


# Barriers to Community Pharmacists Referring Patients With Suspected COVID-19 Symptoms

Journal of Pharmacy Practice  
2022, Vol. 0(0) 1–12  
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DOI: 10.1177/08971900221074952  
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Mohamed Bahlol, PhD, MBA<sup>1,2</sup> , Zachary Z. Sum, PhD<sup>3</sup>, and Rebecca Susan Dewey, PhD, MPhys<sup>4</sup>

## Abstract

**Background:** With the necessary skills available to community pharmacists, they are well equipped to relieve pressure on hospitals and general practices by providing referral services for symptomatic patients for COVID-19 testing.

**Objective:** The assessment of potential barriers that limit the successful implementation of a community pharmacy referral service for patients with suspected COVID-19 symptoms.

**Methods:** A questionnaire comprising of 100 questions was administered to one pharmacist by interview in 1023 working community pharmacies in 4 regions of Egypt between May 17 and May 30th 2020.

**Results:** Forty-five barriers were identified. Respondents (79%, n = 803) had difficulty obtaining an accurate patient history. Patient data confidentiality was a significant issue for pharmacists who had not received referral training, with these respondents being significantly ( $P = .010$ ) less able to differentiate between COVID-19 and similar conditions. Respondents (68.8%, n = 698) were not confident in determining whether COVID-19 was the cause of the patient's presenting symptoms. A large majority (73.7%, n = 747) of respondents were worried about referring misdiagnosed patients and were concerned about the negative implications of proceeding with such a referral, including legal consequences. Of Respondents (71.7%, n = 727) reported that online referral was not easy, and 71.6% (n = 722) were unable to locate paper referral forms. Only a small number of pharmacists (11%, n = 112) preferred to report a referral in their own name.

**Conclusions:** This study has demonstrated the potential of the community pharmacist's role as a point of referral for COVID-19 testing, and identified some major barriers to implementation of this. The lack of pharmacists' education, legal support, availability of referral forms, clarity of responsibility and unsupportive management teams are key obstacles that must be overcome for the successful implementation of a COVID-19 referral service.

## Keywords

COVID-19 diagnostic testing, community pharmacists, referral and consultation, surveys and questionnaires

## Introduction

Since the WHO categorized COVID-19 as a pandemic, governments around the world have been disseminating public health measures to help 'flatten the curve' such as workplace closures and lockdowns. Collectively, these measures have resulted in an extraordinary demand being placed on providers of essential community services. Pharmacies (both in hospitals and the community) are one of the few essential services allowed to maintain operation, and must remain open to provide for the needs of the population. Pharmacists have needed to adapt and go beyond their primary role, adopting new public health functions amidst a dynamic and changing healthcare landscape brought on by COVID-19.

<sup>1</sup>Specialty of Pharmaceutical Management and Economics, Department of Pharmacy Practice and Clinical Pharmacy, Faculty of Pharmacy, Egyptian Russian University, Cairo, Egypt

<sup>2</sup>Specialty of Pharmaceutical Management and Economics, Department of Clinical Pharmacy, Faculty of Pharmacy, Jazan University, Jazan, Saudi Arabia

<sup>3</sup>National Institute of Independent Pharmacist Research, Melbourne, VIC, Australia

<sup>4</sup>Sir Peter Mansfield Imaging Centre, School of Physics and Astronomy, University of Nottingham, Nottingham, UK

### Corresponding Author:

Mohamed Bahlol, Specialty of Pharmaceutical Management and Economics, Department of Pharmacy Practice and Clinical Pharmacy, Faculty of Pharmacy, Egyptian Russian University, Cairo-Suez road, Badr City, Cairo Governorate, Cairo 11829, Egypt.

Email: [ph\\_hossni@yahoo.com](mailto:ph_hossni@yahoo.com) or [bahlol@eru.edu.eg](mailto:bahlol@eru.edu.eg)

There has been an even greater dependence on pharmacists to remain on the frontline to support the challenges facing the healthcare system. Hospital pharmacists have adapted and expanded their clinical services to include collaborative therapeutic decision-making to solve medication-related issues thereby minimizing contact between healthcare personnel and COVID-19 patients. The use of medicines that have a longer half-life and a once-daily dosing regimen, remote communication strategies including cameras and tablet devices, and reconciliation and counselling using these electronic communication methods were the strategies adopted.<sup>1</sup>

Conversely, community pharmacists have continued to ensure continuity of care by extending their opening hours to allow the public access to pharmaceutical products and advice. In some countries, innovative funding models have facilitated community pharmacists in the provision of essential pharmaceutical care (such as accelerated development of electronic prescribing and dispensing, and courier networks for delivery of medicines) whilst reducing the community's risk of exposure to COVID-19.<sup>2</sup>

During the pandemic, community pharmacists not only performed their formal logistical role in ensuring the continuity of the supply of medicines to the public,<sup>3</sup> but also delivered essential public health functions such as clarifying COVID-19 misinformation, and providing direct patient care via innovative strategies such as telephone consultations. Patients' loss of employment and increased financial instability, together with the need for social distancing and the closure of some healthcare services, exacerbated issues in medication access and thus medication adherence. It is therefore imperative that community pharmacists are able to present unique clinical and practical solutions to the challenges brought on by this and future health disaster crises.

