Egypt. J. of Nutrition and Health Vol.20 No.1 January (2025)

Knowledge, Attitudes, and Practice of Cairo University Medical Students in the Clinical Years towards Preventive Measures to COVID-19.

Raghda M. Mostafa[1], Maha El Rabbat[1], Naglaa Youssef [2], Ola A Mostafa[1]

[1]Department of Public Health and Community Medicine Department, Faculty of Medicine, Cairo University, Egypt.
[2]Department of Public Health and Community Medicine Department, Faculty of Medicine, New Giza University, Egypt.

Abstract

Corona virus disease 2019 (COVID-19) was first discovered in China in December 2019, from where it has spread widely and rapidly to other parts of the world, threatening the lives of millions of people. In the absence of a definitive cure, awareness and consistent adherence to preventive measures remain crucial for averting further COVID-19 outbreaks and halting community transmission. Medical students play a crucial role in disseminating accurate information about COVID-19 and preparedness for combating future pandemics. The aim of this study was to assess knowledge, attitudes, and practices (KAP) of Cairo university medical students regarding preventive measures during the COVID-19 pandemic. This analytical cross-sectional study was conducted at the faculty of medicine, Kasralainy from December 2021 to April 2022, involving 384 consented medical students in their 5th and 6th years. Data was collected using a self-administered questionnaire, which was distributed during tutorial sessions and shared through various social media platforms. The knowledge percent score was 84.3% (79.1%- 89.5%). Social media emerged as the primary source of information. The attitude percent score was 73.3% (66.7%-80%). The practice percent score was 66.7 % (54.2%- 77.1%). Knowledge, attitude and practice (KAP) percent scores were influenced by sex,academic year, vaccination status and having chronic diseases. There were statistically significant weak positive correlations between knowledge and attitude percent score (r =0.13), between knowledge and practice percent scores(r =0.167), and between attitude and practice percent scores(r =0.187). Although participating students demonstrated a high level of knowledge about COVID-19 preventive measures, there was a noticeable discrepancy between knowledge and practice, especially in social distancing and mask-wearing behaviors. It is crucial to implement disaster training programs for medical students to enhance their preparedness, knowledge and skills that are essential during times of outbreaks and emergencies.

Keywords: Attitudes, COVID-19; Knowledge, Practice; Preventive Measures

Introduction

Corona virus disease (COVID-19) was first discovered in China, in December 2019,from where it has spread widely and rapidly to other parts of the world, threatening the lives of millions of people. On January 30th 2020, the World Health Organization (WHO) declared COVID-19 a pandemic and a public health emergency of international concern requiring collaborative efforts among all nations to prevent its rapid spread ***(WHO, 2020)***. Following the WHO declaration, Egypt,

responded to the global plans aiming at controlling the pandemic. Among the undertaken proactive measures were travel restrictions, curfews, limiting the number of employees at workplaces, lockdown measures, and closure of schools, universities, and mosques. Some of these preventive measures, which have been adopted worldwide and in Egypt as the most effective methods of reducing the spread of the virus and limiting its morbidity and mortality, were airborne precautions, social distancing, hand washing, cleaning of surfaces, and wearing face masks ***(WHO, 2020 and CDC, 2021)***. In the absence of a definitive cure, awareness and consistent adherence to preventive measures remain paramount in averting further COVID-19 outbreaks and halting community transmission.

In the face of the numerous challenges presented by the pandemic, one of the most significant has been the continuity of education. Despite the rising numbers of COVID-19positive patients, the Egyptian government made the decision to return to face-to-face university education after finishing the vaccines campaign and ensuring the vaccination of students ***(Soltan et al., 2020).*** Medical students find themselves at a higher risk of exposure to the virus, especially those in the final clinical years ***(Wassif&el Din, 2022).*** Moreover, these students serve as valuable sources of health guidance and reliable information for their families and communities ***(Jairoun et al., 2019).*** As future healthcare providers, medical students play a crucial role for preparedness in combating future pandemics ***(Sarzyńska et al., 2022).*** Continued preparedness for pandemics is crucial, as the global response to COVID-19 has underscored the necessity for sustained readiness. Effective pandemic preparedness requires a holistic strategy that encompasses rapid response mechanisms, robust public health infrastructure, effective surveillance systems, and transparent communication channels to reduce future risks. The experiences and strategies implemented during the COVID-19 pandemic—such as widespread testing, quarantine measures, vaccine development and distribution, contact tracing, and the creation of emergency response frameworks—have yielded significant insights. By analyzing these approaches, we can enhance our ability to foresee future health emergencies, improve our preparedness strategies, and ensure resilient systems that can effectively handle emerging pandemics ***(WHO, 2023).***

Studies indicate that medical students often rely on social media and online platforms for information, highlighting the need for targeted educational programs to enhance their understanding and ability to share reliable COVID-19 information with their peers and the community***. (Michenka et al., 2022).*** Therefore, assessing their knowledge, attitudes, and practices (KAP) is vital to ensure they are equipped to effectively communicate health information and contribute to public health efforts. This study was conducted to assess COVID-19 related knowledge, attitude and practice of medical students at Cairo University.

