












Knowledge and attitude evaluation of physicians and nurses on COVID-19

 Hatice Ikiisik,  Merve Kirlangic,  Guven Turan,  Feyza Kutay Yilmaz,  Umut Karayalcin,  Sena Ekiz,  Mehmet Ali Arikan,  Fulya Buse Gungor,  Zeynep Sena Erakkaya,  Beyza Evirgen,  Isil Maral

Department of Public Health, Istanbul Medeniyet University Faculty of Medicine, Istanbul, Turkey

ABSTRACT

OBJECTIVE: This study aims to evaluate the knowledge, perceptions, and attitudes of physician faculty members, nurses, and medical students who work in a hospital in Istanbul regarding COVID-19.

METHODS: This cross-sectional study was conducted in a tertiary hospital from March 2 to March 10, 2020. The research data were collected through a survey consisting of 22 questions about their demographics and their level of knowledge, sources of information, actions, attitudes, and thoughts about COVID-19. The collected data were analyzed using SPSS 22.0.

RESULTS: Out of 1.460 people, 614 (42%) participated in this study. More than 60% of the participants correctly answered the information questions about COVID-19. 72.6% of the participants stated that the situation that would stress them out the most in case of a COVID-19 outbreak in Turkey would be the diagnosis of one of their family members with COVID-19. Social media (66.4%) was the primary source of information in this process.

CONCLUSION: The findings obtained in this study showed that right before the outbreak, healthcare professionals were concerned and stressed about the inadequacy of protective measures and the possibility of transmission, although they were ready for the outbreak in the professional sense.

Keywords: COVID-19; coronavirus; healthcare professional; information.

Cite this article as: Ikiisik H, Kirlangic M, Turan G, Kutay Yilmaz F, Karayalcin U, Ekiz S, et al. Knowledge and attitude evaluation of physicians and nurses on COVID-19. *North Clin Istanbul* 2021;8(1):15–23.

Threatening a large number of people worldwide, COVID-19 first appeared in the city of Wuhan in China in December 2019 [1]. SARS-CoV-2, a member of the coronavirus family, causes severe acute respiratory syndrome and has spread all worldwide, turning into a public health emergency [2, 3].

The level of public awareness on how to deal with infectious diseases is critical in controlling the spread of the infection. Healthcare professionals are on the front-lines in outbreak control with their superior efforts and have a critical role in this fight, which puts them at high

risk for infection [4, 5]. For this purpose, many organizations, especially the WHO, released training videos and materials in various languages to increase the level of knowledge and awareness of healthcare professionals regarding COVID-19 and improve their attitudes towards infection prevention [6].

Many international and national decisions have been made to prevent the spread of COVID-19 worldwide. In Turkey, the first case was reported by the Ministry of Health on March 11. Before and after the disease was declared as a pandemic by the World Health Organi-



Received: August 19, 2020 *Accepted:* November 05, 2020 *Online:* January 29, 2021

Correspondence: Hatice IKIISIK, MD. Istanbul Medeniyet Universitesi Tip Fakultesi, Halk Sagligi Anabilim Dalı, Istanbul, Turkey.
Tel: +90 216 280 33 33 e-mail: drhatice.ikiisik@gmail.com

© Copyright 2021 by Istanbul Provincial Directorate of Health - Available online at www.northclinist.com

zation, various studies were conducted to raise public awareness and create behavioral changes even in countries where no cases had been reported yet, such as Turkey. Similar efforts aiming to prevent the global spread of the disease are of strategic importance for the management and control of the outbreak [7]. Especially data on the knowledge and attitudes of healthcare professionals before the outbreak may be used to prepare targeted training sessions during the outbreak, reduce exposure, and guide the priorities of policymakers by determining key person-oriented points that can facilitate the control of the spread [4]. The purpose of this study, which was conducted a week before the first case was reported in Turkey, is to evaluate the knowledge, perceptions, and attitudes of physician faculty members, nurses, and medical students who work in a training hospital in Istanbul, the most populated city in Turkey, where there were no cases at the time, regarding COVID-19.

MATERIALS AND METHODS

This study was conducted from March 2 to March 10 in a 651-bed training and research hospital in the metropolitan city of Istanbul in Turkey. This study was a descriptive cross-sectional study. The research population consisted of physician faculty members, nurses, and fourth-, fifth-, and sixth-year medical students who were doing their internships in the hospital. At the time of this study, there were 1.460 people actively working in the hospital, including 410 physician faculty members, 602 nurses, 231 fourth-year medical students, 109 fifth-year medical students, and 108 sixth-year medical students. No sample group was selected from the research population as the entire universe was targeted. Intern nurses who were doing their internships in the hospital were not included in this study. A total of 614 people, including 251 physician faculty members, 209 nurses, 79 fourth-year medical students, 32 fifth-year medical students, and 43 sixth-year medical students, were reached.

