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Healthcare professionals' knowledge, perception and practice towards COVID-19: A cross-sectional web-survey

Mohammed I. Aladul[a] [iD], Harith Kh. Al-Qazaz[a] and Omer Q. B. Allela[b]

[a]College of Pharmacy, University of Mosul, Nineveh and [b]Pharmacy Department, Al-Noor College University, Nineveh, Iraq

Abstract

Objective COVID-19 is a highly contagious disease. Healthcare professionals (HCPs) are increasingly facing suspected and confirmed cases of COVID-19. To evaluate Iraqi HCPs (physicians, dentists and pharmacists) knowledge, perception and practice towards COVID-19.

Methods This was a cross-sectional, anonymised web-survey, using an electronic application (Surveyheart®). The web-survey link was posted via the closed groups of physicians, dentists and pharmacists in Iraq on Facebook and Twitter. The questionnaire was self-administered and data was collected between, 10th–25th of March 2020.

Key findings Three hundred seventy two HCPs participated in the study. The majority of Iraqi HCPs have a good knowledge about the origin, incubation period, the mode of transmission, the common signs and symptoms and the groups of patients who were at higher risk of COVID-19. HCPs identified internet, social media as the main source of information about the disease. The lowest rate of correct answers was found in items related to the virus which is responsible for the development of COVID-19 disease (44.6%) and the types of face mask that protect against COVID-19 (40.6%). Physicians were found to have higher score of knowledge compared to dentists and pharmacists. Iraqi HCPs requested more strict preventive measure to be applied to prevent the spread of the disease. Iraqi HCPs expressed their inclination to use the international guidelines to treat confirmed cases.

Conclusions Iraqi HCPs have an overall good knowledge towards COVID-19. More information should be published from reputable and authentic sources to HCPs. The Ministry of Health in Iraq could take its responsibility to inform the health providers with updated and confirmed information about COVID-19 prevention and management.

Keywords corona virus; COVID-19; healthcare professionals; knowledge; perception

Introduction

In December 2019, an outbreak of lower respiratory tract infection with pneumonia was detected in Wuhan, China.[1] The Chinese health authorities identified the causative agent of this outbreak which was similar to previously known severe acute respiratory syndrome coronavirus (SARS-CoV), hence they called it severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2).[2] In February 2020, the term COVID-19 was applied by World Health Organisation (WHO) to the disease caused by 2019 novel corona virus.[3]

The high contagiosity of COVID-19 resulted in a rapid and widespread of the disease in China and surrounding countries, therefore COVID-19 was declared to be epidemic. By the 11th of March, COVID-19 affected more than 120 000 patients and 4000 deaths in 114 countries around the world, the WHO announced that COVID became a pandemic disease.[4] By the time of writing this study, the number of confirmed cases of COVID-19 exceeded 2.9 million cases and more than 200 thousand deaths in 210 countries and territories around the world.[5] In March, the pandemic foci have moved from China to Europe and the United States. It also affected the Middle East during early March.

In Iraq, the first case of COVID-19 was recorded on the 24th of February 2020.[6] Since then the Iraqi authorities have closed schools and universities in an attempt to limit the spread of COVID-19. In response to the increased number of confirmed cases in March, Iraqi authorities made further strict preventive measures and imposed curfew,

Correspondence: Mohammed I. Aladul, College of Pharmacy, University of Mosul, Nineveh 41002, Iraq.
E-mail: m.i.m.aladul@uomosul.edu.iq

banned travels between provinces and suspended flight from and to Iraq.[7] The WHO reassures Iraqis: 'that there is no need to fear a widespread of the corona virus in Iraq'.[8]

In light of the pandemic status of COVID-19 worldwide and in Iraq, healthcare professionals (HCPs) are increasingly managing suspected and/or confirmed cases on everyday bases, therefore, they should have good knowledge about the disease and the clinical manifestation and aware of the most recent updates of treatment and preventive measures to treat their patients and protect themselves from getting an infection. The aim of this study is to explore the knowledge, perception and practice of HCPs in Iraq towards COVID-19.

