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Study the Awareness of COVID-19 among a Sample of Medical Students in Egypt

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ABSTRACT

Background: Coronavirus became a pandemic worldwide and its awareness varied from one country to another across the whole world.

Objective: The study aimed to evaluate the awareness of COVID-19 among a sample of Egyptian medical students who will be healthcare providers soon.

Materials and Methods: The study included108 medical students (55 from 4th year and 53 from 6th year) during their clinical rounds in the Chest Department at Ain Shams University in January 2022. They answered a questionnaire about their awareness of COVID, which consisted of four major sections in the English language.

Results: Mean age for 4th year medical students was 21± 0.9 and 23 ± 0.6 years for 6th year students. Vaccination status was 78.2% (2 doses) and 92.5% in 4th and 6th year students, respectively. Social media, doctors, or other medical staffs were the primary sources of their awareness. 45.5% and 56.6% of the fourth and sixth year students had adequate awareness of COVID, with the best score in the precautionary measures (5 ± 0).

Conclusions: 45.5% and 56.6% of fourth and sixth year medical students, respectively, showed an adequate awareness level of COVID-19 with the highest score in the precautionary measures, which is the cornerstone for stopping of the spread of infection. However, we still need additional educational programs for those with low scores to improve the overall awareness to end this outbreak.

Keywords: Awareness level, Egypt, COVID- 19, Medical students, Precautionary measures.

INTRODUCTION

A Public Health Emergency was reported in 2020, mainly on January 30, by the World Health Organization (WHO) due to the wide transmission of a recent coronavirus (SARS-CoV-2), and after that, on March 12, 2020, the WHO announced that COVID had become a pandemic [(1)]. On February 14, 2020, the first occurrence of COVID-19 in the region of Africa was reported by Egypt, and it required about 3 months to record 10 000 cases, which was nearly double the time of Italy and the USA needed to achieve the same number of cases. Since then, many COVID cases have increased everywhere [(2)].

Like other beta coronaviruses, the COVID-19 infection symptoms are the same [(3)]. Fever, dyspnea, cough, headache, fatigue, diarrhea, and weakness are likely symptoms [(4)]. These symptoms usually develop after the incubation from 0 to 24 days, with three days as the average duration [(5)]. This duration varies from one person to another, depending on the age and immunity of the patient. The most common route of transmission of COVID-19 is human to human transmission, which occurs through close contact or droplets transmitted by coughing [(6, 7)].

By the time the general population provided data about COVID-19 and instructions about how to stop the virus spread (e.g., using masks to cover the face, hand washing, and social distance). However, COVID-19 awareness (knowledge and attitudes) varied from one country to another across the whole world. For example, it was reported that in some countries, such as Africa, Europe, and North America, there is a low awareness level of COVID-19 [(8, 9)]. Therefore, urgent and immediate steps are needed to raise awareness about COVID-19 to cut down on this outbreak [(10, 11)].

Multidisciplinary national arrangements between different ministries were announced by the Egyptian government since the first case of COVID has appeared, and aside from that, they abandoned separate hospitals in each governorate to be quarantine hospitals for patients [(12)]. The Egyptian MOH also relies on a medical team that includes different specialties (Internal Medicine, Pulmonology, Intensive Care, Tropical Medicine, Clinical Pathology, Radiology, and Infection Control) to follow up the COVID patients in these quarantine hospitals, and guidelines booklets have been published on how to diagnose and manage COVID-19 [(12)].

Thus, after four waves of COVID in Egypt; we aimed to determine the awareness of COVID-19 in the medical students sample in Ain Shams University in Egypt, who will be the healthcare providers soon, and to raise the awareness level if it is low, as if they lack the proper awareness about COVID-19 during their clinical training, they will be more liable to infection.

MATERIALS AND METHODS

The study included108 medical students (55 from 4th year and 53 from 6th year) during their clinical rounds in the Chest Department at Ain Shams University in January 2022 by convenience sample. They answered a self-administered questionnaire about their awareness of COVID while they were attending their clinical rounds in the chest department. The questionnaire consisted of four major sections in the English language.

