



## KNOWLEDGE, ATTITUDE, AND PRACTICE TOWARD COVID-19 AMONG COMMUNITY PHARMACISTS IN SAUDI ARABIA: CROSS-SECTIONAL STUDY IN MAKKAH

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### ABSTRACT

We investigated the knowledge, attitude, and practice toward coronavirus disease 2019 (COVID-19) among community pharmacists to evaluate their current readiness and awareness levels. A validated, cross-sectional, self-administered, online questionnaire containing different sections was disseminated. The questionnaire was utilized to investigate potential factors associated with good knowledge, attitude, and practice toward COVID-19. The study period was one-month and the study population was a random sample of 437 licensed community pharmacists from different areas of the Holy City of Makkah, Saudi Arabia. Of the 437 participants, 92.3% demonstrated good knowledge, 75.8% expressed optimism and a positive attitude, and 86.7% exhibited good practice toward COVID-19. These results reflect the considerable efforts made by the Saudi government and other world health authorities to elevate awareness and good practices among healthcare providers. Approximately 94% of the participants strongly acknowledged their crucial role in the management and promotion of precautionary measures against COVID-19. Good knowledge and work experience were major determinants of the practice of community pharmacists. We recommend further education, awareness, and training programs for healthcare providers to address any disparity that may affect their services.

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### Introduction

Coronavirus disease 2019 (COVID-19) was declared a global pandemic in January 2020 [1-3]. The first case in Saudi Arabia was reported on March 2, 2020 [4, 5]. As Saudi Arabia is among the most crowded and visited countries, especially in Makkah city during Hajj and Umrah seasons, it can be a critical hotspot for COVID-19 transmission. This is further exacerbated by Iqama violators and visitors [4, 5].

Fortunately, Saudi Arabia has been following the World Health Organization's (WHO) infection control policies since the onset of the pandemic [4, 6]. It has implemented lockdowns, suspended Umrah and Hajj (limited to a few people), and introduced remote learning and digital health services such as the "Tawakkalna" and "Sehhaty" applications [4, 6].

Being the most accessible healthcare providers, community pharmacists are essential to the management of COVID-19 in Saudi Arabia. They played a key role during the pandemic since pharmacies were among the few places that were open during the lockdown and quarantine period in most countries, including Saudi Arabia. They offered direct access to customers and patients and provided counseling, support, and awareness [1]. Their role in preventing the spread of COVID-19 was praised and emphasized by the International Pharmaceutical Federation (FIP) [6].

The link between the knowledge of and attitude toward contagious infections and community panic levels has been identified [1-9]. During such times, knowledge, attitude, and practice (KAP) surveys provide insight into identifying and evaluating the current state of effective strategies for behavioral change in a community [1, 3, 7]. They help assess comprehension of a given topic and the associated behavior and skills [8, 10], and are widely used to assess how a target population understands, regards,

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and behaves towards a particular topic.

Numerous COVID-19-related KAP studies of community pharmacists have been published in several countries, emphasizing their crucial role during the pandemic [1-3, 8, 10-12].

However, information regarding the awareness level of community pharmacists in Saudi Arabia remains scarce. Therefore, we aimed to evaluate the KAP among community pharmacists toward COVID-19 to help promote COVID-19 management in Saudi Arabia during the latest outbreak of the pandemic, particularly in a cosmopolitan area such as Makkah.

## Materials and Methods

### *Study Design and Setting*

This descriptive cross-sectional study was conducted from December 2020 to January 2021. We targeted randomly selected licensed community pharmacists from different areas of Makkah in the western province of Saudi Arabia. Eligible participants included licensed pharmacists (the licenses obtained from the Saudi Commission for Health Specialties) currently practicing in community pharmacies in Makkah. Excluded participants were licensed pharmacists working outside Makkah and/or practicing in settings other than community pharmacies. After their eligibility was confirmed via an in-person assessment, community pharmacists received a direct text message invitation to complete the questionnaire. Participation was voluntary and anonymous. This study adopted a cross-sectional, deductive approach and a quantitative research design, using a scale-based method to form a broad and solid understanding of the study goals.

