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Rural Healthcare Workers` Knowledge, Attitude, and Practice toward COVID-19 two years after the pandemic onset: is health literacy training still necessary?

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Abstract

This study aimed to assess the level of knowledge, attitude, and practice regarding the coronavirus disease among Iranian rural and urban healthcare workers. The study population consisted of all healthcare experts and staff working in 38 rural health centers in Iran. An online questionnaire was distributed in November 2021. The anonymous questionnaire was comprised of a series of questions about demographic information; knowledge about COVID-19, the attitudes and preventive practices toward COVID-19. The majority of the participants (92.6%) had appropriate knowledge about COVID-19 disease. Most of the participants (77.2%) had a good attitude toward COVID-19 and 60.3% showed good practice. There was a significant, strong, and positive correlation between knowledge and attitude scores (p value $<.05$). The knowledge, attitude, and practice of the urban healthcare workers were at the desired level. To strengthen healthcare workers' knowledge, attitudes, and practices, holding training webinars regarding the adherence and implementation of health protocols and proper practice against COVID-19, seems helpful.

Keywords: knowledge, health literacy, attitude, COVID-19, healthcare workers, practice, rural health

Introduction

In the last days of 2019, an emerging disease of the coronavirus family emerged from China and then spread rapidly around the globe. The World Health Organization (WHO) declared the novel coronavirus 2019 (COVID-19) epidemic a global pandemic (G. DURUK, Gümüşboğa, & Çolak, 2020; Gorbalenya et al., n.d.; Lai, Shih, Ko, Tang, & Hsueh, 2020).

The COVID-19 virus is transmitted from person to person through respiratory droplets or secretions from an infected person during speech, sneezing, and coughing or through contact of the infected surface with the mouth, nose, and eyes. The virus has spread rapidly among individuals and has become widespread (“Transmission of COVID-19,” 2020).

Coronavirus poses an occupational health risk to healthcare staff worldwide because these individuals are at the forefront of the fight against this disease and are more vulnerable than other people in the community. To date, more than a thousand healthcare staff have died from this disease all over the world. The occupational exposure of healthcare staff to this emerging

virus is a significant problem, and preventing the transmission of this contagious disease in healthcare centers is a priority (Gan, Lim, & Koh, 2020; Medscape, 2020; Saqlain et al., 2020).

Healthcare staff from all groups and levels responsible for caring for and treating patients are at increased risk of developing COVID-19 and transmitting it to family, friends, and others at work (Huynh, Nguyen, VO, & Pham, 2020; Saqlain et al., 2020). Factors such as insufficient knowledge and negative attitudes toward the disease among healthcare staff can lead to delays in prevention, diagnosis, poor performance in infection control and treatment; therefore, it may cause widespread disease (R. Nepal et al., 2020; Olum, Chekwech, Wekha, Nassozi, & Bongomin, 2020; Wahed, Hefzy, Ahmed, & Hamed, 2020). In this regard, the World Health Organization (WHO) and the Centers for Disease Control and Prevention (CDC) have issued recommendations for the prevention and control of COVID-19 for healthcare staff to increase their knowledge of this disease (Prevention, 2020; "World Health Organization," 2020).

Healthcare staff in medical centers are at the forefront of the fight against this disease. Hence, it is crucial to examine their knowledge, attitude, and practice toward this disease because by examining these cases, it is possible to evaluate existing programs and identify new and effective strategies for behavior change (Bhagavathula, Aldhaleei, Rahmani, Ashrafi Mahabadi, & Bandari, 2020; Bhagavathula, Aldhaleei, Rahmani, Ashrafi Mahabadi, Bandari, et al., 2020). Many studies in this area have been performed around the world since the beginning of the COVID-19 pandemic. In most studies, healthcare workers' knowledge (awareness), attitude, and practice, including physicians, pharmacists, and nurses in different countries, have been addressed.

