Original Article

National Survey: Knowledge, Attitude and Practice Towards COVID-19 among Iraqi Pharmacy Students

Haydar Al-Tukmagi[1], Omer Qutaiba Baderaldeen Allela[2]*, Hayder Adnan Fawzi[3], Dur Haider Fakhri[4]

[1]Department of Pharmacy, Baghdad College of Medical Sciences, Baghdad, Iraq. [2]Department of Pharmacy, Al-Noor University College, Bartela, Iraq. [3]Department of Pharmacy, Al-Rasheed University College, Baghdad, Iraq. [4]Department of Medicine, Madain General Hospital, Baghdad, Iraq.

Abstract

The recent infection by the COVID-19 virus has rapidly become a major health concern, both in terms of its strong impact on the health system, and economical burden. Assessment of pharmacy students' level of awareness, attitude, and knowledge about the recent COVID-19 infection in Iraq. A population-based cross-sectional study that involved pharmacy college students across the country, this study used an electronic-based questionnaire that was delivered to each of the participants online. The study included 907 pharmacy students, with 609 females (67.1%) and 298 males (32.9%), a ratio of 2:1. The fifth grade represented the majority, with 275 students (30.3%). Overall, 81.1% of all students knew about COVID-19 infection before the outbreak (which was similar across all grades, p-value = 0.160), the most common source of information was social medical (52%, followed by the WHO website (25.8%), in which the lower grades depended less on the WHO website. Most of the students (61%) believed 1-2months ago that the COVID-19 infection was circulating in Iraq, while 29.2% only started to believe it within the previous 2 weeks. In terms of preventive measures, 89.1% believe that adhering to guidelines can prevent infection, 86.0% believe that infection control in hospitals can prevent transmission. Pharmacy students show a high level of awareness in terms of the medical aspect of the disease, good knowledge in the science about the virus. The students have a negative impression of the role of institutes towards the prevention of the spread of the infection.

Keywords: Students, Pharmacist, WHO guidelines, Questionnaire, Electronic

Introduction

The recent infection by the COVID-19 virus has rapidly become a major health concern, both in terms of its strong impact on health systems and as an economical burden [1]. Coronavirus is a major animal and, recently, a human pathogen that is transmitted through human contact. In 2019 it caused a cluster of severe pneumonia, which originated in Wuhan (a city in China) and rapidly spread to most countries worldwide, becoming a pandemic. In February 2020, the World Health Organization designated the disease COVID-19, which stands for coronavirus disease 2019 [2].

The COVID-19 is a beta-coronavirus, which is the same subgenus as the severe acute respiratory syndrome (SARS) virus but in a different clade [3]. The Middle East respiratory syndrome (MERS) virus, another beta-coronavirus, appears to be more distantly related [4, 5]. The closest RNA sequence similarity is to two bat coronaviruses, and it appears likely that bats are the primary source; whether the COVID-19 virus is transmitted directly from bats or through some other mechanism (e.g., through an intermediate host) is unknown [6].

Worldwide, more than 10 million infections were reported, with some reports indicating an underestimate of the actual number of infections: the actual number may be as high as 10-fold the reported number [7, 8].

Direct person-to-person transmission is the primary source of transmission of the virus. It is believed to occur through close-range contact, mainly via respiratory droplets with an infection range of about 2 meters [9].

In the present study, we examined pharmacy students' level of awareness, attitude, and knowledge about the recent COVID-19 infection in Iraq.

Address for correspondence: Omer Qutaiba Baderaldeen Allela, Department of Pharmacy, Al-Noor University College, Bartela-Iraq.
Omerallela@alnoor.edu.iq

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Materials and Methods

Study Design

This was a population-based cross-sectional study that took place during March 2020, when Iraq was in a strict lockdown to implement social distancing to avoid the spread of the virus and involved pharmacist students across the country. This study used an electronic-based questionnaire that was delivered to each of the participants online. It was designed on Google forms and the link generated was shared on the Facebook group of the Iraqi pharmacist's syndicate.