Methods

This was a cross-sectional, anonymised, self-administered, web-survey among Iraqi HCPs (physicians, dentists and pharmacists). This survey was conducted over the period of the 10th–25th of March, 2020 (the survey link was reposted once on the 17th of March only). HCPs from other countries were excluded.

Due to the curfew state imposed by the Iraqi government as a protective measure against COVID-19 and HCPs' duties at this particular time render them hard to reach group of respondents, a convenience sample/virtual snowballing technique was used to invite participants. The researchers posted the web-survey advertisement and link to the survey on their social media pages (four Facebook and two Twitter pages). The researchers also requested the respondents if they can repost/share the survey advertisement and link on their pages. This would allow further colleagues to view and participate. The researchers also posted the web-survey link to the Iraqi Pharmacists' Syndicate Facebook page.

The survey front page included information describing the survey and asking members for voluntary participation. An electronic consent of voluntary participation was sought from the respondents by clicking an 'agree' button. All the respondents were able to review and change their responses by scrolling up and down the page before submission. The survey tool allows no more than one response per computer. The survey tool was designed to allow only fully completed questionnaires to be submitted. Cookies were used by the survey tool (Surveyheart®)[9] to minimise the chance of more than one response per computer.

Following The survey questionnaire was developed from the Centre for Disease Control and Prevention (CDC), European Centre for Disease Prevention and Control (ECDC) and WHO recommendations and publications and designed using an electronic application (Surveyheart®). The survey's questionnaire involved three main themes, including HCPs' knowledge, perception and practice towards COVID-19. The survey questionnaire was validated (content validity), by sending a prepared content validity form to a selected panel of experts (23 experts; two family medicine physicians, three dentists, clinical pharmacists and academic pharmacists in different specialities). The questionnaire met experts' satisfaction with a content validity index of 0.84.

The reliability of the questionnaires was also reviewed. The Cronbach's alpha score was (0.71) for the whole scale, in which the Cronbach's alpha of each domain was 0.715, 0.705 and 0.719 for knowledge, perception and practice domains respectively.

Respondents' responses were collected and summarised as number and percentage by the survey tool (Tables 1 and 2). Descriptive data analysed by Microsoft Excel 365. Students t-test and ANOVA test were used to explore the differences in knowledge scores between the HCPs groups (physicians, dentists and pharmacists; Table 3) chi-square test was used to determine the level of association among variables (Tables 4 and 5). All statistical analysis was performed using SPSS version 24.

The responses of the survey three themes; the knowledge, was summarised in Table 2, which shows the frequency of correct answer to knowledge items. Furthermore, Table 3 showed the differences in knowledge scores between groups of demographic characteristics of the participants. Tables 4 and 5 were used to compare the perception and practice between the studied groups respectively.

Table 1   Characteristics of participants

Variables	Groups	N (%)
Gender	Male	187 (50.25%)
	Female	185 (49.75%)
Age	20–29	167 (45%)
	30–39	144 (38.6%)
	40–49	56 (15%)
	Over 50	5 (1.4%)
Profession	Physician	83 (22.3%)
	Dentist	37 (10%)
	Pharmacist	252 (67.7%)
Workplace	Academia (± private clinic or community pharmacy)	104 (28%)
	Primary care	78 (21%)
	Secondary care	33 (9%)
	Tertiary care	21 (5%)
	Community pharmacy or private clinic	124 (34%)
	Med reps/Office based	12 (3%)
City	Kurdistan region	133 (35.75%)
	Mid-North*	161 (43.3%)
	Baghdad	51 (13.65%)
	South	27 (7.3%)
Educational level	Bachelor degree	237 (63.75%)
	High Diploma	27 (7.25%)
	Master degree	55 (14.75%)
	PhD	40 (10.75%)
	Physician with specialisation	13 (3.5%)
Years of experience in specialisation	Less than 1 year	63 (17%)
	1–5 years	138 (38%)
	6–10	90 (24%)
	11–20	66 (17%)
	More than 20	15 (4%)

*Mid-North (including Nineveh, Al-Anbar, Diyala, Kirkuk and Saladin governorates).