The results of most studies show that healthcare staff have a high knowledge (awareness), positive attitude, and good practice toward COVID-19, which can be compared to the studies conducted in China, Ethiopia, Nepal, Pakistan, Jordan, Turkey, and Saudi Arabia (Asaad, El-Sokkary, Alzamanan, & El-Shafei, 2020; G. G. DURUK et al., 2020; Huynh, Nguyen, VO, Pham, et al., 2020; Khader et al., 2020; Maheshwari, Gupta, Sinha, & Rawat, 2020; Nemati, Ebrahimi, & Nemati, 2020; R. R. Nepal et al., 2020; Saqlain et al., 2020; Shi et al., 2020; Tadesse, Gebrewahd, & Demoz, 2020; Taghrir, Borazjani, & Shiraly, 2020; Wahed et al., 2020; Zhang et al., 2020) In a study, Zhang et al. examined healthcare workers' knowledge, attitudes, and practices toward COVID-19 in Henan Province, China. The study population included physicians, nurses, pharmacists, healthcare assistants, laboratory experts, and microbiologists working in hospitals in Henan Province. The findings indicated that most of these people have enough knowledge about COVID-19, and this sufficient knowledge has directly affected their

attitude and has created a positive attitude (Zhang et al., 2020). According to these findings, it can be concluded that sufficient knowledge has affected attitudes and practices.

However, in some other studies, the results showed that healthcare staff, despite having sufficient knowledge about the disease, have a negative attitude toward the disease (Eddy et al., 2020; Mbachu et al., 2020; Olum et al., 2020). Olum et al. conducted a study to determine healthcare workers' knowledge, attitudes, and practices at Makerere University Teaching Hospitals in Uganda toward COVID-19. The statistical population of the study included physicians, nurses, and midwives. The findings showed that most of these people had sufficient knowledge about COVID-19; however, there was a negative attitude toward this disease among health care providers (Olum et al., 2020). In a study, Eddy et al. examined the knowledge, attitude, and practice of senior medical students in Ecuador about COVID-19. The findings indicated that these students had sufficient knowledge, but they had a negative attitude toward this disease, and due to poor education and lack of personal protective equipment, they did not have proper and desirable practice toward this disease (Eddy et al., 2020). In some other studies, the findings showed that healthcare staff have a negative attitude toward the disease despite having a positive and sufficient attitude about the disease (Bhagavathula, Aldhaleei, Rahmani, Ashrafi Mahabadi, & Bandari, 2020).

In addition to examining the knowledge, attitude, and practice of healthcare staff working on the front lines of the fight against COVID-19, dentists have also been studied in some studies. In this regard, we can refer to the research of Duruk et al. (G. DURUK et al., 2020) and Krishnappa Kamate et al. (Kamate et al., 2020), as well as Khader et al. (Khader et al., 2020). In the study of Duruk et al., the attitudes and behaviors related to COVID-19 among Turkish dentists were investigated. The findings show that although Turkish dentists have increased protection measures against the COVID-19 pandemic, they have not yet reached the desired level in terms of attitude and behavior (G. DURUK et al., 2020). In the study of Krishnappa Kamate et al., dentists' knowledge, attitudes, and practices regarding COVID-19 were examined. The findings of this study revealed that dentists have sufficient knowledge, appropriate attitudes, and good practices toward this disease (Kamate et al., 2020). The findings of Khader et al., including the Jordanian dental community, also indicated sufficient knowledge, a positive attitude, and good practice toward this disease (Khader et al., 2020).

Regarding that no research has been conducted in urban and rural health centers in Iran, this study aims to identify the state of knowledge, attitude, and practice of these centers' healthcare staff toward COVID-19 disease.

Materials and Methods

This cross-sectional study was conducted in Tangestan city. There are seven comprehensive health service centers, three urban health centers, and 38 local health centers in this city. The statistical population of the present study consisted of all staffs working in these centers. In this study, no sampling was performed, and all of the healthcare workers including 189 people, were studied.

Ethics Statement

This research has been approved by the Ethics Committee of Shahid Beheshti University of Medical Sciences (Ethics code: IR.SBMU.RETECH.REC.1400.103). The questionnaire that has been used in this study was anonymous and no personal and private information of the participants has been recorded. Informed written consent was obtained from the study participants.

