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Original Research

An overview of the experience of Iraqi COVID-19 patients, and the role of the pharmacists during their infection

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Abstract

Background: The global healthcare systems have faced significant challenges due to the COVID-19 pandemic. Pharmacists have been frontline healthcare workers playing a pivotal role during this pandemic. This study aimed to understand the experiences of Iraqi COVID-19 patients and highlight the role of pharmacists during their infection. **Methods:** A cross-sectional web-based study was conducted among the Iraqi public. Inclusion criteria comprised individuals residing in Iraq who had previously contracted COVID-19. The survey assessed demographic information, the COVID-19 experience of participants, and the role of pharmacists from the patient's perspective. **Results:** Over 561 participants from various Iraqi cities responded. Most participants (43.5%) stated that their infection source was mainly contacting infected family or friends. About 40.0% of the participants required a specialist doctor visit during their infection, 5.9% required hospitalization, and 1.6% required admission to the intensive care unit (ICU). Regarding herbal products, 42.8% of the study's participants used herbs. Fatigue and fever were the most comely reported symptoms. Vitamin C and analgesics were the most used supplements/medications. Of the participants, 35.0% stated that they visited a pharmacy in person, while 31.2% contacted pharmacists through a third person. Nearly half of the respondents strongly agreed or agreed with the statements highlighting the proactive role of pharmacists in providing medical advice, prevention tips, medication instructions, and drug-to-drug interaction guidance during the COVID-19 pandemic. **Conclusion:** The study highlights the significant role of pharmacists in Iraq during the COVID-19 pandemic, emphasizing their importance in patient care, medication management, and delivering health advice. Collaborative efforts between pharmacists and other healthcare professionals can further optimize patient care during health crises.

Keywords: covid-19; pharmacists; Iraq; patient care; medication management

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INTRODUCTION

The emerge of SARS-COV-2 in Wuhan, China, in 2019 led to a global pandemic. The World Health Organization (WHO) has prompted the declaration of a state of emergency and established international rules to deal with the virus.[1,2] Subsequently, different types of vaccines were developed.[3] The first cases diagnosed with COVID-19 in Iraq were in February 2020.[1,4] After two weeks in Baghdad, the first confirmed case was reported, and 101 people tested positive for the coronavirus. According to the Iraqi Ministry of Health, the number of people infected with the coronavirus in Iraq reached 2,465,545 by October 2023. In comparison, the confirmed cases worldwide during the same period reached 696,246,508.

This posed a new challenge to the Iraqi healthcare system, following decades of international sanctions, and a deteriorating economic situation.[1] In response, the Iraqi government implemented strict measures and declared general curfews. After a few weeks, the government removed some restrictions, and the curfew was adjusted to be from 19:00 to 06:00 every day, except for Fridays and Saturdays the lockdown was all time.[5]

Herbal therapy and non-prescription medications were the first choice for individuals who contracted the virus to relieve their symptoms. Pharmacists have an important role in emergency medical services through dispensing medicines and closely monitoring patients during their treatment. Their interventions

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served as the first line of protecting human lives and enhancing medicine safety. Additionally, the collaboration between pharmacists and physicians reduces drug consumption, increases the benefit of medicines, and minimizes treatment costs.[6]

This research aims to build data on the Iraqi COVID-19-infected people's experience and evaluate the important actions of pharmacists.

METHODS

Study design and participants

A web-based, descriptive, cross-sectional study was conducted among the Iraqi public between October 2021 and March 2022, utilizing a convenience sampling approach. Google Forms was used to distribute the survey. People who reside in Iraq and have at least one history of COVID-19 infection were eligible to participate in the study. The study's objectives were clarified to the potential participants. Participants were notified that taking part in the study is completely voluntary and will not pose a minimal risk to them. If participants completed the survey and submitted their responses, the researchers regarded that as their giving informed consent to participate in the study. Ethical approval for the present study was acquired from the Faculty of Pharmacy, Applied Science Private University.