Sample Size Calculation

A sample size of 817 students was calculated considering the power of 80%, a confidence level of 95%, a relative precision of 7%, and a prevalence of 50% (proposed answer rate). The following formula was used to calculate the estimated sample size:

$$n = \frac{4\,p.q}{d^2} \quad (1)$$

where p is the prevalence, q is $(1 - p)$, and d is relative precision.

Participants

Initially, we collected 1,189 participants. After excluding incomplete answers, 907 students remained in the study (which is above the predetermined number of 817 students).

Students selected to take part in this study met the inclusion criterion of having been exposed to the virus in the recent outbreak of Covid-19 that occurred in the country.

Data Collection

The data were collected based on a 40-item online questionnaire that evaluated three main domains: (1) medical knowledge about virology, mode of transmission, treatment, and epidemiology; (2) attitude toward infectivity, adherence guidelines, transmission prevention, vaccine; and (3) practice regarding COVID-19 treatment and prevention.

Questionnaire Design

The survey instrument was designed based on an extensive literature review, and course material regarding emerging respiratory diseases—including COVID-19— by the World Health Organization (WHO). (WHO) The questionnaire was validated in a two-step process (Supplement 1, [10]): The first step ensured simplicity, and its relevance to the objective, and was assessed by a graduate pharmacist and a professional educationist with a pharmacy and medical background [11, 12]. The next step was to perform a pilot study that included 12 students. These students gave their opinions on making the questionnaire simpler and shorter. Amendments from the participants were considered and integrated into the questionnaire while ensuring its consistency with the published literature. After a thorough discussion, the questionnaire was finalized by the authors and subsequently distributed to the participants for their response.

Test-retest reliability was calculated using Cronbach's alpha [13-17] and found to be 0.947. The data of the pilot study was not used for the final analysis **(**Supplement 2) [18].

Demographic Data

This section assessed participants' age, gender, grade, knowledge about COVID-19, source of knowledge, and residency.

The Domain of the Questionnaire

This section contains 18-items, while the attitude section contains 10-items, and the practice domain contains 10-items.

Statistical Analysis

Discrete variables were presented using their number and percentage; for the assessment of reliability Cohen's kappa test andCronbach's alpha were used. Statistical analysis was performed using SPSS 22.0.0 (Chicago, IL) software package. A P-value of less than 0.05 was considered significant.

Data Availability

Zenodo: Data about the assessment of Iraqi pharmacy students towards COVID-١٩

http://doi.org/10.5281/zenodo.3950381

This project contains the following underlying data:

- Questionnaire about the Iraqi Pharmacy Students' Knowledge, Attitude, and Practice towards COVID-١٩]١٠[
- Extended Data File data setting.xlsx (raw data for 15 students in the pilot study) [18]
- Extended Data File data setting.xlsx (raw data for all 907 pharmacy students) [19].

Results and Discussion

The study included 907 pharmacy students, with 609 females (67.1%) and 298 males (32.9%), a ratio of 2:1. The fifth grade represented the majority, with 275 students (30.3%), followed by the 3rd year 196 (21.6%), 2nd year 160 (17.6%), 4th year 156 (17.2%), and lastly the 1st year 120 (13.2%).

General Knowledge and Awareness of the Students

Overall, 81.1% of all students knew about the COVID-19 infection before the outbreak (which was similar across all grades, p-value = 0.160), the most common source of information was social media (52%, followed by the WHO

website (25.8%) with the lower grade depending less on the WHO website.

Concerning the basic virology knowledge and its epidemiology, the majority of the students (99.1%) knew that COVID-19 is a viral infection, a good proportion (62.3%) knew the origin of the name of the virus, 93.6% knew the mode of transmission, and 87.1% knew the country of origin of the new outbreak.

In terms of clinical items, 71.1% knew the life span of the virus in the air and on different surfaces, 93.7% knew the symptoms of the disease; however only 62% knew that diarrhea can be a symptom besides the respiratory manifestations, 91.7% knew the incubation period of the virus (1–14 days).

