ORIGINAL ARTICLE

THOUGHTS AND AWARENESS OF MEDICAL STUDENTS ABOUT THE COVID-19 PANDEMIC

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ABSTRACT

Aims: This study aims to evaluate medical students' knowledge, thoughts, and awareness of the COVID-19 pandemic. ***Methods:*** A questionnaire consisting of 31 questions was prepared for this descriptive study. In the questionnaire, medical students' knowledge, attitudes and behaviors during the COVID-19 pandemic were investigated. Categorical variables are demonstrated as numbers and percentages, whereas continuous variables are presented as minimum, maximum, and mean values. ***Results:*** A total of 575 participants completed the questionnaire. The mean participant age was 21.7 years. Fifty-two percent of participants knew about the coronaviridae family before the outbreak and 38.8% were informed about COVID-19 in their medical schools. Of the students, 99.7% stated that the first case's origin was in China. Eighty percent of the participants stated that droplet spread is the transmission route of COVID-19. The most common opinion about the incubation period of the SARS CoV-2 was two to twelve days. Being older than 65 years old, having a comorbidity, being immunosuppressed, or working in the healthcare sector were the most particular risk factors to get infected. The majority of the participants follow the vaccine developments from social media, radio and television. According to 75.83% of the participants, all people should wear a mask in daily life for protection. ***Conclusion:*** The epidemiology and diagnostic factors of COVID-19 are well known by medical students. To minimize information pollution and raise awareness, medical students should be educated about pandemic and management of it. Further evaluation with various methods and more participants may help to better understand the awareness of the COVID-19 pandemic in medical students. ***Keywords:*** COVID-19, SARS CoV-2, medical student, pandemic

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Received: 03.06.2020 Accepted: 15.06.2020 • DOI: 10.4274/tmsj.galenos.2020.07.02.01 Available at: tmsj.trakya.edu.tr

Cite this article as: Çiftcibaşı HS, Elibol A, Kef B et al. Thoughts and awareness of medical students about the COVID-19 pandemic. Turkish Med Stud J 2020;7(2):44-64.

INTRODUCTION

Ever since the Severe Acute Respiratory Syndrome (SARS) outbreak in 2002, a large number of SARS related coronaviruses (SARS-CoV) have been discovered (1). In December 2019, pneumonia with an unknown etiology was detected in China (2). On January 3rd, 2020, 44 patients with pneumonia of unknown etiology have been reported to the World Health Organization (WHO) by the national authorities in China (2). The following researches detected that it was a new type of SARS CoV-2. The origin of Coronavirus Disease-19 (COVID-19) was traced back to an animal market in Wuhan, China (1). On 30 January 2020, COVID-19 has been declared as the sixth public health emergency of international concern by the WHO (3). According to the WHO's official website, more than 3 million SARS CoV-2 cases and 243 thousand of deaths by SARS CoV-2 have been reported around the globe (as of 6 May 2020). Epidemiologic and retrospective researches found that people older than the age of 65 and people who are either immunosuppressed, pregnant, or chronically ill are at a greater risk of morbidity and mortality than other groups (4).

The virus encodes 4 different proteins that allow it to attach to the surface of the human cells and enter the cell via the human angiotensin-converting enzyme, whereafter the interaction starts a cytokine storm to bring out the symptoms (5). The main symptoms that patients contracted with COVID-19 are dry cough, fever, and tiredness. Other symptoms include shortness of breath, sputum production, myalgia, sore throat, and headache (6). Centers for Disease Control and Prevention (CDC) announced that some symptoms of COVID-19 require immediate medical attention (7). The patients having difficulty in breathing, persistent pain in the chest, bluish lips, or inability to arouse are encouraged to seek urgent medical intervention. Most of the time, symptoms do not appear in the first 2 days of exposure. The incubation period of COVID-19 is estimated to be between 2-14 days. However, an article published in JAMA reported a case with an incubation period of 19 days (8).

Coronaviruses can spread through ingestion or inhalation of respiratory droplets that are released to the environment by coughing or sneezing, or through contact with infected surfaces (9).