Table 2 frequency of correct answer to knowledge scale items

No.	Knowledge question	Frequency of correct answers	%
Q1	Country of origin of COVID-19	359	96.5
Q2	Causative agent of COVID-19	166	44.6
Q3	Incubation period of COVID-19	300	80.6
Q4	Mode of transmission of COVID-19	354	95.2
Q5	Common sign and symptom of COVID-19	261	70.2
Q6	Subjects at higher risk of COVID-19	211	56.7
Q7	Type of face mask as a protective measure	151	40.6
Q8	Prevention of COVID-19	253	68.0
Q9	Preventive measures against COVID-19	351	94.4
Q10	Distribution of COVID-19 in the community	305	82.0
Q11	Role of HCPs in education	298	80.1
Q12	Personal hygiene (Hand sanitisation)	297	79.8
Q13	Use of face mask in workplace	322	86.6
Q14	Use of face mask in the public	293	78.8
Q15	Use immune boosters	214	57.5
Q16	Role of self-isolation/social distance	327	87.9
Q17	Published guideline in Iraq for COVID-19	231	62.1

Table 3 Differences in knowledge scores between groups of demographic characteristics

Variable		Mean ± SD	P-value
Gender*	Male	11.46 ± 1.838	0.351
	Female	11.32 ± 1.720	
Age**	20–29	11.05 ± 1.816	0.404
	30–39	11.65 ± 1.739	
	40–49	11.75 ± 1.610	
	Over 50	11.33 ± 2.309	
Profession**	Physician	11.93 ± 1.702	0.001
	Dentist	11.27 ± 1.880	
	Pharmacist	11.23 ± 1.762	
Educational level**	Bachelor degree	11.20 ± 1.841	0.227
	Diploma	11.70 ± 1.613	
	Master degree	11.78 ± 1.474	
	PhD	11.70 ± 1.870	
	Physician with specialisation	11.62 ± 1.557	
Years of experience in specialisation**	Less than 1 year	11.25 ± 1.778	0.282
	1–5 years	11.20 ± 1.768	
	6–10	11.50 ± 1.886	
	11–20	11.65 ± 1.641	
	More than 20	11.93 ± 1.751	

*Student *t*-test.
**ANOVA test.

Results

Descriptive analysis

A total of 372 HCPs participated in this study and were evenly distributed between male and female gender. The majority of participants were pharmacists and between the age of 20–39 years. The workplaces of the majority of participants were mainly in either private clinics, community pharmacies and/or academia. The majority of participants were from the northern cities of Iraq including Kurdistan region. The majority of participants have bachelor degree, with professional experience of less than 10 years (Table 1).

The majority of HCPs (95% of physicians, 95% of dentists and 97% of pharmacists) thought that the first case of COVID-19 was diagnosed and reported in China at the end of 2019. The rest of HCPs stated that the first case was diagnosed either in Japan, South Korea or Iran.

About half of HCPs (48% of physicians, 62% of dentists and 53% of pharmacists) thought that the causative agent of COVID-19 is corona virus, while 47% of physicians, 30% of dentists and 46% of pharmacists) stated that novel corona virus is the causative agent of COVID-19.

The majority of HCPs (76% of physicians, 78% of dentists and 83% of pharmacists) thought that the incubation period of COVID-19 is between 2–14 days, while a minority of HCPs stated that it may be longer and may last between 2−28 days or longer.

The vast majority of the HCPs (98% of physicians, 95% of dentists and 94% of pharmacists) were aware that the mode of transmission of COVID-19 through airborne droplets from sneezing or coughing. However, a minority stated that COVID-19 can be transmitted through feco-oral route.

The most common signs and symptoms that were identified by the majority of HCPs are fever and dry cough. Headache, sore throat and chest pain were less commonly stated signs and symptoms of COVID-19 (Figure 1).

Healthcare professionals identified elderly subjects, diabetics, patients with cardiovascular diseases and HCPs themselves are at high risk of COVID-19. A higher percentage of physicians and pharmacists who identified elderly, diabetics and patients with cardiovascular diseases at risk compared with dentists (Figure 2).