Participants and Methods

Study design and settings:

The study was an analytical cross-sectional study, performed among 5th year and 6th year medical students at Cairo University. It was conducted fromDecember 2021 till April 2022 to assess medical students' COVID-19 related KAP.

Sample size:

The sample size was calculated using EPI INFO Stat calc version 7 based on adequate practice of 42% with 95% Confidence interval. The calculated sample size was 345. By adding 10% more, the total sample size was 384.

Data collection tool:

A pretested self-administered questionnaire, adapted from previous studies ***(Barrett & Cheung, 2021; Duong et al., 2021)*** was distributed to the students via email using Google Forms.The questionnaire link was shared in tutorial sessions, and on various social media groups and messaging applications popular among students. It included four sections:

1- Demographic data: age, academic year, sex, living conditions, previous history of infection with corona virus, history of chronic diseases and medications.

2- COVID-19 preventive measures taken on campus: temperature measurement upon entry, the availability of different points of entry and the accessibility and abundance of hand sanitizers, social distancing in tutorials and lectures, and the enforcement of mask wearing on campus.

3- Channels of COVID-19 related knowledge, and students' preferred channels of knowledge.

4- COVID-19-related knowledge, attitude and practice:

- **Assessment of knowledge** consisted of 12 questions addressing COVID-19 related knowledge, covering topics such as modes of transmission, symptoms, disease progression, and potential curability. Additionally, there were 15 questions regarding knowledge about the effectiveness of preventive measures, including face masks, social distancing, and hand hygiene. All questions were closed-ended, with response options of "yes," "no," and "don't know." Correct answers received a score of 2 points, "don't know" responses received a score of 1 point, and incorrect answers received 0 points. The maximum possible raw scores were 24 for COVID-19 knowledge and 30 for knowledge about the preventive measures. Then the percent score was calculated by dividing the raw score by the maximum achievable score and multiplying the result by 100.
- **The questionnaire for the attitude** included six "5 points Likert scale questions" ranging from (strongly agree- strongly disagree). The Likert scale questions were coded (strongly disagree1 - strongly agree 5), however reverse coding was applied in the disadvantage question. Questions were coded so that the higher the score the better the attitude. The maximum achievable score for attitude was 30, then the percent score was calculated by dividing the raw score by the maximum achievable score and multiplying the result by 100.
- **The practice questions** consisted of seven items related to wearing face masks, hand washing before and after using a mask, and social distancing. Responses were measured using a Likert scale with the following options: Always" (2 points), "Sometimes" (1 point), and "No" (0 points). The maximum possible score for social distancing practices was 14, and the percentage score was calculated by dividing the raw score by the maximum achievable score and multiplying the result by 100.

Statistical analysis:

The data was analyzed using SPSS (statistical package for social science) version 26.0 on IBM compatible computer (SPSS Inc., Chicago, IL, USA). The qualitative data was described as numbers and percentages. Mean and standard deviation were used for quantitative normally distributed variables, while median and inter quartile range (IQR) were used for quantitative variables, which were not normally distributed. Mann-Whitney U test, and Kruskal-Wallis tests were used for comparison. Correlation was done using Spearman correlation test. The accepted level of significance in this work was 0.05

Ethical considerations:

The ethical approval to conduct this study was obtained from the ethical committee at the faculty of medicine, Cairo University (MS-5442021). All subjects were treated according to the Helsinki Declaration of biomedical ethics. Students were asked to sign a written consent form placed at the beginning of the questionnaire after explaining the objectives of the study, confidentiality of data, as well as the impact of the study. The researchers emphasized that participation in the study was entirely voluntary.

Results

The median age of the 384 participating students was 23 years (IQR: 22-24), with less than half being males, most were living with senior adults, one-third were in their fifth year, one-tenth reported having a chronic illness, and one-fifth reported being on medications; notably, 90.6% had been vaccinated against COVID-19 **(see Table 1).**

Table 2 shows that most participants reported that there were no temperature checks before entering campus, three-fifths noted the availability of hand sanitizer (with over half finding it easily accessible), three-quarters stated that mask-wearing was mandatory, and less than three-quarters mentioned multiple entry points; additionally, over four-fifths indicated that social distancing was not enforced during tutorials, while fewer than one-fifth observed such measures in lecture halls.

