reflected by the result of the present study, which showed a statistically significant relationship between protective behavior and students' knowledge concerning Omicron. An interpretation to this obtained result could be related to providing scientific knowledge about safety measures such as hand washing, avoiding social gatherings, as well as mode of transmission of infection concerning Omicron Variant, might help students to manage their anxiety toward COVID-19 and also practice protective behavior. In this respect, Akdeniz et al., 2020 reported that COVID-19 knowledge was significantly associated with a lower negative attitudes and preventive practices towards COVID-19.

Concerning the socio-demographic characteristics of the studied students and their relation to the studied variables, there was significant relation between sex and the level of anxiety among the studied participants as females had higher risk for anxiety by 4.1 times as well as age from 14 to less than 16 years (3.7 times). This may be explained by cultural beliefs and attitudes in Egypt which put a lot of pressure over females due to their obligation in the community as caregivers. Also, males tend to cope with stress by engaging in physical activities such as sports or out-door activities such as computer games, and performing exercises. Moreover, females are more emotionally sensitive than males. Concerning age, this can be due to lack of experience and knowledge about omicron and anxiety coping mechanism among the younger students than older ones.

Moreover, the finding of the present study indicated that parent's level of education is a protective factor against anxiety. These results of the present study are in accordance with the findings of the studies conducted by (AlAzzam et al, 2021; Alrubaiee et al.2020; Nebhinani et al.,2021), they found that parent's level of education was statistically and significantly associated with students' anxiety level association with their, and sex of the students. This may be justified by high level of education might help parents to gaining more scientific knowledge concerning Omicron variant, and protective behavior. Therefore, students acquiring adequate knowledge and practice protective behavior concerning Omicron by modeling their parents, which might contributing to low level of anxiety among those students.

In addition, the finding of the current study revealed that level of anxiety among studied students was higher among those living in rural areas. This result could be attributed to limited use of internet and health information resources in rural areas. Therefore, students living in rural are

vulnerable populations and may have poor knowledge, negative attitudes, and poor resources to adopt preventive practices towards Omicron, which might contributing to high level of anxiety.

Moreover, the present study revealed that the students who had COVID-19 previously and those with family history of COVID-19 have higher risk for anxiety. This might be due to that students experience severe symptoms of COVID-19 and observe negative prognosis of disease among their family members and make them to feel that the Omicron is near them especially after previous infection of COVID-19, which might associated with high level of anxiety.

Likewise, low socio-economic status and unemployment are significantly associated with increased risk for anxiety (Fegert et al., 2020), which adds further evidence that low socioeconomic status is an important risk factor for worry. This was supported by the present study, which showed that the students with not working fathers or mothers had higher risk for anxiety that those with working fathers. This is in line with (Chung et al., 2021), they showed that individuals with lower socioeconomic status have no or little resources to cope with COVID-19 and have higher level of worry and anxiety. This can be attributed association between unemployment, and poor income and worry about personal savings and worry about being infected. Concisely, the current study proved that, the highest percentage of students had poor knowledge score, high level of anxiety and displaying low protective behaviors.

Conclusion

According to the findings of the present study, it can be concluded that, the highest percentage of the students had poor knowledge concerning omicron. The main source of information about Omicron was found to be social media. Additionally,

about half of the studied sample had high level of anxiety regarding omicron and display low protective behaviors toward it. Moreover, socio-demographic variables that are significantly associated with anxiety were; age From 14 to less than 16 years, being female, living in rural area, their parents not working, being infected with COVID-19 previously, having a family member infected with COVID-19, poor knowledge concerning Omicron, and displaying high protective behaviors toward COVID-19.

Recommendations

- Conducting digital based and traditional educational interventions to raise the student's awareness concerning omicron and reduce their anxiety.
- Community mobilization campaigns are necessary to raise public awareness in community about factors and health risks associated with omicron to make individuals engage more in protective health behaviors.
- Implementing training programs to encourage students to use anxiety coping mechanisms.
- Schools Policy makers should put strict rules regarding the students commitment with preventive measures toward omicron.