### *Population and Sampling Method*

In total, 8,419 registered pharmacists are currently working in community pharmacies, comprising approximately 34.51% of the licensed pharmacists in the country [13]. In Makkah, there are 71.93 registered pharmacists per 100,000 population, excluding the work sectors or Makkah alone [13, 14]. Therefore, considering the limited information on the number of community pharmacists in Makkah, a minimum sample size of 340 was calculated using the Raosoft sample size calculator (Raosoft Inc., WA, USA). A confidence interval of 95% was accepted, with a 5% margin of error and 50% response distribution. We used convenient sampling to recruit 437 participants and the adequacy of the total sample size was deemed acceptable [15].

### *Study Tool*

Primary data were obtained from an electronic self-administered questionnaire that we developed according to the COVID-19 guidelines provided by the FIP and the national action plan for COVID-19 in Saudi Arabia following an extensive literature review [1, 3, 6, 11]. The questionnaire was in English as it is the official language of medical education and licensing exams in Saudi Arabia. Content validity according to appropriateness, importance, and clarity was assessed by a panel of three field experts. The questionnaire comprised five sections: (1) formal consent; (2) eight questions to collect demographic data (sex, nationality, age, marital status, work experience, academic degree, COVID-19 vaccination status, and COVID-19 infection status); (3–5) 15 questions per section (45 questions in total) that comprised the main study variables to evaluate the pharmacists' knowledge of COVID-19, attitude toward the current situation, and practices were undertaken to prevent transmission or educate patients during walk-in visits. Google Forms was used to design the questionnaire, and all questions were marked as "required" to avoid missing data. The knowledge section comprised 15 "yes/no" questions, whereas the attitude and practice sections comprised questions rated on a five-point Likert scale (from 1 = "strongly disagree" to 5 = "strongly agree"). Cronbach's  $\alpha$  was used to test the internal consistency of the questionnaire.

### *Statistical Analysis*

Study data were analyzed using SPSS version 26.0 (IBM, NY, USA). Descriptive analysis was used to summarize demographic characteristics data. Responses to KAP questions were considered correct when they corresponded to reported information in the literature. Continuous data were expressed based on their central tendencies as means  $\pm$  standard deviation (SD). For comparison, Student's *t*-test, or Pearson's correlation was used as appropriate and  $P < 0.05$  was considered significant. Categorical data were presented as percentages.

## Results and Discussion

### *Socio-Demographic Information*

The demographical characteristics of the participants are summarized in **Table 1**. Approximately 98% of the participants ( $n = 428$ ) were fully vaccinated with two doses of the COVID-19 preventive vaccine at the time of the study (**Figure 1**). Moreover, 69% of the participants ( $n = 301$ ) had not been previously infected, whereas 31% had had COVID-19 at least once before the study.

**Table 1.** Participant characteristics ( $n = 437$ )

Variables	Category	n = 437	%
Sex	Male	380	87.0
	Female	57	13.0
Nationality	Saudi	133	30.4
	Non-Saudi (Arabic)	291	66.6
	Non-Saudi (Non-Arabic)	13	3.0
Age (years)	<25	15	3.4
	25–35	159	36.4
	36–45	254	58.1
	46–55	9	2.1
Work experience	<5	81	18.5
	5–10	188	43.0
	10–15	149	34.1
	>15	19	4.3
Education level	Bachelor of Pharmacy	366	83.8
	Master of Pharmacy	1	2
	Doctor of Pharmacy	70	16.0

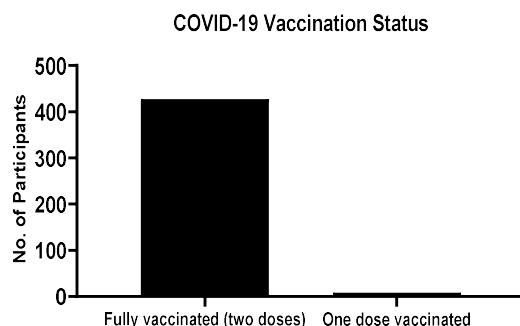
#### Knowledge Among Community Pharmacists Regarding COVID-19