For low- to middle-income countries, community pharmacists provide pharmaceutical care at no charge to the most vulnerable.<sup>4</sup> As community pharmacy practice has evolved over the years to incorporate advanced medication and disease-state management services, it was suggested that they should play a role in triaging suspected COVID-19 patients. By sharing responsibilities with primary care, the collaborative effort from allied health professionals such as pharmacists can maximize the efficiency of the healthcare system, thus helping alleviate the pressures of physician shortages and reducing the workload pressures on general practitioners.<sup>5</sup>

Egypt currently has the highest number of pharmacies in the world at 6.5 pharmacies per 10 000 people.<sup>6</sup> A majority of pharmacists work in community pharmacies and are employed under the private sector. Such community pharmacies are owned by registered pharmacists and can be found in all areas of Egypt from big capital cities to smaller villages. Owing to an over-supply of pharmacy graduates, community pharmacists were identified to be less competitive than their hospital-based counterparts.<sup>7</sup> However to rectify that, it has been recommended that community pharmacists be utilized and

allocated to key areas in the country to provide efficient pharmaceutical care for the community.<sup>8</sup>

Being one of the most populous countries (more than 100 million people) in the Arab and African region,<sup>9</sup> the overcrowded neighbourhoods in Egypt make self-isolation and physical distancing difficult. The government closed schools and cafes and implemented a curfew in an effort to mitigate the health crisis. However no strict lockdown or mandatory mask wearing was implemented. Despite an illiteracy rate of about 27%,<sup>10</sup> a cross-sectional survey undertaken among the public demonstrated good knowledge (the total knowledge score ranged from 7 to 22, with a mean of  $16.39 \pm 2.63$ ), attitudes and practices towards COVID-19. However the over-reliance on news from social media platforms has led to misinformation among the population. Egyptians of lower economic status and elderly age have shown to require more aid in understanding the way COVID-19 is spread and their rights to access decisive care during the pandemic.<sup>11</sup> Health professionals have been praised for their efforts in the pandemic; however, reports have shown that the government only paid a fraction of the promised cash bonus for working on COVID-19 wards.<sup>12,13</sup> In addition, two hospital pharmacists have been arrested in Egypt for publicly criticizing the government's handling of COVID-19 in the hospital. At least 8 pharmacists who were involved in protests against unsafe working conditions were given sanctions of forced transfers to distant provinces for work.<sup>14</sup> Nonetheless, pharmacist roles have continued to expand to meet the needs of its population. In low to middle-income countries, researchers have identified many roles that community pharmacists can play including (1) point-of-care testing, (2) future COVID-19 vaccine immunizer, and (3) appropriate use of medications.<sup>15</sup>

Globally, the responsibility for referring a patient for COVID-19 testing continues to remain within the remit of the primary care physician. In Australia and the United Kingdom, patients who are suspected of having COVID-19 can get a diagnostic test either via direct referral from a general practitioner to a pathology laboratory or by getting a nasopharyngeal swab from a drive-through clinic.<sup>16,17</sup> In addition, there exist many alternative routes to obtaining a COVID-19 test, such as home testing kits, mobile testing units and COVID-19 satellite centres. In March 2020, in an effort to contribute to the public health objective of 'flattening the curve', community pharmacists in Canada were given billing and referral rights to help the government enhance its COVID-19 screening and assessment program.<sup>18</sup> In other countries, community pharmacists are not officially able to provide direct referral for COVID-19 testing to patients.

According to the Egyptian Ministry of Health, patients suspected of having COVID-19 are referred to the Ministry's many collection sites; fever clinics, hospitals, private pathology labs and drive-through PCR testing sites to perform testing.<sup>19</sup> Following this, the swabs and blood samples are being sent to 23 pre-identified government central laboratories (approximately one central laboratory in each governorate).

As reported in May, the rising number of COVID-19 cases has been attributed to the low uptake of COVID-19 tests such as the polymerase chain reaction (PCR) test; with only around 105 000 PCR tests having been conducted. This low uptake has potentially been attributed to the low accessibility of testing centres, and the fear of being stigmatized for contracting COVID-19.<sup>20</sup>

With the role of community pharmacist being highly accessible to the public for advice; the role of community pharmacists as a point-of-contact of referral for COVID-19 testing has been highlighted as a novel one, this study identifies barriers that limit the successful implementation of a community pharmacy referral service.

## Methods

### Design

Community pharmacies in Egypt were canvassed on factors relating to their role in referring patients with suspected COVID-19 symptoms. To address the study objectives, a cross-sectional survey was administered by in-person interview.