Survey development and data collection

The study survey was developed following an extensive literature review.[2,7-11] The first draft of the survey was reviewed by five independent experts in the field to assess the face and content validity. Their appraisal focused on questions comprehension, word clarity, and relevancy of each item. Thus, the survey was revised and rewritten according to their comments and feedback.

The final version of the study's survey consisted of three major sections. The participants' demographic information was included in the first section. The COVID-19 experience of Iraqi participants was evaluated in the second section. The third section evaluated the role of pharmacists from the perspective of the participants.

Social media was mainly used (Facebook and WhatsApp) to invite eligible participants to take part in the current study. Participants who were interested and accepted to participate were able to open a link to view the ethical committee-approved data before filling out the survey. The survey was designed to be completed within 10 minutes.

Sample size

The sample size was determined based on a 5% margin of error, a 95% confidence level, and a 50% response distribution; resulting in a total of 385 participants. A higher sample was contacted by the research team to increase the study's generalizability and power.

Statistical analysis

The Statistical Package for the Social Sciences (SPSS), Version 24.0, was used to code and input the participants' responses once data was collected (IBM Corp., Armonk, New York, USA). For continuous variables, descriptive findings were reported as median and interquartile range, and for qualitative variables, as percentages.

Simple linear regression was used to determine which independent variables affected the severity score during the COVID-19 infection, variables with a p-value <0.25 in simple linear regression were enrolled in multiple linear regression, after confirming that there was no multicollinearity among these variables. For multiple linear regression, a p-value of <0.05 was considered a significant result.

Simple logistic regression was used to explore the demographic variables that were significantly and independently associated with receiving the COVID-19 vaccine. After confirming that there was no multicollinearity among the variables; variables with a p-value of less than 0.25 in simple logistic regression were included in multiple linear regression. Additionally, because there were five predictors, utilizing 20 participants for each would require 100 participants, making our sample representative after taking into account that 5-20 participants were required for each predictor.[12]

RESULTS

In the current study, 561 participants from different Iraq cities reported their experiences when they were infected by COVID-19. The median age of participants was 37 (IQR= 16), the majority were females (58.1%), non-smokers (84.7%), and more than half of the participants were married (64.7%). Most of the participants were residing capital Baghdad (39.9%). About one-third of the participants worked in the health sector (31.2%). Regarding their health status, 12.8% of the participants had chronic diseases, and 6.4% had asthma. Only 5.3% of the participants have medical insurance (Table 1).

Table 1. Demographic characteristics of the study's participants (n= 561)

Parameter	Median (IQR)	n (%)
Age	37 (16)	
Gender		
Male		235 (41.9)
Female		326 (58.1)
Marital status		
Married		363 (64.7)
Single		179 (31.9)
Widowed		11 (2)
Divorced		8 (1.4)
Smoking status		
Smoker		86 (15.3)
Non-smoker		475 (84.7)
Working in the health sector		
Yes		175 (31.2)
No		339 (60.4)
Did not work		47 (8.4)
Chronic diseases		
Yes		72 (12.8)
No		489 (87.2)

Asthma Yes No		 36 (6.4) 525 (93.6)
Medical Assurance yes No		 30 (5.3) 531 (94.7)

Most of the participants (43.5%) stated that their infection source was mainly contacting infected family or friends, while about 23.0% of the participants believed they contracted the virus at work (Figure 1). Most of the participants (89.3%) informed the people whom they contacted in the previous days about their positive COVID-19 test results. Around one-quarter of the study's participants (25.3%) received the COVID-19 vaccine before getting infected.

Regarding the COVID-19 test, most of the participants (38.9%) tested in the public sector, while 25.5% tested in the private sector, 15.2% tested in both sectors, and 20.5% did not undergo testing. Among those participants (n= 446) who did the COVID-19 test, more than half of them (60.3%) stated that the nasal swab was bothersome, 23.3% stated that it was painful, and 16.4% reported feeling no pain or discomfort.

