Original Research

The battle against COVID-19 in Jordan: A cross-sectional study assessing the experience of Jordanians who have been infected with COVID-19

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Abstract

Background: Patients infected with coronavirus have new experiences and hence needs from the healthcare sector. Pharmacists can play vital roles in adopting innovative strategies to meet such needs. **Objectives:** To assess the experience of people who have been infected with coronavirus, and to assess the roles played by pharmacists to meet their new needs. **Methods:** This descriptive cross-sectional online survey was developed based on previous literature, validated, and conducted in Jordan (3-13 May 2021). **Results:** The mean age of the study participants (n=470) was 34.31 years (SD=11.75). About three-quarters were females. Out of the study participants, 24.0% reported to having been infected with the coronavirus previously, and 48.9% of them were infected after contacting an infected family member/friend. Only 36.0% ranked their commitment to the preventative measures as "very committed" before getting infected. The most reported symptom was fatigue (77.1%). The most used medicine/supplement was vitamin C (85.3%), followed by pain relievers (77.7%), and zinc tablets (75.3%). More than half of the participants (66.4%) documented that their anxiety and stress levels increased during their infection. More than half of the participants (53.7%) strongly agreed/agreed that pharmacists had an important and effective role during their infection. **Conclusion:** The experience of individuals who contracted the coronavirus indicated that few were very committed to preventative measures before getting infected. Fatigue was the main experienced symptom, while vitamin C was the supplement used the most. About half of the participants believed that pharmacists have an important role in managing their needs during their COVID-19 infection

Keywords: coronavirus; COVID-19; pandemics; pharmacists; Jordan

INTRODUCTION

Worldwide, the confirmed COVID-19 cases increased sharply; and the Kingdom of Jordan was not an exception, as the first confirmed case of COVID-19 was recorded on the 2nd of March 2020; the patient was a traveler who had returned from Italy two weeks before the quarantine started in Jordan. On the 16th of March 2020, one of the world's strictest lockdowns took place in Jordan.[1,2] Strict measures were enforced by the Jordanian ministry of defense to reduce the spread of COVID-19, including mandatory social distancing, the wearing of masks in public places, the posing of a national curfew, and the suspension of all forms of transportation and international travel.[3]

The most common reported symptoms of COVID-19 include fever, dry cough, and fatigue.[4] Other symptoms that are less common are sore throat, headache, muscle or joint pain, nausea or vomiting, diarrhea, loss/change of taste or smell, nasal congestion, conjunctivitis, and chills.[4] To relieve symptoms, patients start taking different over-the-counter medications (OTCs), and since pharmacists provide patients with these medications, they have a vital role in patients' experience during their COVID-19 infection. Hence, it was not surprising to find that since the beginning of the COVID-19 outbreak, pharmacists globally have been playing crucial roles in adopting innovative strategies to reduce the detrimental effect of the pandemic.[5]

Pharmacists are healthcare providers placed in a significant position; the advantages of this position are numerous because they are easily accessible, highly respected by the general population, and their consultations are provided without charge.[6] Additionally, pharmacists are well-educated healthcare professionals, thus, they are situated to deliver the needed care, preventative services, and other wide range of services during pandemics through several strategies including counselling and education.[7] Therefore, the COVID-19 pandemic is being prevented and controlled with the help of pharmacists, who are considered as essential pillar of public health.[8]

Pharmacists' services are an essential mainstay in public health since they are connected to the patients directly and indirectly. They ensure medicine supply, manage medication shortage issues, counsel the public on the basics of infection prevention, instruct the public about the correct use of personal protective equipment, discourage self-medication, and manufacture small-scale of sanitizers and disinfectants.

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These pharmaceutical services will assist in easing the unprecedented burden and relieving the pressure on other overwhelmed healthcare facilities.[9]

The COVID-19 pandemic continues to spread across the globe, but patient experiences are rarely documented. This cross-sectional study aims to shed light on the COVID-19 infection experience of Jordanians as well as the emergency management roles that pharmacists played in these extraordinary circumstances.

METHODS

Study design and participants

The study objectives were assessed using a cross-sectional study design, which involved an online survey created by the research team. Data collection for the study, which was web-based and completed using Google Forms, took place in May 2021. To be eligible, participants must have been infected with COVID-19 and lived in Jordan for more than two years before study entry. Participation in the study was voluntary and did not pose a minimal risk to participants. The research team considered the potential participants to have given informed consent for participation in the study if they completed the survey and submitted the response. Ethical approval for this study was obtained from the Faculty of Pharmacy, Applied Science Private University (Approval Number: 2021-PHA-23).

