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Pharmacists' awareness of COVID-19 and perceptions of their roles, barriers, and roles of policymakers: Exploring the Middle East and North Africa (MENA)

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Abstract

Background: The coronavirus disease (COVID-19) was declared in January 2020 as a public health emergency of international concern. The Middle East and North Africa (MENA) suffered from several pandemics previously. Pharmacists have vital roles to play to prevent the spread of this virus.

Objectives: To assess the COVID-19 awareness amongst pharmacists from Arabic-speaking countries located in the MENA region, and to assess their perspectives of their role, barriers, and roles of the educational institutions/pharmaceutical associations.

Methods: An online survey was conducted to run a descriptive cross-sectional study in Jordan from 12th to 22nd April 2020. The questionnaire was validated (face validity) and put on Facebook and directed for pharmacists only (clarified in the introduction of the questionnaire). Assessment of pharmacists' awareness (20 questions) about pandemics and COVID-19, their perceived roles and barriers, and roles of the educational institutions (eg, universities) and pharmaceutical associations (eg, Pharmacists Syndicate) was performed. Data were analysed using Statistical Package for the Social Science (SPSS).

Results: Study participants (n = 2589) had a mean age of 29.3 (8.2) years and 1329 (51.5%) were females. Most of the participants were from Egypt (n = 819, 40.8%), followed by Jordan, Algeria, and Syria. Regarding the sources of information about coronavirus management, 60.8% of participants got their information from social media. Fear of contracting the coronavirus while performing their duties was reported by the majority of pharmacists as the main barrier to delivering their roles (82.3%). The majority of pharmacists identified positive roles for the pharmaceutical institutions (74.8%) and pharmaceutical associations (63.6%).

Conclusion: Pharmacists from the MENA countries believe they got enough education previously about pandemics, and the majority follow the latest coronavirus updates from social media. Fear was reported as the major barrier that requires resolution by the policymakers. Certain gaps in the awareness about COVID-19 were identified.

What's known

- The coronavirus disease (COVID-19) was declared in January 2020 as a public health emergency of international concern.
- The Middle East and North Africa (MENA), like other parts of the world, suffered from several epidemics over the years.
- Pharmacists have vital roles to play to prevent the spread of this virus.
- In order to prepare globally uniform pharmacy response directives for pandemics, pharmacists' awareness and perspectives around roles during pandemics in different regions of the world need to be assessed.

What's new

- This article adds that pharmacists from the Arab-speaking countries located in the MENA region (Egypt, East Mediterranean countries (Jordan, Palestine, Syria, Iraq, and Lebanon), Iraq, Lebanon, North Africa (Algeria, Libya, Morocco, Tunisia, and Mauritania), the Gulf countries (Saudi Arabia (KSA) and United Arab Emirates (UAE), Qatar, Kuwait, Oman, and Bahrain), and other Arab countries (Yemen, Sudan, Somalia, Djibouti, and Comoros) believe they got enough education previously about pandemics, and the majority follow on the latest coronavirus updates from the social media.
- Fear of contracting the coronavirus while performing their duties was reported by pharmacists as the major barrier to delivering their roles, requesting new resolutions by the policymakers.
- Certain gaps in the awareness about COVID-19 were identified. In addition, a significant correlation between pharmacists' awareness scores across the study countries with the COVID-19 international mortality statistics was found.

1 | INTRODUCTION

According to the World Health Organization (WHO), a pandemic is the worldwide spread of a new disease.[1] Viral pandemics are caused by viruses that possess a surface protein to which the majority of people lack immunity, which then spreads between people within the population extending beyond national borders.[2] Historically, many viral pandemics have been documented. The most notorious of these is the Spanish influenza pandemic of 1918-1920, which was caused by the H1N1 virus and was responsible for about 40 million deaths worldwide.[3] Other pandemics include Asian influenza (1957) caused by the H2N2 virus, the Hong Kong influenza (1968) caused by the H3N2 virus,[2] the Severe Acute Respiratory Syndrome (SARS) which occurred in 2003 and was caused by SARS coronavirus (SARS-CoV),[4] and the Middle East Respiratory Syndrome (MERS) which occurred in 2012 and was caused by coronavirus (MERS-CoV).[4] Recently, on the 31st of December 2019, a case of pneumonia of unknown cause in Wuhan was reported to the WHO Country Office in China.[1] It was later identified as coronavirus disease-2019 (COVID-19) caused by the novel coronavirus officially called SARS-CoV-2, belonging to the family Coronaviridae.[5] The coronavirus genome consists of a single strand positive sense ribonucleic acid (RNA).[4] The virions (virus particles) are enclosed in a lipid envelope characterised by the presence of crown-like spikes on the surface which have led to the nomenclature- where "corona" implies the crown-like appearance

created by these bulbous spikes.[4] SARS-CoV-2 usually causes mild symptoms such as fever, dry cough, and sore throat. However, it can sometimes lead to fatal complications such as severe pneumonia, pulmonary oedema, Acute Respiratory Distress Syndrome (ARDS), organ failure, and septic shock.[6] The spread of the virus to many countries around the world in a short space of time with no clear treatment or vaccine in sight as yet, is alarming and has resulted in a high workload for healthcare teams globally.[7-9] Effective strategies currently followed to slow the spread of the virus included hygiene practices such as proper handwashing, hand sanitizing, and wearing facemasks and gloves (personal protective equipment), in addition to social distancing and public quarantine measures.[10]

Community pharmacists (or retail pharmacists as they are known in some countries) have a crucial role to play during pandemics.[11,12] One of the most important roles of community pharmacists is to ensure the availability of effective therapy, in addition to health education and health promotion activities and vaccination provision.[13-16] Moreover, community pharmacists need to engage with patients, providing them with counselling regarding the safety precautions to minimise exposure and infection probabilities as well as psychological and mental health support during a pandemic. Pharmacists would be expected to support general healthcare teams in infection prevention, as well as alert public health officials of potential outbreaks/cases.[17,18] During pandemics, pharmacists' role in managing minor ailments