During the participant's infection, 39.9% of them required a specialist doctor visit during their infection, 5.9% required hospitalization, and 1.6% required admission to the intensive care unit (ICU). Five percent of the participants needed to use a ventilator, and 69.3% were measuring the percentage of oxygen in their blood via an oximeter.

Regarding using herbal products, 42.8% of the study's participants used herbs. Among the participants who used these herbs (n= 240), 64.7% believed that the herbs were useful to relieve their symptoms. About 62.0% of the participants reported that their COVID-19 infections had caused an increase in their stress and anxiety levels.

The median score on a 10-point Likert scale used by the study's participants to rate their COVID-19 infection severity was 5 out of 10, with an interquartile range of 3 points. Participants evaluated their adherence to the preventative measure before getting infected on a 10-point Likert scale, where a higher score indicates better adherence; the median score was 8 out of 10, with an interquartile range of 3 points. One-third of the participants (33.3%) stated that their adherence to the preventive measures had increased after their infection, while 19.1% reported that their adherence had decreased, and 47.6% reported that their adherence remained the same before and after the infection.

With regards to the symptoms accompanied by the COVID-19 infection, fatigue (78.8%) was the most reported one, followed by fever (76.1%). Muscle and/or joint pain (70.6%), headache (56.3%), cough (54.2%), as well as loss and/or change in the senses of taste and smell (52.0%) were reported by more than half of the study's participants **(**Figure 2).

Participants were asked about the used medications and vitamins during their COVID-19 infection. As shown in Figure 3, vitamin C was used the most (67.6%), followed by analgesics/ pain relievers such as Paracetamol (65.1%), antibiotics such as Azithromycin (58.8%), vitamin D (56.1%), and zinc (53.8%). On the other hand, 4.8% of the participants did not use any medication or vitamin during their infection.

More than half of the participants who were asked where they got their advice about taking these medications stated that doctors (55.6%) gave it to them. This was followed by pharmacists (15.7%), relatives or friends who are not in the medical field (4.3%), nurses (1.4%), and others (2.2%). After reading medical articles, about 5.0% of participants decided to take these medications, and 2.7% of participants got their information regarding using these medications from social media. On the other hand, 13.2% of the participants had no consultations.

