ASSESSMENT OF KNOWLEDGE, ATTITUDES AND PRACTICES OF HEALTHCARE WORKERS IN TURKEY REGARDING CORONOVIRUS DISEASE-2019

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Abstract. Health care workers are at risk for acquiring Coronavirus disease-2019 (COVID-19). In this study we aimed to determine the knowledge, attitudes and practices (KAP) of healthcare workers in Turkey regarding COVID-19 in order to inform efforts to prevent COVID-19 infection in the study population. Study subjects were healthcare workers working at several different health care facilities in Ankara, Turkey. Each study subject was asked to complete a semi-structured sent to them by email or social media asking about their KAP regarding COVID-19. A total of 340 subjects were included in the study; 76.2% female. The mean (+standard deviation) age of study subjects was 28 (+8; range: 18-55) years. Thirty-six point five (36.5) percent of subjects worked with COVID-19 patients. Ninety-one point four (91.4) percent of subjects knew SARS-CoV-2 is spread through respiratory droplets. Ninety-one point two (91.2) percent of subjects obtained their information about COVID-19 from the Turkey Ministry of Health and 63.2% from the World Health Organization. All the participants (100%) stated they wore face masks, 98.2% stated they had regular good hand hygiene, 96.8% stated they had good respiratory hygiene (covering their mouth and nose with a piece of tissue paper when coughing or sneezing and disposing of the tissue appropriately) and 90.9% stated they had good surface and environment cleaning/disinfection practices. There were no significant differences in subject responses by gender except to the question, "Who is at greatest risk of contracting COVID-19?" in which the most common answer among female subjects was health care workers (52.1% of female subjects) and the most common answer among male subjects was the elderly (59.3% of male subjects) ($p<0.05$). The perceived risk of contracting COVID-19 (72.4%) was significantly greater ($p<0.05$) among physicians than other healthcare workers. In summary, our study subject overall COVID-19 knowledge level was good, the overall attitude level was only fair and the overall practices level was good. We conclude there is a need for an education program for study subjects to improve their KAPs regarding COVID-19. Further studies are needed after implementation of this program to determine its effect in the study population.

Keywords: COVID-19, healthcare worker, knowledge, attitudes, practices

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INTRODUCTION

The coronavirus disease-2019 (COVID-19) pandemic along with its social and economic impacts has strained global healthcare systems (WHO, 2020g; Ferrara and Albano, 2020; Nguyen *et al*, 2020). The COVID-19 pandemic has caused a strain on and frequently overwhelmed healthcare resources and healthcare workers (Ferrara and Albano, 2020). Healthcare workers have had to care for the COVID-19 patients without proper training or proper protective equipment but for the most part have risen to the challenge despite personal risk (Karlsson and Fraenkel, 2020). Healthcare workers are at increased risk of contracting COVID-19, have had to work long hours, have had psychological stress, have had to deal with fatigue, have increased risk of occupational burnout and have experienced the risk and stigma of contracting COVID-19 and spreading it to others (WHO, 2020b; Bagcchi, 2020; The Lancet, 2020; Nagesh and Chakraborty, 2020). Since the emergence of COVID-19, reports of infections and deaths among healthcare workers have occurred worldwide (WHO, 2020d; WHO, 2020e; Sikkema *et al*, 2020; Bahrs *et al*, 2020). Healthcare workers, in particular those in contact with and/or who care for COVID-19 patients, are at greater risk of contracting COVID-19 than the general population (WHO, 2020d). The WHO has reported 14% of COVID-19 cases occur among healthcare workers (WHO, 2020d). Other studies have reported healthcare workers comprise 3.8-19% of COVID-19 cases (CDC, 2020; Wu and McGoogan, 2020). It is important to understand the epidemiology and factors associated with COVID-19 among healthcare workers in order to reduce its incidence (WHO, 2020a). There are differences in the COVID-19 pandemic by region and country (TMA, 2020; Sikkema *et al*, 2020; Bahrs *et al*, 2020; Luo *et al*, 2020; Papagiannis *et al*, 2020). COVID-19 mortality and morbidity rates continue to rise among healthcare workers in Turkey (TMA, 2020; Akçakaya, 2021; Beyazadam and Alimoglu, 2020; Elbek, 2020). In Turkey, it is known that more and more healthcare workers are diagnosed with COVID-19 due to the patient density exceeding the capacity on the one hand, and insufficient personal protective equipment and regulations on the other (TMA, 2020). According to the information updated by the Ankara Medical office, as of 06 December 2020, 81 physicians, a total of 215 healthcare professionals, lost their lives due to

COVID-19 (TMA, 2020). There is limited data about the morbidity and mortality of COVID-19 among healthcare workers world-wide (WHO, 2020e).