All participants (100%, n = 437) knew what COVID-19 was, and 84% (n = 367) were enthusiastic about regularly updating themselves with information on COVID-19 (**Table 2**). Approximately 94% of the participants (n = 410) were following the updates of the Saudi Ministry of Health (SMoH) about COVID-19 precautions and the number of cases. Mixed responses were obtained concerning using social media platforms as sources of COVID-19 information: 48.5% of the participants reported using social media for information, while 39% found official accounts of the WHO, SMoH, and others useful (**Figure 2**). Most participants (98.9%) assuredly knew the symptoms of COVID-19, while 61.5% were aware of its potential long-term effects. Additionally, 95.7% of the community pharmacists were strongly aware of their role during Hajj and Umrah seasons, particularly during the pandemic and quarantine. Furthermore, 95.3% understood the transmission pathways of the virus, susceptible risk groups, and prevention methods, and 86.7% were aware of the current management of COVID-19. Overall, 92.3% of the participants had considerable knowledge regarding COVID-19. Sex, age, or educational level differences were not significantly related to the knowledge level.

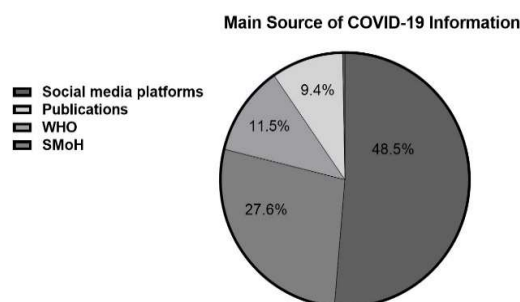
**Table 2.** COVID-19-related knowledge among community pharmacists (n = 437)

Question	Yes (%)	No (%)
I know what the COVID-19 pandemic is.	437 (100)	0 (0)
I update myself on information about COVID-19, daily.	367 (84)	70 (16)
I follow COVID-19 updates from the Saudi Ministry of Health (SMoH).	410 (94)	27 (6)
I seek information from social media handles such as Twitter, Facebook, etc.	225 (51.5)	212 (48.5)
I seek information from credible sources such as the WHO or SMoH.	170 (39)	197 (61)
I scientifically discuss COVID-19 updates with my fellow pharmacists.	199 (45.6)	238 (54.4)
I am aware of the long-term impact of COVID-19 on health.	269 (61.5)	168 (38.5)
I know the main symptoms of COVID-19.	432 (98.9)	5 (1.1)
I know how COVID-19 spreads to other people.	416 (95.3)	21 (4.7)
I am aware of which population group is at the most risk of contracting the infection.	416 (95.3)	21 (4.7)
I know COVID-19 prevention measures.	431 (98.8)	6 (1.3)
I understand the current therapeutic management of COVID-19.	379 (86.7)	58 (13.3)
I know the importance of my role as a pharmacist during the Hajj and Umrah seasons, particularly during the pandemic.	418 (95.7)	19 (4.3)
I understand the necessity of quarantine during the pandemic, especially in Makkah.	414 (94.7)	23 (5.3)
I know that patients needed the advice of community pharmacists more during quarantine.	379 (86.7)	58 (13.3)