Survey development

An extensive literature review was conducted by the research team in order to help in developing the first draft of the survey.[10-15] A variety of references were used to generate a pool of questions that meet the study objectives. The questions were then reviewed by the research team in order to combine concepts and remove irrelevant or unclear items.

To ensure face validity, the first draft of the survey was evaluated by independent academics (n=5) who have previous experience in research and pharmacy practice.

They evaluated questions comprehension, relevancy, and words clarity; then they informed the research team whether any of the questions in the survey was difficult to comprehend, irrelevant, or unclear. The feedback provided was considered by the research team and incorporated where appropriate. As a final point in the survey development, the research team re-revised the questions as necessary to make them concise and appropriate for online administration.

The final version of the survey was organized into three main sections addressing different topics of interest. The *first section* aimed to collect demographic data; the *second section* was designed to investigate patients' COVID-19 experiences. The second section included data on the time and mode of transmission, symptoms, vaccination status, use of medications, supplements, or herbal products, need for hospitalization or doctor visits, anxiety and stress levels, and commitment toward COVID-19 preventative measures. The *third section* assessed the role of pharmacists from the perspective of COVID-19 patients.

Survey implementation

Study participants were recruited through social media (Facebook and WhatsApp); those willing to consider participation could open a link to initially view ethics committee-approved information about the study and then proceed to the survey. The research team designed the survey to take less than 10 minutes to be completed.

Sample size

The Jordanian population in 2020 was officially reported to be 10.1 million. Based on this number, the sample size was calculated using a margin of error of 5%, a confidence level of 95%, and a response distribution of 50%, giving a sample size of a minimum of 385 participants.

Statistical analysis

Following data collection, the survey responses were coded and entered into a customized database using the Statistical Package for the Social Sciences (SPSS), Version 24.0 (IBM Corp., Armonk, New York, USA). Continuous variables were presented as means and standard deviations while qualitative variables were presented as frequencies and percentages.

Screening of the factors affecting COVID-19 severity was carried out using logistic regression. For multiple logistic regression analysis, the variable entry criterion was set to 0.25, in that any variable that was found to be significant during the single predictor level (P <0.25) was entered into the multiple logistic regression analysis in order to explore the variables that were significantly and independently associated with COVID-19 infection severity. Variables were selected after checking their independence, where tolerance values >0.2 and Variance Inflation Factor (VIF) values were <5 were checked to indicate the absence of multicollinearity between the independent variables in regression analysis. The COVID-19 severity was coded as follows [0: Low, 1: High], where "High" indicated participants who ranked their COVID-19 infection severity ≥7 (out of 10).[16]

Simple logistic regression was conducted to determine how age affected the patient's need to visit a specialized doctor, hospital admission, usage of a ventilator, use of herbal remedies, and degree of stress and anxiety during COVID-19 infection.

RESULTS

The study's participants (n=470) had a mean age of 34.31 years (SD=11.75). The majority of the study's participants were females (76.0%), living in Amman (76.6%), married (56.2%), have health insurance (68.1%), and non-smokers (70.9%). Most of the participants did not have any chronic disease (90.4%), and only 5.5% were asthmatic patients. About 29.0% of the participants (n=135) were working in the medical sector (Table 1).

About a one-quarter of the participants got infected with COVID-19 during March 2021 as shown in Figure 1. The lowest percentage (0.4%) of COVID-19 infected patients was observed in July 2020.

Table 1. Demographic characteristics of the study participants (n=470)		
Parameter	Mean (SD)	n (%)
Age	34.31 (11.75)	
Gender Female Male		357 (76.0) 113 (24.0)
Living place, Amman (the Capital) Other cities		360 (76.6) 110 (23.4)
Marital status Married None-married (single, divorced, and widowed)		264 (56.2) 206 (43.8)
Insurance Yes No		320 (68.1) 150 (31.9)
Smoker Yes No		137 (29.1) 333 (70.9)
Do you have a chronic disease? Yes No		45 (9.6) 425 (90.4)
Are you an asthmatic patient? Yes No		26 (5.5) 444 (94.5)
Do you work in a medical sector? Yes No		135 (28.7) 335 (71.3)

Around half of the participants (48.9%, n=230) thought that the COVID-19 was transmitted to them due to contacting infected people from family or friends, while 25.3% thought that it was transmitted from their workplace, 1.9% reported getting infected after attending an event with a lot of people, 1.7% after going to a public place such as café or restaurant, and 1.7% from school or university. In contrast, 16.4% of the participants were unsure of the source of their infection. Other transmission modes were mentioned by the study's participants such as traveling, the gym, transportation, and hospital. A high percentage of participants (94.9%, n=446)

reported that they informed those they had been in contact with recently after their positive COVID-19 test. Furthermore, of the study participants, 94.9% (n=446) did not receive the COVID-19 vaccine before getting infected.