Different approaches were used by the study's participants

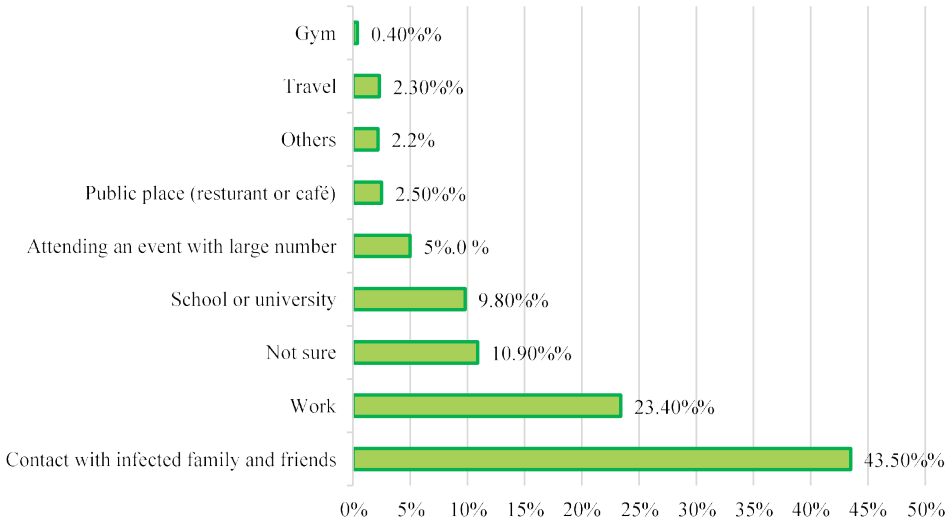

Figure 1. Participants' source of COVID-19 infection

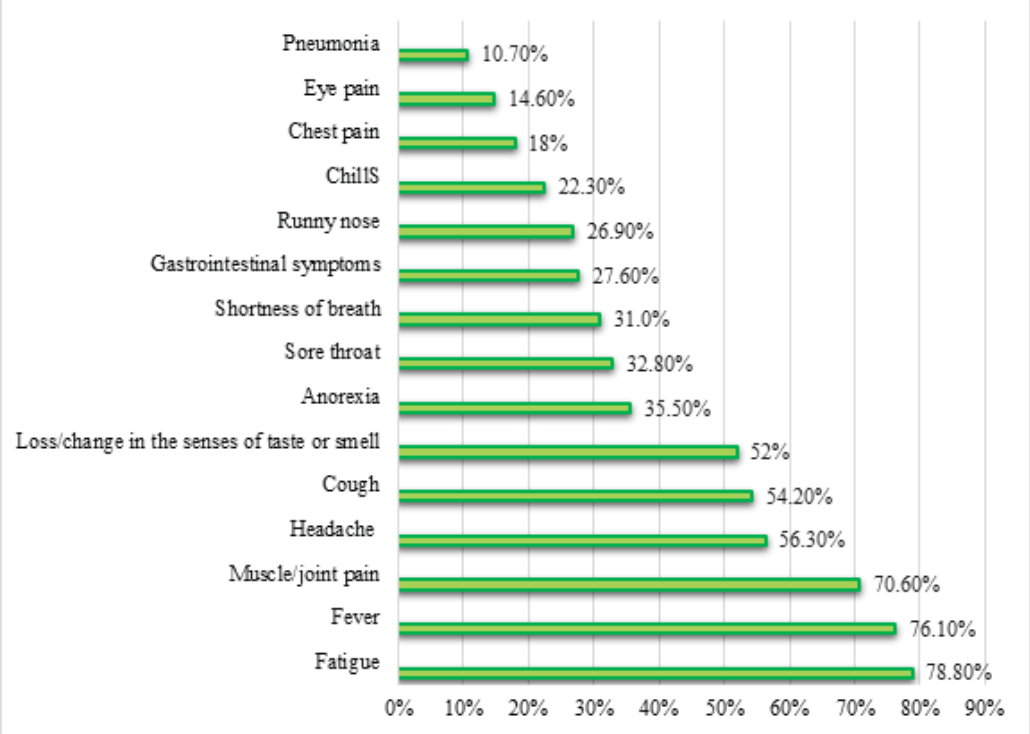

Figure 2. Symptoms accompanied by COVID-19 infection reported by the participants (n= 561)