increases as doctors and hospitals become overwhelmed.[17,18] The International Pharmaceutical Federation (FIP) released a guideline during March 2020 stating the needed information for pharmacists and the pharmacy workforce to help them in dealing with the COVID-19 outbreak,[19] and acknowledging the responsibilities put upon the pharmacists in the control of the COVID-19 outbreak.[19] This mandate highlights the clear need for pharmacists to convey factual evidence-based and up-to-date information to the public.[20] In a study conducted during the pandemic outbreak of the 2009 H1N1 swine flu pandemic in New York City, it was found that patients rely on information provided by pharmacists and considered them an effective educational source regarding the pandemic, in addition to trusting pharmacists as immunisers.[21] In previous "pandemic preparedness testing studies," in the United States (US), community pharmacists have expressed concerns that need to be considered by policymakers, for example, about critical medicine shortages or managing medicine hoarding.[15] Collating published literature, it appears that there are various research studies published to guide pharmacists on how to improve patient care services and outcome,[18,22,23] however, pharmacists are still in need of more tailored and extensive training to improve preparedness for emergency situations.[17] To prepare globally uniform pharmacy response directives for pandemics, pharmacists' awareness (a state wherein a subject is aware of some information when that information is directly available to bring to bear in the direction of a wide range of behavioural actions)[24] and perspectives around roles during pandemics in different regions of the world need to be assessed. In light of the repeated pandemic experiences in the MENA region, the aim of this study, therefore, was to assess the awareness of COVID-19 amongst pharmacists from countries located in the MENA region and to assess their perspectives of their role, barriers, and roles of the educational institutions (eg, universities) and pharmaceutical associations (eg, Pharmacists Syndicate) in preparing them to be able to deal with the pandemic.

2 | METHOD

2.1 | Study design and participants

This study was conducted from the 12th of April to the 22nd of April 2020 over 10 days during the COVID-19 outbreak and public quarantine in most of the Arabic-speaking countries located in the MENA region including Egypt, East Mediterranean countries which included five Arabic-speaking countries (Jordan, Palestine, Syria, Iraq, and Lebanon), North Africa including Algeria, Libya, Morocco, Tunisia, and Mauritania, the Gulf countries including Saudi Arabia (KSA) and United Arab Emirates (UAE), Qatar, Kuwait, Oman, Bahrain, and other Arab countries (Yemen, Sudan, Somalia, Djibouti, and Comoros). A descriptive cross-sectional study design (an online survey) was used to address the study objectives. The research team (IB and co-investigators) developed an online survey (based on the current information regarding the COVID-19,[1,5,6,9,11,17,18] in order to meet the study objectives which included assessing Arab-speaking countries in the MENA region pharmacists':

1. readiness to combat any pandemic with a focus on the COVID-19 pandemic, assessing their clinical awareness, and
2. views on the role of the pharmacy educators/educational institutes/pharmaceutical associations (eg, universities and Pharmacists Syndicate, respectively) in preparing future pharmacists to deal with pandemics and the COVID-19 specifically.

Any licensed pharmacist or enrolled pharmacy student in the Arab-speaking countries in the MENA region (community or hospital pharmacist, academic, industry-based pharmacist, etc.) was deemed eligible for participation in the study. No risk was posed to the participants' and their participation was voluntary. The research team considered completing the survey as informed consent by pharmacists for participating in this study. Ethics approval was obtained from the Faculty of Pharmacy, Applied Science Private University, Jordan.
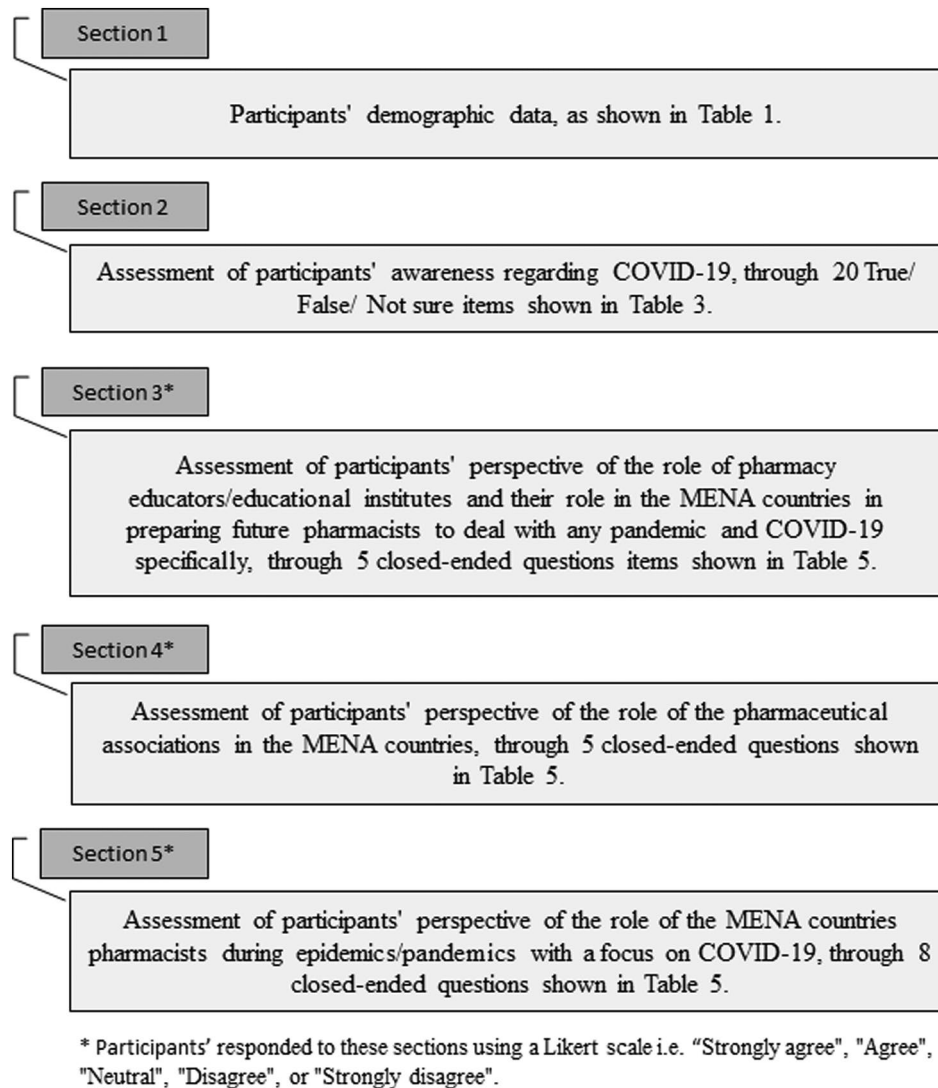
2.2 | Survey development

An extensive review of the literature was conducted to provide the needed information for the development of the items included within this survey.[11] The survey was administered in the Arabic language (common across the MENA region). A variety of questions relevant to the study objectives were also sourced from many avenues that the research team had (eg, FIP/WHO documents). The research team revised the survey in order to eliminate duplicates and refine the question. The team further checked for local context and the aptness of language (slight regional variations in nuanced meanings of words).