The research data were collected using a 22-question survey consisting of two parts. In the first part, the demographics of participants (gender, age, occupation, department, years of professional practice), their sources of information on COVID-19, their opinions about the measures taken at the national level, their basic knowledge of COVID-19 [modes of transmission, sampling, use of personal protective equipment (PPE)], and their individual methods of protection were asked. In the second part, there were 23 propositions about COVID-19,

Highlight key points

- Two-thirds of the participants stated social media as a source of information about COVID-19.
- The symptoms of COVID-19, the need to isolate patients, and the mode of transmission are the most known facts. The lack of a COVID-19 vaccine, the use of PCR for diagnosis, and the need to take nasopharyngeal aspirate samples are the least known facts.
- "Inadequacy of protective measures," "Possibility of the transmission of COVID-19 from a patient in the hospital," and "Diagnosis of a family member with COVID-19" are the most common situations of stress among physicians and nurses.

and participants were asked to respond to these with either "Yes," "No," or "I don't know." The first 14 propositions aimed to evaluate their knowledge of COVID-19, while the remaining nine propositions aimed to probe their thoughts and perceptions.

Before this study, the permission of the Clinic Research Ethics Committee at the Goztepe Training and Research Hospital was obtained with the decision dated February 19, 2020, and numbered 2020/0132. Then, the permission of the training unit of the hospital was obtained to conduct the study on nurses, as well. The purpose of the study was explained to nurses and physician faculty members, and those who gave verbal consent were surveyed under observation. The surveys were sent to fourth-, fifth-, and sixth-year medical students through the social media group of which they were members, and they were conducted virtually.

The collected data were analyzed using SPSS 22.0. In addition to descriptive statistics (frequency, mean, standard deviation, highest value, lowest value), the chi-square test was used in statistical analyses to examine the relationship between variables. $P < 0.05$ was considered significant.

RESULTS

Six hundred fourteen people (response rate is 42%) participated in this study. 61.1% ($n=375$) of the participants were female, 33.1% ($n=203$) were married, 16.8% ($n=103$) had children, and 14.2% ($n=87$) had chronic diseases. The mean ages of nurses, physicians, and students were 29.7 ± 6.9 , 28.4 ± 2.6 , and 23.0 ± 1.3 , respectively. Some of the socio-demographic characteristics of the participants are shown in Table 1. The mean years of professional practice of nurses and physicians were 7.9 ± 7.5 and 3.7 ± 2.3 , respectively.

TABLE 1. Some socio-demographic characteristics of the physicians, nurses, and medical students in this study, March 2020

| Characteristics | % |
|--------------------------------------|------|
| Gender | |
| Female | 61.1 |
| Male | 38.9 |
| Marital status | |
| Married | 33.1 |
| Single | 66.9 |
| Parental status | |
| Yes | 16.8 |
| No | 83.2 |
| Chronic disease | |
| Yes | 14.2 |
| No | 85.8 |
| Occupation | |
| Physician faculty member | 40.9 |
| Nurse | 34 |
| Student | 25.1 |
| Departments of nurses and physicians | |
| Internal medicine | 51.1 |
| Surgical sciences | 37.6 |
| Emergency medicine | 9.1 |
| Basic sciences | 2.2 |

Source of Information

The most common sources from which physicians, nurses, and students obtained information about the COVID-19 pandemic were social media platforms, such as Twitter and Facebook (66.4%, n=408) and their colleagues (57%, n=350). The least preferred source was the CDC (Centers for Disease Control and Prevention) website (14.5%, n=350).

Knowledge of COVID-19

In this study, 94.3% (n=565) of 599 people who answered the question, “Which is the mode of transmission of COVID-19 according to current information?” said that COVID-19 was transmitted via droplets. Fourteen participants who marked the option “Other” stated that it was transmitted via “respiration” and “contact.” Fifteen participants did not answer this question.

Five hundred ninety-three participants answered the question about the sample to be used to test patients who meet the definition of case infected with COVID-19. 66.6% (n=395) said nasopharyngeal aspirate, while

21.9% (n=130) said blood. 11% (n=65) marked the option, “I don’t know.”

In this study, which was conducted right before the announcement of the first case, the participants were asked about the essential items of PPE for healthcare professionals who were to have close contact with suspected/confirmed COVID-19 cases. The most common answers were gloves (89.6%, n=550), N95/FFP2 masks (89.6%, n=550), gowns (78%, n=479), and alcohol-based hand sanitizers (73.8%, n=453). These answers were followed by goggles (62.4%, n=383), liquid soap (56.5%, n=347), medical masks (53.9%, n=331), and face shields (48.7%, n=299).

Among the responses of physicians, nurses, and students to propositions about COVID-19, the highest number of correct answers were given to questions about symptoms (97.9%, n=599). Thirty-seven participants did not answer the next 13 propositions. While 94.8% (n=547) of 577 people who answered these questions responded to the proposition “Infected individuals should be isolated” correctly, 93.2% (n=538) correctly responded to the proposition “The mortality rate is higher among those with comorbidities,” and 92.9% (n=536) correctly responded to the proposition “COVID-19 can be transmitted through close contact with infected individuals.”