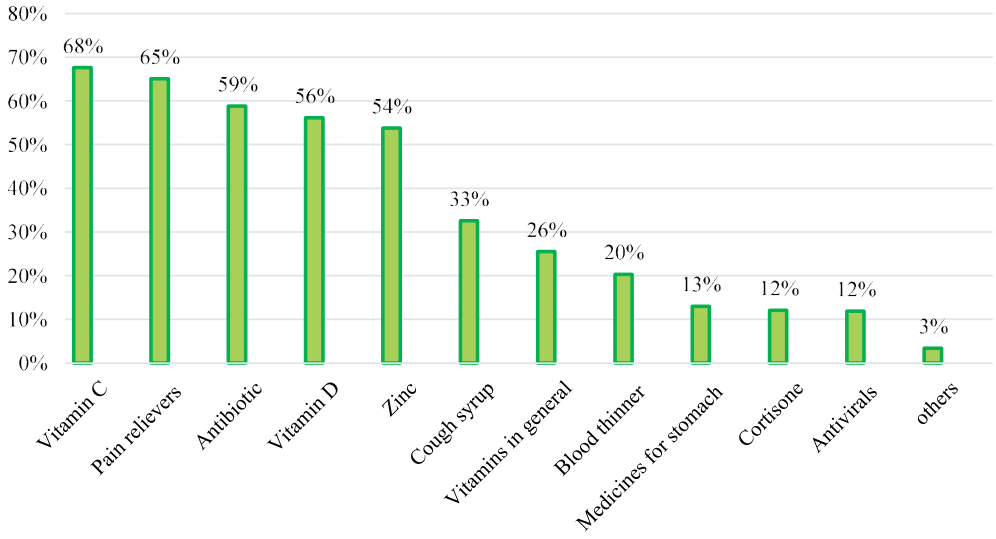

Figure 3. Medications and vitamins used by participants (n= 561) during their infection

to contact the pharmacists during their infection (Figure 4). About 35.0% of the participants stated that they went to the pharmacy in person, 31.2% contacted the pharmacists through a third person, 13.4% called the pharmacist using phones, and 5.9% stated that the pharmacists personally delivered the medications to their homes. About 6.0% of the participants stated that they had no contact with pharmacists when they were infected with COVID-19.

Table 2 shows the agreement percentage of each statement regarding the role of the pharmacists during the participant's COVID-19 infection. Almost all the statements were strongly agreed/agreed by about half of the participants.

The severity of COVID-19 infection was significantly affected by smoking status, chronic disease, and whether the COVID-19 vaccine was received according to the multiple linear regression analysis (Table 3). As a result, compared to other participants,

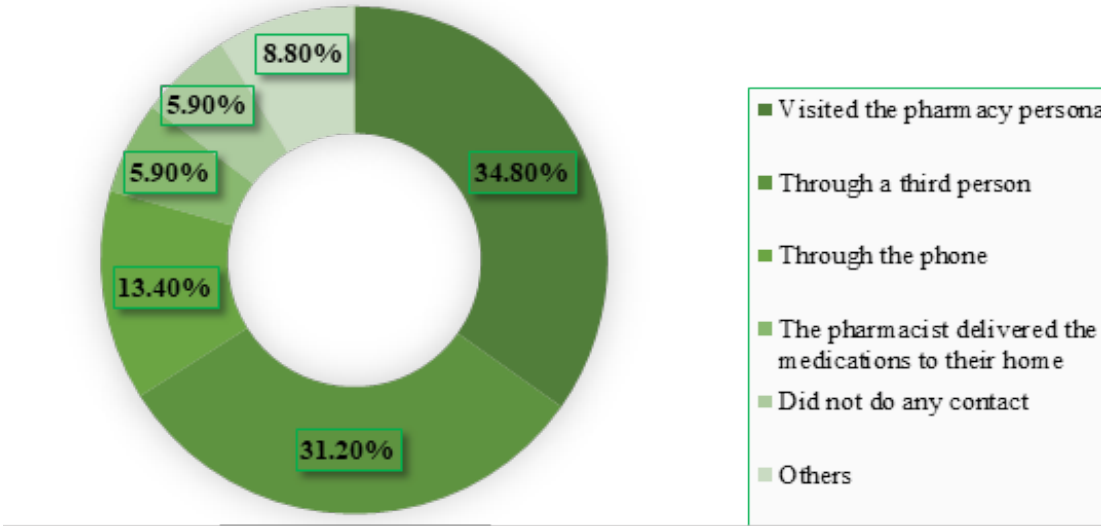

Figure 4. Approaches used by the participants to contact the pharmacists

Table 2. The role of the pharmacists during participants COVID-19 infection			
Statement	**Strongly Agree/Agree n (%)**	**Neutral n (%)**	**Disagree/Strongly Disagree n (%)**
The pharmacist had played an important and effective role during the infection period.	285 (50.8)	157 (28.0)	119 (21.2)
Pharmacists had a role in providing advice on how to control the virus and giving some behavior advice that might increase or maintain the body's immunity	286 (51.0)	145 (25.8)	130 (23.2)
Pharmacist had a role in giving instructions on how to use the medications	316 (56.3)	130 (23.2)	115 (20.5)
Pharmacists had a role in ensuring that there were no drug interactions between the medications.	263 (46.8)	152 (27.1)	146 (26.1)
Pharmacists had a role in warning about some medications that are not recommended for use by someone with coronavirus	270 (48.2)	153 (27.3)	138 (24.6)
Pharmacists had a role in providing advice on how to use some devices such as oximeters and thermometers	279 (49.7)	141 (25.1)	141 (25.1)
Pharmacists had a role in sending medication to home.	208 (37.1)	148 (26.4)	205 (36.5)