Knowledge about a disease may influence healthcare worker attitudes and practices and an incorrect or inadequate knowledge may lead to incorrect attitudes and incorrect and inadequate practices regarding the disease, increasing their risk for infection. Understanding healthcare worker knowledge, attitudes, and practices (KAPs) regarding a disease may help to better understand healthcare worker behavior (Zhang *et al*, 2020) and possibly inform plans to reduce risk for that disease. Few studies have assessed healthcare worker KAPs regarding COVID-19 among healthcare workers in Turkey; these have been conducted primarily among dentists, some physician specialties and students studying to be healthcare workers (Şirin *et al*, 2021).

The aim of the present study was to evaluate the KAPs of healthcare workers regarding COVID-19 in Ankara, Turkey.

MATERIALS AND METHODS

Study design

This cross-sectional study was carried out among healthcare workers during 1-15 July 2020.

Study population, study instrument development and sample size

This study consisted of a survey conducted among healthcare workers with the potential for direct or indirect exposure to COVID-19 patients or infectious materials. The healthcare workers included in this study were physicians, nurses, physiotherapists, health technicians, emergency medical technicians, midwives, anesthesia technicians, pharmacists and support personnel.

Inclusion criteria for study subjects were: residing in Ankara, Turkey and being willing to participate in the study. The exclusion criterion was failure to complete the questionnaire.

Data collection was carried out through an online questionnaire. The questions were prepared using a combination of a pretested, structured WHO rapid qualitative assessment tool for COVID-19 (WHO, 2020c) and WHO COVID-19 guidelines for healthcare professionals (WHO, 2020e). The questionnaire was translated into Turkish by an English teacher to verify the questions were translated correctly and pre-tested on 30 healthcare workers not included in the study. The questionnaire was sent by email and internet messaging to study subjects. Questions were divided into three parts: knowledge, attitudes and practices.

There were 3 knowledge items on the survey adapted from the WHO COVID-19 interactive skills training for health workers. These items had yes or no responses.

There were 4 attitude items on the survey. These were of 2 types: items with responses based on a 3-point Likert scale with no or none resulting in 1 point and yes or many resulting in 3 points. The other items had yes or no responses.

There were 6 practices questions with responses based on a 4-point Likert scale with no or none resulting in 1 point and yes or many resulting in 4 points.

The minimum sample size required for the study was determined using the Cochran formula (Cochran, 1977):

$$n_0 = \frac{Z^2 pq}{e^2}$$

where n is the sample size, Z is the standard normal Z-table with a 95% confidence interval being 1.96, p is the assumed exposure level of 50% and d is the margin of error of 5%, giving the following equation:

$$N= ((1.96)^2 (0.5) (0.5) / (0.05)^2) = 384.$$

We sent the questionnaire to 384 healthcare workers; 88.5% (n = 340) completed the questionnaire so we did not reach the minimum number of study subjects required.

Study subjects were selected through purposive and snowball sampling.

Data analysis

Data analysis was conducted using the Statistical Package for the Social Sciences, version 21 (IBM Corp, Armonk, NY). Descriptive statistics were calculated as frequencies and percentages. A p-value <0.05 was considered statistically significant. The relationships among categorical variables were analyzed using the Chi-square test.

Ethical considerations

Informed consent was obtained from each subject online prior to being included in the study. Ethical approval for this study was obtained from the Ankara, Gazi University Scientific Research and Publication Ethics Committee (IRB No. 2020-278002; 21.05.2020).

RESULTS

A total of 340 subjects were included in the study, 76.2% female. The mean (+standard deviation) age of study subjects was 28 (+8; range: 18-55) years. Of the 340 subjects, 125 (36.8%) were nurses, 79 (23.2%) were physiotherapists, 50 (14.7%) were health technicians, 29 (8.5%) were doctors, 11 (3.2%) were midwives, 4 (1.2%) were anesthesia technicians, 4 (1.2%) were support team members and 3 (0.9%) were pharmacists. 36.5% of subjects worked with COVID-19 patients (Table 1).