Instruments

To collect the data, questionnaires made in the study of Olum et al. (Olum et al., 2020) and Tadesse et al. (Tadesse et al., 2020) were used, which have been modified according to Iranian society. In the present study, Cronbach's alpha reliability coefficient of this questionnaire was 0.87. The content validity of all questionnaire questions was confirmed by the Waltz & Bausell method (Waltz & Bausell, 1981) ($CVR > .81$). The questionnaire was anonymous. The first part of the questionnaire was related to demographic information, including gender, age (year), place of residence, degree, work experience, place of work, and source of information about COVID-19. The second part of the questionnaire consisted of 43 questions, which were arranged into three parts. The first part examined the knowledge of the research population about COVID-19, which included 16 multiple-choice questions and a question about the common symptoms of COVID-19. The answers were in the form of two options including Yes and No. The score 1 was considered for each correct answer, and a zero score was considered for the incorrect answer. Thus, the score of this part is between zero and 16. The questions in the second section examine people's attitudes toward COVID-19 in 11 questions, which were arranged in five options: strongly disagree, disagree, neutral, agree, and strongly agree. The scoring was based on a 5-Likert scale. Some of the questionnaire items were inversely designed to avoid giving a single similar answer in all the items (Olum et al., 2020). Thus, the score of this part of the questionnaire was a number between 11 and 55. The last part of the questionnaire consisted of 15 questions about preventive practice compared to COVID-19, and the answers

included always, occasional, and never. Each answer was given a score of 3, 2, or 1 based on good practice. Accordingly, the score of this part was between 15 and 45. It should be noted that this questionnaire was anonymous and did not contain any personal information that would lead to the identification of participants.

Procedure

The current study was initiated on November 2021, during the implementation of social distancing (due to the prevalence of COVID-19); therefore, it was not possible to visit health centers in person. Therefore, the researchers used an online method to collect data. The online questionnaire was designed using Google Form, and its link was sent to all participants through WhatsApp messaging software. Data collection process took one month and all participants filled in the questionnaires and returned them through the same software.

Statistical analysis

All data collected from Google Form were output as an Excel file and, after initial editing, were entered into SPSS software version 18. Bloom's cut-off of 80% was used to evaluate the results (Kaliyaperuma, 2004). Accordingly, a score above 12.8 was considered appropriate for the knowledge section, with a maximum score of 16. For the attitude section with a maximum score of 55, a score greater than or equal to 44 was considered a desirable attitude, and for the practice section with the highest score of 45, a score greater than or equal to 36 was considered an appropriate practice.

An independent t test was used to measure the difference between the mean scores of the knowledge, attitude, and practice between men and women, as well as different areas of residence. In addition, analysis of variance (ANOVA) was used to measure the differences between the other groups. Additionally, the Pearson correlation test was used to measure the correlation between knowledge, attitude, and practice scores.

Results

All of the healthcare staffs working in urban and rural centers of Tangestan participated in this study. Participants' demographic characteristics are given in Table 1. The majority of participants were female (65.6%). Additionally, most of them had a bachelor's degree (n = 58).

Table 1 .Sociodemographic characteristics of the participants

Variable	Frequency	
	n	%
Sex		
Male	65	34.4
Female	124	65.6
Age		
<=30	57	30.2
31-40	69	36.5
41-50	44	23.3
>50	19	10.1
Place of work		
Urban health center	11	5.8
Health center	88	46.6
local Health center networks	26	13.8
Rural Health Center	43	22.8
Urban Health Center	21	11.1
Area of residence		
Urban	68	36
Rural	121	64
level of education		
Diploma	55	29.1
Associate Degree	53	28
Bachelors	58	30.7
Masters	15	7.9
MD/PhD	8	4.2
Experience (years)		
<=5	44	23.3
6-10	32	16.9
11-15	30	15.9
16-20	41	21.7
>20	42	22.2

Knowledge

Table 2 shows that the mean score of knowledge was 14.44 ± 1.74 , and majority of the participants in this study (92.6%) scored higher than 12.8 regarding the knowledge toward COVID-19, which indicates their appropriate knowledge about this disease.