When the responses to the questions about false propositions were analyzed, the findings showed that 69.7% (n=402) of the participants knew that the proposition “Flu vaccines provide protection against the COVID-19 infection” was false, while 74% (n=427) knew that the proposition “There is a definitive treatment for COVID-19” was false, and 50.4% (n=291) knew that the proposition “Healthy individuals can be protected with the COVID-19 vaccine” was false (Table 2).

The findings showed that 99.4% of the students, 96% of the physicians, and 88.3% of the nurses correctly answered the question about the mode of transmission of COVID-19 (p= 0.001). 80.5% of the physicians, 70.9% of the students, and 56% of the nurses knew that the proposition that flu vaccines provided protection against COVID-19 was false (p<0.001).

Attitudes and Behaviors Towards COVID-19

The findings showed that 86.5% (n=531) of the participants followed developments about the COVID-19 pandemic. 12.7% (n=78) of the participants stated that they were vaccinated against seasonal influenza this sea-

TABLE 2. The level of knowledge of COVID-19 by occupational group

| Information | Nurses % | Physicians % | Students % | Total* %* | p |
|--|-------------|-----------------|---------------|--------------|--------------|
| COVID-19 is transmitted via droplets according to current information | 88.3 | 96 | 99.4 | 94.3 | 0.001 |
| Nasopharyngeal aspirate samples should be used to test patients who meet the definition of case infected with COVID-19 | 58.3 | 76.3 | 62.3 | 66.6 | 0.000 |
| The symptoms of COVID-19 are fever, cough, and respiratory distress | 96.7 | 99.2 | 97.4 | 97.9 | 0.141 |
| The incubation period of COVID-19 is between 2 and 14 days | 63.2 | 84.9 | 76.9 | 75.4 | 0.000 |
| Flu vaccines provide protection against the COVID-19 infection | 56 | 80.5 | 70.9 | 69.7 | 0.000 |
| PCR testing can be used for diagnosis | 32.5 | 77.3 | 23.6 | 59.4 | 0.000 |
| Infected individuals should be isolated | 93.3 | 95.6 | 95.7 | 94.8 | 0.155 |
| Washing hands with soap and water for at least 30 seconds is useful in preventing transmission | 84.7 | 92.4 | 94.9 | 90.1 | 0.007 |
| There is a definitive treatment for COVID-19 | 60.8 | 81.7 | 81.2 | 74 | 0.000 |
| Healthy individuals can be protected with the COVID-19 vaccine | 37.8 | 62.5 | 47 | 50.4 | 0.000 |

*: Column percentages are given. Only those who answered the questions were analyzed.

TABLE 3. Methods of protection from the COVID-19 outbreak by occupational group

| | Nurses % | Physicians % | Students % | Total* %* | p |
|---|-------------|-----------------|---------------|--------------|------------------|
| How do you protect yourself from the COVID-19 outbreak? | | | | | |
| I wear masks in the hospital at all times. | 41.1 | 25.1 | 15.1 | 28.1 | <0.001 |
| I wash my hands more frequently. | 90.0 | 86.1 | 90.2 | 88.4 | 0.313 |

*: Column percentages are given. Only those who answered the questions were analyzed.

son, while 38.4% (n=236) of them stated that they were not vaccinated but thought about getting vaccinated.

When asked about their methods of protection against COVID-19, 88.3% (n=542) said, "I wash my hands more frequently," which was the most common answer. 65.3% (n=401) of the participants said they avoided close contact with people, while 60.7% (n=373) said they avoided crowded places, and 52% (n=319) said they used public transport less.

In this study, 41.1% (n=86) of the nurses stated that they would wear masks in the hospital at all times to protect themselves from the COVID-19 outbreak. As can be seen in Table 3, this rate was 25.1% (n=63) among physicians and 15.1% (n=23) among students (p<0.001).

The most common situation that would stress the participants out in case of a COVID-19 outbreak in Turkey was the diagnosis of one of their family members with COVID-19 (72.6%, n=446) (Table 4).

78.5% (n=164) of the nurses and 67.3% (n=169) of the physicians stated that the inadequacy of protective measures would stress them out in case of a COVID-19 outbreak, while 79.9% (n=167) of the nurses and 66.1% (n=166) of the physicians stated that the possibility of the transmission of COVID-19 from a patient in the hospital would stress them out in such a case (p=0.008; p=0.001). As can be seen in Figure 1, not knowing when the COVID-19 outbreak will be controlled and a lack of treatment were the causes of stress among 63.6% (n=133) and 77.5% (n=162) of the nurses and 47.8% (n=120) and 62.5% (n=157) of the physicians (p<0.001; p<0.001), respectively.