With regard to commitment to preventive measures, 169 (36%) ranked their commitment 10 out of 10, indicating the response of "*very committed*". Figure 2 shows participants' commitment to the preventive measures prior to contracting COVID-19. The mean for the participants' commitment was 8.29 (SD=1.92). When participants were asked about whether their commitment increased after getting infected, 44.9% answered with 'Yes', while 55.1% answered with 'No'.

Regarding COVID-19 testing, 43.3% (n=199) tested in private sectors, 33.2% (n=156) tested in public sectors, 12.3% (n=58) tested in both sectors, and 12.1% (n=57) did not test. Regarding the patients' experiences with the COVID-19 swab, more than half of the participants (64.3%, n=302) stated that the nasal swab test was bothersome, and 14.3% (n=67) stated that it was painful. The remaining study participants stated that it was neither bothersome nor painful, or that they never performed the COVID-19 testing.

As shown in Figure 3, more than half the participants experienced fatigue (75.1%), muscle/joint pain (70.6%), loss/change in taste and smell (67.2%), headache (65.5%), fever (54.9%), and cough (50.2%). For the participants who lost their senses of taste and/or smell, when they were asked how long it took for these senses to return to normal, their answers varied widely ranging from less than a week (32.3%), one week to one month (50.6%), to more than a month (17.1%). The Ministry of Health (MoH) contact 61.7% (n=290) of the study's participants during their COVID-19 infection.

The most used medications and supplements among the study participants during their COVID-19 infection were vitamin C (85.3%, n=401), followed by pain relievers (77.7%, n=365), zinc (75.3%, n=354), and vitamin D (67.0%, n=315). On the other hand, 4.5% (n=21) of the participants did not take any medications or supplements (Figure 4).
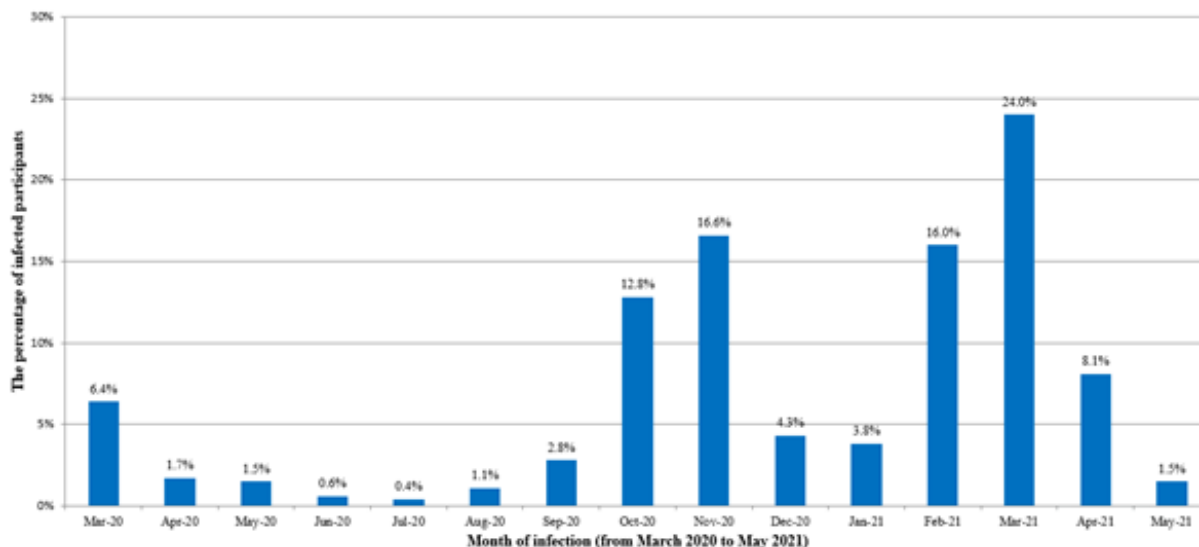