Currently, there are different diagnostic methods used in COVID-19: most prominent methods are reverse transcription-polymerase chain reaction (RT-PCR) and computed tomography (CT) scans (10). Although some studies suggest that oropharyngeal swabs can also be used in sample collection (11), the CDC recommends the usage of nasopharyngeal swabs (12). The collected samples are stored in 2-8°C for up to 72 hours before they are sent to be analyzed further. CT scans are not directly used as a diagnostic tool because of the high rate of misdiagnosis. Patients are diagnosed with ground glass opacities, interlobular septal thickening, and air bronchogram signs. A study by Li et al (13). reported that 88% of 919 patients had multiple lesions in both of the lungs with ground-glass opacities. Overall, the new coronavirus disease is usually diagnosed by RT-PCR and CT scans (14).

The virus can be isolated from many animals, but bats are accepted as the major natural coronavirus reservoir (15). Several studies found that animals, especially domestic animals (including pets) can be infected with the virus (15).

Medical staff has always been at risk of infective diseases because of the fact that they are in close contact with patients. As we know, COVID-19 can also transmitted from asymptomatic patients and this is multiplying the risk of getting infected (16). One patient in Wuhan who would undergo surgery had infected 14 health care workers which 12 of them was in close contact (17). These kinds of events and cases and the fact that we do not know much about COVID-19 are making the situation riskier and more stressful. We should not be forgetting the fact that medical students are also in close contact with patients too. Thus, having the true and enough knowledge about the pandemic process and the virus itself is important to their actions because with this way they can overcome the stress. Therefore, they are also at risk for infectious diseases. Even though The American Association of Medical Colleges (AAMC) advised medical schools to not to involve medical students in patient care (18, 19), some schools in the US and in Europe graduated their final-year medical students early because of workforce shortage (20) and some volunteer medical student teams were formed (21).

Keeping in mind that today's medical students are the foundation of the future healthcare system, it is important to assess their knowledge on COVID-19 as an example for future pandemics and public health safety issues. In one of the studies about COVID-19 knowledge among the Iranian medical students (5th-7th year), they found that the knowledge of the students is on a high level (21). These results are giving feedback about the worries which is the knowledge and stresses among the future health care workers. Despite the high level of knowledge about COVID-19 among Iranian medical students who participated in the study, self reported preventive behavior does not seem as good. This kind of information about the medical students can let us see country's future health systems. We also want to exa-

mine Turkish medical students' knowledge during this pandemic period. This study aims to evaluate the knowledge, thoughts and awareness of medical students about the COVID-19 pandemic.

MATERIAL AND METHODS

This study was approved by the Scientific Research Ethics Committee of Acıbadem University Medical Faculty (Protocol Code: ATADEK 2020-05/40). This descriptive study was carried out between April and May 2020. Individuals other than medical students were not included in the study. The study was conducted via a self-administrative online questionnaire in the Turkish language and delivered through scientific research communities of the medical schools. The participants were informed and their consent for participation was taken at the beginning of the questionnaire.

The questionnaire was prepared via Google Forms and consisted of 31 questions and five distinct sections. The first section contains the informed consent. The second section consisted of demographic questions: date of birth, gender, current year in university, and the name of the university. The third section was designed to assess the knowledge level of the participants on the COVID-19 pandemic. This section consisted of 14 questions (questions 5th-18th). The fourth and fifth sections were designed to investigate the attitude and behaviors of the students towards/during the pandemic. Section four consisted of 9 questions (questions 19th-27th) and the fifth section consisted of 4 questions (questions 28th-31nd). In the 3rd and 4th sections, checkboxes and multiple-choice questions were utilized; in the 5th section, linear scale questions were used.

Categorical variables are demonstrated as numbers and percentages, whereas continuous variables are presented as the minimum, maximum, and mean values. The IBM SPSS version 23 was used for the presentation of the data.