TABLE 4. Stressful situations during a potential COVID-19 outbreak by occupational group

| Potentially stressful situations | Occupation | | | p |
|--|-------------|----------------|--------------|------------------|
| | Nurses % | Physician % | Total* %* | |
| What would stress you out in case of a COVID-19 outbreak? | | | | |
| Inadequacy of protective measures | 78.5 | 67.3 | 72.4 | 0.008 |
| Possibility of the transmission of COVID-19 from a patient in the hospital | 79.9 | 66.1 | 72.4 | 0.001 |
| Not knowing when the COVID-19 outbreak will be brought under control | 63.6 | 47.8 | 55.0 | <0.001 |
| Lack of treatment | 77.5 | 62.5 | 69.3 | <0.001 |
| Diagnosis of one of my colleagues with COVID-19 | 65.6 | 62.5 | 63.9 | 0.505 |
| Diagnosis of one of my family members with COVID-19 | 72.2 | 72.5 | 72.4 | 0.950 |
| Having colleagues with symptoms similar to those of COVID-19 | 58.4 | 43.8 | 50.4 | 0.002 |
| Having symptoms similar to those of COVID-19 | 67.9 | 55.4 | 61.1 | 0.006 |
| Witnessing the death of a patient with COVID-19 | 59.3 | 50.6 | 54.6 | 0.061 |
| News about new cases in the media | 57.4 | 32.3 | 43.7 | <0.001 |
| Conflicts between my work ethics and protecting my own health | 45.5 | 29.9 | 37.0 | <0.001 |

*: Column percentages are given. Only those who answered the questions were analyzed.

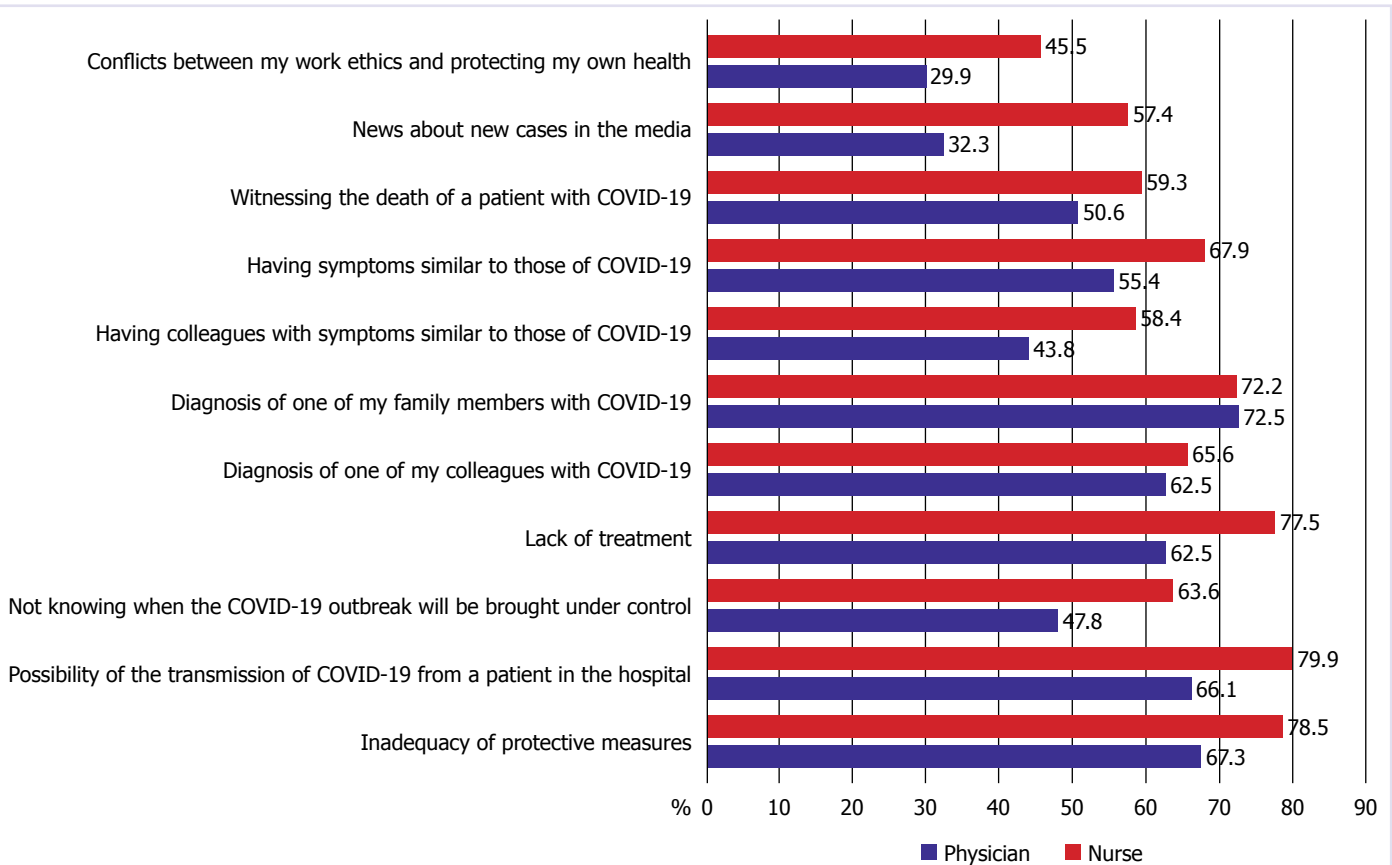


FIGURE 1. Stressful situations during a potential COVID-19 outbreak by occupational group.

