

Knowledge, Attitude, Practice of Iranian Physicians about COVID-19 in Iran

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ABSTRACT

As a result of the global crisis caused by the coronavirus outbreak in late December 2019, Iran was also severely affected. The three provinces of Tehran, Mazandaran, and Gilan were high-risk cities exposed to infection and grievously damaged. Therefore, we decided to look at the level of knowledge, depth of attitude, and quality of physicians' practice in these three provinces. The most significant goal was to assess the level of KAP relative to the COVID-19 virus to provide comprehensive information to identify the strengths and weaknesses of the treatment staff to better cope and more effectively prevent and control critical situations. For research methodology, a cross-sectional study was performed on a sample of 300 people using a self-made questionnaire. An online questionnaire via virtual networks and a paper questionnaire were also distributed by the principal author in medical hospitals, which included four sections: demographic information, knowledge, attitude, and practice. Cronbach's alpha confirmed the validity and reliability of each component. The final results prove that the knowledge of physicians was acceptable and significant at the level of 0.05. Physicians' attitudes showed a level of fear and anxiety that was significant according to a one-sample t-test and chi-square (Sig <0.05). In order to rank the physicians' practice, a T-test was used, and the results of the Friedman test in the first stage of the Chi-square test showed that the significance level is 0.05. Looking at the research results, it can be said that the development of educational programs can have a beneficial effect in increasing physicians' knowledge and controlling the disease as effectively as possible. Also, due to the attitude associated with stress and fear, it can be seen that providing laboratory and treatment equipment has been one of the concerns of physicians.

Keywords: Knowledge- Attitude- Practice- COVID-19- Iranian Physicians

INTRODUCTION

Corona Virus 2019 (COVID-19) is a disease caused by the Acute Respiratory Syndrome called Coronavirus 2 (SARS-CoV-2)(1). SARS-CoV-2, which can lead to infections ranging from the common cold to more severe illnesses, such as Middle East Respiratory Syndrome (MERS-CoV) and Acute Respiratory Syndrome (SARS)(2).

The main symptoms of COVID-19 in the early stages are fever above 40 ° C, dry cough, and shortness of breath(3, 4). In late January 2020, the World Health Organization (WHO) called for a joint effort by all countries to prevent its rapid spread, declaring it a "global epidemic"(5).

Despite national efforts to combat the spread of the disease, the success or failure of these efforts depends to a large extent on knowledge, attitude and behavior. In particular, public adherence to government-prescribed preventive measures is crucial to prevent the spread of the disease(6, 7). In this study evidence shows that general knowledge is important in tackling epidemics.

By assessing the level of public awareness and knowledge about this epidemic, gaining a deeper insight into public perception and practice will lead to healthy actions and responsive behaviors that will affect successful disease control(8).

The findings of this study are expected to provide helpful information about KAP among the population of physicians at the forefront of disease control and prevention at this critical juncture. These findings will inform public health officials about more public health interventions, awareness and improve policies related to the prevalence of COVID-19.

PERSONAL STATEMENT

To understand the social consequences of epidemics, factors such as knowledge and how to act in controlling fear and stress must be considered(9). In an epidemic, fear increases the level of anxiety and stress in people(10). During epidemics, the number of people who have been affected by social and psychological disorders due to poor knowledge, dysfunction and subsequently have a negative attitude will greatly increase(11).

Therefore, this study was conducted to understand the level of knowledge of physicians in three high risk provinces in Iran. Measuring the level of knowledge of physicians can reflect their attitude and have a direct and positive effect on it. Also, with a correct understanding of physicians' knowledge, it is possible to acknowledge their exact practice in following the health instructions to reduce the prevalence of the epidemic and prevent the process of rapid transmission.

EXPERIMENTS AND ANALYSIS

Study Population and Participants

A cross-sectional study was conducted about the KAP of Iranian physicians during COVID-19 on April 1st, 2021. Finally, the result of the investigation on September 1st, 2021, was estimated.

This cross-sectional study was conducted in multispecialty hospitals in Mazandaran, Tehran, and Gilan from the 1st April 2021 to the 1st September 2021. This study included all physicians, medical students, residents, specialists working in public and private hospitals and clinics. Ultimately, the responses of 300 samples were collected.

To maximize the diversity of responses, the researchers distributed the questionnaire through social networks such as the Telegram and WhatsApp groups, which have thousands of subscribers, leading to the questionnaire's publication (snowballing)(12).