### Questionnaire Development

Development of the initial questionnaire was based on the existing literature. Specialized journals, publications from international associations, and the guidance or guidelines produced by national healthcare authorities or organizations, in English, Arabic and Russian languages were used. In addition, translated published literature from other languages specifically that published by the WHO, the Egyptian Government,<sup>21,22</sup> the Ministry of Health of the Russian Federation,<sup>23</sup> the Government of New South Wales, and the UK Government, as well as recommendations from the International Pharmaceutical Federation, the pharmacy Guild of Australia, the British Columbia Pharmacy Association, the Pharmaceutical Services Negotiating Committee, and National Institute for Health and Care Excellence were consulted. This wide range of sources was consulted in order to provide a comprehensive range of potential barriers and to address language bias, and hence publication bias. Following this, a series of validation steps were conducted to ensure the appropriateness of the selected survey questions to the context of Egyptian community pharmacists. First, exploratory interviews were conducted with a purposive sample of 7 pharmacists who were actively working in community pharmacies during the COVID-19 pandemic and covering a range of roles and levels of experience, selected to match the study objective. These exploratory interviews were conducted on the eighth and ninth of May 2020. The exploratory questionnaire included 87 questions divided into 3 sections. The first section covered the demographics of pharmacists and of their customers with suspected COVID-19 symptoms, as well as the

nature and degree of symptoms. The second section contained polar alternative (yes/no answer) questions covering 3 domains related to the COVID-19 pandemic: (1) barriers, (2) preparedness and (3) facilitators. The final section comprised of 3 open-ended questions asking whether questions should be removed, added or modified, if any sentence formatting were required (composition, terminology), regarding the validity of questionnaire content (internal validity), and seeking any other comments. The first 2 sections comprised questions that were predominantly closed-ended, although space was provided for expansion. The final section provided the opportunity for respondents to add any further comments on the topic.

Following this initial feedback phase, a pilot of 120 questions was performed on a random sample of 57 out of total 60 randomly selected pharmacies in demographically similar regions in the Centre, North, South and East of Egypt. The country consists of 7 regional units in Centre (Grater Cairo regional unit), North (Delta and Alexandria regional units), South (North, Asyut/Centre, and south of Upper Egypt regional units), and East (Suez Canal regional unit). For the map of the country regions, please see {<http://gopp.gov.eg/eg-map/>}. These interviews were conducted between the 10th and 14th of May 2020. As a result of feedback obtained during the pilot, a number of changes were made to the questionnaire, namely, the addition and removal of questions, and modifications to question formatting. These open-ended questions were added in the first 2 stages, that is, the exploratory and pilot phases, to ensure content validity of the questionnaire through capturing the comments of respondents around questions they felt should be added or removed, the organization and order of questions, terminology, or any other comments. The used language in writing the initial phases of questionnaire and in its final version was the local language, that is, Arabic.

### Data Collection

The final questionnaire comprised 100 questions in 2 sections; (1) demographics questions and (2) questions covering the domains under investigation. The final section of open-ended questions was removed. Invitations to take part in the research were distributed in printed format to community pharmacies in Egypt. From a list of 71 000 registered pharmacies, a total of 1034 were randomly selected by simple random sampling at the regional level, that is, a proportionate number of sites in the Centre, North, East, and South regions of Egypt. Data collectors delivered envelopes to selected pharmacies that were local to them. Envelopes containing invitations directed to 'the pharmacist'. Using local data collectors was advantageous to ensure that registered community pharmacies were actively working (ie not only registered but also open for service), and to maximize the response rate through obtaining the attention of the pharmacist. Data collectors visited community pharmacists in person on a second visit to conduct the interview. One pharmacist was interviewed in each community pharmacy, and each interview took around 90 min. All questions

had yes/no answers, except those with multiple closed choices, for example, regions (North, Centre, South or East), position (junior, senior, or manager), and years' experience (list of numbers). Each community pharmacy site was assigned a specific data collector (name and ID) to allow the researcher to contact them if necessary. Data collectors (n = 483) were asked to complete the interviews within a 2-week period (17<sup>th</sup>–30<sup>th</sup> May 2020) and submit the answers electronically using Google forms. Following electronic submission of completed responses, all participant data were anonymized. Responses submitted within the 2-week period comprised the study sample.

### Sample Size Calculation

The sample size was calculated using the formula  $X = Z_{\alpha/2}^2 * p * (1-p) / MOE^2$ ,<sup>24</sup> in which  $Z = 2.576$  using a confidence level of 99%, a margin of error of 5%, and a sample proportion of 50%, following the procedure of a similar survey conducted in Egypt.<sup>25</sup> Accordingly, the minimum sample size required in the present study was calculated to be 658. The number of respondents exceeds the minimum sample size required after 2 weeks. Thus, the survey was closed on schedule.

### Data Processing and Analysis

The present article covers one domain (barriers) out of the 3 covered in the survey: (1) barriers, (2) preparedness and (3) facilitators. The results have been divided into separate manuscripts in order to fully address the objectives of the study in isolation, and comprehensively assess the impact of the findings with reference to the field as a whole. The present manuscript deals with the potential barriers of community pharmacists (45 items) to the referral of patients with suspected COVID-19 symptoms (internal consistency measured by Cronbach's alpha = .856). Items related to barriers included factors regarding (1) communication with the suspected COVID-19 patient, (2) pharmacist knowledge, (3) concerns about responsibility, (4) the work environment, specifically attribution of responsibility, (5) the referral process itself and (6) the perceived importance of the COVID-19 referral process.

As such, the method described here resulted in capturing a high response rate (98.9%) from a large random sample of anonymized individual personnel (1023 out of the 1034 community pharmacies contacted), covering an expansive range of roles and levels of experience, over a wide geographical area, with great rapidity. Consequently, all efforts were made to address and minimize any possible bias and thus maximizing the opportunity for generalizability (requiring external validity) of the empirical research outcomes.