TABLE 5. Some opinions of the participants about COVID-19 by occupation

| Opinions | Occupation | | | | p |
|---|-------------|----------------|---------------|--------------|--------------|
| | Nurses % | Physician % | Students % | Total* %* | |
| I do not think there is an outbreak of COVID-19 | 12.9 | 11.6 | 11.1 | 12 | 0.651 |
| I think COVID-19 is a biological weapon | 54.1 | 26.7 | 23.1 | 35.9 | 0.000 |
| I think SARS-CoV-2 is a virus created by pharmaceutical/vaccine companies | 40.2 | 16.7 | 11.1 | 24.1 | 0.000 |
| I think its progression is similar to that of seasonal influenza | 22 | 49.4 | 47.9 | 39.2 | 0.000 |

*: Column percentages are given. Only those who answered the questions were analyzed.

Opinions About COVID-19

As can be seen in Table 5, 54.1% of the nurses, 26.7% of the physicians, and 23.1% of the students thought that the causative agent of COVID-19 was a biological weapon ($p=0.000$). In addition, 40.2% of the nurses, 16.7% of the physicians, and 11.1% of the students thought that SARS-CoV-2 was a virus created by pharmaceutical or vaccine companies ($p=0.000$). 49.4% of the physicians, 47.9% of the students, and 22% of the nurses thought that its progression was similar to that of seasonal flu ($p=0.000$).

DISCUSSION

Due to several reasons, such as population growth, easy and rapid global transportation, and interventions in natural habitats, the risk of epidemic diseases has increased worldwide, and infectious diseases have started to appear more frequently.

The present study was conducted on three different groups, namely physician faculty members, nurses, and medical students. When assessing the responses to propositions, the findings showed that the knowledge of healthcare professionals on COVID-19 was generally sufficient. While the most well-known facts among the research population were the symptoms of COVID-19, the need to isolate patients and the mode of transmission, the least known facts were the lack of a COVID-19 vaccine, the use of PCR for diagnosis, and the need to take nasopharyngeal aspirate samples. In addition, it was found that physicians answered the questions about propositions relating to COVID-19 more accurately than nurses. Among studies evaluating the knowledge of healthcare professionals during the outbreak, the level of

knowledge of physicians was found to be higher in this study than in studies conducted not only on physicians and nurses but also on heterogeneous groups with less direct contact with patients, such as administrative staff, pharmacists, dentists, and technicians [5, 7, 8].

This study aimed to conduct a multi-dimensional evaluation of the existing knowledge of healthcare professionals of COVID-19, which has spread rapidly worldwide. Although the majority of participants correctly answered the questions about false propositions, some participants still claimed that there was a vaccine for COVID-19, that there was a definitive treatment for COVID-19, and that flu vaccines provided protection against COVID-19. It is unfortunate that there were gaps in the knowledge of healthcare professionals when the globally-destructive COVID-19 outbreak was dominating the headlines and it was only a matter of time before it affected Turkey. The lack of knowledge on topics, such as sampling or the use of PCR for diagnosis, indicates that the topics of infectious diseases and epidemics in the vocational education of physicians, nurses, and medical students need to be updated, although accurate and reliable information is easily and rapidly accessible. In addition, the education of healthcare professionals and the provision of different resources to them by policymakers are important elements for success in the fight against the outbreak. The first case was reported in Turkey on March 11. The "2019-nCoV Healthcare Professionals Guide" was published on January 24 before the outbreak began in Turkey [9]. When this study was conducted, which was a week before the first case was reported, the outbreak was rapidly becoming severe worldwide. It is vital to provide accurate and reliable information when preparing for an outbreak. Despite the uncertainty and

panic, the guides prepared by official health authorities can improve the knowledge of healthcare professionals who are on the frontlines of this battle, make it easier to keep track of updates and provide reliable and objective data. Only 36% (n=221) of the participants knew about the guide prepared for this purpose [10]. This rate increased when the first case was reported in Turkey.

Two-thirds of the participants stated social media as a source of information about COVID-19. It is worrying that social media, where unreliable and unverified information spreads rapidly, is the primary source of information for physicians, nurses, and medical students. Nearly half of these individuals (45%) also followed the official website of the Ministry of Health. Considering that the outbreak had not yet begun in Turkey when this study was conducted, some changes in these rates may be expected with the increasing role and visibility of the Ministry of Health during the outbreak. In a similar study conducted nearly a month after the first case was reported in Turkey, the rate of people who followed the website of the Ministry of Health was 64.6%. This result proves the increasing role of the Ministry of Health with the spread of COVID-19 to the country [11].