Questionnaire Design

A standard self-administered questionnaire was distributed among physicians by the principal author and explained if they had any problems completing the survey. An online version of the questionnaire was also made available to be filled up through the social network.

administered questionnaire composed of four parts: demographic information, knowledge, attitude toward COVID-19, and physicians' practices. Validation took place in one step. First, the questionnaire was given to 30 samples to be answered. Accordingly, the revised questionnaire proved reliable, with a Cronbach's alpha value of 0.7(13, 14).

Data collection tools included an online survey in which the questionnaire was divided into two parts. The first part examined demographic variables including gender, age, place of employment, etc., and the second part consisted of 33 items.

The questionnaire was included multiple-choice questions. In this case, ten questions were related to knowledge about the nature, source of transmission, symptoms, how to prevent, diagnose, and treat COVID-19 to assess physicians' knowledge.

Physicians' attitudes were assessed through 13 items, each of which asked respondents' feelings on a five-point Likert scale: (5) strongly agree, (4) agree, (3) neutral, (2) disagree, and (1) Strongly disagree. The inquiries related to attitude consisted of the risk of infection, the severity of fear and anxiety, and the risk of transmission to others.

The study evaluated physicians' practice through 10 questions with five options: always, often, sometimes, rarely, and never, about handwashing, using a mask, observing social distance, etc.

Data Analysis

In this study, data analysis was performed using SPSS software. One-sample t-test, Chi-square, and Friedman tests were also used to analyze the data. Kolmogorov-Smirnov test was utilized to normalize the questionnaire indices.

Finally, the correlations between contextual variables such as age, gender, marital status, etc., with KAP were examined among all physicians.

Table 1: Cronbach's Alpha

Variables	N of Items	Cronbach's Alpha
Knowledge	10	.784
Attitude	13	.750
Practice	10	.753

Note: In order to determine the reliability of the research variables, Cronbach's alpha was calculated for each variable. For this purpose, 30 people were randomly selected from the statistical population, and a questionnaire was distributed among them that the Cronbach's alpha value for the variables was calculated as above. Since the Cronbach's alpha value for the variables is greater than 0.7, the reliability of the questionnaires was confirmed.

Table 2: Kolmogorov-Smirnov test Normality of questionnaire indicators

One-Sample Kolmogorov-Smirnov Test		knowledge	Attitude	practice
N		300	300	300
Normal Parameters ^{a,b}	Mean	3.0111	3.7892	3.6022
	Std. Deviation	.38880	.39525	.43197
Most Extreme Differences	Absolute	.119	.076	.068
	Positive	.068	.060	.065
	Negative	-.119	-.076	-.068
Kolmogorov-Smirnov Z		2.055	1.320	1.177
Asymp. Sig. (2-tailed)		.000	.061	.125
a. Test distribution is Normal.				
b. Calculated from data.				

Note: a. Test distribution is Normal.**Note: b. Calculated from data.**

The test result for all indicators because the significance level is greater than the error value of 0.05, the assumption of zero at the significance level of 0.05 is acceptable. As a result, the variables have a normal distribution, and parametric tests can be used for these indicators. Still, the knowledge index was less than a significant level, so it has an abnormal distribution, and non-parametric tests are used.

Table 3: Correlation of demographic characteristics about attitude and practice scores of COVID-19 based on univariate analysis