The majority of HCPs identified the internet, social media such as Facebook and Twitter and scientific articles as source of information about COVID-19. More dentists thought that social media is the most important source of information compared with physicians and pharmacists (Figure 3).

Knowledge analysis of health care professionals

Table 2 shows the frequency of answers to the knowledge items in the survey. The mean ± SD of the total knowledge was (12.62 ± 1.98) and the median was 12. The per cent of the correct answers to the knowledge scale are shown in Table 2. The lowest rate of correct answers was found in items related to the virus which is responsible for the development of COVID-19 disease (44.6%) and the types of face mask that protect against COVID-19 (40.6%).

A significant difference in knowledge score between the three professions that participated in this study was found ($P < 0.05$). Physicians were found to have higher score of knowledge in this study. No other significant difference in relation to the demographic characteristics of the study group was found (Table 3).

Perception analysis of health care professionals

Table 4 shows the frequency of answers to the perception items in the survey. About half of HCPs did not believe that

Table 4 HCPs' perception of COVID-19

Items	Physicians (n = 83)			Dentists (n = 37)			Pharmacists (n = 252)			P-Value
	Yes (%)	No (%)	Don't know (%)	Yes (%)	No (%)	Don't know (%)	Yes (%)	No (%)	Don't know (%)	
Does the government implement early diagnosis measures for travellers entering the county?	41	47	12	35	57	8	46	36	18	0.065
Does the government banned travels from areas of high incidence?	43	48	9	41	49	10	54	37	9	0.312
Are there specialised hospitals that can deal with COVID-19?	52	41	7	27	62	11	50	45	6	0.095
Do Iraqi hospitals have facilities for diagnosing, dealing with and treating suspected/confirmed cases?	22	63	16	8	73	19	25	56	19	0.163

the early preventive measures implemented by the government to restrict the travellers from entering the country and/or banning travels to/from areas of high incidence of COVID-19 were enough to prevent the spread of COVID-19. Around half of the respondents believe that there are no specialised hospitals for the management of the disease or even don't know if they even exist. With regards to facilities available by the Ministry of Health neither physicians, dentists nor pharmacists believed in the facilities for diagnosis and management of positive cases.

Practice analysis of health care professionals

Table 5 shows the frequency of answers to the practice items in the survey. Though, half of the physicians agreed to use/implement the governmental measures when dealing with suspected or an infected case of COVID-19 in the hospital compared with dentists and pharmacists (P < 0.003). The majority of HCPs expressed their inclination to implement the international guideline for the treatment of confirmed cases of COVID-19 rather than the Iraqi. The majority of HCPs were aware of the Iraqi Ministry of Health's recommendation of isolating suspected and or conformed cases of COVID-19 for at least 14 days. Only half of the physicians were aware that their hospital or workplace report suspected cases to the health authorities. About two third of HCPs have noticed/read the government published material like brochures, leaflets, posters, announcements about COVID-19.

Discussion

COVID-19 is a hot topic right now in which the whole world is concerned about the rapid spread of the disease, associated deaths, social, educational and economic impact of the disease. Scientists, researcher and drug companies race against time to develop a treatment and/or a vaccine for COVID-19.

The results of this study showed that Iraqi HCPs were aware of the origin of COVID-19 and that the first case was reported in Wuhan in China since COVID-19 became a pandemic, spread in the majority of the countries and being the first line in media. Furthermore, HCPs are in the front lines facing the disease and infected cases. Despite the good awareness of the HCPs about the disease, more than half of the respondents thought that COVID-19 is caused by corona virus. This may due to the fact that SARS-CoV-2 is one of the corona viruses' family and different names have been applied to the virus health authorities. The virus was named 'Wuhan coronavirus' and 'China coronavirus', and subsequently '2019-nCoV'. However, the WHO used the COVID-19 virus in communication and publications.[9,10]

The most commonly identified signs and symptoms by the majority of HCPs were fever and dry cough, headache, sore throat and chest pain. Studies have shown that the most common clinical manifestations of COVID-19 in confirmed cases after an incubation period of 1–14 days include fever, cough, dyspnoea, myalgia headache and diarrhoea.[11–13] The reported signs and symptoms by the HCPs in this survey were in accordance with published literature about the disease.[14]