Attitude and Practice

The mean attitude score was 3.92 ± 44.98 . More than half of the participants in this study (77.2%) scored 44 or higher, which shows that they have a good attitude toward COVID-19 (Table 2). The mean practice score was 37.44 ± 4.34 . Among all participants in the study, more than half (60.3%) scored equal to or greater than 36 and showed good practice against COVID-19 (Table 2).

Table 2: The mean score of knowledge, attitude, and practice

Variable	Score		Upper cut-off 80%	
	Mean	SD	n	%
Knowledge	14.74	1.44	175	92.6
Attitude	44.98	3.92	146	77.2
Practices	37.44	4.34	114	60.3

The frequency of each information source to obtain information related to COVID-19 is shown in Fig 1. The findings demonstrate that governmental websites and media such as the Ministry of Health and Medical Education of Iran had the most use (56.1%) among the Iranian healthcare workers participated in this study.

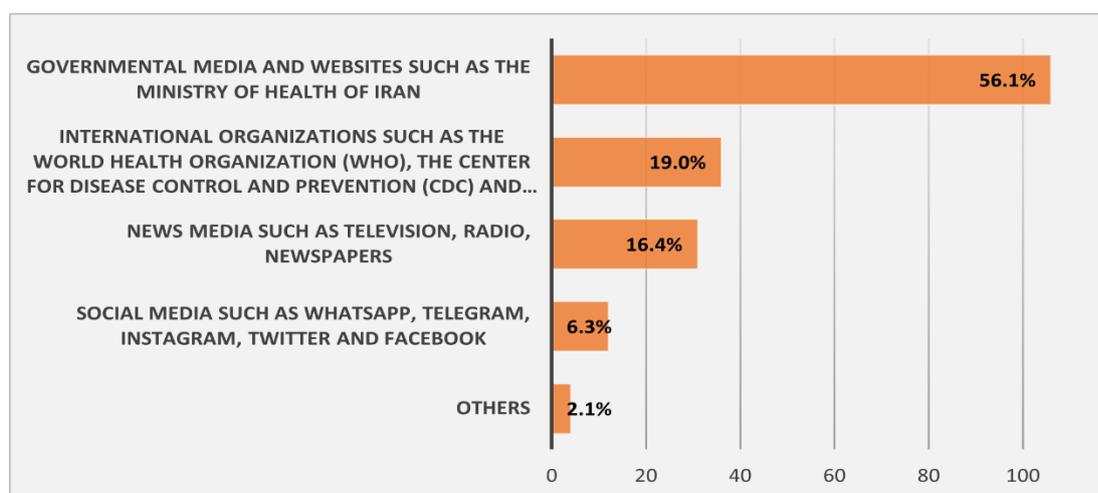


Fig 1. Sources of information regarding COVID-19 reported by healthcare workers (n=189)

Among the symptoms of the COVID-19 virus, participants in this study chose fever, myalgia, and smell disorder more than other symptoms. The number and percentage of selection of other symptoms are presented in Table 3.

Table 3 .The main clinical symptoms of COVID-19

Symptoms of COVID-19	Yes	No
	n (%)	n (%)
fever	185 (97.9)	4 (2.1)
myalgia	172 (91)	17 (9)
sore throats	163 (86.2)	26 (13.8)
smell disorder	160 (84.7)	29 (15.3)
Taste disorder	109 (57.7)	80 (42.3)
Headache	98 (51.9)	91 (48.1)
cough	93 (49.2)	96 (50.8)
runny nose	90 (47.6)	99 (52.4)
Diarrhea	75 (39.7)	114 (60.3)
fatigue	33 (17.5)	156 (82.5)
Sneeze	27 (14.3)	162 (85.7)

The results of the Pearson correlation test, which was performed to measure the correlation between knowledge, attitude, and practice is shown in Table 4.

The findings revealed that there is a significant, strong, and positive correlation between knowledge and attitude scores. However, there was no significant correlation between knowledge and practice or between practice and attitude (p value> .05).