Characteristics		Number (%)	Mean $\pm$ Standard deviation			
			Attitude	sig	practice	sig
Age	18-29 years	119	3.73 $\pm$ 0.37		3.56 $\pm$ 0.43	
	30-49 years	140	3.83 $\pm$ 0.39	P> 0.05	3.65 $\pm$ 0.44	P>0.05
	50+ years	41	3.83 $\pm$ 0.45		3.56 $\pm$ 0.39	
Sex	Female	165	3.78 $\pm$ 0.42	P>0.05	3.63 $\pm$ 0.41	P>0.05
	Male	135	3.80 $\pm$ 0.36		3.57 $\pm$ 0.46	
Marital Status	Single	169	3.77 $\pm$ 0.36		3.59 $\pm$ 0.44	
	Married	126	3.83 $\pm$ 0.41	P>0.05	3.62 $\pm$ 0.41	P>0.05
	Divorced	5	3.46 $\pm$ 0.80		3.50 $\pm$ 0.66	
Profession	Medical student	110	3.73 $\pm$ 0.40		3.56 $\pm$ 0.44	
	General Practitioner	81	3.87 $\pm$ 0.43	P>0.05	3.71 $\pm$ 0.40	P<0.05
	Resident	77	3.76 $\pm$ 0.35		3.54 $\pm$ 0.41	
	Specialist Doctor	32	3.87 $\pm$ 0.34		3.63 $\pm$ 0.48	
Year of working experience	less than 7 years	198	3.77 $\pm$ 0.40		3.64 $\pm$ 0.44	
	7-15 years	62	3.80 $\pm$ 0.42	P>0.05	3.50 $\pm$ 0.44	P>0.05
	more than 15 years	40	3.88 $\pm$ 0.34		3.57 $\pm$ 0.36	
Service location	Tehran	100	3.82 $\pm$ 0.43		3.58 $\pm$ 0.42	
	Gillan	100	3.72 $\pm$ 0.38	P>0.05	3.70 $\pm$ 0.47	P<0.05
	Mazandaran	100	3.82 $\pm$ 0.37		3.52 $\pm$ 0.38	
Workplace	Private Hospital	55	3.85 $\pm$ 0.44		3.66 $\pm$ 0.45	
	Government Hospital	80	3.78 $\pm$ 0.38	P>0.05	3.68 $\pm$ 0.47	P<0.05
	Semi-government or training hospital	165	3.77 $\pm$ 0.39		3.55 $\pm$ 0.40	
Source of information	Social media	179	3.76 $\pm$ 0.42		3.60 $\pm$ 0.47	
	TV	11	3.70 $\pm$ 0.60		3.64 $\pm$ 0.50	
	Official websites			P>0.05		P>0.05
	(Ministry of health and population, WHO, CDC)	110	3.84 $\pm$ 0.33		3.60 $\pm$ 0.36	

Note: This table shows the standard deviation between attitude and practice variables concerning contextual variables; the sig extent of attitude and practice is P> 0.05 for age, sex, marital status, working experience, and source of information.

Table 4: The extent of physicians' knowledge of the questions raised during the COVID-19

	Items	Observed N	Expected N	Residual	Chi- Square	df	Asymp. Sig.
Q3: The virus causing the COVID-19 is	SARS-CoV	47	100.0	-53.0	327.70	2	.000
	MERS-CoV	7	100.0	-93.0			
	SARS-CoV-2	246	100.0	146.0			
	Total	300					
Q4: The incubation period of COVID-19 is	2-11 days	18	75.0	-57.0	551.90	3	.000
	2-14 days	251	75.0	176.0			
	2-21 days	22	75.0	-53.0			
	7-21 days	9	75.0	-66.0			
	Total	300					
	Respiratory droplet	107	60.0	47.0			
Q5: The mode of transmission for COVID-19 is	Direct (infected person) & Indirect Contact	13	60.0	-47.0	245.90	4	.000
	Airborne	19	60.0	-41.0			
	Transmission	18	60.0	-42.0			
	In small liquid particles	143	60.0	83.0			
	All	300					
	Total	300					
Q6: The main symptom of COVID-19 is	Fever or chills	14	75.0	-61.0	676.40	3	.000
	Cough	10	75.0	-65.0			
	Tiredness	6	75.0	-69.0			
	All	270	75.0	195.0			
	Total	300					
	Rapid Diagnosis	4	75.0	-71.0			
Q7: Confirmatory diagnosis for COVID-19 is	Test	131	75.0	56.0	232.00	3	.000
	RT-PCR*	15	75.0	-60.0			
	CT Scan**	150	75.0	75.0			
	All	300					
Q8: The high-risk population of COVID-19 for the severe outcome is	Children	2	75.0	-73.0	428.30	3	.000
	Pregnant Women	3	75.0	-72.0			
	Elderly people (over 60 years)	222	75.0	147.0			
	All	73	75.0	-2.0			
	Total	300					
	Hand-washing	9	75.0	-66.0			
Q9: The preventive measures for COVID-19 infection is	Observance of social distance	11	75.0	-64.0	725.90	3	.000
	PPE***	3	75.0	-72.0			
	All	277	75.0	202.0			
	Total	300					
	Supportive & Symptomatic Management	64	75.0	-11.0			