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The sample size was assessed using Open Epi version 3, an open-source calculator, based on a study carried out by **Hussein *et al.* [13].** The required sample size was at least 87 medical students [14]. However, by the end of the time frame, the collected sample consisted of 108 medical students with 97% confidence intervals (CIs) and a 3% margin of error.

On the first day of the student clinical round, before receiving any data about COVID, a questionnaire in the English language was distributed. We explained the aim of the study to the participants. Then participants who refused to share in the survey or conducted an incomplete questionnaire were excluded. A pilot study included ten students (5 students from year 4 and 5 students from year 6) determined the reliability of the language of the questionnaire. The study did not include the pilot study results, and no further correction was needed.

Data collection:

The study tool design was based on **Jaber *et al.* [15]** study questionnaire, which was composed of four main sections, and its validity was revised by a professional professors in Public Health. The first section included items about demographic data such as age, gender, participant' previous infection of COVID or not, participant was vaccinated or not, and the type of vaccination he received. The second section included awareness of COVID and items about the source of awareness of COVID, symptoms, routes of transmission, precaution measures, and possible treatment choices for COVID -19. Twenty seven points measured the previously mentioned items; 9 points for symptoms, 6 points for routes of transmission, 5 points for precaution measures, and 7 points for variable treatment choices. Participants answered each question with either "Yes" or "No". The scoring system was measured as follows: one point was given for the right answer and zero for the wrong answer, and according to the awareness level, the candidates were divided into three groups: if the score was $\leq$ 18 points, their awareness level was inadequate; if the score was 19–20 points, their awareness level was average; if the score was $\geq$ 21, their awareness level was adequate. The chosen score categories' validity was the same as the **Jaber *et al.* [15]** The third section included items that assessed the beliefs of the participants towards COVID, and they were evaluated by three items. In contrast, the fourth section involved items about emotional feelings towards the COVID- 19 outbreak, and it was determined by only one item.

Ethical approval:

The Ethical Committee of Ain Shams University approved the study under approval number of FMASU R05 2022. Every student signed an informed written consent for acceptance of participation in the study. This work has been carried out in accordance with The Code of Ethics of the World Medical Association (Declaration of Helsinki) for studies involving humans.

Statistical analysis

Revision, coding, and computer data entry were done, and then analysis was performed using the software SPSS (Statistical Package for the Social Sciences) version 28. Quantitative variables were described as means ± SD and categorical variables were measured by their absolute frequencies. Chi-square test was used to compare them. For ordinal binary data, chi-square for trend test was used. An independent sample t-test was used to compare quantitative data between two groups. $P \leq 0.05$ indicated significant statistical level, and $p \leq 0.001$ was set for a highly significant difference.

RESULTS

One hundred and eight undergraduate medical students (55 from year 4 and 53 from year 6) had successfully answered the questionnaire. The total number of students having a clinical round in January were 120 students, 60 students in each year, the total response rate was 90% (the response rate of year 4 and 6 was 91.6%, 88.3% respectively).

Table (1) showed the sociodemographic data of the studied group where the majority of the students of year 4 were females (89%), while half of the students of year 6 were males (51%), and the mean age of the fourth year medical students was 21.0 ± 0.88 years old, while the mean age of the sixth year medical students was 23.23 ± 0.61 years old. There was a statistically significant difference as regards age and gender between the studied groups. Additionally, 76.4% of the fourth year students versus 71.7% of the sixth year students had COVID 19 before and the majority of the 4th and 6th year medical students had COVID once as shown in table (1).

Regarding vaccination status, 92.7% and 100% of the fourth and sixth medical students were vaccinated, respectively, and 78.2%, 92.5% of the fourth and sixth medical students received two doses. Only 5.5% of the fourth medical students received the booster dose. The vaccination type in the fourth year was 38.2% Sinovac, 29.1% Sino pharm, 27.3% AstraZeneca, and only 5.5% Pfizer. While, sixth medical students reported that 41.5% received Sinovac, 24.5% received Moderna, 20.8% received AstraZeneca, and only13.2% received Sino pharm. There was no statistically significant difference regarding being infected with COVID-19 before, number of infections, and doses of vaccination (Table 1).