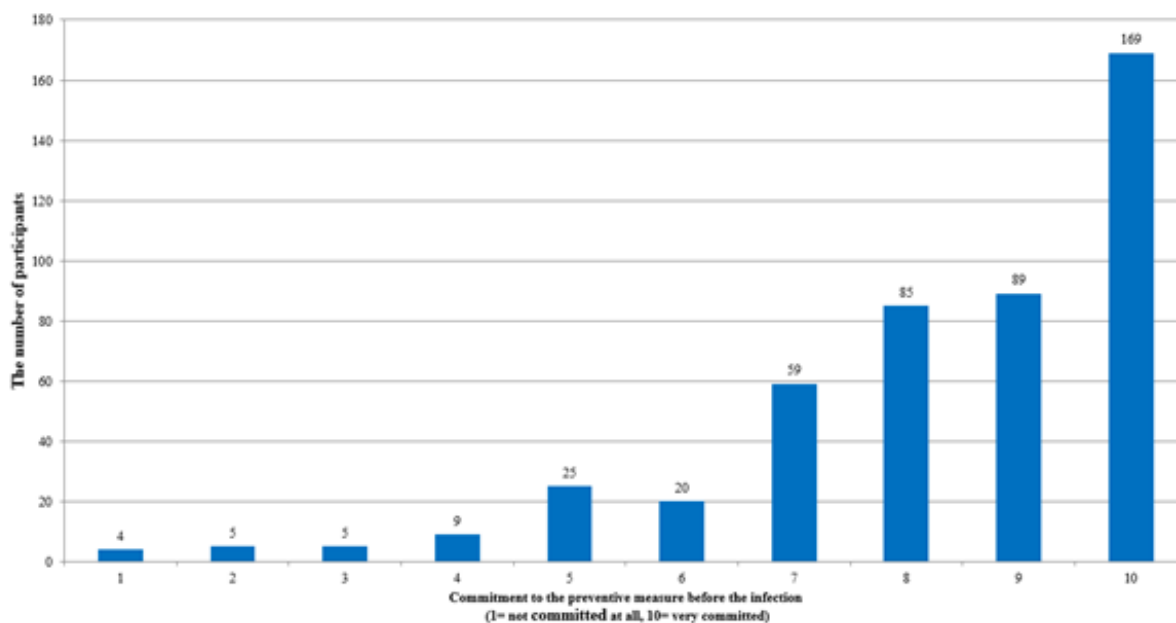Figure 1. Month of infection among the study participants

Figure 2. Participants' commitment to preventive measures before getting infected with COVID-19
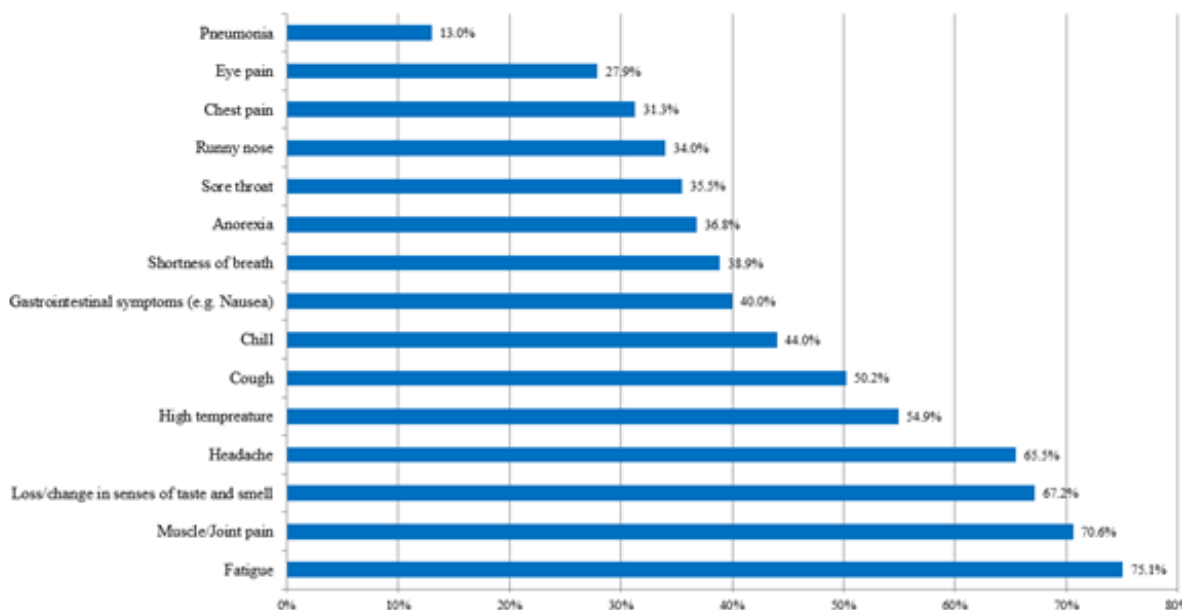