Individuals shape their beliefs about and attitudes towards protection and may encourage the development of positive behavior based on the information they obtain on health-related issues [12]. In this study, the participants were asked about methods of protection from the disease, and the most common answer was "washing hands more frequently" (88.3%). In a similar study that was conducted in the first week of the outbreak on methods of protection from the disease, the rates of these answers were over 90% [13]. The time between these studies is likely to have affected these rates. In addition, the existing knowledge of individuals can constitute a basis for the development of a strategy to deal with diseases and for the changes in their attitudes and behaviors towards protection [12]. It is inevitable for a global outbreak to result in an increase in levels of knowledge and awareness and a change in the attitudes and behaviors of individuals when it spreads to a country.

The effects of the outbreak on mental health may vary in different parts of the world [14]. Before the outbreak, the psychological preparation of society is as important as medical preparations. The anxiety, fear, stress, and depression experienced by healthcare professionals, who faced the risk of transmission due to the nature of their jobs, were evaluated in various studies [15–17].

In the present study, 12 situations that may cause stress in case of a COVID-19 outbreak were identified. The most common situations that caused stress among physicians and nurses were "Inadequacy of protective measures," "Possibility of the transmission of COVID-19 from a patient in the hospital," and "Diagnosis of a family member with COVID-19" (72.4%). The findings showed that the causes of stress for healthcare professionals were different during the phase of preparation for the outbreak when no cases had been reported yet. The uncertainty about the disease and the knowledge and experience of individuals may affect the levels of anxiety and stress. Protective measures, concerns about the transmission (to family members or colleagues), news in the media, a lack of treatment, and uncertainties relating to matters, such as when the outbreak, will end may affect the answers of individuals on psychological issues. Similar situations were asked in the form of propositions in a similar study in which Cai H. et al. [18] examined the psychological effects of COVID-19 on healthcare professionals in Hubei, China and their coping strategies for these effects. In this study, physicians and nurses were asked about similar stressful situations, and it was found that they were causes of stress for less than 70% of these individuals. Given that the levels of stress for each situation were higher in the study of Cai et al. than in ours may show the difference in the levels of stress in different phases of the outbreak, which may indicate that many factors, such as working conditions, measures taken at the national level and the reactions of society to the outbreak and the measures caused the levels of stress to be higher. The fact that COVID-19 is a potentially fatal disease that may be transmitted from person to person and is associated with high morbidity rates may intensify the sense of personal danger during the outbreak [19–21]. This situation should be evaluated again with new studies that show the levels of stress of healthcare professionals in Turkey during the outbreak.

The findings showed that stressful situations would cause more stress among nurses than among physicians in case of an outbreak. Similarly, in a study conducted on 1,257 healthcare professionals in 34 hospitals in China to examine the factors that affect the mental health of healthcare professionals during the outbreak, a significant portion of the participants had symptoms of anxiety, depression, and insomnia and that these symptoms were more common among nurses than among physicians [22]. Nurses who treat patients with COVID-19

are at a high risk of exposure due to their close and frequent contact with these patients [23, 24]. This risk in the professional life of nurses may cause higher levels of stress among nurses in both studies [15, 22, 25].

With the onset of the COVID-19 outbreak, many claims were made worldwide about the source of the virus. Claims that spread rapidly on the Internet were often discussed without questioning their accuracy. Some of the most common claims were that it was an artificial virus created in a laboratory by different countries, that it was a biological weapon, that it was a punishment from God, or that it was created by pharmaceutical companies [26–28]. Similarly, in this study one of the most common beliefs about COVID-19 was that it was a disease similar to seasonal influenza. The next most common belief was that it was a biological weapon and that it was created by pharmaceutical/vaccine companies. Although certain studies proved that the virus did not originate in a lab and even discussed potential sources of the virus, the negative effects of social media, which was the most common source of information for healthcare professionals, can be seen in their beliefs about the virus [29]. Internet users should question the source of the information they obtain. Misinformation is an important problem during public emergencies. It may lead to devastating consequences for health and the economy by creating panic, causing people to stockpile medical supplies or medicine, or worse, promoting potentially life-threatening malpractices.

In the last stage, approximately 40% of the participants found the information provided by the Ministry of Health sufficient, while 30% found the information provided by the hospital sufficient. Approximately half of the participants did not find the information provided by the hospital sufficient. In outbreak management, providing information about the issue should have the highest share among the preparations made before the outbreak. It is an important step to ensure that healthcare professionals feel safe as soldiers in the fight against the outbreak. Healthcare authorities should fulfill their responsibilities in this sense and provide support.

This study is a mass cross-sectional study conducted with healthcare professionals working in a tertiary hospital and with students. In that sense, it does not represent all medical students, nurses, and physician faculty members. The entire universe was not reached due to the intense work environment in the hospital, considering the period of the research, exams, shifts, and limited time to collect the data (8 days).