Table 4. Correlation between knowledge, attitude, and practice scores

Variable	Correlation Coefficient	P value
Knowledge-Attitude	.663	<.001
Attitude-Practice	.051	.487
Knowledge-Practice	.125	.087

The difference between the mean scores of the knowledge, attitude, and practice between different groups is shown in Table 5. The independent t test showed that the mean scores of the knowledge, attitude, and practice did not differ significantly between men and women, nor did the area of residence (p value> .05). In addition, the ANOVA results indicated that these scores did not differ significantly between the variables age, place of work, level of education, experience, and source of information (p value> .05) (Table 5).

Table 5 .The knowledge, attitude and practices among healthcare workers

Variable	Knowledge Mean±SD	Attitude Mean±SD	Practices Mean±SD
Sex			
Female	14.78±1.28 ^a	45.02±3.16 ^a	37.66±4.21 ^a
male	14.66±1.72	44.91±5.09	37.02±4.58
<i>t</i> (P value)	.546 (.586)	.180 (.857)	.972 (.332)
Age			
≤30	14.60±1.68 ^b	44.47±4.97 ^b	36.75±4.04 ^b
31-40	14.93±1.12	45.39±2.89	37.97±4.19
41-50	14.50±1.65	44.39±3.97	37.77±4.32
>50	15.05±1.13	46.37±3.18	36.79±5.63
<i>F</i> (P value)	1.289 (.280)	1.721 (.164)	1.049 (.372)
Place of work			
Urban health center	14.36±1.50 ^b	43.27±4.45	35.18±3.57
Health center	14.92±1.02	45.74±2.88	37.88±4.70
local Health center networks	14.54±1.27	44.08±2.99	37.73±4.03
Rural Health Center	14.86±1.41	44.72±2.89	37.07±4.08
Urban Health Center	14.19±2.66	44.33±7.99	37.19±3.88
<i>F</i> (P value)	1.515 (.200)	1.918 (.109)	1.093 (.361)
Area of residence			
Urban	14.57±1.38 ^a	44.59±3.22 ^a	37.91±3.94 ^a
Rural	14.83±1.47	45.20±4.26	37.17±4.54
<i>t</i> (P value)	-1.197 (.233)	-1.027 (.306)	1.123 (.263)
level of education			
Diploma	14.91±1.06	45.31±2.97	37.69±4.89

Associate Degree	14.64±1.48	45.38±3.35	36.89±4.27
Bachelors	14.76±1.78	44.48±5.29	38.12±3.85
Masters	14.40±1.24	44.13±3.02	37.20±4.36
MD/PhD	14.75±1.17	45.25±3.01	34.88±3.48
<i>F</i> (P value)	0.457 (.767)	0.646 (.630)	1.339 (.257)
Experience (years)			
<=5	14.66±1.73	44.25±5.49	36.84±4.05
6-10	14.78±1.50	45.19±3.21	37.81±4.19
11-15	14.57±1.48	44.20±4.24	38.23±3.84
16-20	14.66±1.48	45.29±2.94	37.39±4.49
>20	15.00±0.96	45.83±2.84	37.26±4.93
<i>F</i> (P value)	0.519 (.722)	1.271 (.283)	0.533 (.711)
Source of information			
Social media such as WhatsApp, Telegram, Instagram, Twitter and Facebook	14.33±1.30	43.42±4.70	38.08±4.56
News media such as television, radio, newspapers	14.42±2.50	44.48±6.77	36.74±4.90
International organizations such as the World Health Organization (WHO), the Centers for Disease Control and Prevention (CDC), etc.	15.06±0.83	44.94±3.36	39.03±3.93
Governmental media and websites such as the Ministry of Health of Iran	14.78±1.16	45.31±2.80	37.08±4.23
Others	14.50±1.73	45.00±1.41	36.25±3.78
<i>F</i> (P value)	1.108 (.354)	0.788 (.534)	1.763 (.138)

Discussion

COVID-19 is currently a global public challenge, especially among healthcare staff. Therefore, analyzing the knowledge of healthcare workers and investigating the factors affecting their attitude and practice is of particular importance. The results of this analysis can be used as a reference to prevent the further spread of this disease among healthcare staff.