Figure 3. The symptoms that were reported by the study participants due to COVID-19 infection (n=470)

Regarding the use of herbal products, 65.3% of participants (n=307) reported using many herbs such as ginger, anise, and clove while they were infected; and around 80% reported that these herbal products were useful. Around 40% of participants were advised to use these medications and supplements by their doctors, and 25% by community pharmacists. Figure 5 shows the participants' source of advice.

A high percentage of participants (74%, n=348) did not need to visit a specialist doctor nor required hospital admission (93.2%, n=438). Out of the participants who were admitted to a hospital (n=32), only two participants required Intensive Care Unit admission. Moreover, the vast majority did not need to use the artificial respiration apparatus (94.7%, n=445), and 47.4% (n=223) were consistently measuring their oxygen saturation in the blood via an oximeter. More than half of the participants (66.4%, n=312) stated that their level of anxiety and stress increased during the COVID-19 infection.

Figure 6 shows how the participants ranked the severity of their COVID-19 infection out of ten. The mean infection severity of the participants was 5.87 (SD=2.39); 16.6% (n=78) and 15.3% (n=72) rated their infection severity as 7/10 and 8/10, respectively.
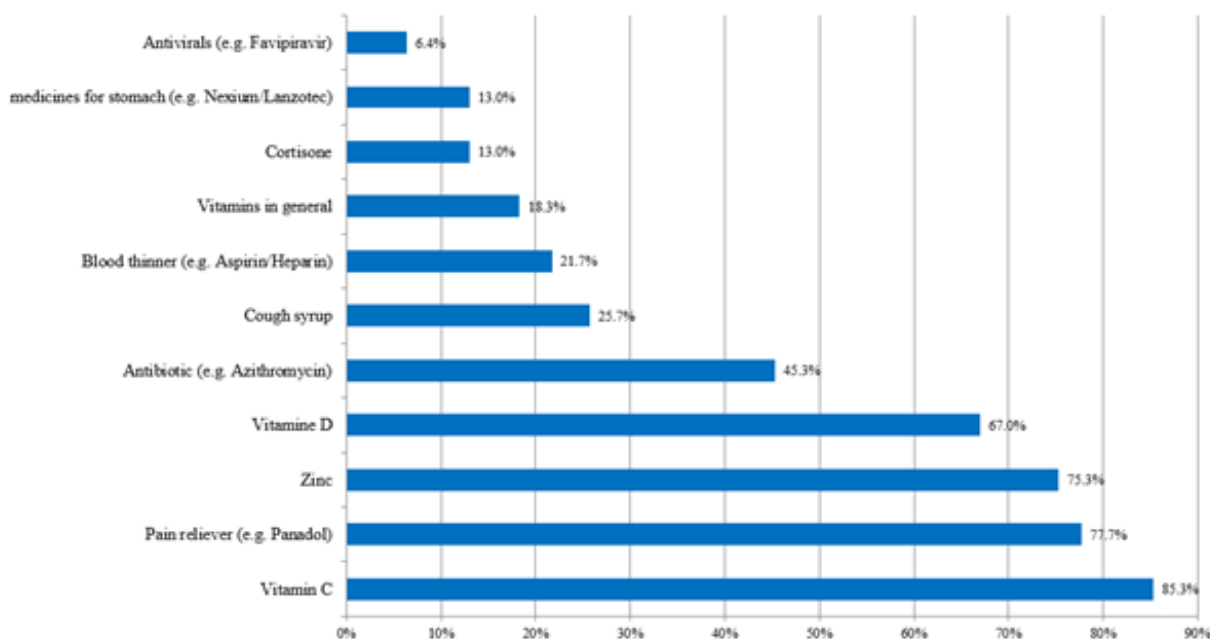
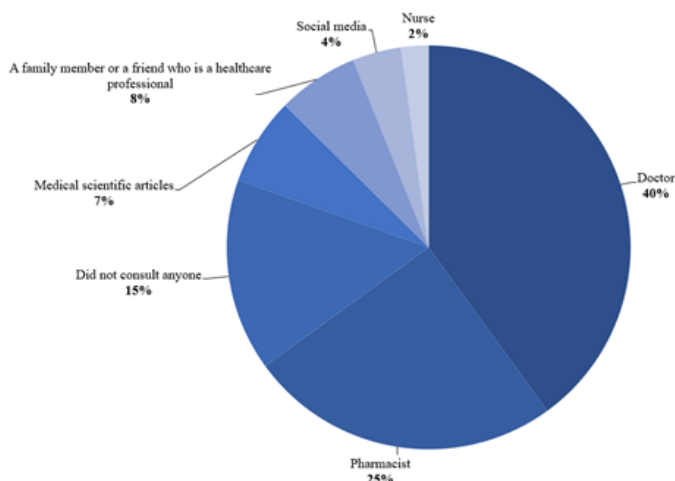Figure 4. Medications and supplement use among the study' participants during their COVID-19 infection.