Table (1):

Baseline Characteristics of the Studied Group (n=384)

Characteristic	Category	N%
Age (Y)	Median IQR (25^{th} -75^{th})	23 (22-24)
Sex	Male Female	170 (44.3%) 214 (55.7%)
Living conditions	Living with friends Living with seniors (grandparents, parents, aunts, uncles....etc.)	54 (14.1%) 330 (85.9%)
Academic year	Fifth Sixth	128 (33.3%) 256 (66.7%)
Chronic disease	Yes No	42 (10.9%) 342 (89.1%)
Any medications	Yes No	74 (19.3%) 310 (80.7%)

Table (2):

Preventive Measures on Campus as Reported by the Students (n =384)

COVID-19 Preventive measures on campus	Answer	(N)%
Is temperature measured before entering campus?	Yes	27 (7%)
	No	357 (93%)
Are there hand sanitizers available on campus?	Yes	228 (59.4%)
	No	156 (40.6%)
If yes, are they easily accessible? (n =228)	Yes	127 (55.7%)
	No	101 (44.3%)
Are you required to wear mask on campus?	Yes	293 (76.3%)
	No	91 (23.7%)
Are there different entry points on campus to avoid crowding?	Yes	273 (71.1%)
	No	111 (28.9%)
Is social distancing applied in lecture halls on campus (do you keep at least 1.5 meter between you and the next student)?	Yes	73 (19%)
	No	311 (81%)
Is social distancing applied in tutorials on campus (do you keep at least 1.5 meter between you and the next student)?	Yes	60 (15.6%)
	No	324 (84.4%)

Table 3 shows that two-thirds of the participants obtained their COVID-19 prevention knowledge from social media, while less than one-tenth referred to scientific websites. Additionally, half of the respondents preferred to receive information through social media, while one-quarter favored learning via lectures.

Table (3):

Source of Participants' Knowledge about COVID-19 Virus Preventive Measures (n=384)

Knowledge about COVID 19 virus preventive measures	(N)%
Where do you get your information on how to prevent Covid-19 spread?	
Social media	255 (66.6%)
Scientific websites	32 (8.4%)
Lectures	30 (7.8%)
Television	21 (5.7%)
Awareness posters	19 (4.9%)
Newspaper	7 (1.8%)
Other	20 (4.8%)
Where would you prefer to receive information on how to prevent covid-19 spread?	
Social media	205 (53.3%)
Lectures	97 (25.2%)
Awareness posters	52 (13.5%)
Television	12(3.1%)
Scientific websites	8(2%)
Newspaper	7 (1.8%)
Others	3 (0.7%)

Table 4 reveals that most students correctly identified fever and dry cough as the primary symptoms of COVID-19, with over three-fifths recognizing myalgia as another key symptom. Two-thirds correctly understood the treatment options available, acknowledging the benefits of early symptomatic treatment. However, more than two-fifths believed that only the elderly or those with chronic illnesses are at risk for severe illness. The majority demonstrated a solid understanding of the virus's transmission methods, and four-fifths accurately identified the observation period for contacts of infected individuals. Overall, the median knowledge score among students was 87.5%, with an inter-quartile range (IQR) of 79.1% to 95.8%.

Table (4):

Participants' Knowledge about COVID-19 Virus (n=384)

Knowledge about COVID 19 virus	Answer	(N)%
The main clinical symptoms of COVID-19 are [Fever]?	True	342 (89.1%)
	False	23(6%)
	I don't know	19 (4.9)
The main clinical symptoms of COVID-19 are [myalgia]?	True	267 (69.5%)
	False	31 (8.1%)
	I don't know	86 (22.4)
The main clinical symptoms of COVID-19 are [dry cough]?	True	332 (86.5%)
	False	22 (5.7%)
	I don't know	30 (7.8)
Currently, there is no effective cure for COVID-19?	True	238 (62%)
	False	64 (16.7%)
	I don't know	82 (21.4%)
Can early symptomatic and supportive treatment help most patients recover from the infection?	True	347 (90.4%)
	False	7 (1.8%)
	I don't know	30 (7.8%)
Not all individuals with COVID-19 will develop severe infection. Only the elderly, or individuals with chronic illnesses and/or obesity are more likely to contract severe infection?	True	270 (70.3%)
	False	101 (26.3%)
	I don't know	13 (3.4%)
Individuals with COVID-19 who do not have fever cannot infect other individuals.	True	21 (5.5%)
	False	330 (85.9%)
	I don't know	33 (8.6%)
COVID -19 spreads via respiratory droplets of infected individuals?	True	354 (92.2%)
	False	16 (4.2%)
	I don't know	14 (3.6%)
It is not necessary for children and young adults to take precautionary measures against COVID-19?	True	13 (3.4%)
	False	360 (93.8%)
	I don't know	11 (2.9%)
To prevent contraction of COVID-19, individuals should avoid visiting crowded places, such as train stations, and avoid public transportation?	True	338 (88%)
	False	22 (5.7%)
	I don't know	24 (6.3%)
Isolation and treatment of people with COVID-19 are effective methods of reducing the spread of the virus?	True	378 (98.4%)
	False	3 (0.8%)
	I don't know	3 (0.8%)
People who have come in contact with an individual with COVID-19 should immediately isolate themselves in a proper place. In general, the observation period is of 14 days?	True	308 (80.2%)
	False	44 (11.5%)
	I don't know	32 (8.3%)
Knowledge about COVID 19 virus percent score	Median	87.5%
	IQR (25^{th}-75^{th})	(79.1%-95.8%)