Q11: Complications of COVID-19 is	option for COVID-19 is	Rehabilitative & Palliative Care Management	3	75.0	-72.0	391.40		.000
		Anti-viral Therapy or specific therapy Management	15	75.0	-60.0		3	
		It varies according to severity of the disease	218	75.0	143.0			
		Total	300					
		ARDS	20	75.0	-55.0			
		Septic Shock	15	75.0	-60.0			
		Organ dysfunction ****	15	75.0	-60.0	544.70	3	.000
		All	250	75.0	175.0			
		Total	300					
		giving rise to widely variable estimate of CFR*****	245	73.0	172.0			
Q12: The mortality rate of COVID-19 is		9.5%	22	73.0	-51.0	542.30	3	.000
		34.4%	19	73.0	-54.0			
		39%	6	73.0	-67.0			
		Total	292					

Note: Reverse Transcription-Polymerase Chain Reaction*

Note: Chest Computed Tomography**

Wearing of personal protective equipment***

(Acute Kidney Injury, Acute Lung Injury, etc.) ****

(case fertility ratio) by country-from less than 0.1% to over25%*****

Note: The Chi-square test results examining the effect of physicians' knowledge during COVID-19 disease showed that the level of physicians' knowledge was good during COVID-19 (P<0.0001).

Table 5: The results of one-sample t-test related to physicians' attitudes

	N	Mean	Std. Deviation	Test Value = 3		Sig. (2- tailed)	Mean Differ ence	95% Confidence Interval of the Difference	
				t	df			Lower	Upper
Q13: due to having enough knowledge compared to the previous type of viruses, my anxiety will be increased or decreased	264	3.75	.818	14.821	263	.000	.746	.65	.85
Q14: my attitude towards the patient who comes to our medical center before the end of the incubation period is accompanied by fear and anxiety	300	3.71	.936	13.071	299	.000	.707	.60	.81
Q15: due to the easy transmission of the virus, as a front-line health care worker, I'm always worried about getting sick	298	3.84	.898	16.189	297	.000	.842	.74	.94
Q16: I believe that even an asymptomatic patient can transmit the virus to others	300	4.20	.776	26.788	299	.000	1.200	1.11	1.29
Q17: awareness and access to information resources and laboratory and radiographic facilities help resolve my concerns	299	4.11	.695	27.691	298	.000	1.114	1.03	1.19
Q18: as a physician at health center, having a high possibility of exposure, I am always worried about transmitting the virus to high-risk populations	285	4.04	.853	20.558	284	.000	1.039	.94	1.14
Q19: I believe that hand-washing with soap & water is sufficient for infection prevention	299	2.53	1.124	-7.254	298	.000	-.472	-.60	-.34

Q20: I believe that detergents should regularly be used	299	3.61	.929	11.39 6	298	.000	.612	.51	.72
Q21: I believe that wearing a mask is a necessity	299	4.54	.636	41.76 4	298	.000	1.535	1.46	1.61
Q22: the high-risk groups are a big challenge for me	290	4.00	.765	22.34 6	289	.000	1.003	.92	1.09
Q23: due to the possibility of complications, my concern about the lack of access or lack of equipped medical facilities and equipment for the patient increases	293	4.16	.871	22.80 8	292	.000	1.160	1.06	1.26
Q24: my concern about the mortality rate from COVID-19 is not the same in all patients	284	3.77	.867	14.92 3	283	.000	.768	.67	.87
Q25: as long as there are no complications, I do not worry about patient mortality	284	2.98	1.048	-.283	283	.777	-.018	-.14	.10

Note: In the one-sample t-test, the statistical assumption of the mean of a population, or in other words, the t-test or a sample, is used, which tests the difference between the mean of the sample with a hypothetical value. These items were considered in the range of 1 to 5, and the average unit equals 3. Therefore, the mean of the sample was tested with the assumed value (3). As the results of the above table shows in the one-sample test, the mean of the items for this hypothesis was estimated. The significance level obtained from the single-sample test for questions 13 to 24 is less than the error level of 0.05, so the attitude of physicians during the disease of COVID-19 was significant to these factors. (Sig <0.05). Considering that the average of these items is equal to 3 and if the average for this question is more than the average, we conclude that the attitude of physicians on the questions has been appropriate and acceptable. In this case, questions 18 and 20 to 24 were above average three and positive, and for question 19 were below average, and also for question 25 is average. (Sig>0.05).