Figure 5. Participants' source of advice regarding taking the medications/supplements

Figure 6. The severity of participants COVID-19 infection

Multiple logistic regression analysis of factors affecting COVID-19 infection severity among study participants highlighted that being an asthmatic patient significantly affected the COVID-19 infection severity (Table 2).

Simple logistic regression highlighted that participant's age significantly affected the participant's need to visit a specialist doctor, require hospital admission, and need for a ventilator use during their COVID-19 infection (Table 3).

Regarding approaches used by the study's participants to contact the pharmacists during their COVID-19 infection, 38.7% (n=182) contacted the pharmacist through a third person, while 29.1% (n=137) contacted the pharmacist through the phone (Figure 7). On the other hand, 7.4% (n=35) did not contact any pharmacist.
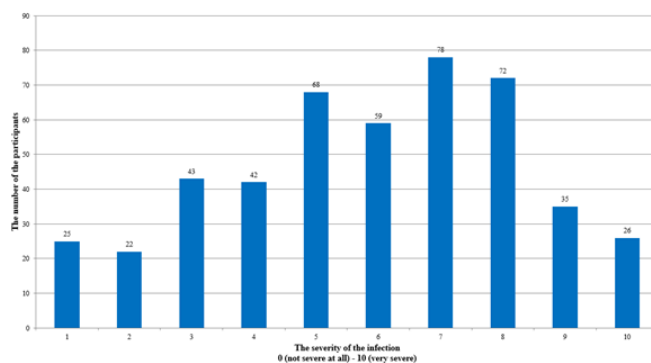
Assessing the role of the pharmacists showed that 53.7% of the participants strongly agreed/agreed that the pharmacist had an important and effective role during the infection, 53.6% strongly agreed/agreed that the pharmacist role included providing advice on how to control the virus by giving behavioral advice that might increase or maintain the immunity strength, 56.6% strongly agreed/agreed that the pharmacist role included giving instructions on how to use the medications, 49.5% strongly agreed/agreed that the pharmacist role included ensuring that there were no drug interactions between the medications, 47.5% strongly agreed/agreed that the pharmacist role included a warning about some medicines that are not recommended for use by COVID-19 patients, 46.6% strongly agreed/agreed that the pharmacist role included providing advice on how to use some devices such as the Oximeter and the thermometer, and 41.3% strongly agreed/agreed that the pharmacist role included sending their medicines to their homes during the pandemic.

Table 2. Assessment of factors affecting the COVID-19 infection severity among study participants (n= 470)				
Parameter	COVID-19 Infection Severity [0: Low, 1: High]			
	OR	P-value#	OR	P-value$
Age	1.014	**0.084**	1.011	0.220
Gender • Male • Female	Reference 1·138	0·554	------	------
Smoking • No • Yes	Reference 1·207	0.358	-----	-----
Chronic disease (e.g., hypertension and diabetes) • No • Yes	Reference 0.688	**0.233**	0.939	0.858
Asthmatic patient • No • Yes	Reference 0.342	**0.014**	0.372	**0.025***

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

Table 3. The influence of age on the different variables among study participants (n= 470)		
Parameter	**OR**	**P-value#**
Age	Need to visit specialist doctor [0: No, 1:Yes]	
	1.033	**0.046***
Age	Requiring hospital admission [0: No, 1:Yes]	
	1.032	**0.025***
Age	Using a ventilator [0: No, 1:Yes]	
	1.032	**0.038***
Age	Using herbal products during infection [0: No, 1:Yes]	
	1.006	0.504
Age	Level of anxiety and stress [0: No, 1:Yes]	
	1.011	0.194