RESULTS

A total of 575 participants completed the questionnaire. The mean participant age was 21.7 ± 1.9 years (range: 17-33 years). Three hundred and eighty-three (66.6%) participants were female, 190 (33%) were male, and 2 (0.3%) did not declare their gender. All participants were undergraduate medical students. The distribution of grades is shown in Table 1. Students from 41 different universities participated in the questionnaire. The highest participation was from Trakya University with a rate of 31.3%.

According to questions, 301 (52.3%) participants knew about the coronaviridae family before the outbreak, and 223 (38.8%) were informed about COVID-19 by their universities. Five hundred and seventy-three (99.7%) students stated that the origin of the pandemic was China. Of the participants, 80% stated that droplet spread is the transmission route of COVID-19 (Table 2). When participants' opinion about the animal to human transmission was asked 310 (53.9%) students chose "transmittable" for this question, 174 (30.3%) chose "not transmittable" and 91 (15.8%) chose "I don't have any idea". In addition, human to pet transmission was not accepted by almost half of the participants [255 (44.3%)] and 90 (15.7%) participants didn't have any idea. Being older than 65 years old, having a comorbidity, being immunosuppressed or working in the healthcare sector were the most selected groups with the highest mortality and morbidity risk (Table 3). The most common opinion about the incubation period of SARS CoV-2 was 2 – 14 days (Table 4). Dry cough, high fever, and difficulty in breathing or shortness of breath were the main symptoms of SARS CoV-2 according to participants (Table 5). Distributions of answers to symptoms that require the emergency intervention of COVID-19 according to CDC are presented in Table 6. Answers to the epidemiologic history criteria are detailed in Table 7. General opinions about the parameters that are used to investigate COVID-19 diagnosis can be seen in Table 8. Nasopharyngeal swab (58.96%) followed by oropharyngeal swab (53.39%) were the most common answers to the question of which clinical samples can be used in the diagnosis (Table 9). Distribution of answers to the question about the importance of social isolation is detailed is detailed in Table 10.

More than half of the participants follow vaccine developments from social media [341 (59.30%)], radio and television (45.36%) (Table 11). Mask, gloves, cologne, and alcohol-based antiseptic solutions were the most common items used by students as a precaution (Table 12). According to 75.83% of the participants, all people should wear a mask in daily life (Table 13). Almost half of the participants wash their hands with water and soap 5-9 times a day and they spend 10-19 seconds per wash (Table 14-15). During the COVID-19 pandemic period, 56.0% of participants think that interns can be called for duty in a state of emergency. The most common lack of healthcare professionals working in Turkey during the COVID-19 pandemic was personal protective equipment (57.0%) according to participants (Table 16). Of the participants, 38.1% thought that they had a maximum of 20.0% risk of getting infected (Table 17). The most common answer (28.0%) to the risk of a family

member being infected was between 20-40% (Table 18).

Information pollution related to the pandemic, the social responsibility awareness of the student from the first case in Turkey, the disruption level of medical education was scored in the questionnaire. Whether there was a change in the departments they were planning to choose in specialization was questioned. The average score and standard deviation of the answers described in Table 19.

Table 1: Medical school grades' dispersion of the participants.

Grade	Number	Percentage (%)
Preparatory	1	0.17
1	191	33.21
2	128	22.26
3	102	17.73
4	59	10.26
5	74	12.86
6	20	3.47
Total	575	100

Table 2: Responses for the transmission route of the SARS CoV-2.

Route of Transmission	Number	Percentage (%)
Droplet Spread	460	80
Airborne	60	10.4
Direct Contact	43	7.5
Oral	7	1.2
Faecal–oral	4	0.7
I don't have any idea	1	0.2
Total	575	100

Table 3: Responses for the criteria to be in risk group for COVID-19.

Risk Group	Number	Percentage (%)
65+ age (year)	486	84.52
Comorbidity	485	84.35
Immunosuppressed patients	451	78.43
Healthcare workers	350	60.87
55-64 age (year)	209	36.35
Pregnant women	202	35.13
All of them	81	14.09
45-54 age (year)	54	9.39
0-19 age (year)	27	4.7
Other	16	2.78
20-44 age (year)	10	1.74
I don't have any idea	1	0.17
Total	575	100

(Participants were able to choose more than one option.)