Surveyed HCPs also identified elderly subjects, diabetics, patients with cardiovascular diseases and HCPs themselves are at high risk of COVID-19. Studies suggested that every subject is prone to COVID-19, but those with cardiovascular diseases and diabetes were tied to worse prognosis than healthy counter age subjects. Some studies suggested that cancer, surgery, cirrhosis and Parkinson's disease are also associated with poor prognosis of COVID-19.[15,16] Studies also showed that HCPs themselves are at high risk of COVID-19 and amplification of the transmission of the infection.[2,15,16] The ECDC reported that the risk of transmission of COVID-19 in primary and secondary care settings is high.[14] Furthermore, studies and reports have documented that transmissions from patients to HCPs have

Table 5 HCPS' practice towards COVID-19

Items	Physicians (n=83)			Dentists (n=37)			Pharmacists (n=252)			P-Value*
	Yes (%)	No (%)	Don't know (%)	Yes (%)	No (%)	Don't know (%)	Yes (%)	No (%)	Don't know (%)	
Do you implement the governmental measures when contacting an admitted a suspected or an infected case?	51.8	10.8	37.3	24.3	37.8	37.8	43.7	16.3	40.1	0.003
Does your hospital/work place report the suspected cases to health authorities?	52	33	16	19	57	24	34	44	22	0.007
I have read/noticed/watched governmental brochures, leaflets, posters, announcements/visual or audio media about COVID-19?	69	5	27	57	16	27	71	6	23	0.127
To treat a confirmed case, I would use the....	Iraqi guideline 23	Arabic guideline 0	International guideline 86	Iraqi guideline 14	Arabic guideline 0	International bbguideline 87	Iraqi guideline 12	Arabic guideline 1	International guideline 87	0.231

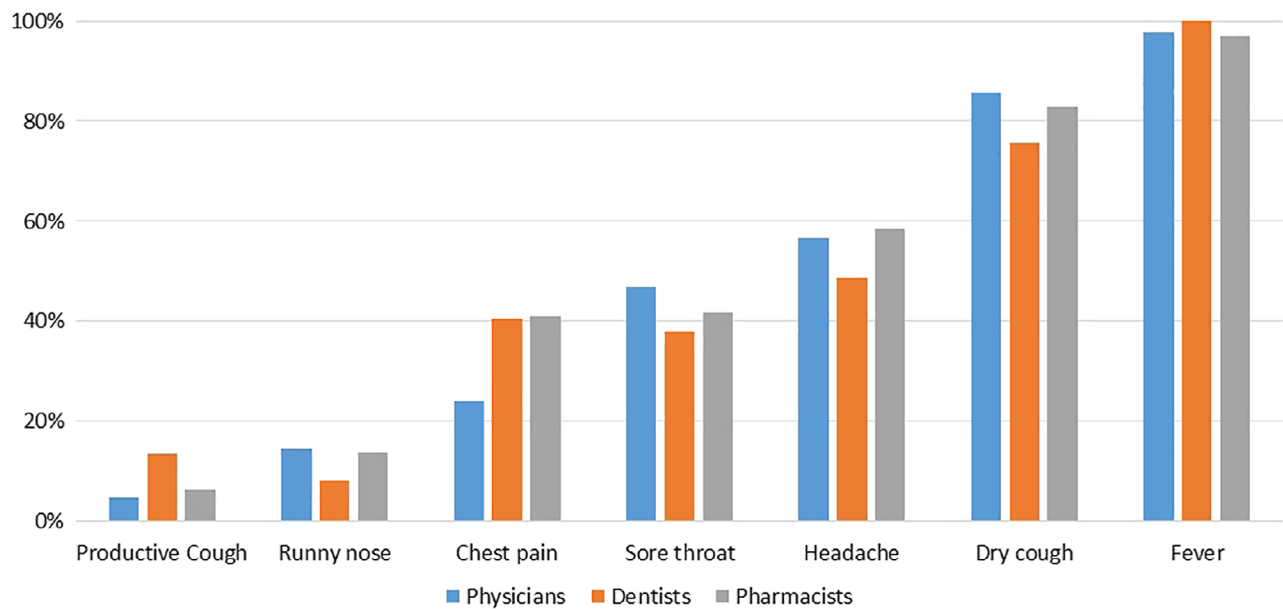*P-value: for chi-square test.