#Using simple logistic regression, *Significant at 0.05 significance level

Figure 7. The approaches used by the study's participants to contact the pharmacist during their COVID-19 infection

DISCUSSION

This cross-sectional study provides an overview of people who have been infected with COVID-19 in Jordan, and highlights the role of pharmacists during the infection. In this study, the highest percentage of infected participants was documented in March 2021. The most symptom that was reported by the participants was fatigue (77.1%). Vitamin C was used the most, followed by pain relievers. Many participants (40%) were advised to take medications and supplements by the doctor, and 25% were advised by the pharmacist. Regarding the psychological state, more than 66.0% documented that their level of anxiety and stress increased during the infection. The present findings reported that more than half of the participants (53.7%) strongly agreed/agreed that pharmacists have a vital and effective role during the infection period.
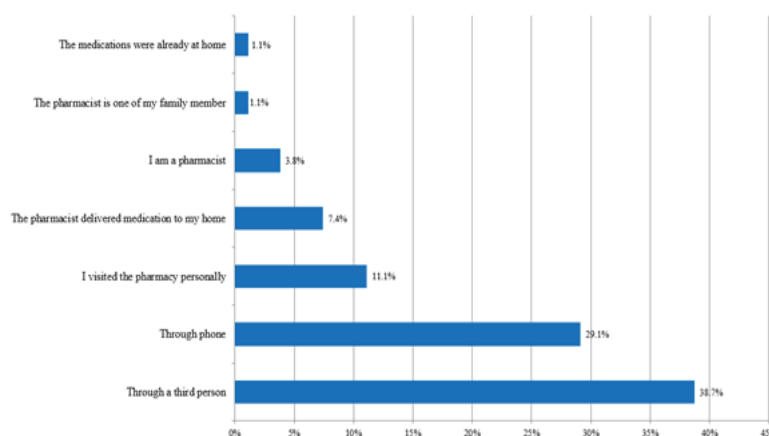
The percentage of participants infected with COVID-19 showed two peaks during October and November 2020, and February and March 2021, which was similar to that reported by Johns Hopkins University CSSE COVID-19 Data.[17] It was stated by the Jordanian minister of health that the second wave was more severe than the first one by 30% increased cases.[18] The increase in cases called on the Jordanian government to mobilize and impose strict preventative measures in order to control the spread of the virus;[19] noting that if the government had not taken those measures, cases would have increased by 250% more.[18] The government has taken the recommendations of the National Committee to combat the epidemics which included stressing the wearing of the mask, keeping physical and social distancing, reducing overcrowding, and extending the night ban hours. Moreover, all the institutions were instructed to close at 7:00 PM daily, while the events such as weddings and funerals were prohibited. Gym centers, public swimming pools, and children playing areas were all closed. A lockdown on Fridays and Saturdays was implemented to

facilitate the task of the epidemiological investigation teams. Additionally, distance education via online platforms in schools and universities was continued.[20,21] Vaccination played a major role in the number of newly reported COVID-19 cases. Worldwide, the government pinned its hopes on vaccines to prevent the spread of COVID-19, thus, the government had a vital role in focusing on vaccinating the largest possible number of people. On 29 April 2021, the minister of health stated that Jordan was able to vaccinate 60,000 people per day, and can reach 100,000 people if needed, and 65% of people responded to their appointment after receiving a message on the date of their vaccination.[18] After all the efforts and strict measures, the number of COVID-19 cases decreased with the start of the vaccination in January 2021. In June 2021, the Jordanian government reconsidered the preventive measures. The data-driven approach was to start the gradual reopening of different sectors based on the public health risks and economic.[22]

Almost half of the participants thought COVID-19 was transmitted to them from contacting infected people from family or friends, this sheds light on the importance of social distance, and the quarantine of infected individuals. This finding is consistent with a systematic review conducted by Rahman et al., in which it was found that COVID-19 is primarily transmitted by human-to-human contact.[23]

The mean score of Jordanian's commitment to COVID-19 preventive measures was high (8.29 out of 10). This can be explained by two main reasons; the first is the strict consequences (i.e., fines, imprisonment) imposed by the Jordanian government for those who do not abide by the preventative COVID-19 measures.[24] The second reason is the high knowledge and awareness of the Jordanian people regarding COVID-19 as stated by a national survey by Al Hussami et al.[25]