Regarding knowledge about the modes of COVID-19 transmission, 91.4% of subjects knew the SARS-CoV-2 virus is transmitted through respiratory droplets, 84.4% knew the virus could be transmitted by contact with contaminated objects/ surfaces and 57.6% knew the virus was aerosol transmitted. Forty-three point

eight (43.8) percent of subjects believed the virus could be transmitted by consuming contaminated food or water, 30.5% believed the virus could be transmitted by contact with infected animals, 19.7% believed the virus could be transmitted by blood transfusion and 6.1% believed the virus could be transmitted by mosquito bite (Table 2). The groups with the most correct answers regarding modes of transmission were nurses (41.4%) and midwives (40.7%) (Table 3).

Table 1

Demographic characteristics of study subjects (N = 340)

Characteristics	*n* (%)
Gender	
Female	259 (76.2)
Male	81 (23.8)
Age in years	
18-30	241 (70.9)
31-45	88 (25.9)
>45	11 (3.2)
Occupation	
Nurse	125 (36.8)
Physiotherapist	79 (23.2)
Health technician	50 (14.7)
Emergency medicine technician	35 (10.3)
Doctor	29 (8.5)
Midwife	11 (3.2)
Anesthesia technician	4 (1.2)
Support team	4 (1.2)
Pharmacist	3 (0.9)
Working with COVID-19 patients	
Yes	124 (36.5)
No	216 (63.5)

Table 2

Knowledge about COVID-19 among study subjects (N = 340)

Knowledge items	*n* (%)
How is COVID-19 transmitted?	
By droplets from infected people[a]	311 (91.4)
Touching contaminated objects/surfaces[a]	287 (84.4)
Airborne route	196 (57.6)
By contaminated food/water	149 (43.8)
By contact with contaminated animals	104 (30.5)
By blood transfusion	67 (19.7)
By mosquito bite	21 (6.1)
What are the main symptoms of COVID-19?	
Fever[b]	336 (98.8)
Dyspnea[b]	334 (98.2)
Cough[b]	328 (96.4)
Myalgia[c]	187 (55.0)
Headache[c]	185 (54.4)
Diarrhea[c]	175 (51.4)
No symptoms	23 (6.7)
Where did you get your information about COVID-19?	
Turkey Ministry of Health	310 (91.2)
World Health Organization	215 (63.2)
Internet search	169 (49.7)
Television	163 (47.9)
University/hospital	145 (42.6)
US CDC	60 (17.6)
Radio	15 (4.4)
I did not research	3 (0.9)

a: correct answer (WHO, 2020f); b: common symptoms; c: uncommon symptoms

COVID-19: coronavirus disease 2019; US CDC: The United States Centers for Disease Control and Prevention

Table 3

Study subject responses about how COVID-19 is transmitted by occupation (N = 340)

Responses	Occupation						
	Physiotherapist	Physicians	Nurse and midwives	Health technicians	Support persons	Pharmacists	Total
	n (%)	*n* (%)	*n* (%)	*n* (%)	*n* (%)	*n* (%)	*n* (%)
Blood transfusion	23 (34.3)	4 (6.0)	22 (32.8)	17 (25.3)	0 (0.0)	1 (1.0)	67 (19.7)
Droplets from infected people*	71 (22.8)	29 (9.3)	128 (41.1)	76 (24.4)	4 (1.3)	3 (1.0)	311 (91.4)
Airborne route	47 (24.0)	10 (5.1)	84 (42.9)	50 (25.5)	4 (2.0)	1 (0.5)	196 (57.6)
Touching contaminated objects/surfaces*	63 (22.0)	26 (9.1)	117 (40.7)	75 (26.1)	3 (1.0)	3 (1.0)	287 (84.4)
Contact with contaminated animals	23 (22.1)	7 (6.7)	46 (44.2)	24 (23.1)	0 (0.0)	0 (0.0)	100 (29.4)
Mosquito bite	4 (19.0)	1 (4.8)	7 (33.3)	7 (33.3)	0 (0.0)	0 (0.0)	19 (5.5)
Contaminated food/ water	31 (20.8)	9 (6.0)	65 (43.6)	38 (25.4)	0 (0.0)	0 (0.0)	143 (42.0)

*Indicates the correct answer (WHO, 2020f)

COVID-19: coronavirus disease 2019

Regarding the knowledge about the symptoms of COVID-19, 98.8% answered fever, 98.2% answered dyspnea, 96.4% answered cough, 55.0% answered myalgia, 54.4% answered headaches and 51.4% answered diarrhea (Table 2). When subjects were asked about where they obtained their information about COVID-19, 91.2% answered the Turkish Ministry of Health, 63.2% answered the WHO, 49.7% answered by internet searches or YouTube videos, 47.9% answered the television, 42.6% answered the hospital or university and 17.6% answered the US Centers for Disease Control and Prevention (Table 2). There were no significant differences in answers by gender, age or occupation.