In order to ensure survey face validity, six expert academics in pharmacy practice and education were requested to evaluate the first draft. A pretest for the survey was conducted and necessary refinements were made. The pretest included evaluating the survey from different aspects such as the wording, the clarity of the questions and whether each question is relevant for inclusion with respect to the study objectives. As a final point in the survey development, the research team re-examined each question and made sure that the survey was suitable for online administration (relevance, clarity, context, response categories, format, and layout).

The final version (contained 60 questions; Appendix 1) of the survey was organised into five main sections that address several topics of interest. The *first section* included items aimed at collecting participant's demographic data. The latter four sections included several items relevant to the study objectives (Figure 1).

Countries of the participants were grouped into geographic clusters (regions) that are: East Mediterranean countries and Iraq, Egypt, North Africa, Gulf countries, and other Arab countries.

Section 1

Participants' demographic data, as shown in Table 1.

Section 2

Assessment of participants' awareness regarding COVID-19, through 20 True/ False/ Not sure items shown in Table 3.

Section 3*

Assessment of participants' perspective of the role of pharmacy educators/educational institutes and their role in the MENA countries in preparing future pharmacists to deal with any pandemic and COVID-19 specifically, through 5 closed-ended questions items shown in Table 5.

Section 4*

Assessment of participants' perspective of the role of the pharmaceutical associations in the MENA countries, through 5 closed-ended questions shown in Table 5.

Section 5*

Assessment of participants' perspective of the role of the MENA countries pharmacists during epidemics/pandemics with a focus on COVID-19, through 8 closed-ended questions shown in Table 5.

* Participants' responded to these sections using a Likert scale i.e. "Strongly agree", "Agree", "Neutral", "Disagree", or "Strongly disagree".

FIGURE 1 Study process showing the five sections of the online survey used in this study

2.3 | Survey implementation

Social media (Facebook and WhatsApp) was used to recruit the participants. An invitation was sent to all pharmacists in Jordan via social media. Those willing to consider participation could open a link to initially view ethics committee approved information about the study and then proceeding to the survey. The survey questions could be completed within an average of 10 minutes. Participants were able to view the ethics committee approval and the information about the purpose of the survey and what participation entailed before completing the survey.

2.4 | Statistics of confirmed cases and deaths

The COVID-19 statistics of cases and deaths announced at the beginning and around the end of the study period (12th to 22nd of April 2020) for the countries which had at least one confirmed case at the beginning of the study were collected from the WHO Coronavirus Disease (COVID-19) Dashboard. [25]

2.5 | Sample size

Sample size calculation was performed using the following formula: $n = P \times (100 - P) \times z2/d2$. Where P is the anticipated awareness score percent, d is the desired precision, z is the appropriate value from the normal distribution for the desired confidence interval. Using 95% confidence levels, 5% precision level and an anticipated 50% proportion of participants receiving an appropriate score (this conservative value results in the highest possible sample size that can be used in this study, as no previous studies in this area were found to indicate the level of awareness), a sample size of 385 was required.

2.6 | Statistical analysis

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

variables. A one-way ANOVA test was performed to analyse regional differences in perception scores. All tests were two-tailed. A P-value of <.05 was considered statistically significant.

Pearson's correlation between awareness score (out of 20) and the COVID-19 statistics of cases and deaths announced at the beginning and end of the study period (12th to 22nd of April 2020) for the countries which had at least one case at the beginning of the study was also conducted.

Linear regression was used to screen for the factors affecting participants' awareness score about coronavirus pandemic vs chosen independent variables in the study, ie, age, area of residency (city and urban areas or rural areas), country, region, having children, educational level, university type (the university where participants had studied and/or are studying at; public vs private), years of experience, number of professional education workshops attended during the last year, work setting, source of previous knowledge about epidemics and pandemics, source of updates about COVID-19 management, and current satisfaction with knowledge about COVID-19. These predictor measures (independent variables) were considered as candidates for linear regression modelling if they had a significance value $P \leq .25$ in univariate analyses. The candidate variables were subjected to backward linear regression, where finally only the significant variables (ie, $P \leq .05$) were retained with the model equation constant. Variables were selected after checking their independence, where tolerance values > 0.1 and Variance Inflation Factor (VIF) values < 10 were selected to indicate the absence of multicollinearity between the independent variables in regression analysis. The homoscedasticity assumption for multiple linear regression was checked using the Breusch-Pagan test, with a $P \geq .05$, indicating the absence of heteroscedasticity.

3 | RESULTS

The study included 2,589 participants with a mean age of 29.3 (8.2) years, and the majority were females (n = 1329, 51.5%) as shown in Table 1. Most of the participants were from Egypt (n = 819, 40.8%), followed by Jordan (n = 274, 13.7%), Algeria (n = 258, 12.9%), and Syria (n = 184, 9.2%). More than 80% of the participants lived in urban areas (including capital cities). About 75% of the participants had, as the highest level of pharmacy education, either a bachelor's degree in Pharmacy or Pharm.D., while the rest were either pharmacy students or technicians, or they had received other postgraduate degrees. The majority were alumni of public universities (75.7%). More than half of the participants were working either in the community pharmacy or in hospital, years of work-experience tended to be short, ie, less than and up to 5 years, and the number of attended professional development workshops was low on average.

While only 30% of the participants had received enough education about pandemics and updates about coronavirus management, 91.2% of them do follow the latest coronavirus updates on the management. Results were almost similar across all regions (Figure 2). As for the sources of information about coronavirus management

amongst the study participants, 60.8% reported that they sourced their information from social media, followed by WHO reports (57.2%), and published articles (50.2%) as shown in Figure 3.

Awareness scores (out of 20) were very similar across regions (Table 2), with a mean of 13.9 (out of a maximum of 20), no statistically significant difference was found between the regions (n = 2589, P = .193, one-way ANOVA). A significant correlation between awareness scores across study countries was found (P = .026, Pearson correlation = −0.054) with the COVID-19 mortality statistics as they stood on the 15th of March 2020 for the countries which had at least one case at the beginning of the study.[25] Awareness score was higher in countries with lower mortality. No significant correlation was noted with other statistics of COVID-19 cases and deaths as they stood 15th of March, and 1st and 15th of April 2020.

Table 3 presents the total percentage and the percentages of participants from the participating countries answering each of the awareness statements correctly. Interestingly, univariate analysis of the awareness score vs chosen independent variables showed significant association with many variables. This was reflected in the linear regression results, where older age participants, graduates of public universities, higher annual attendance rates at professional workshops yearly, participants who practice in community pharmacy and hospital settings, participants who reported to have had previous knowledge from their graduating institute, participants who sourced their information about COVID-19 from published studies, and those who were highly satisfied with their knowledge after 4 months of COVID-19 had higher knowledge scores (Table 4).