Table 4: Responses for the incubation period of SARS CoV-2 (days).

Incubation Period	Number	Percentage (%)
0-1	1	0.2
2-14	520	90.4
15-21	23	4
I don't have any idea	31	5.4
Total	575	100

Table 5: Responses for the main symptoms of COVID-19.

Main Symptoms	Number	Percentage (%)
Having difficulty in breathing or shortness	529	92
High fever	521	90.61
Dry cough	499	86.78
Persistent pain or pressure in the chest	230	40
New confusion	79	13.74
Bluish lips or face	53	9.22
All of them	35	6.09
Sputum cough	31	5.39
Other	16	2.78
Total	575	100

(Participants were able to choose more than one option.)

Table 6: Responses for emergency symptoms of COVID-19.

Emergency Symptoms	Number	Percentage (%)
Having difficulty in breathing or shortness	494	85.91
Chronic fever	293	50.96
Persistent pain or pressure in the chest	205	35.65
New confusion	161	28
Bluish lips or face	155	26.96
Dry cough	86	14.96
I don't have any idea	44	7.65
All of them	13	2.26
Sputum cough	10	1.74
Other	4	0.7
Total	575	100

(Participants were able to choose more than one option.)

Table 7: Responses for epidemiologic history of COVID-19

Epidemiologic History	Number	Percentage (%)
All of them	430	74.78
Contact with a COVID-19 positive case	137	23.83
Travel to risky areas	132	22.96
Fever or respiratory tract symptoms and contact with a case came from a risky area	126	21.91
Contact with a case came from a risky area and 2 or more cases with fever/ respiratory tract symptoms in the close area (school, family, work etc.)	91	15.83
I don't have any idea	4	0.7
Other	1	0.17
Total	575	100

(Participants were able to choose more than one option.)

Table 8: Responses for the diagnostic parameters of COVID-19.

Diagnostic Parameters	Number	Percentage (%)
All of them	268	46.61
Clinical findings	260	45.22
Contact with a person with COVID-19 suspicion	251	43.65
PCR	223	38.78
Radiological examinations like tomography	175	30.43
Blood examinations like complete blood count, CRP	72	12.52
I don't have any idea	13	2.26
Other	1	0.17
Total	575	100

(Participants were able to choose more than one option.)

Table 9: Responses for the test samples of COVID-19.

Test Samples	Number	Percentage (%)
Nasopharyngeal swab	339	58.96
Oropharyngeal swab	307	53.39
Bronchoalveolar lavage	187	32.52
Phlegm	143	24.87
Tracheal aspiration	139	24.17
Nasopharyngeal wash/aspiration or nasal aspiration	136	23.65
I don't have any idea	119	20.7
All of them	38	6.61
Stool	18	3.13
Other	3	0.52
Total	575	100

(Participants were able to choose more than one option.)

Table 10: Responses for the importance of social isolation.

Social Isolation	Number	Percentage (%)
All of them	388	67.48
To prevent older people and people with chronic diseases from getting infected	159	27.65
To prevent healthy people from getting infected	128	22.26
To decrease the workload of healthcare centers	120	20.87
I don't have any idea	5	0.87
Other	3	0.52
Total	575	100

(Participants were able to choose more than one option.)

Table 11: Responses for following vaccine development.

Following Vaccine Development	Number	Percentage (%)
Social media	341	59.30
Radio and television	261	45.39
Popular science platforms	199	34.61
Scientific studies or meetings	154	26.78
I don't follow	100	17.39
Other	12	2.09
Total	575	100

(Participants were able to choose more than one option.)

Table 12: Precautions that the students take for themselves or the people around them.