Concerning the therapeutic aspect of the disease, 96.4% of the students knew that no vaccine was currently available for COVID-19, while 77.7% knew that no available treatment for COVID-19 was currently available. At the same time, 68.4% believed that a home remedy or herbs are not effective as a treatment for COVID-19 infection.

As regards their knowledge about prevention measures, most (85.2%) reported studying more is the best preventive measure, 87.7% believed that 70% alcohol is the most effective surface disinfectant, 95.8% of the students believed that patients with chronic disease, and 96.6% that healthcare workers are at increased risk of serious COVID-19 infection, and 96.6% believed that healthcare providers are at increased risk of serious COVID-19 infection. COVID-19 infection was believed to be fatal by 95.9% of the students.

Most of the students (61%) believed that the COVID-19 infection believed 1-2 months ago that the COVID-19 infection was present in Iraq, while 29.2% only started to believe it within the previous 2 weeks, as illustrated in **Table 1**.

Table 1. Assessment of student knowledge

	Response	Number (%)
Do you have sufficient knowledge about COVID-19?	No	171 (18.9%)
	Yes	736 (81.1%)
Source of your knowledge about COVID-19?	MOH website	70 (7.7%)
	Friend	21 (2.3%)
	Newsletter	27 (3.0%)
	WHO website	234 (25.8%)
	TV	66 (7.3%)
	Social media	472 (52.0%)
	Electronic resources	5 (0.6%)
	All methods	12 (1.3%)
Did you know that COVID-19 is a viral infection?	No	8 (0.9%)
	Yes	899 (99.1%)
Do you know why this virus is called a novel coronavirus?	No	343 (37.8%)
	Yes	564 (62.2%)
Do you know where the term COVID-19 comes from?	No	342 (37.7%)
	Yes	565 (62.3%)
Do you think/believe that COVID-19 is transmitted by close contact with an infected person or animal?	No	58 (6.4%)
	Yes	849 (93.6%)
In your opinion, China do most infected cases originate?	No	117 (12.9%)
	Yes	790 (87.1%)
Do you know exactly the life span of COVID-19 in the air and on different surfaces?	No	257 (28.3%)
	Yes	650 (71.7%)
Do you know the exact signs and symptoms of COVID-19 infection?	No	57 (6.3%)
	Yes	850 (93.7%)
Did you know that diarrhea can be one of the symptoms of COVID-19 infection besides the known respiratory symptoms of the disease?	No	345 (38.0%)
	Yes	562 (62.0%)
What is the exact incubation period of the virus?	5 days	15 (1.7%)
	1–14 days	832 (91.7%)
	21 days	53 (5.8%)
	>21 days	7 (0.8%)
Is there any vaccine for COVID-19 available on the market?	No	874 (96.4%)
	Yes	33 (3.6%)
Is there any treatment for COVID-19 infection available on the market?	No	705 (77.7%)
	Yes	202 (22.3%)
Do you believe that there is a home remedy or a herbal mixture that is effective as a treatment for COVID-19 infections?	No	620 (68.4%)
	Yes	287 (31.6%)
What is the best prophylactic tool?	Stay home	773 (85.2%)
	Just washing hands with soap	37 (4.1%)
	Just cleaning surfaces with disinfectants	6 (0.7%)
	All	91 (10.0%)
The best surface disinfectant for COVID-19 is?	Alcohol more than 70%	788 (87.7%)

	Chloroxylenol B.P. 4.8%w/v	97 (10.8%)
	Povidone iodine 0.5 %	14 (1.6%)
Do you think that patients with underlying chronic diseases are at a higher risk of infection?	No	38 (4.2%)
	Yes	869 (95.8%)
Do you think that healthcare workers are at a higher risk of infection?	No	31 (3.4%)
	Yes	876 (96.6%)
Did you know that COVID-19 infection could be fatal?	No	37 (4.1%)
	Yes	870 (95.9%)
When did you believe that COVID-19 was a real infection in Iraq?	<2 weeks	265 (29.2%)
	1–2 months	553 (61.0%)
	2–3 months	89 (9.8%)

Student Attitude Toward COVID-19 Infection

Table 2 summarizes the students' attitudes concerning COVID-19 infection, in which 86.2% were worried about getting infected.