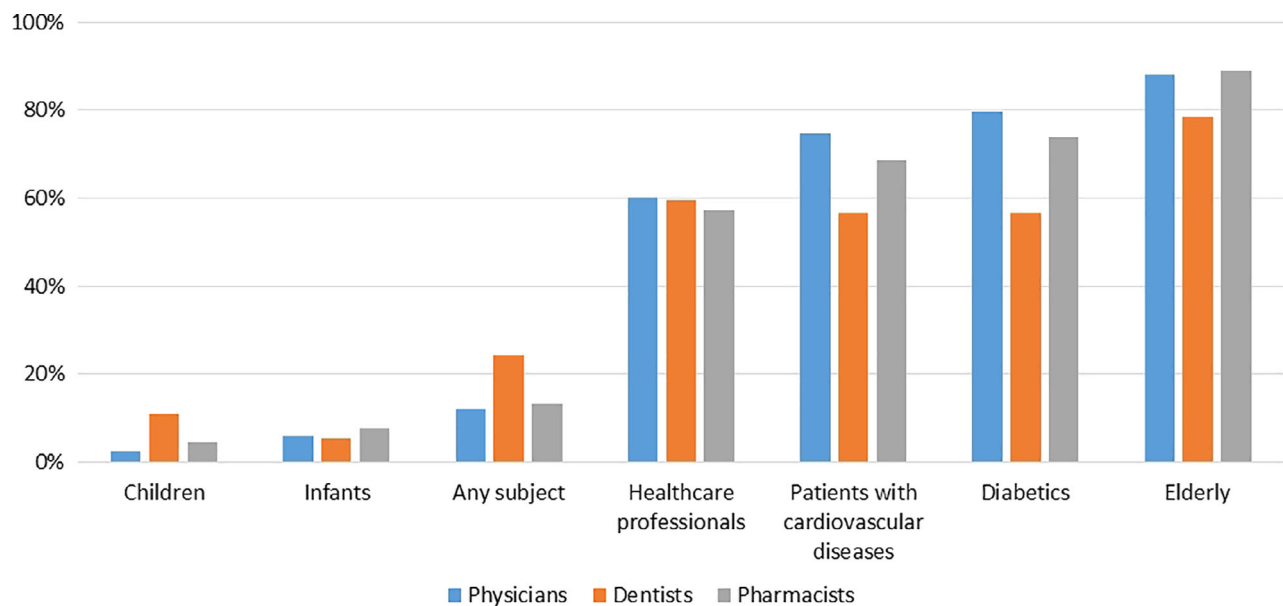**Figure 1** Participants were asked about the signs and symptoms of COVID-19.

Figure 2 Participants were asked about who are the people that are at high risk of COVID-19.

been identified, which place a heavy burden on national health system and society.[17,18]

Iraqi HCPs also have shown a good knowledge about the incubation period of COVID-19. Studies have revealed that the mean incubation period of COVID-19 between 3–5.5 days and within 97.5% of confirmed cases, symptoms appear by 11.5 days.[15,19] However, several cases of longer incubation periods (19–27 days) have been reported in two studies and a report.[20,21] Similarly, Iraqi HCPs have good knowledge about the mode of transmission of COVID-19 through airborne droplet from sneezing or coughing which

was confirmed in many studies.[12,22] Recently, studies found that the virus is present in the stool, blood, amniotic fluid and breast milk which may be potential routes of transmission.[23,24]