Technique by Friedman test method

To rank, the Friedman test was used, and the results of the Friedman test in the first stage of the Chi-square test show that the significance level is less than 0.05. Therefore, we can rank the factors related to physicians' attitudes in the following table:

Table 6: Friedman Test

	Mean Rank	Result Rank	Chi-Square	df	Asymp. Sig.
Q13: due to having enough knowledge compared to the previous type of viruses, my anxiety will be increased or decreased	5.83	9			
Q14: my attitude towards the patient who comes to our medical center before the end of the incubation period is accompanied by fear and anxiety	5.76	10			
Q15: due to the easy transmission of the virus, as a front-line health care worker, I'm always worried about getting sick	6.15	7			
Q16: I believe that even an asymptomatic patient can transmit the virus to others	7.83	3			
Q17: awareness and access to information resources and laboratory and radiographic facilities help resolve my concerns	7.21	4			
Q18: as a physician at health center, having a high possibility of exposure, I am always worried about transmitting the virus to high-risk populations	7.14	5	601.761	11	.000
Q19: I believe that hand-washing with soap & water is sufficient for infection prevention	3.14	12			
Q20: I believe that detergents should regularly be used	5.59	11			
Q21: I believe that wearing a mask is a necessity	8.97	1			
Q22: the high-risk groups are a big challenge for me	6.91	6			
Q23: due to the possibility of complications, my concern about the lack of access or lack of equipped medical facilities and equipment for the patient increases	7.33	2			
Q24: my concern about the mortality rate from COVID-19 is not the same in all patients	6.14	8			
Q25: as long as there are no complications, I do not worry about patient mortality					

Note: According to the output of the Friedman test, the first variable that had the most role in the attitude of physicians in the period of COVID-19 was question 21. The second effect was 23, and the last part was related to question 19.

Table 7: The results of one-sample t-test related to physicians' practice

	N	Mean	Std. Deviation	Test Value = 3 t	df	Sig. (2- tailed)	Mean Differ ence	95% Confidence Interval of the Difference Lower Upper
Q26: given my knowledge of the guidelines for the background of the disease, I have some knowledge of how to take effective action and do my best to control the disease	281	3.69	.746	15.601	280	.000	.694	.61 .78
Q27: in case of encountering a patient, who has not completed his incubation period, I follow the health instructions with more intensity and sensitivity	300	4.22	.826	25.650	299	.000	1.223	1.13 1.32
Q28: I am wearing personal protective equipment (PPE) while caring for the patient	300	4.29	.880	25.378	299	.000	1.290	1.19 1.39
Q29: when examining a patient with a complaint of COVID-19 symptoms, I check the patient's temperature and lungs in the first step	300	4.28	.752	29.573	299	.000	1.283	1.20 1.37
Q30: I immediately request corona test for all suspected patients, both symptomatic and asymptomatic	300	2.98	1.203	-.336	299	.737	-.023	-.16 .11
Q31: in dealing with high-risk patients, I follow health guidelines more strictly (given my likelihood of being a carrier)	298	4.29	.740	29.971	297	.000	1.285	1.20 1.37
Q32: I am using 60% alcohol-based hand	299	4.17	.982	20.543	298	.000	1.167	1.06 1.28

sanitizer in the
absence of soap &
water

Q33: I start one type of treatment for all patients with any severity	30 0	2.13	1.078	-14.038	299	.000	-.873	-1.00	-.75
Q34: with any complications from covid-19 in the patient, I immediately hospitalize the patient	30 0	2.83	1.190	-2.425	299	.016	-.167	-.30	-.03
Q35: I remind all patients of mortality from covid-19	29 7	3.15	1.177	2.218	296	.027	.152	.02	.29

Note: the above table illustrates in the one-sample test, the mean of the items for this hypothesis was estimated. The significance level obtained from the single-sample test for questions 26 to 29 and 30 to 35 is less than the error level of 0.05, so the performance of physicians during COVID-19 disease has been significant to these factors. (Sig <0.05) Considering that this component was considered in the range of 1 to 5, the average unit equals 3. Therefore, in the opinion of the study population, questions 26, 27, 28, 29, 31, 32, and 35 are more than three on average. Also, the results obtained for questions 33 and 34, the calculated mean is less than the average (3), so the performance of physicians during the disease of COVID-19 for these two factors are less than the average and significant (Sig <0.05), and for the factor of question 30 is average. (Sig >0.05).