Regarding subject attitudes about COVID-19, 60.5% felt it was "very dangerous", 34.7% stated "more or less dangerous" and 1.7% stated "not dangerous". When asked if the subject felt they were likely to contract COVID-19, 33.8% answered "Yes", 14.1% answered "No" and 52.0% answered "don't know". Almost all (99.4%) of subjects believed it was important to prevent the spread of COVID-19. About one-half (48.8%) of subjects felt the group with the greatest risk for contracting COVID-19 was healthcare workers and 46.7% felt it was the elderly (Table 4).

Regarding practices, all the subjects stated they wore facemasks, 98.2% stated they washed their hands as recommended, 96.8% stated they covered their nose and mouth with tissue paper when coughing or sneezing and disposed of the tissue correctly, 90.9% stated they cleaned and disinfected surfaces in the environment, 49.1% stated they cooked their food adequately and 37.3% stated they avoided contact with animals (Table 5).

Female subjects (52.1%) were significantly (p<0.05) more likely to feel healthcare workers were the greatest risk group for contracting COVID-19 while male subjects (59.3%) felt the elderly were the greatest risk group (Table 6). Furthermore, the participants' age was significantly associated with knowledge and skills regarding COVID-19 (p<0.001). While 64.6% of the participants over the age of >25 stated that they are fully prepared and competent for their jobs, 42.7% of the participants between the ages of 18-25 think that they are more or less competent in their job (Table 7). Physicians (72.4%) were the occupation group who felt they were significantly (p<0.05) more likely to contract COVID-19 than any of the other groups (Table 8).

DISCUSSION

Healthcare workers are at increased risk of contracting COVID-19 (Bandyopadhyay *et al*, 2020; Du *et al*, 2021; Sikkema *et al*, 2020; Nguyen *et al*, 2020; Zheng *et al*, 2020). It is important to understand how SARS-CoV-2 is spread in order to develop measures to prevent this (WHO, 2020f).

In our study, study subject knowledge about the actual transmission modes of

COVID-19 appeared to be fairly good, similar to the finding of other studies (Saqlain *et al*, 2020; Olum *et al*, 2020; Huynh *et al*, 2020; Tamang *et al*, 2020). However, our subjects also believed COVID-19 was spread by food, water, contact with animals, blood transfusions and mosquito bites, indicating subject

Table 4

Attitudes about COVID-19 among study subjects (N = 340)

Item	*n* (%)
How dangerous do you think COVID-19 is?	
Very dangerous	206 (60.5)
More or less dangerous	118 (34.7)
Not dangerous	6 (1.7)
Other	10 (2.9)
Who do you think is at greatest risk of getting COVID-19?	
Healthcare workers*	166 (48.8)
Elderly persons*	159 (46.7)
Adults	11 (3.2)
Youths	2 (0.5)
Pregnant women*	2 (0.5)
Do you think you are likely to become sick with COVID-19?	
Yes	115 (33.8)
No	48 (14.1)
Don´t know	177 (52.0)
Do you consider it important to take action to prevent the spread of COVID-19 in your community?	
Yes	338 (99.4)
No	0 (0.0)
Don´t know	2 (0.6)

*Indicates the correct answer

COVID-19: Coronavirus disease 2019

Table 5

Study subject COVID-19 prevention practices (N = 340)

Preventive practices	*n* (%)
Hand hygiene	
Always, as recommended	334 (98.2)
Most of the time	6 (1.8)
Occasionally	0 (0.0)
Rarely	0 (0.0)
Cleaning and disinfection	
Always, as recommended	309 (90.9)
Most of the time	31 (9.1)
Occasionally	0 (0.0)
Rarely	0 (0.0)
Use of masks	
Always, as recommended	340 (100.0)
Most of the time	0 (0.0)
Occasionally	0 (0.0)
Rarely	0 (0.0)
Respiratory hygiene*	
Always, as recommended	329 (96.8)
Most of the time	11(3.2)
Occasionally	0 (0.0)
Rarely	0 (0.0)
Proper cooking of foods	
Always, as recommended	167 (49.2)
Most of the time	173 (50.8)
Occasionally	0 (0.0)
Rarely	0 (0.0)