Regarding source of awareness, social media and doctors or other medical staffs were the main sources of awareness for both groups (72.7% and 76.4% within 4th year versus 43.4% and 77.4% within 6th year group, respectively)as shown in table (1).

Table (1): Comparison of demographic data, previous COVID infection, vaccination status and source of awareness between the studied groups

Parameter	Groups		Test	
	Fourth year students	Sixth year students	t/χ^2	p
	N=55 (%)	N=53 (%)		
Age (year): Mean ± SD	21 ± 0.9	23 ± 0.6	-15.212	<0.001**
Gender:				
Male	6 (10.9%)	27 (50.9%)	20.387	<0.001**
Female	49 (89.1%)	26 (49.1%)		
Had COVID before				
Yes	42 (76.4%)	38 (71.7%)	0.306¥	0.580
How many times:				
0	13 (23.6%)	15 (28.3%)		
1	36 (65.5%)	38 (71.7%)	2.373	0.123
2	6 (10.9%)	0 (0%)		
Vaccinated:				
Yes	51 (92.7%)	53 (100%)	Fisher	0.118
Vaccination type:				
Sino pharm	16 (29.1%)	7 (13.2%)		
Sino vac	21 (38.2%)	22 (41.5%)	MC	<0.001**
AstraZeneca	15 (27.3%)	11 (20.8%)		
Moderna	0 (0%)	13 (24.5%)		
Pfizer	3 (5.5%)	0 (0%)		
Doses				
One	9 (16.4%)	4 (7.5%)	0.217	0.642
Two	43 (78.2%)	49 (92.5%)		
Three	3 (5.5%)	0 (0%)		
Source of awareness				
Social media	40 (72.7%)	23 (43.4%)	9.554¥	0.002*
Television	15 (27.3%)	10 (18.9%)	1.072¥	0.301
Electronic and printable newspaper	6 (10.9%)	5 (9.4%)	0.064¥	0.8
Official reports	21 (38.2%)	6 (11.3%)	10.386¥	0.001**
Family and friends	15 (27.3%)	9 (17%)	1.654¥	0.198
Doctors or other medical staff	42 (76.4%)	41 (77.4%)	0.015¥	0.902

χ^2 Chi square for trend test ¥chi square test MC Monte Carlo test t independent sample t test **p≤0.001 is statistically highly significant *p<0.05 is statistically significant.

Table (2) showed that the majority of fourth and sixth medical students did not feel that they had possessed enough information about COVID-19, while nearly half of both studied groups had enough information about COVID-19 precautionary measures, and there was no statistical difference between both groups in having enough information about COVID-19 and its precautionary measures.

In addition, the awareness of symptoms, mode of transmission, precaution measures, and treatment of COVID 19 in both studied groups showed a statistically significant difference between both groups in symptom awareness as regards fever, cough, and sneezing (all 6th year students knew that fever is a symptom of COVID-19 versus 89.1% within the fourth year). Cough and sneezing were also COVID-19 symptoms according to 94.5% and 50.9% of 4th year students, versus 79.2% and 24.5% of 6th year students, respectively). Concerning the route of transmission, 78.2% and 89.1% reported that COVID-19 can transmit by airborne and by handshaking and kissing versus 94.3% and 100% within 6th year students. Regarding treatment, 89.1%, 89.1%, and 83.6% within the 4th year reported that COVID-19 had no specific treatment, drinking hot drinks and herbal remedies versus 69.8%, 50.9%, and 32.1% within the 6th year, respectively.

On the other hand, no statistically significant difference was detected between both groups as regards awareness of other symptoms, other routes of transmission, precautionary measures, and other possible treatment options as shown in table (2).