Precautions	Number	Percentage (%)
Social isolation	410	71.3
Mask	369	64.17
Home ventilation	349	60.7
Cologne	332	57.74
Alcohol based antiseptic solutions	218	37.91
Gloves	214	37.22
All of them	156	27.13
Other	1	0.17
Total	575	100

(Participants were able to choose more than one option.)

Table 13: The distribution of answers to the question regarding the people who need to wear a mask in daily life.

People Who Need to Wear a Mask	Number	Percentage (%)
All people	436	75.83
Sick people	133	23.13
People with suspected disease	131	22.78
People in contact with sick people	121	21.04
Healthy people	15	2.61
Other	5	0.87
Total	575	100

(Participants were able to choose more than one option.)

Table 14: Daily frequency of hand-washing.

Daily Frequency of Hand-Washing	Number	Percentage (%)
0-4	62	10.78
5-9	269	46.78
10-14	189	32.86
15+	55	9.56
Total	575	100

Table 15: The average hand-washing times of the participants.

Average Hand-Washing Time (s)	Number	Percentage (%)
0-9	28	4.9
10-19	271	47.1
20-39	255	44.3
40-59	15	2.6
60+	6	1.0
Total	575	100

Table 16: The greatest lack of healthcare professionals.

Lack	Number	Percentage (%)
Personal protective equipment	328	57
Materials to treat patients, such as medication or ventilator	67	11.7
Motivation	67	11.7
No lack	72	12.5
Other	41	7.1
Total	575	100

Table 17: Perception of self-risk of being infected in current pandemic period.

Percentage of Risk (%)	Number	Percentage (%)
0-20	219	38.1
21-40	169	29.4
41-60	121	21
61-80	40	7
81-100	26	4.5
Total	575	100

Table 18: Perception of the risk of a family member being infected in current pandemic period.

Percentage of Risk (%)	Number	Percentage (%)
0-20	219	38.1
21-40	169	29.4
41-60	121	21
61-80	40	7
81-100	26	4.5
Total	575	100

Table 19: The average score and standart deviation of lineer scale questions.

Questions	Minimum-Maximum	Average Score	Standart Deviation
Information accuracy about the pandemic	1-5	3.98	0.96
The social responsibility awareness expected to occur from the first case in Turkey	1-5	3.82	1.21
Disruption level of medical education	1-5	4.64	0.73
Change in the department of the speciality planned	1-5	2.43	1.46

(Rated 1 to 5.)

DISCUSSION

Since the COVID-19 outbreak in December 2019, there has been a great concern among all the people in the world. The knowledge of and attitudes towards infectious diseases are very important for the health and safety of students (22). As healthcare workers, medical students are at higher risk for infectious diseases as well (23). In the future, in case of an epidemic/pandemic, today's medical students will be the healthcare professionals who are responsible for the care of the general public. Therefore, it is important to determine their knowledge, thoughts, and awareness about the COVID-19 pandemic.

In this study, 575 medical students from different medical schools in Turkey filled out an online survey, and results were evaluated descriptively. In our study, 52.3% of medical students who participated in this questionnaire had knowledge of coronaviridae family before the COVID-19 pandemic and 38.8 % were informed about the COVID-19 in their faculties. Similarly, Taghrir et al. (21) reported that 43.3% of medical students received education about COVID-19. These rates show that the majority of medical students have not been trained about COVID-19. Although most medical students may not be trained on this subject, 99.7% of the students stated that the first case was seen in China. In the study of Taghrir et al. (21), this rate was 91.7% which was lower than our study. COVID-19 was first detected in China presented as atypical pneumonia in December 2019 (2). It may mean that, in the pandemic period we live in, the vast majority of medical students are informed by their own means. Eighty percent of students stated that the droplet spread is the main transmission route, which was lower than Iranian medical students (21). COVID-19 is a viral infection that can spread through ingestion or inhalation of respiratory droplets (9). Of the students, 53.9% stated that SARS-CoV-2 can be transmitted from an infected animal to a non-infected person and 40% stated that it can be transmitted from an infected person to a non-infected pet. SARS-CoV-2 is thought to be primarily transmitted from bats to humans and is transmitted from person to person (24). There are not many studies or case reports indicating that the virus is transmitted from human to animal. However, the first case seen in an animal was the tiger in a zoo in the United States and the test was positive for SARS CoV-2 (25). Until this time, 2 dogs and 2 domestic cats have tested positive for SARS CoV-2. The common feature of these animals is that they live with infected owners (26).