Data were analysed in SPSS version 20 using descriptive statistics. Comparative analyses between survey items were conducted using chi-square tests. Due to the presence of a small number of missing values in the data, the results tables

presented show both absolute numbers of respondents and the percentage of valid responses for transparency. Significance was considered at a threshold of  $P \leq .05$ .

## Results

1023 community pharmacists completed the survey within 2 weeks. The remaining eleven pharmacists (from the 1034 initially contacted) were not included in the data analysis due to not responding within the survey period.

Respondents worked in all levels of community pharmacist position, originated from all regions of Egypt, graduated between 1972 and 2019, and ranged in age from 23 to 72 years, where the life expectancy in Egypt is 71.66 years; thus, the captured experiences span the age range of the Egyptian population. 17.6% of respondents had received referral training, and even fewer respondents (15.8%) had referred a suspected COVID-19 case to a COVID-19 testing site. Incomplete questionnaires were included in the statistical analysis, with missing data for each variable of interest varied between 1 and 28, with a mean of 5.5 and mode of 5 missing datapoints per item (Table 1).

More than half the respondents agreed that they experienced difficulties discussing COVID-19 with patients (52.9% to 79.0%). This was not seen to interact with job role (see Table 2).

Pharmacists who had received referral training were significantly less likely ( $P = .010$ ) to agree with finding it 'difficult to differentiate between similar conditions (eg cold)'. Similarly, pharmacists who had received referral training were less likely to agree that 'one case is not dangerous enough to refer' ( $P = .033$ ) and 'I do not know how to refer' ( $P = .001$ ), in comparison to pharmacists who had not received referral training.

73.7% of respondents reported being 'worried that I am referring the wrong patient' (Table 2). In addition, pharmacists who had received referral training were significantly ( $P = .002$ ) less likely to view this question as a barrier to referral compared to those without referral training. Pharmacists who had received referral training were also less likely to agree with items 'concern over legal consequences of referral' ( $P < .001$ ) and 'only referring when there are several patients' ( $P = .009$ ) when compared to those who had not received referral training.

Pharmacists who had received referral training were significantly ( $P < .05$ ) less likely to identify the referral process as a barrier, that is, significantly less likely to agree with statements such as 'insufficient information about referral process', 'I do not know where to send the referral', 'it is not easy to refer online' and 'unavailability of referral forms'.

As detailed in Table 3, more than half the respondents agreed that 'it is my role, but I assume the doctor will make the referral' and 'nothing prevents me from making the referral' with rates of 61.2% and 70.0%, respectively.



**Table 1.** Demographics of Respondents (Community Pharmacists) and Patients (Suspected COVID-19 Symptoms).

	Number	Valid
<b>I- community pharmacists</b>		
Region		
South	95	9.3%
East	79	7.8%
Centre	168	16.5%
North	677	66.4
Missing	4	
Position		
Junior	368	36.1%
Senior	230	22.6%
Manager	420	41.3%
Missing	5	
Graduation year (mean, median and range)		
	2007, 2009	1972–2019
Missing	28	
Years' experience (mean, median and range)		
	13, 10	1–48 y
Missing	15	
Respondent gender		
Male	742	72.9%
Female	276	27.1%
Missing	5	
Respondent age (mean, median and range)		
	36, 34	23–72 y
Missing	23	
University <sup>a</sup>		
Government-funded	825	81.0%
Private	193	19.0%
Missing	5	
Received referral training		
No	841	82.4%
Yes	180	17.6%
Missing	2	
Reported at least 1 suspected case		
No	860	84.2%
Yes	161	15.8%
Missing	2	
<b>II- symptomatic patients<sup>b</sup></b>		
Severity of most patients' symptoms		
Mild	378	37.2%
Moderate	241	23.7%
Severe	15	1.5%
3 degrees	130	12.8%
Mild and moderate	197	19.4%
Mild and severe	23	2.3%
Moderate and severe	32	3.1%
Missing	7	
Age category of most patients		
Elderly	244	24.0%
Adults	244	24.0%
Pediatrics	49	4.8%

(continued)

**Table 1.** (continued)

	Number	Valid
All of the above	479	47.1%
Missing	7	
Gender of most patients		
Male	182	18.0%
Female	22	2.2%
All of the above	809	79.9%
Missing	10	

Source: analysis of cross-sectional survey of 1023 community pharmacies in Egypt by SPSS version 20.0, May 15–30, 2020.

<sup>a</sup>Pharmacists that graduated from government pharmacy schools represent the largest proportion of graduates, as government-funded pharmacy schools are greater in number (the first being established in 1827); however, the first private pharmacy school was recently established in 1997.<sup>1</sup> I. APU. Arab pharmacists Union. Schools of pharmacy. <http://www.apharmu.com/Home/FacultiesofCntry?CntryID=2&CntryName=%D8%AC%D9%85%D9%87%D9%88%D8%B1%D9%8A%D8%A9%20%D9%85%D8%B5%D8%B1%20%D8%A7%D9%84%D8%B9%D8%B1%D8%A8%D9%8A%D8%A9> (2020, accessed Jun 16 2020).

<sup>b</sup>Each respondent was asked to select the gender, age category and degree of symptoms of the most common characteristics of symptomatic patients (suspected COVID-19) whom they consulted during the pandemic.