Tables (2): comparison of COVID awareness, symptoms, route of transmission, precautionary measures and treatment between the studied groups

Parameter	Groups		Test	
	Fourth year students	Sixth year students	t/χ^2	p
	N=55 (%)	N=53 (%)		
Do you think you know enough about COVID-19 generally?				
No	12 (21.8%)	12 (22.6%)	0.056	0.813
Yes	3 (5.5%)	0 (0%)		
Maybe	40 (72.7%)	41 (77.4%)		
Do you think you know enough about COVID-19 Precautionary measures?				
No	3 (5.5%)	0 (0%)		
Yes	30 (54.5%)	28 (52.8%)	1.435	0.231
Maybe	22 (40.0%)	25 (47.2%)		
Symptoms:				
Fever	49 (89.1%)	53 (100%)	Fisher	0.027*
Cough	52 (94.5%)	42 (79.2%)	5.6	0.018*
Sneezing	28 (50.9%)	13 (24.5%)	7.976	0.005*
Dyspnoea	25 (45.5%)	29 (54.7%)	0.926	0.336
Fatigue and weakness	55 (100%)	52 (98.1%)	Fisher	0.491
Chest pain	22 (40%)	24 (45.3%)	0.308	0.697
Diarrhoea	31 (56.4%)	35 (66%)	1.063	0.303
Headache	46 (83.6%)	37 (69.8%)	2.9	0.089
Sore throat	40 (72.7%)	36 (67.9%)	0.299	0.585
Route of transmission				
Airborne	28 (50.9%)	34 (64.2%)	1.936	0.164
Droplets	43 (78.2%)	50 (94.3%)	5.892	0.015*
Contact with contaminated surfaces	49 (89.1%)	46 (86.8%)	0.135	0.714
Contaminated foods and drinks	12 (21.8%)	14 (26.4%)	0.312	0.576
Pets	3 (5.5%)	3 (5.7%)	0.002	0.963
Handshaking and kissing	49 (89.1%)	53 (100%)	Fisher	0.028*
Precautionary measures:				
Hand washing with water and soup	55 (100%)	53 (100%)	0¥	>0.999
Hand washing with alcoholic disinfectant	55 (100%)	53 (100%)	0¥	>0.999
Face masks	55 (100%)	53 (100%)	0¥	>0.999
Avoiding crowded area	55 (100%)	53 (100%)	0¥	>0.999
Avoiding handshaking and kissing	55 (100%)	53 (100%)	0¥	>0.999
Treatment:				
No specific treatment	49 (89.1%)	37 (69.8%)	6.185	0.013*
Antibiotics	22 (40%)	24 (45.3%)	0.308	0.576
Antipyretics	55 (100%)	53 (100%)		
Panadol and paracetamol	55 (100%)	52 (98.1%)	Fisher	0.491
Drinking hot drinks	49 (89.1%)	27 (50.9%)	18.838	<0.001**
Herbal remedy	46 (83.6%)	17 (32.1%)	29.522	<0.001**
Vitamins	55 (100%)	50 (94.3%)	Fisher	0.115

χ^2 Chi square test **p≤0.001 is statistically highly significant *p<0.05 is statistically significant

Regarding COVID-19 consequences, mortality rate, the most susceptible group, and the emotional status due to COVID-19, a statistically significant difference between both groups was detected. About 62% versus 36% of 4th and 6th year students reported that COVID can cause death, while 28% and 60% of 6th year students reported that the mortality rate of COVID was < 1% and 1–5%, while 10.9% of 4th year students reported that mortality ranged from 50 to 65%. About 33% versus 62% of 4th and 6th year students respectively reported that all age groups are susceptible to COVID. About 27% and 29% of 4th year students versus 0% and 54.7% of 6th year students were depressed and worried due to COVID-19 (Table 3).

Table (3): Comparison of COVID awareness, consequence, mortality rate, most susceptible group, and emotional status between the studied groups