Identifying the risk groups for COVID-19 is important to manage the outbreak and to take preventive measures. Although there are many guidelines suggesting different risk groups for the disease, they agree on the major ones such as 65+ age (year), comorbidities and immunosuppressed patients (27-29). The National Health Service (NHS) suggests two risk group categories: high risk (clinically extremely vulnerable) and moderate risk (clinically vulnerable) (27). The NHS includes people who are pregnant in the moderate risk group although a study done by Zhang et al. (29) reported the neonates of the infected women did not carry the SARS-CoV-2 infection. The prognosis for pregnant women was indifferent to the general public (29). Despite the different approaches, the medical students who participated in our study have a good level of knowledge according to their answers: 84.52% for people older than 65 years, 84.35% people with comorbidities, and 78.43% for immunosuppressed people being the most common risk groups.

The incubation period of SARS-CoV-2 is 2-14 days (29-31). However, an article published in JAMA reported a case with an incubation period of 19 days (8). 90.4% of the participants answered the question in accordance with the literature.

The main symptoms of COVID-19 are fever, cough, dyspnea, and headache (7, 32, 33). The participants showed good knowledge; 92% for dyspnea, 90.61% for high fever, and 86.78% for coughing. Nevertheless, there are many atypical symptoms to the SARS-CoV-2 infection and a certain percentage of the patients are asymptomatic and diagnosed via screening protocols (32-34). According to the study done by Kong et al. (32), asymptomatic patients had similar comorbidity ratios, but they were younger.

Emergency symptoms listed on CDC are trouble in breathing, persistent pain or pressure in the chest, new confusion, inability to wake or stay awake, and bluish lips or face (7). The participants' answers; 85.91% for dyspnea, 50.96% for high fever, and 35.65% for chest pain showed that they were somewhat aware of the emergency symptoms. People who experience any of the emergency symptoms are recommended to seek medical care as soon as possible and the guidance of medical students can play a role in timely referrals (7). Turkish Ministry of Health's guideline states a detailed patient history including travel to risky areas, contact with a COVID-19 positive case, fever or respiratory tract symptoms should be taken from potential COVID-19 patients (35). The Ministry of Health also developed an app called "Hayat Eve Sığar" (HES) (Stay at Home) which uses mobile phone signals to track possible contact with COVID-19 positive cases and inform the users of high-risk areas (36). The joint effort of the Ministry of Health and the media might be the reason that 74.78% of the participants answered in accordance with the guidelines.

Molecular assay testing is the accepted method of diagnosis for COVID-19 (36-38). Li et al. (38) showed that chest CT can be helpful as a rapid diagnostic method combined with patient history and clinical examination although the molecular assay is currently the only accepted method for the confirmation of the disease (39). The answers correlate with the literature; 91.83% said clinical findings, 85.39% said PCR, and 77.04% said radiological investigations such as CT scan would be helpful in the diagnosis.

The CDC guideline recommends the specimen to be collected by a healthcare provider from the nasopharynx or oropharynx (40). Participants answered in accordance with the guideline with 58.96% saying nasopharynx and 53.39% saying oropharynx. However, a study performed by Gu et al. (41) showed the virus could be isolated from the stool of a patient even after they are released from the hospital. 3.13% of the participants said a stool sample could be used in the diagnosis. On April 21st, the FDA authorized the first test with at-home sample collection which also allows the nasopharynx or oropharynx sampling (41).

Various limitations have been forced on society to contain the spread of the infection. Individuals are compelled to remain at home and to isolate socially (42). According to our results, the importance of social isolation is unignorable. 27.65% of the students think that social isolation is necessary to prevent older people and people with chronic diseases to get infected. While 128 students thought it was important to prevent healthy people from becoming infected, 120 students said it was important to reduce the workload of health institutions. The reason that the number of students who choose these options is very close, maybe due to the linear relationship between the workload of the health system and the infected people.