In terms of preventive measures, 89.1% believed that adhering to guidelines can prevent infection, 86.0% believed that infection control in hospitals can prevent transmission, 84.8% gave a positive answer with regards to taking the COVID-19 vaccine if it becomes available in the future.

With regards to treatment, 75.2% believed that intensive treatment should be given to diagnosed patients, and 96.1% believed that healthcare providers should increase their knowledge about the virus.

As regards the available information provided to the Iraqi society toward COVID-19 infection, most reported a neutral belief (40.7%) and 27.5% disagreed that there is sufficient information available. Only 33.3% thought that the government can control COVID-19 infection, 32.0% of the measures taken by the government are not sufficient to control the spread of COVID-19 infection, and only 58.8% knew the hotline number for information about COVID-19 infection.

Table 2. Assessment of patient's attitude toward COVID-19 infection

Question	Response	Number (%)
Are you worried that you, one of your family members, and friends can get an infection?	No	125 (13.8%)
	Yes	782 (86.2%)
Can transmission of COVID-19 be prevented by using standard and isolation precautions given by the MOH, WHO, or any other authorized organizations?	No	99 (10.9%)
	Yes	808 (89.1%)
Can the prevalence of COVID-19 be reduced by the active participation of a healthcare worker in the hospital infection control program?	No	127 (14.0%)
	Yes	780 (86.0%)
If the COVID-19 vaccine becomes available, will you take it?	No	138 (15.2%)
	Yes	769 (84.8%)
Should intensive treatment be given to diagnosed patients?	No	225 (24.8%)
	Yes	682 (75.2%)
Should healthcare workers acquaint themselves with all the information there is about the virus?	No	35 (3.9%)
	Yes	872 (96.1%)
The available information about COVID-19 in the Iraqi Society is sufficient.	Strongly disagree	123 (13.6%)
	Disagree	249 (27.5%)
	Neutral	369 (40.7%)
	Agree	133 (14.7%)
	Strongly agree	33 (3.6%)
Are the government institutions able to control the infection spread?	No	605 (66.7%)
	Yes	302 (33.3%)
Do you believe that the procedures taken by the government to stop the infection spread are enough?	No	617 (68.0%)
	Yes	290 (32.0%)
Did you know that there is a hotline number for information about COVID-19 from the MOH?	No	374 (41.2%)
	Yes	533 (58.8%)

Most of the students (92.6%) had taken action to prevent COVID-19 infection, 62.5% would go to the hospital if they became feverish, while 87.1% would advise any person with suspected symptoms to visit the hospital, 93.5% of the students' advised their relatives to follow the WHO recommendations, while about half of the students would advise people to follow the information navigable on social media, as illustrated in **Table 3**.

Table 3. assessment of the student practice toward COVID-19 infection

Question	Response	Number (%)
Have you taken any action to avoid being infected by COVID-19?	No	67 (7.4%)
	Yes	840 (92.6%)
If you had a fever would you go to a hospital?	No	341 (37.6%)
	Yes	566 (62.4%)
If anyone is suffering from fever or any suspected symptoms, do you advise them to go to a hospital?	No	117 (12.9%)
	Yes	790 (87.1%)
For how long you have been practicing these behaviors?	< 1 months	500 (55.1%)
	1–2 months	407 (44.9%)

Do you advise your family, relatives, and friends to follow MOH advice?	No	59 (6.5%)
	Yes	848 (93.5%)
Do you advise people to follow what they read on Facebook, WhatsApp, and website information?	No	470 (51.8%)
	Yes	437 (48.2%)
In what ways have you changed your behavior or taken actions to avoid being infected?	I stay at home	529 (58.3%)
	I wash my hands with soap and water more often	95 (10.5%)
	Others	283 (31.2%)
What would be the first thing you do if you suspect that one of your family, neighbor, or friends has a COVID-19 infection?	Call the hotline number	388 (42.8%)
	Go to the health center	375 (41.3%)
	Others	144 (15.9%)
What actions have you taken to protect your family members from COVID-19?	Telling them to stay home	634 (69.9%)
	Telling them about handwashing and hygiene	89 (9.8%)
	Others	184 (20.3%)
How can you safely help care for a family member, neighbor, or friend suspected of having COVID-19 while waiting for healthcare staff to arrive? What can you do?	Keep the person away from others	516 (56.9%)
	Use protective barriers such as gloves and mask	176 (19.4%)
	Others	215 (23.7%)