Iraqi HCPs showed good knowledge about the major aspects of knowledge COVID-19 (country of origin, incubation period, mode of transmission, common signs and symptoms, subjects at higher risk, prevention and preventive measures, distribution of COVID-19 in the community, the role of HCPs in patients education, personal hygiene and hand sanitisation, use of face mask in workplace, use of
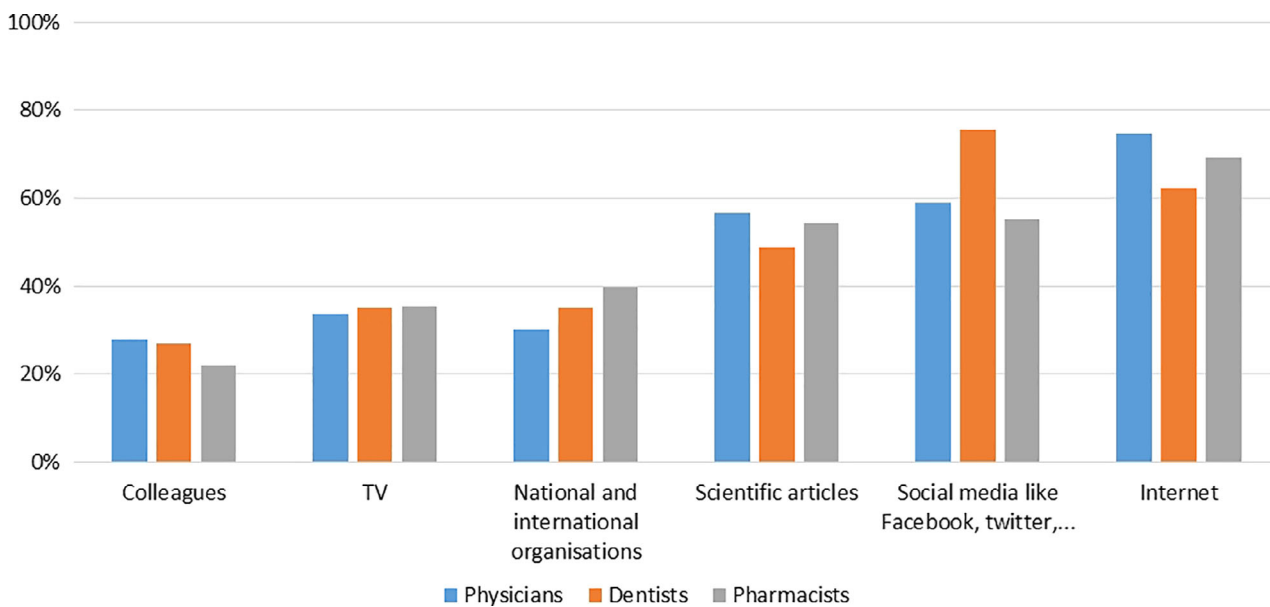
Figure 3 Participants were asked about their source of information about COVID-19.

face mask in the public, use immune boosters, role of self-isolation/social distance and published guideline in Iraq for COVID-19). Iraqi HCPs showed a higher knowledge in comparison with global HCPs that participated in Bhagavathula *et al*., study.[25] However, Iraqi HCPs have poor knowledge regarding the name of the causative agent (as discussed earlier) and the type of face mask that provides the best protection against COVID-19. Our survey highlighted a variance in knowledge items between studied HCPs groups (physicians, dentists and pharmacists), in which physicians showed a statistically significant higher score of knowledge in comparison with dentists and pharmacists. This is not surprising since physicians were in close contact with patients within primary and secondary care settings and dealing with patients on daily basis.

The survey respondents highlighted the importance of the internet as the first source of information followed by social networks (Facebook and Twitter) and scientific articles. Nowadays, national and international health organisation are publishing guidelines, recommendations and statistics through the internet, it became an important source of information for HCPs.[26] The result of our study was in line with Bhagavathula *et al*., study that found that 60% of HCPs used social media as a source of information about COVID-19.[25] Interestingly, pharmacists were the least social media users as source of information compared with physicians and dentists. This was in line with Grindrod *et al*., study, which found that pharmacists have been relatively slow to adopt social media.[27]