More than 90% of participants agreed with the statements provided regarding the role of the educational institutes (pharmaceutical faculties) except for the statement "Your faculty/educational institute has a role in preparing you to deal with any pandemic" (74.8%). As for the role of the pharmaceutical associations, more than 90% of pharmacists agreed with the statements provided except for "The pharmacists associations and societies (eg Pharmacists Syndicate) have a role in preparing you to deal with pandemics such as the coronavirus" (63.6%). More than 80% of participants agreed with the statements provided regarding their role as pharmacists with the highest percentage being about the statement "If you suspect someone may have coronavirus, you know how to seek immediate medical attention" (97.2%) followed by the statement "You ensure your personal safety by wearing gloves and masks and avoid close contact with patients" (97.1%). Significant differences were seen regarding the regional distribution of study participants' perceptions about the current role of the faculties of pharmacies/educational institutes with regards to dealing with pandemics and coronavirus specifically (n = 1998), while no significant differences were seen with regards to perceptions about the current role of pharmacists' associations and societies and current role of pharmacists (Figure 4, Table 5).

Most pharmacists believed that working in the pharmacy increases their fears of getting infected with the coronavirus (n = 2131, 82.3% strongly agree/agree). Significant differences found between regions (P = .009). In addition, participants believed that they should

TABLE 1 Demographic characteristics of the study sample (n = 2589) at baseline

Parameter	Mean (SD)	n (%)
Age, mean (SD)	29.3 (8.2)	
Gender, n (%)		
Female		1329 (51.5)
Male		1251 (48.5)
Marital status, n (%)		
Married		1187 (46.0)
Not married		1391 (54.0)
Having children		1060 (41.3)
Country of residency		
Egypt		819 (40.8)
East Mediterranean countries and Iraq		638 (31.8)
Jordan		274 (13.7)
Syria		184 (9.2)
Palestine		96 (4.8)
Iraq		60 (3.0)
Lebanon		24 (1.2)
North Africa		373 (18.6)
Algeria		258 (12.9)
Libya		51 (2.5)
Morocco		45 (2.2)
Tunisia		15 (0.7)
Mauritania		4 (0.2)
Gulf countries		102 (5.1)
Saudi Arabia (KSA)		64 (3.2)
United Arab Emirates (UAE)		15 (0.7)
Qatar		13 (0.6)
Kuwait		5 (0.2)
Oman		4 (0.2)
Bahrain		1 (<0.1)
Other Arab countries		74 (3.7)
Yemen		35 (1.7)
Sudan		34 (1.7)
Somalia		2 (0.1)
Djibouti		2 (0.1)
Comoros		1 (<0.1)
Living area		
Capital city		524 (20.3)
Urban area		1550 (60.1)
Rural area		505 (19.6)
Educational level		
Student		666 (25.8)
Diploma		87 (3.4)
B. Pharm		756 (39.3)
Pharm. D		890 (34.5)

(Continues)

TABLE 1 (Continued)

Parameter	Mean (SD)	n (%)
Masters		137 (5.3)
PhD.		43 (1.7)
Employment		
Pharmacy owner		317 (12.3)
Pharmacy employee		506 (19.6)
Hospital pharmacist		324 (12.6)
Pharmacy trainee		156 (6.0)
Academic		110 (4.3)
Pharmacy student		743 (28.8)
Others		423 (16.4)
Graduation years		
I am still a student		896 (34.7)
1-5 y ago		618 (24.0)
6-15 y ago		757 (29.4)
16-25 y ago		260 (10.1)
More than 25 y ago		48 (1.9)
Years of experience		
1-5 y		1635 (63.8)
6-10 y		380 (14.8)
11-15 y		282 (11.0)
16-20 y		185 (7.2)
21-25 y		42 (1.6)
More than 25 y		37 (1.4)
Number of attended educational workshops in the last year		
0		1113 (43.2)
1		495 (19.2)
2		392 (15.2)
3		248 (9.6)
4		70 (2.7)
5		53 (2.1)
More than 5		204 (7.9)
University		
Public university		1951 (75.7)
Private university		553 (21.5)
Others		74 (2.9)

receive training programmes on how to provide mental health support for people during epidemic and pandemic outbreaks (n = 2257, 87.7% strongly agree/agree) with no significant difference found between the regions (P = .426).