The prior knowledge and attitude of three different groups, namely physician faculty members, nurses, and medical students are evaluated within the scope of the research before the first COVID-19 case is seen in Turkey. This study will contribute to the literature by evaluating the outbreak preparations of the healthcare professionals (imperfect, wrong, deficient applications) and by shedding light on new research regarding outbreak management.

Conclusion and Recommendations

Considering that this study was conducted before the first case was reported, the use of masks was not considered to be as important as hand washing among methods of protection although physicians, nurses, and medical students, who are generally well-educated, have good knowledge of COVID-19 (including the symptoms, mode of transmission, diagnosis). Among the factors that could potentially have emerged when the pandemic started to affect the country, the most stressful factors were uncertainties, the inadequacy of protective measures, and the possibility of transmission. The fact that concerns about protection emerged before the outbreak, although these individuals were ready for the outbreak in the professional sense, should be considered by local and national health administrators when preparing for an outbreak. In addition, the advantages and disadvantages of the use of social media platforms as the main source of information should be assessed. This study is valuable since it evaluates the knowledge and perceptions of healthcare professionals and enables the analysis of the preparations before the outbreak as it was conducted a week before the first case was reported in Turkey. As the global COVID-19 threat and its effects continue to grow, our study provides a basis for monitoring the changes in the knowledge, attitudes, and behaviors of healthcare professionals.

Ethics Committee Approval: Istanbul Medeniyet University Goztepe Training and Research Hospital Clinical Research Ethics Committee granted approval for this study (date: 19.02.2020, number: 2020/0132).

Conflict of Interest: No conflict of interest was declared by the authors.

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

Authorship Contributions: Concept – HI, MK; Design – HI, MK; Supervision – HI, MK, GT, FKY; Fundings – HI, MK, GT, FKY; Data collection and/or processing – UK, SE, MAA, FBG, ZSE, BE; Analysis and/or interpretation – HI, MK, GT, FKY; Literature review – UK, SE, MAA, FBG, ZSE, BE; Writing – HI, MK, GT, FKY; Critical review – HI, IM.