As shown in Table 4, 62.8% of respondents agreed that they had experienced ‘difficulty communicating with health authority staff’ as a barrier. Responses to the item ‘referral not encouraged by pharmacy management’ showed significant regional differences ( $P = .024$ ), with pharmacists in the South, East, Centre and North regions agreeing at rates of 44.2%, 30.4%, 35.7% and 29.6%, respectively.

## Discussion

The present study has identified 45 barriers to community pharmacists performing a referral role for COVID-19 testing sites. These barriers can be divided into 6 categories; barriers related to (1) communication with patients with suspected COVID-19 symptoms, (2) pharmacist knowledge, (3) concerns about responsibility, (4) the perceived importance of the referral process, (5) the referral process itself and (6) the work environment and specific responsibilities.

### Barriers Related to Communication With Suspected Patients

The data showed that a large proportion of pharmacists have expressed difficulties in communicating with patients about COVID-19. These difficulties included patients’ willingness to divulge information about their symptoms, and the accuracy in doing so. Similar observations were noted by Chinese doctors in obtaining accurate patient histories and symptoms, where a mix of poor health literacy, low communication skills and defensive patient behaviours were attributed to poor physician–patient communication outcomes.<sup>26</sup>

**Table 2.** Factors Regarding Communication with the Patient, Pharmacist Knowledge, and Responsibility (Chi-Squared Tests for Interactions with Position and Referral Training Status).

	Differences between Pharmacists (by Position and Referral Training Status) (Chi-Square Test)								
	Yes		Position				Referral Training Status		
	n	%	Junior %	Senior %	Manager %	P-value	None %	Trained %	P-value
<b>Factors regarding communication with the patient</b>									
Unsure about reliability of patients' report of symptoms	748	73.5	75.0	77.4	70.0	n.s	73.0	76.1	n.s
Patient uncooperative	698	68.6	69.8	68.3	67.8	n.s	68.7	68.7	n.s
Difficult to obtain accurate information from patient	803	79.0	79.8	78.7	78.3	n.s	78.8	79.4	n.s
Patient does not complain about symptoms	652	64.1	63.3	68.3	62.5	n.s	65.2	60.0	n.s
Worried about affecting the patient's confidence	766	75.4	79.3	74.7	72.4	n.s	77.2	67.2	.005
Patient uncommunicative	538	52.9	57.6	49.1	50.8	n.s	54.7	45.8	.031
Worried about patient data confidentiality	683	67.3	70.5	65.7	65.4	n.s	69.4	58.1	.004
<b>Factors regarding pharmacist knowledge</b>									
Insufficient information about symptoms for referral	155	15.2	17.1	14.8	13.8	n.s	14.8	17.2	n.s
Uncertainty that COVID-19 is the cause	698	68.8	69.4	70.4	67.3	n.s	69.8	63.7	n.s
Difficult to differentiate between similar conditions (e.g. cold) <sup>a</sup>	584	57.4	59.2	59.1	54.9	n.s	59.4	48.9	.010
There are not enough cases to be worth referring	641	63.2	64.1	55.9	66.3	.029	64.6	56.7	.046
There is no need to educate myself on what is common knowledge	214	21.1	27.1	16.1	18.7	.002	22.0	16.8	n.s
Referral of one case does not make a difference	134	13.2	15.5	15.2	10.0	.044	13.3	12.3	n.s
One case is not dangerous enough to refer	478	47.0	48.6	46.5	45.9	n.s	48.7	40.0	.033
I do not know how to refer	198	19.6	21.9	16.2	19.5	n.s	21.6	10.2	.001
I cannot remember who I should refer cases to	200	19.8	20.3	17.9	20.4	n.s	20.5	16.2	n.s
<b>Factors regarding concerns about responsibility</b>									
Worried that I am referring the wrong patient, that is, incorrectly suspecting COVID-19	747	73.7	74.5	78.6	70.4	n.s	75.8	64.4	.002
Concern over legal consequences of incorrect referral	598	58.9	56.4	62.4	59.0	n.s	61.9	45.6	<.001
Concern about making additional by needing to conduct patient follow-up	400	39.4	43.2	37.8	37.0	n.s	40.0	36.7	n.s
Referral may negatively affect my job	181	17.8	18.0	19.2	16.9	n.s	17.4	19.6	n.s
Only referring when there are several patients	475	46.9	51.4	40.4	46.5	.033	48.7	38.0	.009

SOURCE analysis of cross-sectional survey of 1023 community pharmacies in Egypt by SPSS version 20.0, May 15–30, 2020.

Health Department of Australian Government<sup>a</sup>.

<sup>a</sup>Health Department of Australian Government. COVID-19: Identifying the symptoms. 2020; <https://www.health.gov.au/sites/default/files/documents/2020/03/coronavirus-covid-19-identifying-the-symptoms.pdf>. Accessed Mar, 2020.