The current work examined pharmacy students' knowledge, awareness, attitude, and practice toward the recent COVID-19 infection in Iraq after the emergence of its global pandemic. It revealed a high level of knowledge and awareness toward this disease, and to the best of our knowledge, this is the first study that has examined pharmacy students, both locally and in the world.

The current work revealed that Iraqi pharmacy students had sufficient knowledge about COVID-19 infection, which is consistent with previous studies, some of which involved medical students, such as the study by Al-Mohrej and Agha, [20] which involved 136 medical students. They found that medical students had a good awareness of the disease (clinically in terms of diagnosis, etiology, and management), [20] which was in agreement with our findings.

In another study by Al-Mohrej *et al*., a sample of more than 1,100 Saudi Arabian general participants were assessed on their awareness of the Middle East Respiratory Syndrome (MERS) and their knowledge on how to protect themselves from the infection. The majority (more than 90%) of them responded that they had some knowledge about the infection, [21] which was in agreement with our findings.

In another study that involved 200 dental students conducted in Saudi Arabia), the study aimed to assess the level of awareness, knowledge, and attitude of these students towards MERS-coronavirus (this study was published in 2015, before the recent COVID-19 pandemic). The knowledge about the infection was low (44%), and the author concluded that the dental students had good knowledge, despite being lower than the present study, which can be attributed to higher media and social coverage about the recent COVID-19 pandemic compared to before the pandemic [22].

In the present study, pharmacy students had excellent knowledge about COVID-19 virology, the methods of transmission, signs and symptoms, treatment, prevention, and outcomes. About 96.4% that a vaccine was not currently available, and 93.6% knew the method of transmission. This can be attributed to increased governmental and educational campaigns aimed at the public, especially toward those in the medical field [23].

In this regard, the majority of the students chose social media (52%) and the WHO website (25.8%) as the most important source of their knowledge, which could explain why there was no significant difference in knowledge when divided using their grade (data not shown) since, in case of COVID-19, the source of the students' knowledge comes mostly from noneducational programs.

In the current study 62.2% of the students knew why the virus is called "novel coronavirus," and 62.3% knew the source of naming the virus; in addition, 71.7% knew its life span in the various environments. This indicates good knowledge about virology, which could come from good knowledge obtained from a university education (since in their curriculum, virology lessons are given at the early stages with extensive courses), while students in the last year (fourth and fifth stages) have courses that involve clinical studies through community pharmacy and hospital training that enhance their knowledge.

In terms of attitude, most of the students reported being worried about the virus infecting their family and close contacts (86.2%). Additionally, 66.7% of the respondents believed that the government did not offer sufficient control regarding the virus, with 68% believing that insufficient procedures had been taken by the government to stop the virus. This negative impression in later months has become more evident since the spread of the virus increased extensively later. Additionally, 66.7% of the respondents believed that the government did not offer sufficient control regarding the virus. Concerning the information available about COVID-19 in Iraqi society, 27.5% believed it is

insufficient and 50.7% gave a neutral answer. So, we could use the negative view of the respondents as a strong predictor of the worse spread of the virus that subsequently occurred.

In terms of student attitude towards preventive methods, most of them (89.1%) believed active participation in the preventive methods declared by the WHO will reduce transmission, and if a vaccine becomes available they will take it (84.8%). This point of view indicates that our students want to take an active part in infection control and they feel that insufficient resources have been mobilized by the government.

Conclusion

Pharmacy students showed a high level of awareness in terms of the medical aspect of the disease, and a good knowledge of the basic science about the virus. The students had a negative impression of the role of official institutions towards the prevention of the spread of the infection.

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