References:

- Akdeniz, G., Kavakci, M., Gozugok, M., Yalcinkaya, S., Kucukay, A., & Sahutogullari, B. (2020). A survey of attitudes, anxiety status, and protective behaviors of the university students during the COVID-19 outbreak in Turkey. *Frontiers in psychiatry*, 11, 695.
- AlAzzam, M., Abuhammad, S., Abdalrahim, A., & Hamdan-Mansour, A. M. (2021). Predictors of depression and anxiety among senior high school students during COVID-19 pandemic: The context of home quarantine and online education. *The Journal of School Nursing*, 37(4), 241-248.
- Alrubaiee, G. G., Al-Qalah, T. A. H., & Al-Aawar, M. S. A. (2020). Knowledge, attitudes, anxiety, and preventive behaviours towards COVID-19 among health care providers in Yemen: an online cross-sectional survey. *BMC Public Health*, 20(1), 1-11.
- Alzoubi, H., Alnawaiseh, N., Al-Mnayyis, A. A., Abu-Lubad, M., Aqel, A., & Al-Shagahin, H. (2020). COVID-19-knowledge, attitude and practice among medical and non-medical University Students in Jordan. *J Pure Appl Microbiol*, 14(1), 17- 25.
- Baig, M., Jameel, T., Alzahrani, S. H., Mirza, A. A., Gazzaz, Z. J., Ahmad, T., Baig, F & Almurashi, S. H. (2020). Predictors of misconceptions, knowledge, attitudes, and practices of COVID-19 pandemic among a sample of Saudi population. *PIOS one*, 15(12).
- Centers for Disease Control and Prevention (2022). Omicron Variant: What You Need to Know. Retrieved from <https://www.cdc.gov/coronavirus/2019-ncov/variants/omicron-variant.html#:~:text=Omicron%20in%20the%20United%20States,variant%20in%20the%20United%20States>.
- Chen, X., Ran, L., Liu, Q., Hu Q., Du X., Tan, X. (2020). Hand hygiene, mask-wearing behaviors and its associated factors during the COVID-19 epidemic: A cross-sectional study among primary school students in Wuhan, China. *Int J Environ Res Public Health*, 17(8), 28-93.

- Chung, R. Y. N., Chung, G. K. K., Chan, S. M., Chan, Y. H., Wong, H., Yeoh, E. K., ... & Marmot, M. (2021). Socioeconomic inequality in mental well-being associated with COVID-19 containment measures in a low-incidence Asian globalized city. *Scientific reports*, 11(1), 1-10.
- Erfani, A., Shahriarirad, R., Ranjbar, K., Mirahmadizadeh, A., & Moghadami, M. (2020). Knowledge, attitude and practice toward the novel coronavirus (COVID-19) outbreak: a population-based survey in Iran. *Bull world Health organ*, 30(10.2471), 10-2471.
- Fegert, J. M., Vitiello, B., Plener, P. L., & Clemens, V. (2020). Challenges and burden of the Coronavirus 2019 (COVID-19) pandemic for child and adolescent mental health: a narrative review to highlight clinical and research needs in the acute phase and the long return to normality. *Child and adolescent psychiatry and mental health*, 14(1), 1-11.
- Galal S, 2021. Number of enrollment of students by educational level in Egypt 2019/2020. Statista Survey, published January 2021. Retrieved from: [• Egypt: number of enrollment of students by educational level 2019/2020 | Statista](#)
- Gautam, V., Dileepan, S., Rustagi, N., Mittal, A., Patel, M., Shafi, S & Raghav, P. (2021). Health literacy, preventive COVID 19 behaviour and adherence to chronic disease treatment during lockdown among patients registered at primary health facility in urban Jodhpur, Rajasthan. *Diabetes & Metabolic Syndrome: Clinical Research & Reviews*, 15(1), 205-211.
- Hu, W., Su, L., Qiao, J., Zhu, J., & Zhou, Y. (2020). Countrywide quarantine only mildly increased anxiety level during COVID-19 outbreak in China. *MedRxiv*, 1-20.
- Islam, M. S., Sarkar, T., Khan, S. H., Kamal, A. H. M., Hasan, S. M., Kabir, A., ... & Seale, H. (2020). COVID-19-related infodemic and its impact on public health: A global social media analysis. *The American journal of tropical medicine and hygiene*, 103(4), 162.
- Liu, P., Teng, M., & Han, C. (2020). How does environmental knowledge translate into pro-environmental behaviors?: The mediating role of environmental attitudes and behavioral intentions. *Science of the total environment*, 728, 138126.
- Lin, Y., Hu, Z., Alias, H., & Wong, L. P. (2020). Knowledge, attitudes, impact, and anxiety regarding COVID-19 infection among the public in China. *Frontiers in public health*, 8, 236.
- Lodge, E. K., Schatz, A. M., & Drake, J. M. (2021). Protective population behavior change in outbreaks of emerging infectious disease. *BMC infectious diseases*, 21(1), 1-7.
- Lunsford, N. B., Berkthold, J., Holman, D. M., Stein, K., Prempeh, A., & Yerkes, A (2018). Skin cancer knowledge, awareness, beliefs and preventive behaviors among black and Hispanic men and women. *Preventive medicine reports*, 12, 203-209.
- Nebhinani, M., Parihar, A., Kumar, A., Gomathi, A., Nebhinani, N., & Rani, R. (2021). COVID-19-induced anxiety and protective behaviour among nursing students: A survey from western India. *Journal of Family Medicine and Primary Care*, 10(12), 4483-4488.