In this study, pharmacists who did not receive referral training experienced significantly higher barriers in communicating a positive referral for COVID-19 to their patients, in fear of breaching patient data privacy and making patients feel uncomfortable about the possibility of having COVID-19. Data privacy issues have been widely discussed in the pharmacy practice literature. A systematic review has shown that in order to encourage the disclosure of relevant information, a suitable environment must be achieved, that acknowledges the patient's privacy requirements and thus facilitate the community pharmacist to make better-informed decisions.<sup>27</sup> Evidence from the United Kingdom identifies patient confidentiality as a barrier to participation in the in-pharmacy health screening service, and as such, it is advocated

that a safe and neutral environment can prevent patients from withholding details about their condition and lifestyle.<sup>28,29</sup>

In line with existing research, the need to provide an appropriate space in the community pharmacy for conducting private conversations is key in supporting the referral process of many advanced pharmacy services such as alcohol and drug use disorder. From the data, it is evident that pharmacists who received referral training were more competent in discussing sensitive issues in a semi-private environment such as the community pharmacy. Studies have shown that community pharmacies are less likely to adopt a designated area for potential COVID-19 patients.<sup>30</sup> Such is the case in Egypt, where, as per regulations, some community pharmacies have a total area as small as 25 m<sup>2</sup>.<sup>25</sup> Based on the present findings,

**Table 3.** Factors Regarding Specifying Responsibility, and the Referral Process Itself. (Interactions with Position, Referral Training Status, and Region).

	Differences between Pharmacists (by Position, Referral Training Status and Region) (Chi-Square Test)													
	Yes		Position				Referral Training Status			Region				
	n	%	Junior %	Senior %	Manager %	P-value	None %	Trained %	P-value	South %	East %	Centre %	North %	P-value
<b>Factors regarding specifying responsibility</b>														
Referral is the responsibility of the doctor	231	22.3	28.3	17.4	20.8	.004	23.6	18.4	n.s	28.4	25.3	20.4	22.0	n.s
Referral is the responsibility of the hospital pharmacist	180	17.7	20.9	15.3	16.2	n.s	18.2	15.1	n.s	18.9	19.0	13.8	18.3	n.s
Referral is the responsibility of the clinical pharmacist	181	17.9	18.6	16.1	18.1	n.s	17.4	19.7	n.s	16.8	19.0	15.1	18.5	n.s
It is my role, but I assume the doctor will make the referral	622	61.2	62.4	62.6	59.3	n.s	60.2	64.4	n.s	56.8	57.7	56.0	63.2	n.s
It is my role, but I assume the nurse will make the referral	260	25.6	27.9	24.3	24.3	n.s	24.8	29.1	n.s	24.2	38.0	21.0	25.4	.039
It is my role, but I assume the patient will refer themselves	320	31.5	32.3	36.1	28.2	n.s	31.3	31.3	n.s	28.7	36.7	26.8	32.2	n.s
It is my role, but I assume the patient's family refer them	371	36.8	39.5	37.6	34.0	n.s	37.4	32.6	n.s	40.2	35.1	26.8	38.8	.030
If the patient is severe, I refer them to the physician, and they will decide	421	41.6	39.5	42.8	42.7	n.s	42.1	38.2	n.s	48.9	27.8	37.7	43.0	.020
Nothing prevents me from making the referral	709	70.0	66.9	68.1	73.7	n.s	70.6	67.0	n.s	77.2	60.8	66.7	70.8	n.s
<b>Factors regarding access to the referral process</b>														
Lack of information on type/severity of symptoms warrants referral	421	41.5	45.6	40.4	38.6	n.s	41.7	40.0	n.s	36.6	46.8	36.9	42.5	n.s
No way to access the information needed for referral	495	48.8	54.5	48.9	43.8	.011	49.9	43.9	n.s	47.9	50.0	44.0	50.1	n.s
Insufficient information about referral process	547	53.9	58.0	54.6	49.9	n.s	55.6	46.1	.020	46.8	58.2	54.2	54.5	n.s

(continued)

**Table 3.** (continued)

	Differences between Pharmacists (by Position, Referral Training Status and Region) (Chi-Square Test)													
	Yes		Position				Referral Training Status			Region				
	n	%	Junior %	Senior %	Manager %	P-value	None %	Trained %	P-value	South %	East %	Centre %	North %	P-value
I do not know where to send the referral	383	37.7	43.4	33.2	35.2	.017	40.1	26.7	.001	38.7	41.8	30.4	38.9	n.s
It is not easy to refer online	727	71.7	72.8	70.7	71.3	n.s	73.0	65.6	.044	68.8	78.5	71.4	71.4	n.s
Unavailability of referral forms	722	71.6	71.2	72.6	71.4	n.s	74.0	61.2	.001	67.4	74.0	71.9	71.8	n.s
Over-complicated referral forms	270	26.7	33.8	18.4	25.1	<.001	26.3	27.9	n.s	19.8	39.0	23.2	27.1	.026
Factors regarding perceived importance of the referral process														
I do not think referral is important	77	7.6	10.1	8.3	5.0	.025	7.2	9.6	n.s	5.3	11.4	6.6	7.7	n.s
I do not think referral is a priority	142	14.0	18.0	11.4	11.9	.021	12.7	20.0	.010	8.5	20.3	15.6	13.6	n.s
I want to report the case in my name, not just refer it	112	11.0	13.5	12.2	8.3	n.s	10.4	14.0	n.s	7.5	25.3	11.9	9.6	<.001

Source: analysis of cross-sectional survey of 1023 community pharmacies in Egypt by SPSS version 20.0, May 15–30, 2020.