COVID-19, coronavirus disease 2019; WHO, World Health Organization



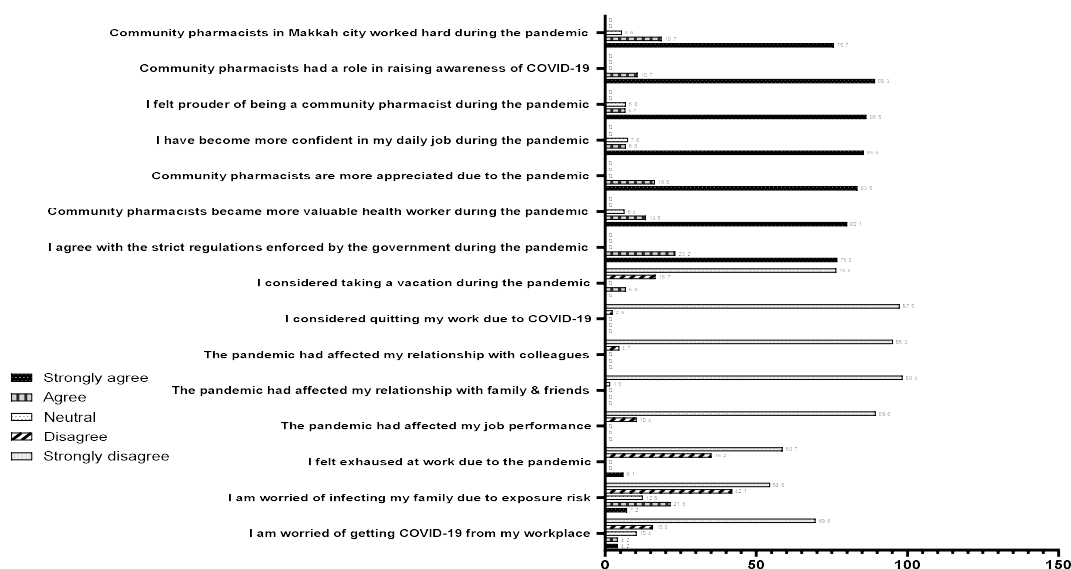
**Figure 1.** Main sources of COVID-19 information for community pharmacists. SMoH, Saudi Ministry of Health; WHO, World Health Organization.



**Figure 2.** The attitude of community pharmacists toward COVID-19.

#### *Attitude Among Community Pharmacists Regarding COVID-19*

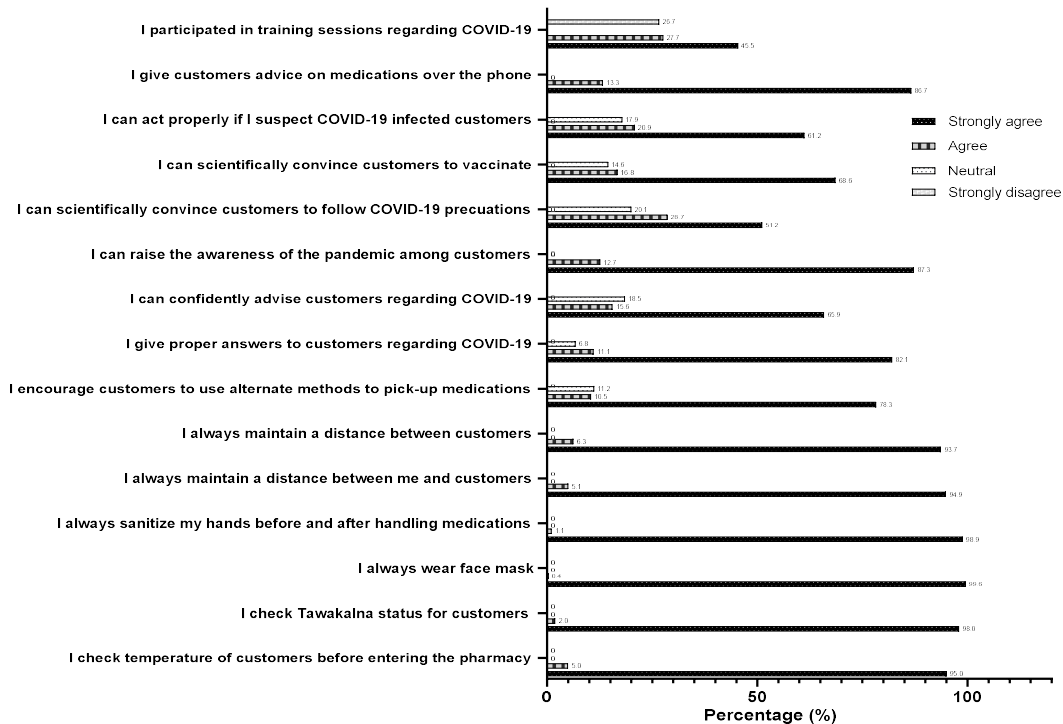
Most participants were not afraid of contracting the disease from their workplace (85.4%,  $n = 373$ ) or transmitting the disease to their families (96.7%,  $n = 423$ ). Most did not experience work exhaustion during the pandemic (93.9%,  $n = 410$ ) or any effect on their job performance. Most felt that the pandemic had not affected their relationship with their family, friends, and colleagues [16]. Additionally, most participants did not consider resigning or taking a vacation during the pandemic and strongly agreed with the strict governmental regulation imposed on Makkah. Approximately 83% of the participants felt more valued, confident, and proud of their work during the pandemic. They strongly believed that community pharmacists are crucial in raising awareness of disease containment and prevention. Approximately 75.8% of the participants expressed mostly positive attitudes toward COVID-19 (**Figure 3**).