4 | DISCUSSION

Nowadays, the world is facing a predatory pandemic infection caused by the COVID-19 requiring a concerted effort by healthcare
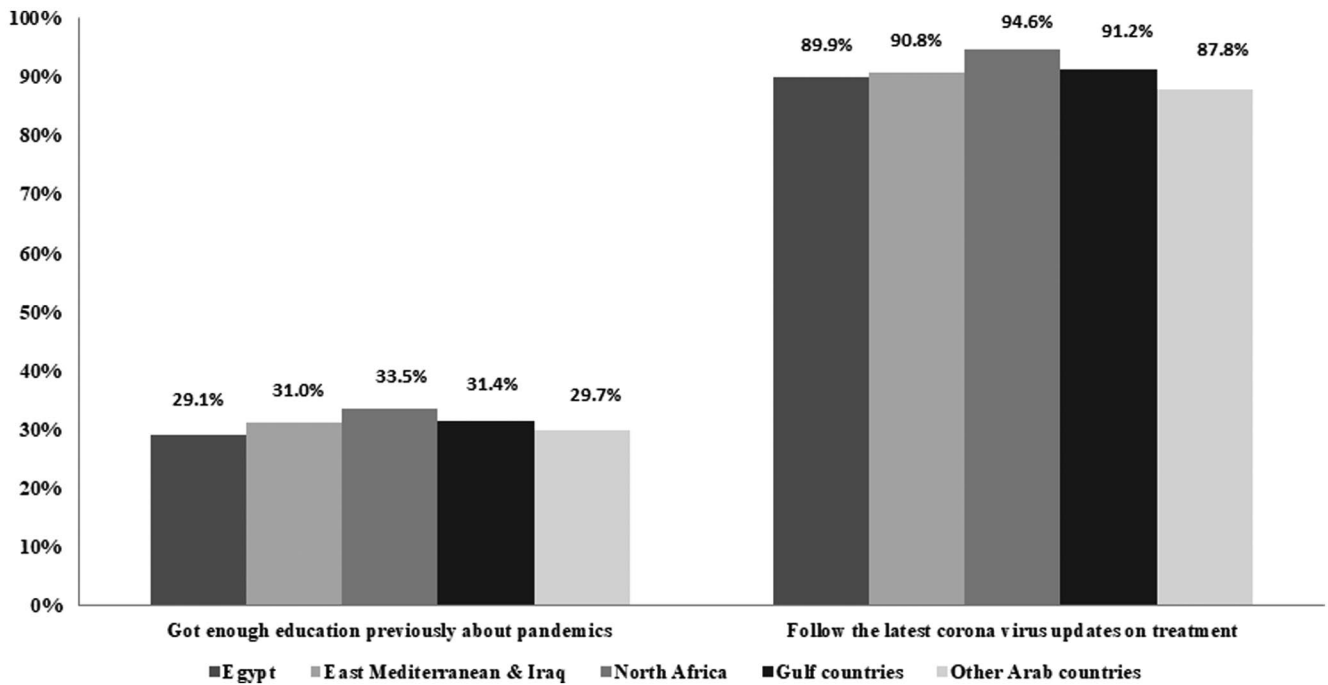
FIGURE 2 Study participants (n = 2589) awareness of pandemics and updates about coronavirus treatment based on region
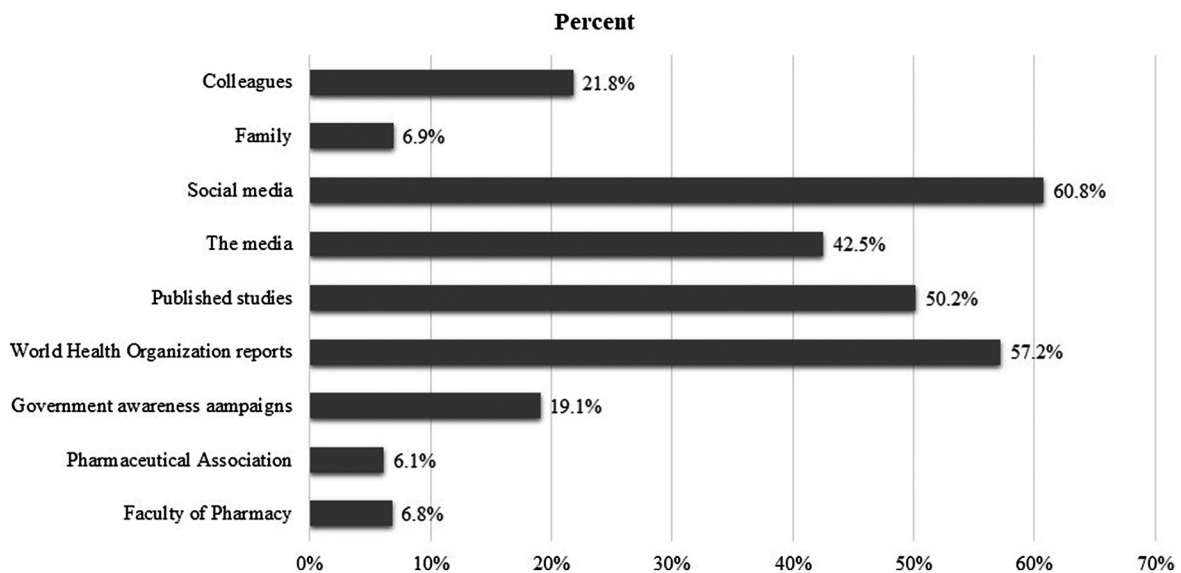

FIGURE 3 Sources of information about coronavirus treatment amongst the study participants (n = 2589)

professionals and public health experts to contain the rate of infection and the havoc it wreaks. Pharmacists, as essential health service providers, are important in the management and control of COVID-19.[16,26,27] Hearteningly, the results of this survey indicated that pharmacists in the Arab-speaking countries in the MENA region have a good awareness about the COVID-19 and acknowledge the different roles they can play during these times. Further, this study revealed that pharmacists are aware of the important responsibilities of the different educational faculties/educational institutes and pharmaceutical associations in preparing them to take on their

roles during pandemics. Barriers impeding pharmacists from acting to their full potential were also explored, with fear of contracting the virus, while performing their duty emerging as an important barrier that requires resolution.

One of the unique features of the results of this study is that it included participants from various countries covering many Arabic-speaking populations located in the MENA region. Data and results presented in this manuscript were clustered into East Mediterranean countries, North Africa, Gulf countries, Egypt, and other Arab countries. Of noteworthy, Egypt was presented alone here, and not

TABLE 2 COVID-19 statistics of cases and deaths in the beginning and end of the study period (12th to 22nd of April 2020) for the Arab countries that have had at least one case at the beginning of the study

Country	Mean awareness score	Confirmed COVID-19 15th Mar 2020		Confirmed COVID-19 cases 1st Apr 2020		Confirmed COVID-19 cases 15th Apr 2020	
		Cases	Deaths[*]	Cases	Deaths	Cases	Deaths
Jordan	13.7	6	0	274	1	397	7
Egypt	13.9	110	2	710	46	2350	178
Lebanon	15.0	99	3	479	12	658	21
Palestine	14.2	38	0	134	1	291	2
Algeria	13.7	49	3	584	35	2070	326
Iraq	13.0	124	9	694	50	1415	79
Saudi Arabia	13.7	103	0	1720	16	5862	79
Morocco	13.4	28	1	638	37	1988	127
UAE	14.3	98	0	664	6	4933	28
Qatar	14.1	337	0	781	2	3711	7
Oman	15.5	22	0	210	1	910	4
Tunisia	14.5	18	0	394	10	747	34
Mauritania	11.3	1	0	5	0	7	1
Sudan	13.8	1	1	7	2	32	5
Kuwait	13.8	112	0	317	0	1405	3
Bahrain	10.0	214	0	569	4	1671	7

*Significant correlation (2-tailed) with mean awareness score, $P = .026$, Pearson correlation $= -0.054$.

within the North African countries for two main reasons. Egypt has the largest population (a population of 95, 689, 000) amongst the Arabic-speaking countries,[28] and hence the largest proportion of participants included in this study came from Egypt. Second, although Egypt is a country geographically located in North Africa, it has not been classified as one of the North African Arabic-speaking countries; these countries have their own council within the Arab League, with Egypt not being included.[29]

The source of information gathered by healthcare professionals is important as it can affect clinical practice. The results of this study illustrated that more than 90% of the pharmacists monitor closely COVID-19 news, with the major sources of information being social media, WHO reports, and published literature. The collective responses are indicative of a well-informed group of pharmacists, possibly the high proportion of students and early pharmacy graduates contributed to this result. Although the pre-mentioned sources of information are important; García and Júlvez reported that referring to websites prepared by official public health organisations is important to ensure a trusted and updated source of information about COVID-19.[30] Interestingly, the majority of respondents reported that they have a good awareness of COVID-19, and they have sufficient information about the infection. Social media may not always be the best source of accurate information although previous studies in the region indicate that this has been an important source of information for pharmacists in the Arab-speaking countries in the MENA region through several epidemics earlier.[31]