**Table 4.** Factors Related to the Work Environment (Interactions with Region).

Factors Related to the Work Environment	Yes		Differences between regions (Chi-Square test)				
	N	%	South %	East %	Centre %	North %	P-value
Insufficient time to make referrals with normal workload	423	41.5	38.9	48.1	40.5	41.4	n.s
Referral is time-consuming	349	34.3	36.8	31.6	36.9	33.6	n.s
Unavailability of internet for online referral	371	36.5	47.3	30.4	38.7	35.2	n.s
Difficulty communicating with health authority staff	637	62.8	68.4	59.0	57.7	63.6	n.s
Referral not encouraged by pharmacy management	626	32.1	44.2	30.4	35.7	29.6	.024

Source: analysis of cross-sectional survey of 1023 community pharmacies in Egypt by SPSS version 20.0, May 15–30, 2020.

alternative referral pathways should be considered if floor space remains a challenge in the provision of effective and safe delivery of COVID-19 referral services in the community pharmacy.

### Barriers Related to Pharmacist Knowledge

The data obtained from this study showed that most Egyptian community pharmacists were uncertain as to whether a patient's symptoms were related to COVID-19, and almost 60% of respondents found it difficult to differentiate between symptoms of COVID-19 and similar conditions, thus hindering and delaying treatment onset. Zayet and colleagues (2020) have also described the difficulties in early detection of COVID-19, finding the main symptoms of the influenza A/B

virus to be similar to those of SARS-CoV-2.<sup>31</sup> Similar results were gathered in a systematic review and meta-analysis of 46248 COVID-19 patients.<sup>32</sup> It is expected that pharmacists will err on the side of caution when referring patients for COVID-19 testing.

Interestingly, the junior pharmacists participating in this study viewed themselves as more knowledgeable about COVID-19. There have been few studies on pharmacist clinical competence and age, with most research focusing on improving junior doctors' prescribing and diagnostic confidence during the early stages of their medical careers. In the present investigation, it could be assumed that junior pharmacists possessed more recent clinical knowledge, or that they are more involved in the day-to-day patient activities of the community pharmacy. With senior pharmacists more involved



in additional non-clinical and administrative duties, this could reflect their increased need to keep abreast of clinical knowledge related to COVID-19.

With the WHO reporting Egypt's total number of COVID-19 cases to be 5,537, with 392 deaths as of May 1 2020,<sup>33</sup> it is concerning that 63.2% of community pharmacists in Egypt do not find enough cases worth referring. This response also differed significantly between job positions and with having received referral training. Pharmacists who did not receive referral training were more likely to struggle to identify, differentiate, and refer patients suspected of having COVID-19. Thus, the impact of referral training demonstrates that education is paramount in ensuring pharmacists are competent and up to date with clinical and referral pathways, as well as pharmacist-patient communication outcomes to ensure an efficient public health response to the pandemic.

### ***Barriers Related to Concerns About Responsibility***

Considering the novelty and evolving nature of the pandemic in the healthcare system, the legal impact of initiating a COVID-19 referral, and the subsequent implications of an incorrect referral, are major concerns identified in this study. It has been seen that community pharmacists in Egypt are afraid of the legal repercussions of referral and therefore require additional legal support and indemnity for their actions in this role. Misdiagnosis has always presented itself as an obstacle in the healthcare system for both patients and physicians alike.<sup>34</sup> Despite many years of research into improving medical practitioners' diagnostic skills with the assistance of technology and electronic health records, the prevalence of misdiagnosis has remained stable and has not changed.<sup>35</sup> Taking into consideration that community pharmacists triage and diagnose mild health conditions daily in their practice, pharmacists continue to identify a lack of knowledge in areas outside their professional domain, and the implications of a misdiagnosis, as major barriers to enhanced pharmaceutical care.<sup>36</sup> In our study, pharmacists who received referral training were less likely to identify the legal consequences and accountabilities of referral as barriers to referring patients suspected to have COVID-19. This suggests that familiarity with the best practice standards and adherence to guidelines for COVID-19 referral through training programs can help community pharmacists stay vigilant and remain confident in the provision of the new COVID-19 referral service.

### ***Barriers Related to the Referral Process Itself***

Our findings have shown that almost half the respondents had issues with understanding, obtaining, performing and dispatching referral request forms. This lack of understanding is a key barrier to referring patients with suspected COVID-19 symptoms. However, pharmacists who received referral training did not identify these factors as barriers as readily, but conversely were able to navigate the referral process smoothly, including in

obtaining the required forms, conducting online referrals and dispatching referral forms to the relevant authorities.

Pharmacists in the present study reported significant difficulties in conducting online referral, and as such it is essential that public health authorities review their information distribution processes and customize referral forms for easier online and on mobile devices to prevent further delays to patient referral. Even till now, online medical meetings and telemedicine is still in its primitive stages in Egypt's health landscape.<sup>37</sup> Learning from oversights made in Italy, the need to incorporate information technology to ensure timely and accurate referrals has never been more critical than during the pandemic.<sup>38,39</sup>

### ***Barriers Related to the Perceived Importance of the Referral Process***

The data from this study demonstrated that, irrespective of job position or region of work, community pharmacists perceived highly of themselves as key members of the healthcare team in Egypt's COVID-19 response.