**Figure 3.** The attitude of community pharmacists regarding COVID-19. No answers were recorded in the “disagree category;” thus, it is not included in the figure.

*Practice Among Community Pharmacists Regarding COVID-19*

More than 86% of the community pharmacists followed good practices regarding COVID-19. Most of the participants maintained good practices such as wearing facial masks, measuring body temperature, sanitizing their hands regularly, and using the smartphone application “Tawakkalna” to check the infection or vaccination status of patients (99.6%,  $n = 435$ ). Other good practices, such as maintaining an appropriate distance (94.9%,  $n = 415$ ) and offering telephone or in-person consultations (67.3%,  $n = 294$ ), were also observed (**Figure 4**).



**Figure 4.** The practices of community pharmacists regarding COVID-19. No answers were recorded in the “disagree category;” thus, it is not included in the figure.

*Assessment of KAP Score of Community Pharmacists*

The KAP score of community pharmacists was estimated using a five-point Likert scale, with each category containing various questions. Factors were evaluated by calculating the mean of each answer and the weighted mean of the large scopes. The configuration of a regular 5-level scale was used to quantify the weighted mean for positive inquiries.

Based on the mean of each variable, participants demonstrated a great KAP score regarding COVID-19. The deviations from the correct answers were exceedingly small, which solidifies the position of community pharmacists regarding each factor.

*Correlations Between Factors Associated with Good KAP Scores*

Chi-square tests were used to assess differences between the KAP score and participant characteristics (sex, age, and educational level). No significant differences were found between the characteristics of community pharmacists and the KAP score regarding COVID-19. Overall, participants demonstrated high KAP scores regarding COVID-19.

The relationship between the KAP score and the work experience of community pharmacists was initially assessed using Spearman's correlation analysis since work experience was categorized. However, the relationships among the three main variables were assessed using Pearson's correlation analysis. Overall, there was a highly significant relationship among KAP variables and between KAP variables and work experience ( $P < 0.01$ ).

Finally, there was a linear statistically positive correlation between KAP scores ( $P < 0.01$ ), and the correlation was positively moderate ( $r = 0.63$ ). Thus, the knowledge of pharmacists positively impacted their adherence to COVID-19 safety measures. This descriptive cross-sectional study assessed the KAP of community pharmacists toward COVID-19 in Makkah city. Overall, most community pharmacists had adequate knowledge, attitude, and practice regarding COVID-19. They also acknowledged their essential role in the pandemic. Most participants used official WHO and SMOH accounts for daily updates on COVID-19 owing to the accessibility and availability of regular updates, which is consistent with previous findings [1, 10]. However, research articles were not the main sources of information, which raises the concern of pharmacists being misguided by false information. Therefore, healthcare providers should evaluate the sources of COVID-19 information and only use official and reliable sources, as recommended [12, 17].