Parameter	Groups		Test	
	Fourth year students	Sixth year students	t/χ^2	p
	N=55 (%)	N=53 (%)		
Consequences of COVID-19				
May lead to death	34 (61.8%)	19 (35.8%)		
Organ failure	3 (5.5%)	15 (28.3%)	MC	<0.001**
Immunodeficiency	3 (5.5%)	9 (17%)		
Permanent disability	6 (10.9%)	10 (18.9%)		
no side effect	9 (16.4%)	0 (0%)		
Mortality rate:				
1%	0 (0%)	15 (28.3%)		
1-5%	6 (10.9%)	32 (60.4%)	34.424	<0.001**
5-20%	34 (61.8%)	2 (3.8%)		
20-35%	6 (10.9%)	0 (0%)		
35-50%	3 (5.5%)	4 (7.5%)		
50-65%	6 (10.9%)	0 (0%)		
Most susceptible:				
Paediatric	9 (16.4%)	0 (0%)		
Geriatric	6 (10.9%)	0 (0%)		
Pregnant women	13 (23.6%)	5 (9.4%)	MC	<0.001**
Immunodeficient people	9 (16.4%)	15 (28.3%)		
All are susceptible	18 (32.7%)	33 (62.3%)		
Emotional status?				
Sad	15 (27.3%)	11 (20.8%)		
Happy	0 (0%)	0 (0%)		
Depressed	15 (27.3%)	0 (0%)	MC	<0.001**
Worried	16 (29.1%)	29 (54.7%)		
Panic	6 (10.9%)	13 (24.5%)		
Didn't affect me	3 (5.5%)	0 (0%)		

χ^2 Chi square for trend test ¥chi square test MC Monte Carlo test t independent sample t test **p≤0.001 is statistically highly significant *p<0.05 is statistically significant.

There was a statistically significant difference between both groups where the symptom score was higher in 4thyear students, the transmission score and treatment score were both higher in 6th year students. There was no statistically significant difference between the studied groups in the categories of awareness as 45.5% and 56.6%, of the fourth year and sixth year students respectively had adequate awareness versus 38.2% and 24.5% of fourth year students and sixth year, respectively, had inadequate awareness (Table 4).

Table (4): Comparison of the different score items and awareness level between the studied groups

Parameter	Groups		Test	
	Fourth year students	Sixth year students	t	p
	Mean ± SD	Mean ± SD		
Symptom score	7± 2	6 ± 2	3.411	<0.001**
Transmission score	5± 1	6± 1	-2.897	0.005*
Precautionary score	5 ± 0	5 ± 0	§	
Treatment score	3 ± 1	5 ± 11	-9.015	<0.001**
Total Awareness score	20 ± 3	21 ± 2	-1.145	0.255
	N=55 (%)	N=53 (%)	χ^2	p
Awareness:				
Inadequate	21 (38.2%)	13 (24.5%)		
Average	9 (16.4%)	10 (18.9%)	2.092	0.148
Adequate	25 (45.5%)	30 (56.6%)		

χ^2 Chi square for trend test t independent sample t test **p≤0.001 is statistically highly significant *p<0.05 is statistically significant §t test cannot be computed as both means are equal

DISCUSSION

COVID-19 pandemic became a major threat to the general public and healthcare providers all over the world. Knowledge of COVID-19 remains limited to its status as a novel virus. Until now, we could only prevent human-to-human transmission by implementing infection control measures [16]. Thus, an adequate level of awareness about COVID-19 is needed to face the previously mentioned challenges and to have realistic expectations towards the disease in the future [15]. Therefore, our study aimed to assess, after about four waves of COVID, the awareness of COVID among a sample of medical students in Ain Shams University in Egypt, as they will be healthcare providers soon and spread their information to the public. Moreover, if they lack the proper awareness about COVID-19 during their clinical training, they will be more liable to infection.

The results of our questionnaire showed that 45.5% of the 4th year and 56.6% of the 6th year had adequate awareness level of COVID, which was based on symptoms, transmission, precaution measures, and treatment scores. The precaution score was the highest score among both groups, as this reflects the perfect role of medical staff and social media from the beginning of COVID as they focused on the precautionary measures to stop the spread of this disease and vaccination level among students reached 92.7% in the 4th and 100% in the 6th year, reflecting the strict measures taken by the Egyptian government towards the COVID outbreak as vaccination was mandatory for all university students.

Regarding the main sources of information as mentioned above, health care providers and social media were the main sources, from which both studied groups received their knowledge and awareness about COVID. This focus on the major role that medical staff should play in providing reliable and accurate information about the virus and it was not surprising at all to find that social media also was an important source of information and this can be explained as it is an easy accessible method, and can be reached by all people everywhere and it was evident also in most of the literature that during the crisis, health care providers and social platform are the main source of information [17, 18].