According to the findings of this study, among the healthcare staff surveyed, the majority of them (92.6%) had sufficient knowledge about COVID-19. Accordingly, these findings are consistent with the findings of Zhang et al. (Zhang et al., 2020), Olum et al. (Olum et al., 2020), Behary Tedese et al. (Tadesse et al., 2020), Nepal et al. (R. Nepal et al., 2020), and Saglin et al. (Saqlain et al., 2020) but are inconsistent with the findings of Bhagavathula et al. (Bhagavathula, Aldhaleei, Rahmani, Ashrafi Mahabadi, & Bandari, 2020). Given that knowledge is a prerequisite for forming beliefs and promoting attitudes and behaviors (McEachan et al., 2016), health system executives should always consider the ongoing training of healthcare staff in the prevention, transmission, and symptoms of COVID-

19 (Olum et al., 2020). In addition, to fully realize this issue, practical plans should be developed.

The findings of the present study revealed that most of the healthcare workers had a positive attitude toward COVID-19. Considering that the findings indicated a significant and robust correlation between knowledge and attitude, it can be concluded that good and sufficient knowledge directly affects people's attitudes. These findings are consistent with several studies (Asaad et al., 2020; Huynh, Nguyen, VO, Pham, et al., 2020; Kamate et al., 2020; Khader et al., 2020; Maheshwari et al., 2020; R. R. Nepal et al., 2020; Saqlain et al., 2020; Shi et al., 2020; Tadesse et al., 2020; Wahed et al., 2020; Zhang et al., 2020). Therefore, it is recommended that the Ministry of Health consider comprehensive training programs to increase the knowledge of healthcare staff at regular intervals. All healthcare staff participated in this study were expected to perform well concerning COVID-19 prevention. However, the findings showed that only 60% of the subjects have a good practice compared to COVID-19 and take the necessary measures to observe the health issues required to prevent coronavirus transmission. Therefore, health policymakers and officials should pay more attention to healthcare workers' knowledge about health protocols and ensure that they take precautionary measures toward controlling infection and preventing the spread of disease. The findings of the present study are consistent with the research of Zhang et al. on physicians, nurses, and other healthcare staff (Zhang et al., 2020), with the research of Olum et al. on nurses, midwives, internship doctors, medical officers, senior house officers, and specialists (Olum et al., 2020), Tadesse et al. with research on the nursing community (Tadesse et al., 2020), and Nepal et al. with research on doctors and health assistants, nurses and other healthcare staff (R. Nepal et al., 2020). However, it is inconsistent with the research of Eddy et al on medical students (Eddy et al., 2020).

The results revealed that most of the healthcare workers used governmental media such as the website of Ministry of Health and Medical Education of Iran to receive information about COVID-19. This shows that the presence of relevant and updated information related to COVID-19 on the website of the Ministry of Health and Medical Education is essential. As a result, it may have positive consequences in increasing the knowledge of healthcare staff because trust in a reliable source of information is a crucial factor in accepting that information (Bhagavathula, Aldhaleei, Rahmani, Ashrafi Mahabadi, Bandari, et al., 2020). In a study conducted at Makerere University Teaching Hospitals in Uganda, Olum et al. (Olum et al., 2020) found that most health staff use traditional news media such as television, radio, or newspapers to obtain information. Another study by Wahed et al. (Wahed et al., 2020) at medical centers in Egypt's Fayoum province found that most healthcare staff use information

from doctors and official websites such as the WHO, and they use much less newspaper information.

Incentives, job security, timely payment of salaries, and financing of healthcare staff by health system officials can be used as motivational approaches to enable these individuals to fulfill their responsibilities with greater confidence and motivation (Iliyasu et al., 2015).

In general, the knowledge, attitude, and practice of the healthcare staff studied in this study were at the desired level. According to the research findings, there are few possible solutions to strengthen healthcare workers' knowledge, attitudes, and practices. In this regard, holding training webinars regarding the adherence and implementation of health protocols and proper practice against COVID-19, as well as holding virtual training courses with the approach of promoting staff health literacy (due to the daily increase of users in cyberspace), seems helpful.

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