Most participants demonstrated a strong understanding of the importance of staying home when feeling unwell or experiencing cold symptoms. However, only about 27.9% recognized the significance of meeting friends and family outside their homes as a preventive measure. A large majority acknowledged the need to avoid close contact with infected individuals. Furthermore, over 75% stated

that self-isolation for 14 days is necessary if someone in their household develops a high temperature or persistent cough. Similarly, about 75% emphasized the importance of staying home for seven days or until symptoms resolved if they experienced COVID-19 symptoms. Most participants also confirmed the necessity of maintaining a distance of at least 2 meters from others when outside (Table 5).

Regarding hand-washing practices, the majority of students answered questions correctly (Table 6). In terms of mask usage, most students recognized that wearing a surgical mask provides protection against COVID-19 and understood the proper way to use one. However, fewer than 40% identified 8 hours as the appropriate duration for wearing a mask.

Overall, the knowledge score across all questions was 84.3%, with an inter-quartile range (IQR) of 79.1% to 89.5%. There was no statistically significant difference in knowledge scores based on participants' sources of information (un-tabulated results).

Table (5):

Participants' Knowledge about COVID-19 Preventive Measures: Social Distancing, (n =384)

Knowledge about COVID 19 preventive measures Social distancing	Answer	
Is it an essential preventive measure to Stay at home when you are sick or have a cold?	Yes No I don't know	372 (96.9%) 8 (2.1%) 4 (1%)
Do you think that meeting with friends and family should be outside the homeis an essential preventive measure?	Yes No I don't know	107 (27.9%) 243 (63.3%) 34 (8.9%)
Do you think that avoiding close contact with someone who is infected is an essential preventive measure?	Yes No I don't know	379 (98.7%) 1 (0.3%) 4 (1%)
Do you think that Staying at home for 14 days after someone in your home starts having high temperature or new continuous cough is an essential preventive measure?	Yes No I don't know	297 (77.3%) 47 (12.2%) 40 (10.4%)
Is it essential to stay at home for seven days or till your symptoms stop if you develop COVID-19 symptoms of high temperature or new continuous cough?	Yes No I don't know	287 (74.7%) 66 (17.2%) 31 (8.1%)
Is it essential to Keep at least 2 meters from other people when you are outside home?	Yes No I don't know	353 (91.9%) 13 (3.4%) 18 (4.7%)

Table (6):

Participants' Knowledge about COVID-19 Preventive Measures: Hand Hygiene& Mask Wearing (n =384)

Knowledge about COVID 19 preventive measures: Hand hygiene	Answer	(N)%
Which of the following are effective hygiene or personal measures to prevent the spread and infection of the novel corona virus? Hand washing with soap and water for at least 20 seconds?	Yes No I don't know	357 (93%) 14 (3.6%) 13 (3.4%)
Avoiding touching your eyes, nose, and mouth with unwashed hands?	Yes No I don't know	376 (97.9%) 3 (0.8%) 5 (1.3%)
Use of anti-bacterial gel to clean hands when soap and water is not available for washing hands?	Yes No I don't know	319 (83.1%) 39 (10.2%) 26 (6.8%)
Covering your mouth with a tissue or sleeve when you cough or sneeze?	Yes No I don't know	367 (95.6%) 9 (2.3%) 8 (2.1%)
Throwing away tissues immediately after coughing or sneezing and washing your hands	Yes No I don't know	363 (94.5%) 10 (2.6%) 11 (2.9%)
Proper hand washing technique	Yes No I don't know	377 (98.2%) 0 7(1.8%)
Mask wearing knowledge questions Can wearing a surgical mask protect you from COVID-19?	Yes No I don't know	319 (83.07%) 63 (16.41%) 2(0.52%)
Which is the correct way of using surgical face mask to protect against COVID-19?	White side facing in(correct) wrong answer I don't know	344 (89.6%) 35 (9.1%) 5(1.3%)
How long can you wear a surgical mask?	8 hours Others I don't know	147 (38.28%) 234(60.94%) 3(0.78)
Overall knowledge about COVID-1 preventive measures percent score	Median IQR (25^{th}-75^{th})	84.3% (79.1%-89.5%)