Many medications for the management and treatment of the coronavirus have been discussed within the media/social media. Chloroquine and Hydroxychloroquine for example have been frequently mentioned as potential treatments for the virus. In this study, 35% of the pharmacists reported that these medications can be used not only for treatment but for the prevention of the virus. Given that there is no evidence supporting their use, this belief is disturbing. Currently, more than 140 clinical trials to test the COVID-19 efficacy of these medications alone or in combination with other medications, such as the antibiotic Azithromycin, have been registered worldwide to explore their use as treatment/prevention options for COVID-19.[32] However, on the 24th of April 2020, the United States Food and Drug Administration (FDA) issued a warning on the use of Chloroquine and Hydroxychloroquine for treating COVID-19.[33] The warning was because of reports of serious cardiac rhythm problems associated with the use of these medications particularly in combination with Azithromycin, causing QT interval prolongation, a measure of delayed ventricular repolarisation.[34] As another example, the majority of the study participants concurred that the use of Non-Steroidal Anti-Inflammatory Medications (NSAIDs) such as Ibuprofen would increase the risk of COVID-19 complications. This probably was based on the fact that NSAIDs use as antipyretics for acute viral infections may induce serious complications such as empyema (presence of pleural effusion on chest radiograph and acidic pleural fluid).[35] However, Capuano and co-workers published a review on the effect of NSAIDs on COVID-19 infection based on the available

TABLE 3 Proportion of participants (n = 2006) who answered correctly each of the awareness questions, comparing the MENA countries

Statement	Correct answer, n (%)						
	Total	East Mediterranean and Iraq	Egypt	North Africa	Gulf countries	Other Arab countries	P-value#
	n = 2006	n = 638	n = 819	n = 373	n = 102	n = 74	
One way of transmission of coronavirus is respiratory droplets from person to person amongst close contacts	1940 (96.7)	602 (94.4)	803 (98.0)	367 (98.4)	99 (97.1)	69 (93.2)	**<.001**
Coronavirus can be transmitted after touching surfaces that were contaminated with the virus	1925 (96.0)	611 (95.8)	793 (96.8)	352 (94.4)	99 (97.1)	70 (94.6)	.314
Non-steroidal anti-inflammatory drugs such as Ibuprofen decrease the risk of complications when there is an infection	1610 (80.3)	497 (77.9)	656 (80.1)	319 (85.5)	89 (87.3)	49 (66.2)	**<.001**
Fevers/Dry cough/Shortness of breath are associated with coronavirus	1991 (99.3)	636 (99.7)	813 (99.3)	368 (98.7)	102 (100.0)	72 (97.3)	.093
Muscle aches and GI symptoms (nausea/vomiting/diarrhoea) are not associated with coronavirus.	1285 (64.1)	416 (65.2)	478 (58.4)	270 (72.4)	70 (58.3)	51 (68.9)	**<.001**
Hand-washing with soap and water for 20 s is enough to clean the hands and protect from spreading the infection	1699 (84.7)	540 (84.6)	736 (89.9)	288 (77.2)	77 (75.5)	58 (78.4)	**<.001**
Steroids do not increase the susceptibility to coronavirus infection	929 (46.3)	271 (42.5)	356 (43.5)	212 (56.8)	49 (48.0)	41 (55.4)	**<.001**
Generally, the use of autoimmune disease medications increases the susceptibility to contract coronavirus infection	1110 (55.3)	371 (58.2)	445 (54.3)	188 (50.4)	60 (58.8)	46 (62.2)	.094
Hydroxychloroquine can be used as a preventative therapy against coronavirus infection	1293 (64.5)	426 (66.8)	534 (65.2)	216 (57.9)	71 (69.6)	46 (62.2)	**.040**
Azithromycin can be used along with Hydroxychloroquine in the treatment of coronavirus infection.	1326 (66.1)	483 (75.7)	439 (53.6)	288 (77.2)	72 (70.6)	44 (59.5)	**<.001**
Oseltamivir cannot be used in the management of coronavirus infection	680 (33.9)	202 (31.7)	324 (39.6)	82 (22.0)	47 (46.1)	25 (33.8)	**<.001**
Protein calorie malnutrition impairs host immunity (particularly the T-cell system) resulting in increased opportunistic infection	1516 (75.6)	487 (76.3)	647 (79.0)	261 (70.0)	67 (65.7)	54 (73.0)	**.002**
Patients should eat food that contains Vitamin C and D to boost their immunity	1867 (93.1)	600 (94.0)	768 (93.8)	340 (91.2)	89 (87.3)	70 (94.6)	.054
Eating food like mushrooms and garlic is beneficial for the immune system	1593 (79.4)	485 (76.0)	699 (85.3)	277 (74.3)	69 (67.6)	63 (85.1)	**<.001**
Exercise causes antibodies and white blood cells to circulate in the body more rapidly detecting infections at an early stage	955 (47.6)	314 (49.2)	418 (51.0)	142 (38.1)	44 (43.1)	37 (50.0)	**.001**
The brief rise in body temperature during and right after exercise increases bacterial growth, which will lower the body's ability to fight the infection	1522 (75.9)	502 (78.7)	624 (76.2)	258 (69.2)	83 (81.4)	55 (74.3)	**.008**
Not smoking and decreasing stress help support the immune system.	1950 (97.2)	622 (97.5)	802 (97.9)	355 (95.2)	100 (98.0)	71 (95.9)	.087
Sunlight activates T-helper cells hence boosts immunity	1327 (66.2)	439 (68.8)	560 (68.4)	219 (58.7)	56 (54.9)	53 (71.6)	**.001**
You need to keep a distance of at least 3 metres (10 feet) when counselling patients during a pandemic	463 (23.1)	142 (22.3)	179 (21.9)	99 (26.5)	34 (33.3)	9 (12.2)	**.006**
The highest risk patients in contracting coronavirus are elderly (>65), immune-compromised, and children under the age of 9	659 (32.9)	190 (29.8)	169 (20.6)	145 (38.9)	39 (38.2)	16 (21.6)	**.006**

#P-value under .05 indicates a significant outcome. Values in bold indicate significance.