COVID-19 can be transmitted from infected people without symptoms and its ability to cause a pandemic in a couple of months suggests that control of it will be hard without a vaccine (43). Therefore, we asked medical students if they are following anything about vaccine development. 261 of medical students are following vaccine development via radio and television, while 341 of them are following only via social media. There are 100 students who do not follow any development.

This shows us that social media is an important way to be up to date among medical students.

Ağalar et al. (44) stated that patients should wear masks during the whole time they are at the hospital and there should be hand sanitizers at the hospital entrance, waiting rooms, etc. Considering the importance of precautions such as wearing masks and gloves, using alcohol-based antiseptic solutions and cologne, home ventilation, social isolation, 156 of the students stated that they had all of the precautions listed on the questionnaire. 410 students only isolated themselves. Because its easy to implement, social isolation is the most preferred precaution.

Four hundred thirty-six medical students think that all people should wear masks. Wearing medical masks could reduce infection risk by 30% (45). This indicates that most of the medical students are aware of the benefit of wearing a mask. 269 students out of 575 reported that they are washing their hands 5 to 9 times in a day. It takes 10-19 seconds to wash hands for 47.1% of the students, also for 44.3% of the students, washing hands takes 20-39 seconds. An average recomended time to wash hands is 20 seconds (46). Compared to our study, it can be said that most medical students know how long they should wash their hands. In addition, 56% of students think that only intern doctors should be called back to school in case of an emergency. It is thought that intern doctors are competent among medical students.

According to 57% of participants, the greatest lack of healthcare professionals working in Turkey during the COVID-19 pandemic period is personal protective equipments such as masks, gloves, and safety goggles. Given that all protective equipment come via a chain of events, it is a known fact that the COVID-19 pandemic has disrupted the healthcare supply chain worldwide with shortages of raw materials and dramatic increases in prices (47). 11.7% of participants were worried if healthcare professionals had enough materials such as medication or ventilators necessary for the treatment of COVID-19 patients. Only 12.5% of participants thought that healthcare professionals lacked nothing, but this number is the minority. Interestingly, the participants were not as concerned about getting infected as they were of healthcare equipment. 38.1% of participants think the risk of themselves being infected is only 0-20%. Only 4.5% of the patients thought their risk of being infected was 81-100%, but this ratio increased to 8% when they were asked about the risk of a family member being infected. This data suggests that the students are more concerned about their family members' health. This might be due to the fact that family members go to work and the work environment could be risky. Besides, the students might be concerned if their family members are as careful as them by taking the necessary precautions against the virus. A reason for this might be that college students, who are very exposed to social media were cognizant of all aspects of the COVID-19 pandemic, and therefore the majority had many concerns (48). All the participants of our survey were medical students, therefore different results might have been obtained from students studying another major. There is a significant data that health education specifically aimed at improving knowledge of COVID-19 can help them maintain an optimistic attitude (49). Since our participants might have known about COVID-19 more than an average person, their concern levels might have been different. On a scale of 1 to 5, the participants rated their thoughts on information pollution during the pandemic as an average of 3.98. Bastani et al. (49) suggests that increased demand for information during the crisis, the easiness of information dissemination via social networks, marketing incentives, and the poor legal supervision of online content are the main reasons for misinformation dissemination. The study explains "disease statistics, treatments, vaccines and medicines; prevention and protection methods; dietary recommendations and disease transmission ways are the main subjective categories of releasing misinformation in regard to novel coronavirus outbreak" (49). It is important to remember that misinformation dissemination regarding disease causes psychosocial consequences; anxiety and depression during the pandemic lead to somatic symptoms that in turn cause significant physical and mental discomfort (48).