Regarding participants' attitude towards COVID -19 preventive measures, **table 7** shows that most participants demonstrated a high level of agreement that mask-wearing and social distancing are effective preventive measures. However, over 60% reported a negative personal attitude towards social distancing, citing feelings of missing family and friends and experiencing boredom. The overall attitude percentage score was 73%, with an inter-quartile range (IQR) of 66.7% to 80%.

Table (7):

Participants' Attitude towards COVID-19 Preventive Measures (n=384):

Attitude questions	Strongly agree no (%)	Agree no (%)	Neutral no (%)	Disagree no (%)	Strongly disagree no (%)
Level of agreement regarding whether wearing a face mask in public places can help stop the spread of COVID-19 in the community?	202 (52.6%)	140 (36.5%)	35 (9.1%)	3 (0.8%)	4 (1%)
I believe social distancing will help protect the vulnerable from getting corona virus	257 (66.9%)	111 (28.9%)	11 (2.9%)	5 (1.3%)	0
I think I miss meeting up with family and friend	128 (33.3%)	144 (37.5%)	89 (23.2%)	17 (4.4%)	6 (1.6%)
I think I will get too bored during the time of social distancing	122 (31.8%)	122 (31.8%)	83 (21.6%)	33 (8.6%)	24 (6.3%)
I think the decisions that have been made to reduce the spread of the novel corona virus are fair	108 (28.1%)	127 (33.1%)	75 (19.5%)	59 (15.4%)	15 (3.9%)
I am confident that I can practice social distancing when I am outside	87 (22.7%)	105 (27.3%)	111 (28.9%)	62 (16.1%)	19 (4.9%)
Overall attitude percent score	Median IQR (25^{th}-75^{th})			73.3% (66.7%-80%)	

In terms of participants' adherence to preventive measures, only half consistently wear face masks. Less than one fifth wash their hands before putting on a mask, and approximately one-third wash their hands after removing it. About 25% of participants reported going out only for essential activities or as infrequently as possible. Additionally, around a quarter of students isolate at home for one week when they feel unwell, while two-thirds do so for 14 days if anyone in their household is unwell. The overall practice score is 66.7%, with a range between 54.2% and 77.1% **(table 8).**

Table (8):

Participants Practice of COVID-19 Preventive Measures (n =384)

Question	Answer	no (%)
Do you wear a mask when going out?	Always	199 (51.8%)
	Sometimes	169 (44%)
	No	16 (4.2%)
Do you wash your hands before wearing a face mask	Always	71 (18.5%)
	Sometimes	177 (46.1%)
	No	136 (35.4%)
How do you wash your hands after removing a face mask?	Always	135 (35.2%)
	Sometimes	227 (59.1%)
	No	22 (5.7%)
How well do you comply with the following social distancing guidance staying at home when sick or have a cold or have a fever?	Always	151 (39.3%)
	Sometimes	175 (45.6%)
	No	58 (15.1%)
Isolating at home if you have high fever or new continuous cough until symptoms stop or at least seven days or intending to isolate if this situation occurs?	Always	218 (62%)
	Sometimes	144 (37.5%)
	No	22 (5.7%)
Isolating at home for 14 days if someone in your home starts having high temperature or new continuous cough or intending to isolate if the situation occurs?	Always	94 (24.5%)
	Sometimes	201 (52.3%)
	No	89 (23.2%)
Going out only for necessities or as infrequently as possible?	Always	102 (26.6%)
	Sometimes	149 (38.8%)
	No	133 (34.6%)
Overall practice percent score	Median IQR (25^{th}-75^{th})	66.7 % (54.2%- 77.1%)

Table 9 indicates that while males exhibited a statistically significantly higher attitude percent score (p value =0.001), females demonstrated a statistically significant higher knowledge percent score (p=0.026) and a higher practice percent score, although the latter was not statistically significant. Sixth-year students showed significantly higher attitude and practice percent scores, with p-values of 0.012 and <0.001, respectively. Additionally, they demonstrated a higher though not statistically significant knowledge percent scores compared to fifth year students. The results also revealed that students with chronic diseases had statistically significantly higher knowledge percent scores compared to their peers without chronic diseases (p-value 0.02). A similar trend was observed among students taking medication for chronic diseases, who also had significantly higher knowledge percent scores compared to those who did not (p=0.02). Furthermore, the attitude and practice percent scores were higher among students with chronic diseases and those on medication, but these differences were not statistically significant (p-values of 0.77 for attitude and 0.7 for practice among students with chronic diseases; p-values of 0.5 and 0.11 for attitude and practice among students taking medication, respectively). Additionally, there were statistically significant higher knowledge (p=0.004) and practice (p=0.04) percent scores among vaccinated students compared to those who were not vaccinated.