TABLE 4 Assessment of factors affecting awareness scores amongst study participants (n = 2589)

| | Awareness score | | | |
| | | | 95% Confidence interval for B | |
Parameter	Beta	P-value[#]	Lower bound	Upper bound
Age	0.082	**.005**	0.007	0.041
Having children	0.108	**<.001**	0.265	0.810
Education level	−0.100	**<.001**	−0.801	−0.270
University (public vs private)	0.062	**.003**	0.122	0.595
Workshop number attended during the last year	0.062	**.004**	0.027	0.137
Practice setting (community vs hospital)	0.110	**<.001**	0.314	0.751
Previous knowledge is gained from the Faculty of Pharmacy/educational institute	0.110	**<.001**	0.345	0.754
Main source of information is published studies	0.104	**<.001**	0.300	0.711
Current satisfaction with knowledge	0.149	**<.001**	0.274	0.493

#P-value under .05 indicates a significant outcome. Values in bold indicate significance.

preclinical and clinical published studies.[36] They reported that there is conflicting data in the current literature, and there is no scientific evidence correlating NSAIDs use to the deterioration of COVID-19 patients' symptoms.[36] On March 18th 2020, the European Medicines Agency (EMA) declared the need for further epidemiological studies for this issue and urged health professionals to wait for formal results of an ongoing revision by the Pharmacovigilance Risk Assessment Committee (PRAC) on the association of Ibuprofen/Ketoprofen and worsening of infections.[37] Accordingly, NSAIDs usage by COVID-19 patients should be conducted with ultimate caution and under medical supervision. This conflicting news leads to conflicting believes and incorrect counselling provided by healthcare professionals all over the world, not just the MENA countries. Unifying the source of information for pharmacists worldwide and keeping it updated is vital to prevent such undesirable consequences.

Fear is a normal consequence of pandemics and public quarantine.[38] Our study findings demonstrated that the majority of pharmacists have fears about being infected with the coronavirus during their work at the pharmacy. Such findings have been acknowledged previously by pharmacists from other countries around the world.[39] Mental health is a priority for healthcare workers during pandemics, and pharmacists are not an exception.[39] Training sessions and online workshops were requested by the pharmacists in this study, as has been the case in previously published findings.[17] In this term, the FIP had published a guideline for the pharmacists and pharmacy workforce, clarifying all the required responsibilities and role of both the community and hospital pharmacists.[40] This guideline also demonstrates all the preventive measures, tips on infection control, and some recommendations for outpatient care.[40] Interestingly, this study resonates with research investigating the experiences of other healthcare professionals, which highlights the need for more tailored and appropriate training to improve preparedness for deployment.[17]

Delivering medication to patients' homes can decrease infection spread especially for elderly patients where the risk of infection is increased. As an example, in Jordan, the Jordan Food and Drug Administration (JFDA) allowed community pharmacists and hospitals to provide free delivery of medications to patients' homes. Before the COVID-19, this practice was not allowed by the local laws,[41] which is the case in most countries in the MENA region. The majority of participants in this study were willing to deliver medicines to patients' homes. This provides an example of an effective service that can be successfully delivered everywhere if the safety of pharmacists from COVID-19 was guaranteed.

Social media was employed in the conduct of this study, which facilitated a large and rapid collection of the sample size from numerous countries in the MENA region. It is of note that a significant correlation between pharmacists' awareness across the countries included in this study and the COVID-19 statistics of cases and deaths was found. This may indicate that countries with people (hence pharmacists) of higher awareness are likely to end with lower numbers of COVID-19 cases.

4.1 | Limitations

The fact that this study was conducted via an online survey brings limitations just as it brought strengths. Such sampling technique led to a convenience sample which is a type of non-probability sampling that allows for data collection from a group of people easy to contact and/or reach.[42] Such approach may introduce sampling bias, as pharmacists who use social media more frequently had a better chance to participate in this study, giving results that may not be representative of all of the pharmacists' groups in the Arab-speaking countries in the MENA region.[43] Although the questionnaire was sent to pharmacists only, it was difficult to ensure that all participants
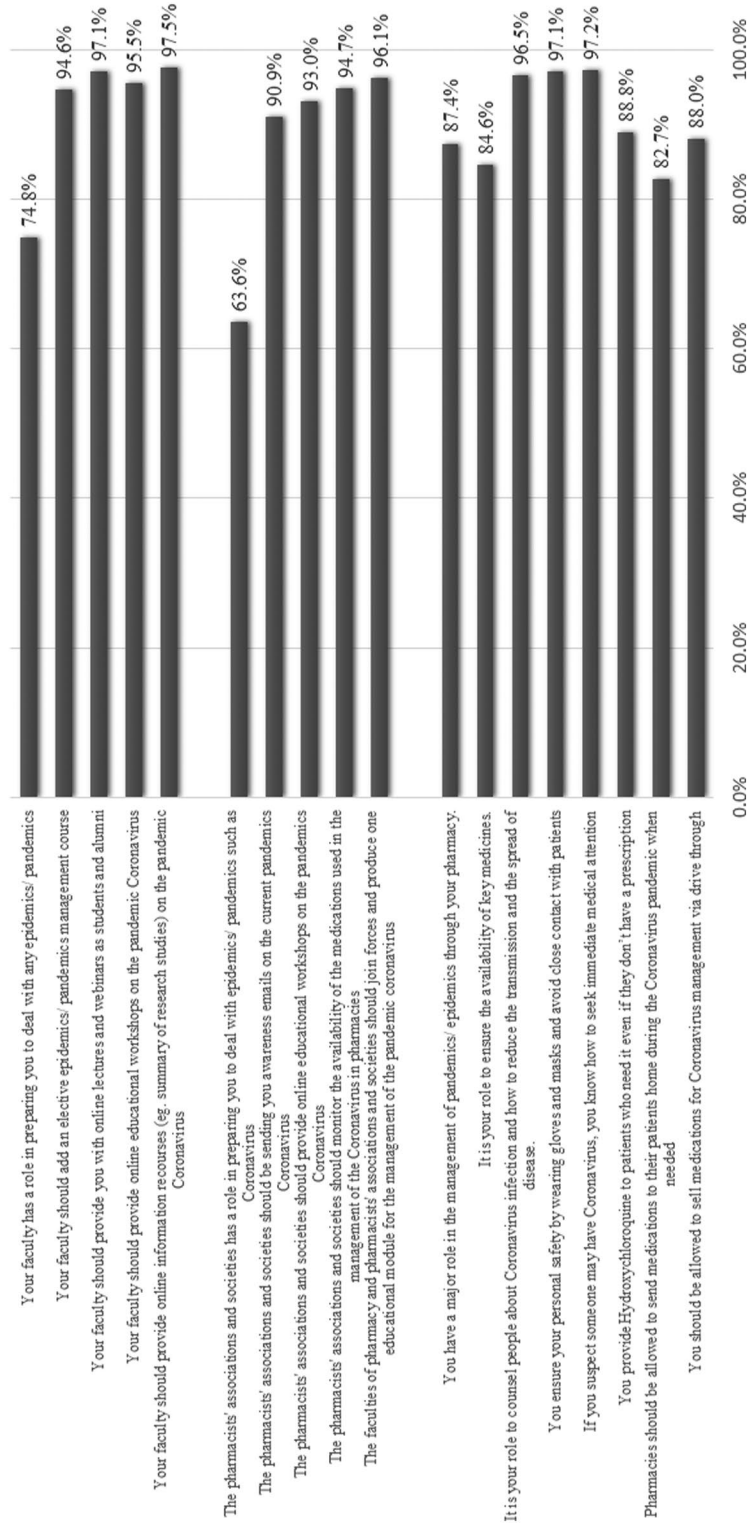
FIGURE 4 Study participants' perceptions about the current role of the faculties of pharmacies/educational institutes, pharmacists' associations and societies, and pharmacists' role to deal with pandemics and the coronavirus pandemic specifically (n = 2589)