Ranking technique by Friedman test method

To rank, the Friedman test was used, and the results of the Friedman test in the first stage of the Chi-square test show that the significance level is less than 0.05. Therefore, we can rank the factors related to physicians' attitudes in the following table:

Table 8: Friedman Test

	Mean Rank	Result Rank	Chi-Square	df	Asymp. Sig.
Q26	4.71	6			
Q27	6.14	4			
Q28	6.28	2			
Q29	6.23	3			
Q31	6.29	1	883.626	8	.000
Q32	6.06	5			
Q33	2.24	9			
Q34	3.23	8			
Q35	3.83	7			

Note: According to the output of the Friedman test, the first variable that had the most role in physicians' practice in the period of COVID-19 was question 31 and the second effect was 28 seconds. Similarly, questions 29, 27, 32, 26, 35, 34, and 33, respectively, have had the greatest impact in this regard.

CONCLUSION

The study was performed in the middle stages of COVID-19 in three high-risk provinces (Mazandaran, Tehran, and Gilan), which have still severely damaged. In this study, we selected physicians who are at the forefront of diagnosis, care, and treatment because they are more prone to infection. An examination of physicians' knowledge, attitudes, and practice is an important way to prevent the spread of the disease within the treatment unit.

Since the options presented in the knowledge questions were different, we examined the options individually in this study. In general, the level of knowledge of physicians has been satisfactory ($P < 0.0001$). According to the results of the Chi-square table for analyzing physicians' knowledge, it can be said that their understanding has shown different effects in different factors. The vast majority of doctors believed that the recovery period of this disease was 2 to 14 days, which was according to the result of Chi-square 551.90. The doctors' answer to the question about the symptoms of the COVID-19 showed that they have a good knowledge of this question, and the result was equal to 676.40. Finally, physicians' knowledge of protective measures to reduce COVID-19 translocation showed a high level of awareness, equal to 725.90. The findings indicate the frequency of factors for the knowledge variable. In question 3, according to the diagnosis of the type of virus, 82% of doctors agreed, the COVID-19 virus is made up of SARS-CoV-2. Also, 83.7% of physicians believed that the recovery period of patients was 2-14 days. According to data, 47.7%, physicians had complete knowledge about the transmission of the virus through direct and indirect contact, airborne particles, respiratory droplets. Moreover, 90% of physicians had sufficient knowledge about the clinical symptoms of the disease as well as 74% of physicians had the necessary knowledge about the risks of the disease for people 60 years and older.

The extensive knowledge demonstrated in other research, clinical features of COVID-19 include cough and fever. In high-risk patients with multiple co-morbidities, acute kidney injury (AKI) and ARDS symptoms should also be considered (15). According to these findings, it can be said that physicians' knowledge in diagnosing symptoms has been acceptable.

Based on the significance level obtained from the single t-test, the sample related to the attitude factor for the questions asked is 13 to 24, less than the error level of 0.05. In the element of attitudes, physicians' answers to the questions under the fear and anxiety subset showed that the items were considerable. As a result, the factors 13 to 18 and 20 to 24 were more than average and positive. According to the outcome of the Friedman test, question number 21 has been equal to 601.761, having the most effect. Furthermore, Questions 13 with 53.8%, Question 14 with 63.7%, Question 15 with 59.4%, Question 16 with 55.7%, Question 17 with 61.5%, and Question 18 with 48.8% indicate concern, fears, and anxieties between physicians.

Based on the findings, the results of the sample T-test table show the details of physicians' performance against the disease and patients. The significance level obtained for action-telling questions such as questions 26 to 29 and 30 to 35 is less than the error level of 0.05. Therefore, the practice of doctors can be considered acceptable. Question 21 (4.54) had the most impact, and question 19 (2.53) had the most negligible impact. In general, the practice of physicians has been satisfactory. Still, according to the questions raised, the most result is related to questions 31, and 28 with (4.29), question 29 with (4.28) and question 27 with (4.22), and question 33 with (2.13) had the least impact.

Compared to several similar studies in Iran and other countries, we found that Kamali Haghighi had conducted a study in Shiraz, Iran, which showed that 72.2% of HCWs ($n = 360$) had sufficient knowledge, 66.65% ($n = 329$) had positive attitudes, and 67.72% ($n = 335$) possessed adequate practical skills, but 150 24.23% ($n = 120$) believed the availability of protective equipment or facilities was not enough(16).