Table 3. Assessment of factors affecting the severity score of COVID-19 infection among the study's participants (n= 561)				
Parameter	**Severity score**			
	Beta	**p-value#**	**Beta**	**p-value$**
Age	- 0.052	**0.237**	-0.062	0.145
Gender Male Female	 reference -0.031	 0.464	 ------	 -------
Smoking status Yes No	 reference 0.101	 **0.016**	 0.086	 **0.044***
Chronic diseases Yes No	 reference -0.167	 **<0.001**	 -0.149	 **<0.001***
Asthma Yes No	 reference -0.099	 **0.019**	 -0.072	 0.091
Vaccine Received Yes No	 Reference <0.001	 **-0.156**	 -0.162	 **<0.001***

#Using simple linear regression, $Using multiple linear regression; *Significant at 0.05 significance level

the participants with chronic conditions had a higher COVID-19 severity. Additionally, scores for severity were higher for nonsmokers compared to smokers. A significant result between receiving the COVID-19 vaccine and the severity of the infection was also observed (p-value= <0.001); as participants who reported high severity scores were not vaccinated before their COVID-19 infection. The proportion of variability R^2 for this model in these two variables was 0.067.

As presented in Table 4, simple logistic regression showed that only the gender of the participant affected receiving the COVID-19 vaccine (considering a p-value of less than 0.25 significant). However, Multiple logistic regression showed that none of the demographics were significantly affected by receiving the COVID-19 vaccine (considering a p-value of less than 0.05 significant).

Table 4. Assessment of demographic factors affecting receiving the COVID-19 vaccine among the study's participants (n= 561)

Parameter	Receiving the COVID-19 vaccine (0:No, 1:Yes)			
	OR	**p-value#**	**OR**	**p-value$**
Age	0.999	0.677	-------	------
Gender				
Male	reference			
Female	0.745	**0.141**	1.311	0.184
Smoking status				
Yes	reference			
No	1.254	0.384	-------	------
Chronic diseases				
Yes	reference			
No	0.900	0.722	-------	-------
Asthma				
Yes	reference			
No	1.323	0.456	-------	-------

#Using simple logistic regression, $Using multiple logistic regression

DISCUSSION

The COVID-19 pandemic has presented unprecedented challenges to healthcare systems worldwide. This study was conducted with the aim of understanding the experiences of Iraqi COVID-19 patients and the role of pharmacists during their infection. The findings highlight the significant role of pharmacists in patient care during pandemics and the varied experiences of patients in Iraq. The majority of participants expressed agreement regarding the significant contributions of pharmacists during their infection, including providing valuable medical advice on virus management, offering guidance on medication usage, and informing patients about potential drug-to-drug interactions.

A scoping review published in 2021 found that pharmacists can fulfill a crucial role during the COVID-19 pandemic, with their contributions falling into several categories including 'disease prevention and infection control', 'adequate storage and drug supply', and 'patient care and support for healthcare professionals'. These categories are concordant with the responsibilities that the International Pharmaceutical Federation (FIP) has outlined for pharmacists in both primary care contexts and hospital settings.[13,14]