- Olagoke, A. A., Olagoke, O. O., & Hughes, A. M. (2020). Exposure to coronavirus news on mainstream media: The role of risk perceptions and depression. *British journal of health psychology*, 25(4), 865-874.
- Riad, A., Huang, Y., Zheng, L., & Elavsky, S. (2020). COVID-19 induced anxiety and protective behaviors during COVID-19 outbreak: Scale development and validation. Available at SSRN 3594370. Retrieved from: [COVID-19 Induced Anxiety and Protective Behaviors During COVID-19 Outbreak: Scale Development and Validation | Abanoub RIAD and Yi Huang - Academia.edu](https://www.ssrn.com/document/3594370)
- Roy, D., Tripathy, S., Kar, S. K., Sharma, N., Verma, S. K., & Kaushal, V. (2020). Study of knowledge, attitude, anxiety & perceived mental healthcare need in Indian population during COVID-19 pandemic. *Asian journal of psychiatry*, 51.
- Saravanan, C., Mahmoud, I., Elshami, W., & Taha, M. H. (2020). Knowledge, anxiety, fear, and Psychological distress about COVID-19 among university students in the United Arab Emirates. *Frontiers in Psychiatry*, 1057.
- Shirahmadi, S., Bashirian, S., Barati, M., Jenabi, E., Haghighi, M., Shamsaei, F., ... & Asgari, A. (2022). Fear and COVID-19 protective behaviors among high school students in hamadan, Iran; Application of an extended parallel process model. *Journal of Education and Community Health*, 8(3), 165-172.
- Siddiquea, B. N., Shetty, A., Bhattacharya, O., Afroz, A., & Billah, B. (2021). Global epidemiology of COVID-19 knowledge, attitude and practice: a systematic review and meta-analysis. *BMJ open*, 11(9).
- UNICEF. Secondary education, April 2021. Retrieved from: <https://data.unicef.org/topic/education/secondary-education/>
- UNICEF. Adolescent development, 2020. Retrieved from: <https://www.unicef.org/egypt/adolescent-development#:~:text=Egypt%E2%80%99s%20young%20population%20is%20rapidly%20growing.%20The%20adolescents,represent%20almost%20one%20third%20of%20the%20Egyptian%20population>
- Wang, C., Pan, R., Wan, X., Tan, Y., Xu, L., Ho, C. S., & Ho, R. C. (2020). Immediate psychological responses and associated factors during the initial stage of the 2019 coronavirus disease (COVID-19) epidemic among the general population in China. *International journal of environmental research and public health*, 17(5), 1729.
- WHO. (2017, May). Adolescents: Health risks and solutions. Fact Sheet. Retrieved March,24, 2022. From: [Adolescents: health risks and solutions \(essensys.ro\)](https://www.who.int/news-room/fact-sheets/detail/adolescents-health-risks-and-solutions)
- World Health Organization (2021). Update on omicron. Retrieved from: [https://www.who.int/news/item/28-11-2021-update-on-omicron#:~:text=On%2026%20November%202021%2C%20WHO,Evolution%20\(TAG%2DVE\)](https://www.who.int/news/item/28-11-2021-update-on-omicron#:~:text=On%2026%20November%202021%2C%20WHO,Evolution%20(TAG%2DVE)).
- WHO. (2022). Enhancing response to Omicron SARS-CoV-2 variant: Technical brief and priority actions for Member States, 2022 Accessed March, 24, 2022. Retrieved from [Enhancing response to Omicron SARS-CoV-2 variant \(who.int\)](https://www.who.int/publications/m/item/enhancing-response-to-omicron-sars-cov-2-variant)