One study was done by Zhang, which was a cross-sectional survey on KAP. This study was performed on 1357 health workers, including physicians, nurses, and paramedics in China. The results report that physicians have higher knowledge scores compared to nurses and paramedics (physicians = 38.56 ± 3.31 ; nurses = 37.85 ± 2.63 ; paramedics = 36.72 ± 4.82). The results further showed that knowledge directly affects attitudes. Approximately 85% of health workers feared contracting the virus, while 60% experienced anxiety while working in isolation rooms and intensive care units. In the end, the results showed that 89.7% of health workers follow the correct methods to handle COVID-19 cases(17).

Zhong investigated Chinese residents' KAP towards COVID-19 during the rapid rise period of the outbreak. Twelve knowledge questions related to COVID-19 were included in the questionnaire; the study questions on residents' attitudes and practices towards COVID-19 included wearing masks. In multiple logistic regression analyses, the knowledge score was significantly correlated with a more positive attitude and preventive approach toward the COVID-19. The majority of Chinese residents, especially women, had a good knowledge about COVID-19, held optimistic attitudes, and practiced appropriately.(18).

Alzoubi did one study in Jordan, which was based on an online self-administrated questionnaire. The sample size was 592 people, which were medical and non-medical students that scored an average of ($SD\ 0.81 \pm 0.15$). This study indicated that 90% of participants had a good knowledge of the symptoms of COVID-19, and in terms of knowledge, no significant difference was observed between medical and non-medical students. Our study focused on the sources of knowledge mentioned about COVID-19 were social media, WHO, television, the Ministry of Health. The attitude results showed that students have a high level of attitude with a mean score of ($SD\ 0.82 \pm 0.07$). The results of the practice study showed that the mean score was ($SD\ 0.78 \pm 0.2$) ($SD\ 0.78 \pm 0.2$) (19).

A cross-sectional study on KP was done by Abou-Abbas, which had 372 samples. The majority of Lebanese physicians were knowledgeable about the condition, 89.5%, while almost half practiced good prevention, 49.7%. The odds of having excellent knowledge was 2.16 times higher among physicians aged 40 and above $OR=2.16$ with a 95% confidence interval (CI) of 1.08 to 4.34 compared to their counterparts aged less than 40 years old. Their results also showed that the odds of reasonable practice were two times higher among frontline compared to the second line workers (adjusted $OR=2.01$ with 95% CI of 1.60 to 7.02). Finally, participants with satisfying knowledge of COVID-19 were 2.04 times more likely to have a great practice ($OR=2.04$ with 95% CI of 1.01 to 4.12) (20).

The Centers for Disease Control must emphasize stress management and mental health protection during this uncertain period, as increasing stress can lead to inappropriate coping mechanisms(21). Amid an epidemic, time-sensitive research will affect various factors, such as

physicians' stress and anxiety, fear, lack of access to trustworthy information, and personal protection equipment, all of which will directly impact disease control.

As COVID-19-induced stress intensifies during a crisis, seeking social support is often one of the most adaptive ways to deal with stress. Therefore, many coping strategies will be helpful during the crisis, including government involvement in the provision of medical and laboratory equipment and active coping to reduce problems.

According to the recommendation of the WHO, increase hospital preparation programs; Providing sufficient space, staff, and resources is enough to improve patient care needs. Establishing benchmarks and monitoring evaluation systems is needed to increase physicians' effectiveness of ongoing actions and documented information and training programs to increase preparedness and performance(22). It is essential to identify educational programs to increase knowledge and promote the correct practices concerning infectious diseases in health systems.

The present findings also have limitations: Firstly, the cooperation of the medical staff has been fragile for various reasons and has dramatically prolonged the data collection process. Secondly, more time is required to follow up on additional research used throughout the country. Lastly, this analysis did not assess other risk factors, including medical conditions which could increase the number of complications and severe illnesses among physicians. Additional research increases physicians' perceptions of the risk of severe disease and death from COVID-19. Clinical guidance and supportive, supplementary, and educational planning can help control the disease among treatment personnel.

In conclusion, according to the study results, an acceptable level of KAP was found among physicians in three provinces of Tehran, Mazandaran, and Gyllan regarding COVID-19. However, more education can have more practical effects on how to control and prevent disease progression.

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