Table 5 (cont)

Preventive practices	*n* (%)
Avoiding contact with animals	
Always, as recommended	127 (37.4)
Most of the time	213 (62.6)
Occasionally	0 (0.0)
Rarely	0 (0.0)

*Covering the mouth and nose with a tissue when coughing and sneezing and disposing of the tissue correctly

COVID-19: Coronavirus disease 2019

knowledge needs to improve. This shows the need for COVID-19 education for healthcare workers (WHO, 2020f). In our study, the occupations with the most correct answers regarding COVID-19 transmission were nurses and midwives, similar to the findings of a study from northern Ethiopia (Tadesse *et al*, 2020).

In our study, subject knowledge about the symptoms of COVID-19 was good, similar to the findings of previous studies (Saqlain *et al*, 2020; Olum *et al*, 2020; Huynh *et al*, 2020; Tamang *et al*, 2020). About half our subjects were aware diarrhea can be a symptom of COVID-19, similar to the findings of other studies (Olum *et al*, 2020; Bhagavathula *et al*, 2020). It is important for healthcare professionals to be aware of this less common symptom in order to improve chances of identifying patients with COVID-19 (Schmulson *et al*, 2020).

People are more likely to believe and share information if it comes from a source they trust. Therefore, it is important to assess a reliable source (SSHAP, 2020). Most of our study subjects used the Turkey Ministry of Health website as their primary source for information about COVID-19, similar to the findings of a study from the United Arab Emirates (Bhagavathula *et al*, 2020). Our findings show the importance of having accurate, up to date government websites. Preferred social media platforms vary by region, demographics and the constantly changing information-seeking practices of individuals (SSHAP, 2020). In our study, about half our subjects obtained their information through the internet or from television. This shows that need for governments, professional agencies and public health departments to use these modes of communication (SSHAP, 2020).

Table 6

Study subject gender and attitudes (N = 340)

Item	Sex		*p*-value
	Female, *n* (%)	Male, *n* (%)	
How would you rate your knowledge and skills regarding COVID-19?			
Fully prepared and competent	118 (45.6)	43 (53.1)	0.069
More or less competent	100 (38.6)	29 (35.8)	
Inadequate	28 (10.8)	2 (2.5)	
I am not involved in COVID-19 intervention	13 (5.0)	7 (8.6)	
How dangerous do you think COVID-19 is?			
Very dangerous	156 (60.2)	50 (61.7)	0.063
More or less dangerous	95 (36.7)	23 (28.4)	
Not dangerous	3 (1.2)	3 (3.7)	
Other	5 (1.9)	5 (6.2)	
Who do you think is at greatest risk of getting COVID-19?			
Health workers	135 (52.1)	31 (38.3)	0.032
Elderly persons	111 (42.9)	48 (59.3)	
Other	13 (5.0)	2 (2.4)	

Table 6 (cont)

Item	Sex		*p*-value
	Female, *n* (%)	Male, *n* (%)	
Do you think you are likely to become sick with COVID-19?			
Yes	83 (32.0)	32 (39.5)	0.390
No	36 (13.9)	12 (14.8)	
Don´t know	140 (54.1)	37 (45.7)	
Do you consider it important to take action to prevent the spread of COVID-19 in your community?			
Yes	258 (99.6)	80 (98.8)	0.383
Don´t know	1 (4.0)	1 (1.2)	

COVID-19: Coronavirus disease 2019

Table 7

Attitude responses of study subjects by age group (N = 340)

Items	Age 18-25 years *n* (%)	Age >25 years *n* (%)	*p*-value
How dangerous do you think COVID-19 is?			
Very dangerous	143 (59.3)	63 (63.6)	0.357
More or less dangerous	89 (36.9)	29 (29.3)	
Not dangerous	3 (1.2)	3 (3.0)	
Other	6 (2.5)	4 (4.0)	

Table 7 (cont)