Table (9)

Difference in Knowledge, attitude and Practice of students according to their characteristics:

	knowledge percent score Median (IQR)	P-value	Attitude percent score Median (IQR)	P-value	Practice percent score Median (IQR))	P-value
Sex Male Female	87.5%(71%-91.6%) 87.5%(79.1%-95.8%)	0.026	63.3% (60%-70%) 60%(56.6%66.6%)	0.001	66.6%(53.6% 73.4%) 68.7% (54.1%-77.%)	0.26
Academic year Fifth Sixth	83.3%(77.3%-88.5%) 84.3%(80.2%-89.5%)	0.095	60%(56.6%-66.6%) 63.3% (56.6%-66.6%)	0.012	62.5%(47.9% 72.9%) 68.7%(60.4% 79.1%)	<0.001
Covid -19 infected? -Yes, suspected, not tested -No, I never tested -Yes,tested +ve -Idon't know -Tested -ve	*87(71%- 91.6%)* 84.3%(81.2%-94.7%) 83.8%(80.2%-89.5%) 79.1%(76.2%-84.3%) 82.3% (76%-87.5%)	0.11	63.3% (60 %- 66.6%) 60% (56.6%-63.3%) 63.3% (60%- 66.6%) 60% (56.6%- 65.8%) 63.3% (60%-66%)	0.02	66.6%(58.3%-75.%) 64.5% (50%-77%) 68.7% (52%-72.9%) 62.5%(55.7%-83.8%) 72.9%(56.2% 85.4%)	0.27
Chronic disease No Yes	81.2% (75%-87.5%) 84.3% (79%-89.3%)	0.02	60% (56.7%-70%) 63.3% (56%- 66%)	0.77	68.7%(52.8% 79.1%) 66.6% (54.1%-75.%)	0.7
Any medications No Yes	82.3%(77%-87.7%) 84.2% (79%-89.5%)	0.02	63.3% (56.3%-66.6%) 63.3%(53.3%-70%)	0.5	66.6% (52%-73.4%) 68.75% (56.2%-77%)	0.11
Vaccinated againstCOVID-19 No Yes	79.1% (75%-83.3%) 84.2% (79%-89.5%)	0.004	56.6% (55.8%-70%) 63.3% (56.6%-66.6%)	0.11	54%(43%-67.1%) 68% (56.2%-77%)	0.04

Table 10 shows that there is a statistically significant weak positive correlation (r =0.13) between total knowledge percent score and attitude percent score.Additionally, there is a statistically significant weak positive correlation (r =0.167) between knowledge and practice percent scores, and a statistically significant weak positive correlation (r =0.187) between attitude and practice percent scores.

Table (10):
Correlation between Total Knowledge Percent Score and Attitude Score among the studied group (n =384)

	Attitude percent score	P-value
knowledge about COVID-19 virus percent score	r =0.132	<0.001*
	Practice percent score	P-value
Knowledge about COVID-19 virus Percent score	r =0.167	<0.001*
Attitude percent score	r =0.187	<0.001*

Discussion

The study was conducted to evaluate the knowledge, attitude, and practice (KAP) regarding COVID-19 preventive measures among fifth and sixth-year medical students at Cairo University. The findings indicated that the participating students exhibited a high level of knowledge. This aligns with previous research conducted across 25 universities in Egypt, which reported high knowledge score of 72.2% among medical students in various health disciplines, including nursing and pharmacy ***(Salem et al., 2021).***Moreover, the results were consistent with another study focused on medical students at Cairo University, where only 75% of questionnaire items were answered correctly by most students, except for final-year students who performed better ***(Abd El Fatah et al., 2020).*** The discrepancy between these studies and the current one may be attributed to the focus on final-year students in this research, who are known to possess higher knowledge levels. In contrast, a study from Jordan reported that 90% of medical students achieved high knowledge and attitude scores regarding COVID-19 ***(Bani Hani et al., 2021),*** highlighting regional differences in KAP among medical students. Overall, while Cairo University students demonstrated commendable knowledge levels, there remains room for improvement compared to their peers in other countries.