Precaution measures are essential to decrease transmission in the general population. According to previous studies, a

combination of good knowledge, positive attitude, and practices among community pharmacists helps in achieving this goal [4, 6, 8]. Owing to the pandemic, community pharmacists are mandated to increase their precautions. Additionally, the Saudi government has implemented recommendations related to COVID-19 by extending the quarantine period in Makkah. Thus, the excellent KAP of community pharmacists and their compliance with precautions raised community awareness and contributed to limiting the spread of COVID-19 [1, 4, 12, 17].

Recent studies demonstrated different levels of knowledge about COVID-19 among pharmacists: 71.5% in Pakistan [1] and 90% in Turkey [17]. The high percentage of participants that had good knowledge of COVID-19 in our study can be explained by the considerable efforts of the SMoH to disseminate COVID-19 precautions. This also provides cause for optimism in the management efficiency of community pharmacists during the pandemic during Umrah and Hajj seasons. During the study period, COVID-19 was mainly treated through the repurposing of available therapeutic agents based on symptoms and severity [1-5, 7, 10], which might explain why most of the participants were aware of the current management of COVID-19.

Most participants perceived their work as important during the pandemic. Similar findings were reported in Jordan [12] and Pakistan [1]. Moreover, most participants were confident that the pandemic was being effectively controlled by the government, similar to recent reports from different parts of the world [1, 12]. Usually, a lack of confidence arises from limited health facilities and equipment, absence of recommendation policies, lack of public awareness, or economic crises that may prevent some countries from managing such outbreaks [1, 3, 11].

We noticed a slight association between negative attitudes and expatriates, which might have been influenced by the COVID-19 status in their homelands. Participants who showed a higher level of concern demonstrated a positive attitude compared to that of less concerned participants. Additionally, good knowledge was a potential predicting factor of positive attitude, as its positive association with attitude has been reported [1, 11, 18]. Therefore, to improve knowledge and consequently increase positive attitudes about COVID-19, continuous educational programs and training sessions can be effective interventions [1, 3].

One Pakistani study demonstrated a significant relationship between the age and attitude of pharmacists [1], whereas a different study—corroborating our results—did not confirm any associations between attitude, age, sex, and educational level [18]. The cultural and geographical differences between these countries could explain this discrepancy [1, 18]. Participants concurred with the stricter precautions and longer quarantine periods imposed on Makkah compared to other cities in Saudi Arabia.

The percentage of participants with good practice toward COVID-19 in this study was higher compared to those in recently conducted studies in Turkey and Pakistan [1, 17], but comparable to a similar study in the United Arab Emirates [1].

To our knowledge, this is the first study to explore the KAP of community pharmacists toward COVID-19 in Saudi Arabia. However, it has some limitations. This cross-sectional survey was conducted during a partial quarantine, in one city. Since we used an electronic questionnaire, the responses mainly depended on the honesty and integrity of the participants and might have been partially affected by their recall abilities, which might have caused confirmation bias. Finally, this study provided an under-standardized assessment of attitudes that should be established comprehensively through focus group discussions and detailed interviews and constructed as multi-dimensional measures [1, 8, 10, 12, 17].

## Conclusion

This evaluation highlights the importance of the continuous assessment of the professional development of community pharmacists. Overall, the participants showed adequate KAP toward COVID-19 and recognized their essential role in the pandemic by providing services and consultations to raise public awareness. We also highlighted some aspects of the KAP of community pharmacists that must be addressed in future education, awareness, and training programs. Future studies evaluating the KAP of other healthcare providers are required. Understanding the current KAP of community pharmacists may help evaluate their role in managing the COVID-19 pandemic. We recommend that the SMoH and other associated authorities continue their efforts of promoting awareness about COVID-19 and similar pandemics.

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**Conflict of interest:** None

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**Ethics statement:** The study protocol was approved by the ethical committee of Umm Al-Qura University (Reference number: HAPO-02-K012-2021-11-831) following the Declaration of Helsinki. The questionnaire included a brief introduction describing the nature and purpose of the study, in addition to a consent section to ensure anonymity and voluntary participation.

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