According to a systematic review including 24,410 international patients, fever and cough are the most prevalent symptoms experienced by adults infected by COVID-19.[26] However, in this cross-sectional study, fatigue and muscle/joint pain ranked first. The loss and change of taste or smell were documented by 67.2% of the study participants; it is worth mentioning that these symptoms were not reported by the infected patients at the beginning of the pandemic. A study conducted in Jordan, contacted 350 patients who attended a wedding in March 2020; cough, fever, congested nose, headache, sore throat, fatigue, and shortness of breath were reported by the patients, however, loss and change of taste or smell were not reported.[27] Also, in another study conducted in earlier stages of the pandemic in Jordan, the loss and change of taste or smell were not reported by the patients.[28] In the current study, participants reported loss and change of taste or smell from August 2020 onwards. The MoH had contacted 61.7% of the study participants during their infection period. Nonetheless, 12.1% of the participants did not do the COVID-19 test; accordingly, the MoH was not informed about their infection and did not have the ability to contact them. Additionally, the MoH also released emergency phone numbers to deal with the various complaints and observations of Jordanian citizens.[29] Educational campaigns are needed for such issues to be resolved.

According to a Google Trends Analysis study assessing dietary supplements during the COVID-19 outbreak, interest in immune-related foods and compounds was on the rise. In particular, the consumption of vitamin C and D, zinc, ginger, turmeric, omega 3, and garlic was noted. This is comparable to this survey's findings, where many participants reported the use of immune-boosting supplements.[30] In the current study, vitamin C was the most used supplement by the participants. A study conducted by Gao et al. assessed the effect of vitamin C among COVID-19 patients, and stated that high doses of vitamin C may reduce mortality and improve oxygen support status in COVID-19 patients without adverse effects.[31]

Long ago, herbal medicine played a major role in preventing and controlling epidemic diseases. For instance, clinical evidence from several studies has shown that herbal product has significant results in the treatment of SARS coronavirus.[32] The National Health Commission in China has released various guidelines on herbal medicine-related therapy, and has proclaimed the use of herbal products in western medicine as a treatment for COVID-19.[33] As there is no specific antiviral treatment against COVID-19 up today, many COVID-19 patients tend to take herbs such as ginger in order to enhance the body's immunity and relieve the symptoms.[34] A high percentage of the current study's participants (65.3%) have used herbal products during their infection period, and 82.7% of them stated that the herbs were beneficial and useful.

More than half of the participants (66.4%) stated that their level of anxiety and stress increased during their infection. The spread of the COVID-19 pandemic might be related to psychiatric implications.[35] Usually, patients who have been severely affected by COVID-19 develop neurological symptoms more than patients that were affected mildly or moderately.[36] A study conducted in Italy, screened psychiatric symptoms in COVID-19 survivors, most participants documented having symptoms of depression (31%), post-traumatic stress disorder (28%), or anxiety (42%).

The role of the pharmacist in the COVID-19 crisis had been studied widely, and many researchers documented that pharmacists can play a pivotal role in delivering pharmaceutical services to COVID-19 patients.[37,38] In the current study, more than half of the participants (53.7%) agreed/ strongly agreed that the pharmacist had an important and effective role during their infection. In Jordan, during the coronavirus pandemic, and similar to other parts of the world, the pharmacies were one of the few facilities that remained open for public services even during the strict lockdowns, which allowed more availability for appointments compared to other sectors such as the private doctor's office or the local health departments.[6,7] Moreover, this allowed the pharmacies to deliver a broader range of services.

Among the study limitations is the sampling approach; "self-selection bias" where there is a specific group of people that will answer the survey while others do not. For example, only people with internet access can actually have access to the survey, and self-selection can lead to biased estimates.[39]

CONCLUSION

Patients infected with COVID-19 have new experiences and hence needs from the healthcare sector. Increasing focus on

the patient experience is a part of a move towards patient-centered care. Pharmacists can play a vital role in adopting innovative strategies to meet such needs. In Jordan, the experience of participants who contracted the coronavirus indicated that few were very committed to the preventative measures before getting infected, and fatigue was the most experienced symptom, while vitamin C, was the supplement used the most. About half of the participants believed that pharmacists have an important role in managing their needs during their COVID-19 infection period. Implementing this emergency management role during these unprecedented circumstances is an important pillar in public health to prevent and control the COVID-19 pandemic.

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