The study found that female students exhibited higher knowledge scores regarding COVID-19, a finding consistent with previous research on first-year medical students at Suez Canal University ***(Soltan et al., 2020)*** and another study by ***Salem et al. (2021).*** In contrast, a study in Turkey reported significantly higher scores among male students ***(Yakar et al., 2020),*** suggesting that contextual factors may influence these differences. Additionally, students with chronic illnesses or those on medications demonstrated increased knowledge about the COVID-19 virus, likely due to their health-seeking behavior and a greater concern for personal health information. This aligns with findings from Indonesia, where students with chronic diseases also showed higher knowledge scores about COVID-19 ***(Adli et al., 2022).*** Overall, the results indicate that both gender and health status play significant roles in the knowledge levels of medical students regarding COVID-19.

The study indicated that students who reported no previous COVID-19 infections had higher knowledge scores, suggesting that understanding the virus's symptoms and transmission may help protect against infection. This finding aligns with research from Ain Shams University, which showed a statistically significant negative correlation between prior COVID-19 infections and knowledge and attitude scores among medical students ***(Wassif&el Din, 2022).*** Additionally, a study by ***Bani Hani et al., 2021.*** found that Jordanian students with fewer infections also exhibited higher knowledge scores. These results emphasize the potential link between awareness of COVID-19 and the likelihood of infection, highlighting the importance of education in preventing disease.

The study found that while most participating students were vaccinated, particularly those with high knowledge scores, a previous study indicated significant vaccine hesitancy and refusal among Egyptian medical students ***(Saied et al., 2021).*** This hesitancy may have been mitigated by government efforts and awareness campaigns aimed at increasing vaccine accessibility and understanding. The contrast highlights the impact of targeted health education on vaccination rates among medical students.

The study revealed that over two-thirds of students preferred social media platforms as their primary source of information about COVID-19, followed by scientific websites and lectures. This trend is consistent with findings from Suez Canal University, where nearly two-thirds of participants also utilized the World Health Organization (WHO) website and social media for information (***Soltan et al., 2020).*** Similar preferences were noted in studies involving Turkish students ***(Aker & Mıdık, 2020; Yakar et al., 2020)*** and Nigerian residents, indicating a global reliance on social media for health information ***(Reuben et al., 2021).*** Conventional media sources, such as television and newspapers, were the least favored, possibly reflecting a mistrust in formal media outlets. The preference for lectures as a second source suggests that students value the expertise of their professors. Notably, there was no significant relationship between the sources of information chosen by students and their knowledge scores regarding COVID-19.

The study's findings indicate a relatively low overall attitude score of 73%, which contrasts with previous research that reported higher scores. For instance, a Turkish study by Yakar et al. (2020) found an average attitude score of 95%, while ***Salem et al. (2021)*** reported an attitude score of nearly 80%. The lower score in the current study could be attributed to its timing, as it was conducted in 2022, after the return to face-to-face learning amidst ongoing social restrictions, potentially leading to student discouragement regarding the end of the pandemic. In contrast, the Turkish study collected data in April 2020, during the early phases of the pandemic. Additionally, the current study revealed that male students exhibited better overall attitudes, a finding that aligns with Salem et al. (2021), which also noted higher attitude scores among male medical students. Furthermore, students in their sixth year, those with chronic diseases, and individuals who suspected or tested positive for COVID-19 also demonstrated higher attitude scores. These trends suggest demographic and experiential factors significantly influence students' attitudes towards their educational and health contexts during the pandemic.

The study found that most students recognized the importance of social distancing in protecting vulnerable populations from COVID-19. They displayed a good understanding of social distancing and home isolation protocols when sick. However, the social distancing practice score was only 62%, with only 25% of participants stating they "always" went out only for necessities, and 40% reported "mostly" staying home when feeling unwell. This gap between knowledge and practice may stem from the time required to change behaviors. In comparison, a British study reported that 88.9% of university students adhered to social distancing measures "mostly" ***(Barrett & Cheung, 2021).*** Additionally, practice score among medical students in Pakistan was 76 %. The lower adherence in the current study could be attributed to its later timing, as it was conducted after the easing of restrictions and amidst high vaccination rates among participants. An earlier Egyptian study indicated a practice score of 91.2% for social distancing ***(Salem et al., 2021),*** highlighting a decline in adherence from 2020 to 2022 that warrants further investigation. Moreover, gender did not significantly influence practice scores, consistent with findings from another Egyptian study ***(Salem et al., 2021).***

This suggests that while awareness of social distancing is high among students, translating that knowledge into consistent behavior remains a challenge. The current study found a positive correlation between knowledge, attitude, and practice scores regarding health behaviors. Higher knowledge and attitude scores were associated with better practice scores, supporting the assertion by Salem et al. 2021 that good knowledge is essential for fostering positive attitudes and encouraging effective practices. Similarly, a Turkish study involving healthcare workers also identified a link between strong knowledge and preventive practices ***(Arslanca et al., 2021). Modi et al., (2020)*** further emphasized that high knowledge levels are a key determinant of positive attitudes and practices. This body of evidence underscores the importance of enhancing knowledge to improve health-related behaviors among individuals.