However, on the other hand, the social platform is sometimes supersaturated with a lot of information about the virus and some of them are not true and may be misleading [19]. Therefore we need mainly to depend on health care workers as the source of information and the senior medical students to be the source of spreading the correct information about this virus depending on official reports and data evidence-based as 38.2% within 4th year versus and 11.3% within 6th year group only had their information that was official reports. This is in agreement with **Hussein *et al.*** [13] study that was conducted on medical students in Ain Shams University but with a different questionnaire, and there were 26.2% and 3.4% of the students who had their information from educational sources. **Jaber *et al.*** [15] study that was carried out on the general population in Iraq and Jordan, found that the most used sources of awareness about COVID-19 were doctors or medical staffs (65.7% and 62.9% respectively) and social media was the second most used source (62.8% and 53.7% respectively).

Both the fourth and sixth year medical students (72.7% and 77.4%) claimed that they were not sure if they knew enough about COVID. This can be explained by the fact that COVID awareness remains limited to its status as a novel virus [16]. However 54.5% and 52.8% of both studied groups, respectively, had enough information about precautionary measures, which reflects the strict precautionary measures that were announced by the Egyptian government. As the campaigns of "Stay Home, Stay safe", which aimed for social distancing, which were announced on the social platform and other campaigns began on the streets to encourage regular hand washing, cough etiquette, wearing face masks, and avoiding crowding in public areas. A massive disinfection program focusing on all squares, work areas, touristic locations, hotels, and restaurants was carried out by the Egyptian government and an immediate fine of EGP 50 (approximately $3.16) was charged on those not wearing masks in public areas beginning from the second wave of COVID and till now [20]. Moreover, most of the answers to our questionnaire were promising and showed that most of the medical students were quite involved in the current COVID scenario. The majority of them were aware of the symptoms, precaution measures, and treatment, but understanding the source of the spread of infection needed to be better than that, especially in fourth year students.

The majority of the studied groups knew that fever, cough, and sneezing were symptoms of COVID, which is closely similar to flu illnesses. This is matched with **Jaber *et al.*** [15] study. On the other hand, the majority of sixth year students had better awareness that droplets were the sources of transmission, but only 78.2% of the fourth year students knew that COVID can be transmitted by droplets, although droplets have been established as being the main source of transmission [6]. The threatening condition is that the percentage of the fourth year students that knew that droplets were the source of transmission was lower than that in **Jaber *et al.*** [15] study. As 80% of the general population in Jaber study knew that droplets can transmit COVID. Our explanation that this may be due to our small sample size but still this point needs to be focused on and discussed with fourth year students as this percentage of unaware people could spread false information to their surroundings [21]. Another surprising point that needs to focus on is that all fourth year medical students and 94.3% of sixth medical students think that vitamins were treatment to COVID and 83.6% of the fourth year medical students think that herbal remedies were also treatment to COVID. This is matched with **Jaber *et al.*** [15] study, as big percentages of the participants think falsely that vitamin supplements and herbal remedies

are effective in the treatment of COVID and this is a common belief in the Middle East region. These results are matched also with a study done in Saudi Arabia at the time of the outbreak of Middle East respiratory syndrome [(22)]. Therefore this point needs to be discussed with the junior health care providers (4th and 6th year medical students) and to be corrected and their information should depend on evidence-based studies and guidelines. Even after four waves of COVID, there are still different opinions among the studied groups regarding the consequences, the mortality rate, the most susceptible group, and the emotional status toward COVID-19, and this can be explained as this virus is novel [(16)].

LIMITATION

Our small sample size was the main limitation and this can be explained that our study duration was two weeks duration only.

CONCLUSIONS

45.5% and 56.6% of fourth and sixth year medical students, respectively, showed an adequate awareness level of COVID-19 with the highest score in the precautionary measures, which is the cornerstone for stopping the spread of infection. However, we still need additional educational programs for those with low scores to improve the overall awareness to end this outbreak.

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