Items	Age 18-25 years *n* (%)	Age >25 years *n* (%)	*p*-value
Who do you think is at greatest risk of getting COVID-19?			
Health workers	119 (49.4)	47 (47.5)	0.310
Elderly persons	114 (47.3)	45 (45.5)	
Other	8 (3.3)	7 (7.1)	
Do you think you are likely to become sick with COVID-19?			
Yes	76 (31.5)	39 (39.4)	0.278
No	33 (13.7)	15 (15.2)	
Don´t know	132 (54.8)	45 (45.5)	
Do you consider it important to take action to prevent the spread of COVID-19 in your community?			
Yes	239 (99.2)	99 (100.0)	0.363
Don´t know	2 (0.8)	0 (0.0)	
How would you rate your knowledge and skills regarding COVID-19?			
Fully prepared and competent	97 (40.2)	64 (64.6)	0.000
More or less competent	103 (42.7)	26 (26.3)	
Inadequate	23 (9.5)	7 (7.1)	
I am not involved with COVID-19 patients	18 (7.5)	2 (2.0)	

COVID-19: Coronavirus disease 2019

Table 8

Relationship between subject occupation and perceived risk of contracting COVID-19 (N = 340)

Occupation	Do you think you are likely to become sick with COVID-19?			*p*-value
	Yes	No	Don't know	
Emergency medical technician	8 (22.9)	4 (11.4)	23 (65.7)	<0.001
Midwife	2 (18.2)	0 (0.0)	9 (81.8)	
Physiotherapist	20 (25.3)	13 (16.5)	46 (58.2)	
Doctor	21 (72.4)	2 (6.9)	6 (20.7)	
Nurse	45 (36.0)	21 (16.8)	59 (47.2)	
Health technician	12 (24.0)	8 (16.0)	30 (60.0)	
Other	7 (63.6)	0 (0.0)	4 (36.4)	

COVID-19: Coronavirus disease 2019

In our study, about a third of subjects were unaware of the potential severity of COVID-19, half felt they were at increased risk for contracting COVID-19 while half did not know their risk of contracting COVID-19. A study from China reported 85% of subjects interviewed were afraid of contracting COVID-19 (Zhang *et al*, 2020). A study from Iran among healthcare workers found 92% of subjects were afraid of contracting COVID-19 and transmitting it to their families (Maleki *et al*, 2020). Another study reported in spite of having high knowledge levels, subjects were afraid and considered themselves as a high risk for contracting COVID-19 (Abdel Wahed *et al*, 2020).

In our study, many subjects had knowledge gaps regarding COVID-19. This can influence attitudes and practices affecting public health control measures (Cawcutt *et al*, 2020). Health authorities need to be aware of healthcare worker perceived risks in order to reduce risk and anxiety among those workers (Nabe-Nielsen *et al*, 2020; Moradzadeh *et al*, 2020).

In our study, although subjects had only fair attitude levels, most had good practice levels because the practices used to reduce COVID-19 risk the same practices used to prevent other diseases, such as using personal protective equipment, hand hygiene and masks (WHO, 2020e; WHO, 2021)

which reduce the risk of contracting other respiratory infections (Huynh *et al*, 2020; Limbu *et al*, 2020).

In our study, older workers were significantly more likely to have a better knowledge and better practices regarding COVID-19 and its prevention. This could be because older workers were more likely to know how to improve their knowledge and apply it at work resulting in better disease prevention confidence which can result in a more positive attitude (Limbu *et al*, 2020) as seen in a study from Egypt (Abdel Wahed *et al*, 2020).

In our study, subject gender affected their belief about risk for contracting COVID-19: males stating the elderly were at greater risk and females stating healthcare workers were at greater risk. Other studies have reported females perceived health care workers to be at greater risk of contracting COVID-19 (Galasso *et al*, 2020; Yesilgul *et al*, 2018; Bostan *et al*, 2020). It is unclear what the reason for this difference is. It could be due to biological or psychological differences (Huang *et al*, 2021). The large percentage of doctors who viewed themselves at increased risk for contracting COVID-19 could be due to their involvement in the treatment of COVID-19 patients (Johnson and Butcher, 2021).

Our study had limitations. It was conducted at the beginning of the COVID-19 pandemic in Turkey, possibly explaining the deficiencies in knowledge and practices among study subjects. All our subjects were from one province, so the findings cannot be applied to other parts of Turkey.

In summary, our study subject overall COVID-19 knowledge level was good, the overall attitude level was only fair and the overall practices level was good. We conclude there is a need for an education program for study subjects to improve their KAP regarding COVID-19. Further studies are needed after implementation of this program to determine its effect in the study population.

CONFLICT OF INTEREST DISCLOSURE

The author declares no conflict of interests.

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