Over 56.3% of participants acknowledged receiving guidance on medication usage. Among those, over half of the participants were informed about their medications by doctors, followed by pharmacists. It is worth noting that community pharmacists have the potential to assist in identifying and referring potential COVID-19 cases. Yet, this practice appears to be relatively uncommon. According to a survey by Bahlol and Dewey, only 8.8% of the respondents had referred individuals they suspected to be infected. This finding is surprising, especially considering the significant knowledge and understanding of COVID-19 that has been reported in earlier studies.[15] As for hospital pharmacists, an observational study carried out by McConachie and colleagues on the operations and clinical inpatient pharmacy services at a community teaching hospital in the USA, revealed a 30% drop in new order verifications, dropping from 5,000 down to 3,300 orders per day (p-value < 0.01). Moreover, there was a decline in the average daily pharmacokinetic dosing consultations (p-value < 0.01). However, despite these reductions, the overall daily interventions and services provided by pharmacists remained consistent. This stability was achieved by a compensatory increase in the dispensing of certain medications, including hydroxychloroquine (antimalarials), enoxaparin (anti-coagulants), azithromycin (antibiotics), and sedative drugs (p < 0.01).[16] This showcases the essential role that pharmacists play in medication therapy management during pandemics.

The data also reveals the need for enhancing home delivery services since only 37.1% agreed that pharmacists had a role in sending medication to homes. While the primary source of infection for the participants (43.5%) was contact with infected family members or friends, most of the study participants did not have a medical insurance plan (94.7%), and the most

common symptoms were fatigue (78.8%) and fever (76.1%). This emphasizes the role of community transmission in the spread of the virus. Home delivery of medications managed by pharmacists eliminates the need for sick patients to leave their homes and thereby decreases the spread of infection. These medications include vitamin C, pain relievers, antibiotics, vitamin D, zinc, cough syrup, and others. Most participants agreed that pharmacists had a role in giving instructions on how to use the medications, which would be better than patients having to search for these medications and their use on the web.

The present study provides several significant contributions. Firstly, it addresses a critical issue related to the COVID-19 pandemic by focusing on the experiences of infected individuals in Iraq and the role of pharmacists during the crisis. This research is especially relevant given the global impact of the pandemic and the limited documentation of patients' experiences.

Secondly, the study includes a diverse sample of participants from different cities in Iraq, ensuring a broad representation of the population. This diversity enhances the generalizability of the findings. In addition, the survey covers a wide range of aspects related to COVID-19, including infection source, symptoms, medical care, medication use, and the role of pharmacists. This comprehensive approach provides a holistic view of the pandemic's impact.

However, the study's findings should be interpreted with caution due to some limitations. The study relies on convenience sampling, which may introduce selection bias. Participants who choose to respond to an online survey may not accurately represent the entire population. Furthermore, participants were asked to recall their experiences during the pandemic, including symptoms and medical care, which can be subject to recall bias. Future longitudinal studies are warranted to monitor the long-term effects of COVID-19, as well as randomized controlled trials to assess the effectiveness of specific interventions involving pharmacists in managing COVID-19 cases.

In conclusion, the present study sheds light on the experiences of COVID-19-infected individuals in Iraq and underlines the pivotal role played by pharmacists during the pandemic. The study's findings reveal that a substantial number of participants contracted the virus through contact with infected family or friends, emphasizing the significance of community transmission. Fatigue and fever were the most prevalent symptoms reported by participants, highlighting the diverse clinical presentation of COVID-19. The findings showed that pharmacists were perceived as valuable healthcare resources, and emphasized the need for enhancing home delivery services.

These findings offer valuable insights into the pandemic's impact on individuals in Iraq and the role of pharmacists in managing COVID-19 cases. To further advance our understanding of this topic, future studies should explore the long-term consequences of COVID-19 and conduct more in-depth assessments of pharmacist interventions. This will contribute to a more comprehensive understanding of pandemics and healthcare responses, ultimately guiding the development of more effective strategies for managing similar public health crises in the future.

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SPECIFIC CONTRIBUTIONS OF EACH CONTRIBUTOR TO THE PAPER: All authors were involved in all parts of study and manuscript preparation including literature search, study design, analysis of data, manuscript preparation, and review of the manuscript.

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