REFERENCES

- Zhu N, Zhang D, Wang W, Li X, Yang B, Song J, et al; China Novel Coronavirus Investigating and Research Team. A Novel Coronavirus from Patients with Pneumonia in China, 2019. *N Engl J Med* 2020;382:727–33. [CrossRef]
- WHO/Europe/International Health Regulations. 2019-nCoV outbreak is an emergency of international concern. Available at: <https://www.euro.who.int/en/health-topics/health-emergencies/international-health-regulations/news/news/2020/2/2019-ncov-outbreak-is-an-emergency-of-international-concern#:~:text=2019%2DnCoV%20outbreak%20is%20an%20emergency%20of%20international%20concern,-AddThis%20Sharing%20Buttons&text=By%20declaring%20the%20outbreak%20a,risk%20of%20further%20international%20spread>. Accessed Dec 10, 2020.
- Cascella M, Rajnik M, Cuomo A, Dulebohn SC, Di Napoli R. Features, Evaluation, and Treatment of Coronavirus. 2020 Oct 4. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2020.
- Zhang M, Zhou M, Tang F, Wang Y, Nie H, Zhang L, You G. Knowledge, attitude, and practice regarding COVID-19 among healthcare workers in Henan, China. *J Hosp Infect* 2020;105:183–7. [CrossRef]
- Bhagavathula AS, Aldhaleei WA, Rahmani J, Mahabadi MA, Bandari DK. Knowledge and Perceptions of COVID-19 Among Health Care Workers: Cross-Sectional Study. *JMIR Public Health Surveill* 2020;6:e19160. [CrossRef]
- World Health Organization. COVID-19. Available at: <https://openwho.org/channels/covid-19>. Accessed Dec 10, 2020.
- Khader Y, Al Nsour M, Al-Batayneh OB, Saadeh R, Bashier H, Alfaqih M, et al. Dentists' Awareness, Perception, and Attitude Regarding COVID-19 and Infection Control: Cross-Sectional Study Among Jordanian Dentists. *JMIR Public Health Surveill* 2020;6:e18798.
- Moro M, Vigezzi GP, Capraro M, Biancardi A, Nizzero P, Signorelli C, et al. 2019-novel coronavirus survey: knowledge and attitudes of hospital staff of a large Italian teaching hospital. *Acta Biomed* 2020;91:29–34.
- Türk Tabipleri Birliği COVID-19 Danışma ve İzleme Kurulu. Türk Tabipleri Birliği Covid-19 Pandemisi İki Aylık Değerlendirme Raporu. Available at: <https://www.ttb.org.tr/userfiles/files/covid19-rapor.pdf>. Accessed Dec 10, 2020.
- Geldsetzer P. Use of Rapid Online Surveys to Assess People's Perceptions During Infectious Disease Outbreaks: A Cross-sectional Survey on COVID-19. *J Med Internet Res* 2020;22:e18790. [CrossRef]
- Aker S, Mıdık Ö. The Views of Medical Faculty Students in Turkey Concerning the COVID-19 Pandemic. *J Community Health* 2020;45:684–8. [CrossRef]
- McEachan R, Taylor N, Harrison R, Lawton R, Gardner P, Conner M. Meta-Analysis of the Reasoned Action Approach (RAA) to Understanding Health Behaviors. *Ann Behav Med* 2016;50:592–612.
- Taghrir MH, Borazjani R, Shiraly R. COVID-19 and Iranian Medical Students; A Survey on Their Related-Knowledge, Preventive Behaviors and Risk Perception. *Arch Iran Med* 2020;23:249–54. [CrossRef]
- Holmes EA, O'Connor RC, Perry VH, Tracey I, Wessely S, Arseneault L, et al. Multidisciplinary research priorities for the COVID-19 pandemic: a call for action for mental health science. *Lancet Psychiatry* 2020;7:547–60. [CrossRef]
- Pappa S, Ntella V, Giannakas T, Giannakoulis VG, Papoutsis E, Katsaounou P. Prevalence of depression, anxiety, and insomnia among healthcare workers during the COVID-19 pandemic: A systematic review and meta-analysis. *Brain Behav Immun* 2020;88:901–7. [CrossRef]
- Chew NWS, Lee GKH, Tan BYQ, Jing M, Goh Y, Ngiam NJH, et al. A multinational, multicentre study on the psychological outcomes and associated physical symptoms amongst healthcare workers during COVID-19 outbreak. *Brain Behav Immun* 2020;88:559–65. [CrossRef]
- Wang C, Pan R, Wan X, Tan Y, Xu L, Ho CS, et al. Immediate Psychological Responses and Associated Factors during the Initial Stage of the 2019 Coronavirus Disease (COVID-19) Epidemic among the General Population in China. *Int J Environ Res Public Health* 2020;17:1729.
- Cai H, Tu B, Ma J, Chen L, Fu L, Jiang Y, et al. Psychological Impact and Coping Strategies of Frontline Medical Staff in Hunan Between January and March 2020 During the Outbreak of Coronavirus Disease 2019 (COVID 19) in Hubei, China. *Med Sci Monit* 2020;26:e924171.
- Li Q, Guan X, Wu P, Wang X, Zhou L, Tong Y, et al. Early Transmission Dynamics in Wuhan, China, of Novel Coronavirus-Infected Pneumonia. *N Engl J Med* 2020;382:1199–207. [CrossRef]
- Rothe C, Schunk M, Sothmann P, Bretzel G, Froeschl G, Wallrauch C, et al. Transmission of 2019-nCoV Infection from an Asymptomatic Contact in Germany. *N Engl J Med* 2020;382:970–1. [CrossRef]
- Wang W, Tang J, Wei F. Updated understanding of the outbreak of 2019 novel coronavirus (2019-nCoV) in Wuhan, China. *J Med Virol* 2020;92:441–7. [CrossRef]
- Lai J, Ma S, Wang Y, Cai Z, Hu J, Wei N, Wu J, et al. Factors Associated With Mental Health Outcomes Among Health Care Workers Exposed to Coronavirus Disease 2019. *JAMA Netw Open* 2020;3:e203976.
- Li L, Cheng S, Gu J. SARS infection among health care workers in Beijing, China. *JAMA* 2003;290:2662–3. [CrossRef]
- Shih FJ, Gau ML, Kao CC, Yang CY, Lin YS, Liao YC, et al. Dying and caring on the edge: Taiwan's surviving nurses' reflections on taking care of patients with severe acute respiratory syndrome. *Appl Nurs Res* 2007;20:171–80. [CrossRef]
- Li Z, Ge J, Yang M, Feng J, Qiao M, Jiang R, et al. Vicarious traumatization in the general public, members, and non-members of medical teams aiding in COVID-19 control. *Brain Behav Immun* 2020;88:916–9.
- Olapegba PO, Ayandele O, Kolawole SO, Oguntayo R, Gandi JC, Dangiwa AL et al. A Preliminary Assessment of Novel Coronavirus (COVID-19) Knowledge and Perceptions in Nigeria. *MedRxiv* 2020 Apr 9, 2020 [Epub ahead of print], doi: 10.1101/2020.04.11.20061408.
- Abdelhafiz AS, Mohammed Z, Ibrahim ME, Ziady HH, Alorabi M, Ayyad M, et al. Knowledge, Perceptions, and Attitude of Egyptians Towards the Novel Coronavirus Disease (COVID-19). *J Community Health* 2020;45:881–90. [CrossRef]
- Egunjobi JP. The Perception of Covid-19 As A Fear Factor in The Preparation for the Pandemic Aftermath. *Apr* 2020, doi: 10.13140/RG.2.2.14933.17125.
- Andersen KG, Rambaut A, Lipkin WI, Holmes EC, Garry RF. The proximal origin of SARS-CoV-2. *Nat Med* 2020;26:450–2. [CrossRef]