Although many think that they received incorrect information sometimes, they rated their social responsibility awareness from the first case in Turkey an average of 3.82. The participants, who are all medical school students, scored their disruption level of medical education during the pandemic as 4.64. As Ferrel et al. (50) explains, the irreplaceable value of attending class in-person was hard to replicate in online forums, especially for medical students. When the participants were asked whether there was a change in the departments they were planning to choose in specialization, the rate was 2.43. This indicated that the majority of students did not have any particular interest change during the pandemic.

In our study, there were some significant limitations. One of them was that the questionnaire we conducted to students is online. With the online questionnaire, some marking problems have occurred. One of our other limitations was to deliver the survey to students. Therefore, further studies with more participants are needed in this regard.

In conclusion, the epidemiology and diagnostic factors of COVID-19 are mostly well known by the medical students. To minimize information pollution and raise awareness, medical students should be educated about pandemic and management of it. Further experiments with various methods and more participants are needed to better understand the awareness of the COVID-19 pandemic.

Ethics Committee Approval: This retrospective study was approved by the Scientific Research Ethics Committee of Acıbadem University School of Medicine

Informed Consent: Online informed consent was obtained from the participants of this study.

Conflict of Interest: The authors declared no conflict of interest.

Author contributions: Concept: HSÇ, AE, BK, BG, SK, BK, HOİ, NK, EŞ, EA, BT, AG, ATC, AUM, BB, EC, NKÇ, CE, MZD, SA, MŞ, SGG. Supervision: HSÇ, AE, BK, BG, SK, BK, HOİ, NK, EŞ, EA, BT, AG, ATC, AUM, BB, EC, NKÇ, CE, MZD, SA, MŞ, SGG. Resources: HSÇ, AE, BK, BG, SK, BK, HOİ, NK, EŞ, EA, BT, AG, ATC, AUM, BB, EC, NKÇ, CE, MZD, SA, MŞ, SGG. Materials: HSÇ, AE, BK, BG, SK, BK, HOİ, NK, EŞ, EA, BT, AG, ATC, AUM, BB, EC, NKÇ, CE, MZD, SA, MŞ, SGG. Data collection and/or processing: HSÇ, AE, BK, BG, SK, BK, HOİ, NK, EŞ, EA, BT, AG, ATC, AUM, BB, EC, NKÇ, CE, MZD, SA, MŞ, SGG. Analysis and/or Interpretation: HSÇ, AE, BK, BG, SK, BK, HOİ, NK, EŞ, EA, BT, AG, ATC, AUM, BB, EC, NKÇ, CE, MZD, SA, MŞ, SGG. Literature Search: HSÇ, AE, BK, BG, SK, BK, HOİ, NK, EŞ, EA, BT, AG, ATC, AUM, BB, EC, NKÇ, CE, MZD, SA, MŞ, SGG. Writing Manuscript: HSÇ, AE, BK, BG, SK, BK, HOİ, NK, EŞ, EA, BT, AG, ATC, AUM, BB, EC, NKÇ, CE, MZD, SA, MŞ, SGG. Critical Review: HSÇ, AE, BK, BG, SK, BK, HOİ, NK, EŞ, EA, BT, AG, ATC, AUM, BB, EC, NKÇ, CE, MZD, SA, MŞ, SGG.

Financial disclosure: The authors declared that this study received no financial support.

Editor-in-chief's Note: Sixteen authors of this article, Hilal Sena Çifcibaşı, Alperen Elibol, Berkay Kef, Bengisu Gür, Selin Kolsuz, Berra Kurtoğlu, Hasan Orkun İpsalalı, Nazlıcan Kükürtcü, Ece Şenyiğit, Ekin Altınbaş, Berfin Tan, Aslı Göztepe, Alperen Taha Certel, Arda Ulaş Mutlu, Burak Bardakçı, Elif Cengiz are members of the editorial board of Turkish Medical Student Journal. However, they did not take place in any stage on the editorial decision of the manuscript. The editors who evaluated this manuscript are from other institutions.

Acknowledgments: We would like to express our gratitude to Müberra Devrim Güner for her contributions to our article.

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