TABLE 5 Regional distribution of study participants' perceptions about the current role of the faculties of pharmacies/educational institutes to deal with pandemics and coronavirus specifically (n = 1998)

Statement	Strongly agree/agree, n (%)						P-value#
	Total n = 1998	East Mediterranean and Iraq n = 638	Egypt n = 819	North Africa n = 365	Gulf countries n = 102	Other Arab countries n = 74	
Your faculty/educational institute has a role in preparing you to deal with any pandemics	1495 (74.8)	458 (71.8)	590 (72.0)	277 (75.9)	74 (72.5)	60 (81.1)	.301
Your faculty/educational institute should add an elective pandemics management course	1891 (94.6)	613 (96.1)	770 (94.0)	344 (94.2)	93 (91.2)	71 (95.9)	.198
Your faculty/educational institute should provide you with online lectures and webinars as students and alumni	1940 (97.1)	623 (97.6)	800 (97.7)	351 (96.2)	93 (91.2)	73 (98.6)	**.003**
Your faculty/educational institute should provide online educational workshops on the pandemic coronavirus	1908 (95.5)	620 (97.2)	783 (95.6)	343 (94.0)	93 (91.2)	69 (93.2)	**.022**
Your faculty/educational institute should provide online information recourses (eg summary of research studies) on the pandemic coronavirus	1949 (97.5)	623 (97.6)	799 (97.6)	358 (98.1)	97 (95.1)	72 (97.3)	.551
Perceptions about the current role of pharmacists' associations and societies							
The pharmacists' associations and societies have a role in preparing you to deal with pandemics such as coronavirus	1270 (63.6)	403 (63.2)	522 (63.7)	225 (69.9)	65 (63.7)	55 (74.3)	.362
The pharmacists' associations and societies should be sending you awareness emails on the current pandemics coronavirus	1817 (90.9)	582 (91.2)	753 (91.9)	323 (88.5)	93 (91.2)	66 (89.2)	.407
The pharmacists' associations and societies should provide online educational workshops on the pandemics coronavirus	1858 (93.0)	597 (93.6)	759 (92.7)	334 (91.5)	98 (96.1)	70 (94.6)	.481
The pharmacists' associations and societies should monitor the availability of the medications used in the management of the coronavirus in pharmacies	1893 (94.7)	607 (95.1)	779 (95.1)	342 (93.7)	93 (91.2)	72 (97.3)	.308
The faculties of pharmacy/educational institutes and pharmacists' associations and societies should join forces and produce one educational module for the management of the pandemic coronavirus	1920 (96.1)	613 (96.1)	787 (96.1)	351 (96.2)	98 (96.1)	71 (95.9)	1.000
Perceptions about the current role of pharmacists							
You have a major role in the management of pandemics through your pharmacy	1746 (87.4)	558 (87.5)	719 (87.8)	320 (87.7)	82 (80.4)	67 (90.5)	.254
It is your role to ensure the availability of key medicines	1691 (84.6)	541 (84.8)	691 (84.4)	309 (84.7)	81 (79.4)	69 (93.2)	.170
It is your role to counsel people about coronavirus infection and how to reduce the transmission and the spread of disease	1929 (96.5)	618 (96.9)	792 (96.7)	352 (96.4)	98 (96.1)	69 (93.2)	.599
You ensure your personal safety by wearing gloves and masks and avoid close contact with patients	1941 (97.1)	624 (97.8)	793 (96.8)	355 (97.3)	98 (96.1)	71 (95.9)	.712
If you suspect someone may have coronavirus, you know how to seek immediate medical attention	1942 (97.2)	622 (97.5)	792 (96.7)	356 (97.5)	99 (97.1)	73 (98.6)	.796
You provide Hydroxychloroquine to patients who need it even if they don't have a prescription	224 (11.2)	72 (11.3)	78 (9.5)	53 (14.5)	9 (8.8)	12 (16.2)	.066
Pharmacies should be allowed to send medications to their patients home during the coronavirus pandemic when needed	1653 (82.7)	522 (81.8)	666 (81.3)	308 (84.4)	88 (86.3)	69 (93.2)	.065

#P-value under .05 indicates a significant outcome. Values in bold indicate significance.

were pharmacist-oriented; this might explain the relatively young age of the study participants, as men and older individuals are generally known to be underrepresented on social media.[43] Pharmacy students who participated in this study did not report their year of study, which can unveil useful information if indicated. Fifth-year students for example are expected to have different awareness levels compared with first and second-year students. Finally, although the survey was not completely validated (construct validity was not conducted), the items incorporated in it were performed in real-time, based on the literature and reviews of a team of clinical pharmacy specialists.

5 | CONCLUSION

Pharmacists from the Arab-speaking countries in the MENA region believed that they got enough education previously about pandemics, and the majority follow the latest coronavirus updates on treatments mostly from social media followed by the World Health Organization reports and published literature. The majority believed they have a major role in the management of the COVID-19, identifying fear of contracting the coronavirus as a barrier that requires resolutions by the policymakers. Certain gaps in the awareness about COVID-19 were identified, mainly concerning the conflicting news about Hydroxychloroquine and Ibuprofen use by infected patients. Such findings highlighted areas of improvement and indicated that a significant association is found between higher awareness amongst pharmacists and the number of cases of COVID-19 patients in the Arab-speaking countries in the MENA region involved in the study. Results of this study have important international applicability, as pharmacists all over the world share similar barriers, responsibilities, and engagements when it comes to the COVID-19 pandemic. Countries in the MENA region and worldwide share similar undergraduate pharmacy education and training, in addition to similar healthcare systems,[44] hence perspectives presented by the thousands of pharmacists involved in this study are an important springboard for further action.

CONFLICTS OF INTEREST
The authors have declared no conflicts of interest for this article.

AUTHOR CONTRIBUTIONS
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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SUPPORTING INFORMATION

Additional Supporting Information may be found online in the Supporting Information section.