Iraqi HCPs believed that the preventive measures imposed by the government were weak and or late in response to the infestation of COVID-19 in different countries around the world. The Iraqi government imposed curfew and banned travel in the middle of March only after the confirmation of 230 cases of COVID-19 and 10 deaths.[28] This result was in line with reports that stated that

physicians' deemed the central government's measures insufficient to control the disease and more strict measures were requested.[29]

Healthcare professionals believed that the Iraqi health system infrastructure is poor and there is a shortage in the number of hospitals, HCPs and medical equipment that make Iraq's healthcare system lags behind the region and may face a health crisis due to COVID-19 pandemic.[6] The WHO have identified gaps in Iraq's medical infrastructure and they are working to address them and supplying Iraq with facilities aid in the detection of COVID-19.[6,30]

Only half of the Iraqi physicians agreed to use the governmental measures when dealing with suspected/infected case of COVID-19 that stated that 'those who have influenza-like symptoms should contact their nearest health centre as soon as possible, early diagnosis is critical to averting more serious health complications later'. Furthermore, the newly updated treatment regimen includes hydroxychloroquine plus azithromycin for COVID-19 positive cases without pneumonia, and the same regimen plus oseltamivir for cases with pneumonia. While those patients with pneumonia in who were admitted to the intensive care unit would be treated with a combination of hydroxychloroquine, azithromycin, oseltamivir and Kaletra® (lopinavir/ritonavir) in addition to antibiotic therapy.[31] The European Medicine Agency stated that up to the time of the writing of this study, 'no medicine has yet demonstrated efficacy in treating COVID-19'. China, Italy, France, Spain and recently USA have used off-label medicine for severely ill patients including several antivirals ribavirin, lopinavir/ritonavir, remdesivir and favipiravir. In addition to interferon β-1a and chloroquine/hydroxychloroquine.[32] Unfortunately, a newly published randomised clinical trial of lopinavir/ritonavir in China failed to show any favourable effect on the clinical course or the mortality compared to standard treatment.[14] Furthermore, following publishing a small French

non-randomised clinical trial used hydroxychloroquine alone or in combination with azithromycin and revealed that both medicines reduced the time to resolution of viral shedding of COVID-19.[33] Some countries incorporated these medicines in their treatment protocol like Iraq. The American cardiologists raised concerns about the risk of arrhythmic death due to the concurrent use azithromycin plus hydroxychloroquine,[34] which could be one of the reasons that made Iraqi HCPs to be inclined to use the international guideline rather than the Iraqi guideline.

The strength of this study was that this is the first study to compare and contrast HCPs' knowledge and perception towards COVID-19. Our study has some limitations. Most of the respondents were pharmacists compared to dentists and physicians. The second limitation was that nurses were not included due to the English language barrier that requires translation of the questionnaire and reverses translation of the responses which is time-consuming with regard to this hot topic. Unlike medicine, dentistry and pharmacy colleges, the study in nursing college is in Arabic language and most of the nursing staff have modest English level. Third limitation was that the authors could not distinguish participants who were actually dealing with confirmed cases which might reflected in their responses. Despite these limitations, the findings of this study provide an insight into the knowledge, perception and practice of Iraqi HCPs towards COVID-19.

Conclusions

Iraqi HCPs have an overall good knowledge towards COVID-19. Due to the pandemic nature of COVID-19 and spread all over the world, continuous information should be published from reputable and authentic sources to HCPs. Despite their awareness of the Iraqi guidelines and recommendations about dealing with suspected and confirmed cases, Iraqi HCPs were more inclined to use the international guideline to treat their patients. Ministry of health in Iraq could take its responsibility to inform the health providers with updated and confirmed information about COVID-19 prevention and management.

Declarations

Conflict of interest

The Authors declares that they have no conflicts of interest to disclose.

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Authors' contributions

All authors have contributed to this study and all authors reviewed and approved the final version of the manuscript. MIA participated in the study design, data collection and interpretation of results, prepared the manuscript draft, and performed all analytical testing and manuscript review. HKA and OQA participated in the study design and reviewed the manuscript and corrected the final version of the manuscript.

Informed consent

Electronic consents were obtained from all individual participants included in the study.

Ethical approval

Not applicable.

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