Conclusion and recommendations:

Although participating students demonstrated a high level of knowledge about COVID-19 preventive measures, there was a noticeable discrepancy between knowledge and practice, especially in social distancing and mask-wearing behaviors, reflecting a potential gap between awareness and application.

It is crucial to implement disaster training programs for medical students to enhance their preparedness, knowledge and skills that are essential during times of outbreaks and emergencies.

This Preparedness involves awareness of the tools and resources available for the maintenance of optimal student mental health. A paradigm shift in the norms of medical education is essential to equip students for effective action in times of crisis

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معرفة،اتجاهات، وممارسات طلاب الطب بجامعة القاهرة في السنوات الإكلينيكية تجاه الإجراءات الوقائية لكوفيد-١٩

[١]رغده مصطفي مصطفي ,[١] مها الرباط , [٢]نجلاء يوسف
[١]علا عبد المنعم مصطفي

١ قسم الصحه العامه و طب المجتمع كليه الطب جامعه القاهره
٢ قسم الصحه العامه و طب المجتمع كليه الطب جامعه نيو جيزه

الملخص العربي

تم اكتشاف مرض فيروس كورونا ٢٠١٩ (كوفيد-١٩) لأول مرة في الصين، في ديسمبر ٢٠١٩، ومن هناك انتشر على نطاق واسع وسريع إلى أجزاء أخرى من العالم، مهددًا حياة الملايين من الناس. في غياب علاج نهائي، يظل الوعي والالتزام المستمر بالإجراءات الوقائية أمرين حاسمين لتجنب المزيد من تفشي كوفيد-١٩ وإيقاف انتقال العدوى في المجتمع. يلعب طلاب الطب دورًا حيويًا في نشر المعلومات الدقيقة حول كوفيد-١٩ ، و الاستعداد لمكافحة الأوبئة التي قد تحدث في المستقبل.و كان الهدفمن الدراسة هوتقييم المعرفة والإتجاه والممارسات لطلاب الطب بجامعة القاهرة بشأن الإجراءات الوقائية خلال جائحة كوفيد-١٩. و تم إجراء هذه الدراسة التحليلية المقطعية في كليه الطب (القصر العيني) في الفترة من ديسمبر ٢٠٢١ إلى أبريل ٢٠٢٢

بمشاركة ٣٨٤ طالب طب من سنتي الدراسة الخامسة والسادسة. تم جمع البيانات باستخدام استبيان ذاتي الإدارة، تم توزيعه خلال جلسات التعليم ، كما تم مشاركته عبر منصات التواصل الاجتماعي المختلفة.

اوضحت النتائج ان نسبة المعرفة كانت ٨٤.٣% (٧٩.١%- ٨٩.٥%). ظهرت وسائل التواصل الاجتماعي كمصدر رئيسي للمعلومات. كانت نسبة الإتجاه ٧٣.٣% (٦٦.٧%-٨٠%)، و كانت نسبة الممارسة ٦٦.٧% (٥٤.٢%- ٧٧.١%). تأثرت نسب المعرفة والتصورات والممارسات بالجنس، والسنة الدراسية، وحالة التطعيم، والاصابة بالأمراض المزمنة.كما كانت هناك علاقات إيجابية ضعيفة وذات دلالة احصائية بين نسبة المعرفة ونسبة الإتجاه، وبين نسبة نسبة المعرفة و نسبة الممارسة، و نسبة الإتجاه ونسبة الممارسة على التوالي (R=0.13, 0.167, 0.187) والخلاصه بينت انه بالرغم من أن الطلاب المشاركين أظهروا مستوى عالٍ من المعرفة حول إجراءات الوقاية من كوفيد-١٩، إلا أن هناك فجوة ملحوظة بين المعرفة والممارسة، خاصة في سلوكيات التباعد الاجتماعي وارتداء الكمامات.لذا، فإنه من الضروري تنفيذ برامج تدريب على الكوارث لطلاب الطب لتعزيز استعدادهم ومعرفتهم ومهاراتهم التي تعتبر أساسية خلال أوقات التفشي والطوارئ.

الكلمات المفتاحية: كوفيد-١٩؛ المعرفة، الإتجاه، الممارسة؛ الإجراءات الوقائية