Despite referring suspected COVID-19 patients, only 11% of pharmacists would want to officially report the case in their own name. Again, this exposes the hitherto unknown and undiscussed legal liability brought upon by COVID-19 referral, and the issues surrounding ownership of reporting.

### ***Barriers Related to the Work Environment and Specific Responsibilities***

Most respondents felt confident in taking up responsibilities in the referral of suspected COVID-19 patients. However, there were mixed responses regarding which professional role should default to taking responsibility for referring patients for COVID-19 testing. Respondents had a higher tendency towards stating that the role of referral should fall to a doctor rather than a nurse, family member and/or non-community pharmacist. These findings were in agreement with observations from similar studies reporting that the responsibility of reporting cases of notifiable infectious diseases to surveillance units belonged to clinic administrative staff rather than physicians themselves.<sup>40</sup>

It is promising and noteworthy to know that the majority of respondents embraced the role of referring suspected COVID-19 cases to testing centres, irrespective of the seniority of their position.

The present study showed that communication with health authorities is a major barrier experienced by community pharmacists in the workplace in regards to COVID-19 referral. The subject of communication between healthcare providers across the primary/secondary/tertiary interface has been studied using the example of doctors.<sup>41</sup> Factors such as time and data accessibility present as major barriers in the reporting of notifiable disease cases between primary care clinics and

public health authorities.<sup>41</sup> The study recommended that such barriers can be reduced by improving the reporting workflow, and having a better understanding of information reciprocity between patients, clinicians and public health authorities.<sup>40</sup>

### Referral Role and Reports

In their response to any epidemic, authorities must be evidence-driven. The role of the community pharmacist in the referral of suspected COVID-19 patients for testing is of a similar degree of importance to their indispensable role in the spontaneous reporting of adverse drug reactions, as it contributes to concurrent surveillance studies, epidemiological field investigations, and case series, thereby assisting to develop national reports about COVID-19 disease incidence. The present findings highlighted significant regional differences, with pharmacists working in the South of Egypt being more likely to be discouraged from referring a suspected COVID-19 patient. Conversely, this aversion to reporting was less likely to be expressed by pharmacists working in the North. Studies have related this occurrence to the lack of comprehension on the subject matter, which ultimately led to managers' resistance to implement a new clinical service within the community pharmacy.<sup>42,43</sup> With the majority of the Egyptian population being situated in the North, it is anticipated that pharmacists based in the North would be more likely to provide COVID-19 referrals compared to their Southern counterparts, as community transmission is more probable in a densely populated environment. Similar results were seen in the USA where population density and transport connectivity were significant predictors of higher infection and mortality rates.<sup>44</sup> However the region-dependence ( $P = .024$ ; Table 4) in the present findings should still be further investigated in future research to determine other potentially related barriers created by poor management support within the service. These are in line with the Weekly Reports published by the CDC COVID-19 Response Team entitled 'Geographic Differences in COVID-19 Cases, Deaths, and Incidence—United States, February 12–April 7, 2020'. Thus the importance of the referral role in the pharmacy also extends beyond this to contributions such as effect monitoring, monitoring of the disease spread, and enhancing the reliability and validity of national figures, and the accuracy of reports. Efficient and effective referral of suspected COVID-19 patients from community pharmacies benefits healthcare professionals and the general population in enduring the pandemic.

### Conclusion

In this study, we identified the barriers that can affect the uptake of COVID-19 referral in a low to medium-income country of Egypt. Some of these barriers are country and socioeconomically specific, while some presents as universal problems that can be found across more developed nations.

Though idyllic, having community pharmacists with pathology referral capabilities will require new partnerships, seamless adoption of technologies, removal of legal and regulatory barriers, and provision of high quality training and education, if such expanded services are to produce positive outcomes. The referral role of the pharmacist must not be overlooked and attention should be paid to accuracy in referral procedures. Avoidance of under-referral and over-referral is important in order that the referral of suspected COVID-19 patients by pharmacists contributes constructively to national figures and reports of the spread of infection.

Over the next few months and years, the aftermath of the COVID-19 pandemic will change the role of community pharmacists considerably. The impact of communicable diseases now takes similar priority to those of non-communicable diseases. The barriers identified in this study will mould and shape the professional roles and responsibilities of the pharmacy profession; with the impact of the crisis necessitating and accelerating the expansion and evolution of the community pharmacy and its most vital team member – the community pharmacist.

### Limitations

The article concerns a global pandemic, however, in designing the research and writing the article, the authors consulted existing literature published in English, Russian and Arabic languages, as well as published literature from other languages, that had been translated into English, Russian and Arabic, such as translated WHO reports and publications, or studies originally published in Chinese. The data presented were collected within one nation and represent a very specific context. As such, caution must be applied in generalizing the findings of this article to other places or contexts.

### Acknowledgements

The authors are thankful to Prof. Dr M. Ihab Fetouh, Dean of Faculty of Pharmacy, Egyptian Russian University (ERU), for his support in conducting the study as well as all the community pharmacists who agreed to be interviewed for the study. The authors acknowledge the efforts conducted by undergraduate students in conducting these interviews, which comprises a critical part of their education on courses related to the specialty of pharmaceutical management and economics according to international education standards, providing professional development and real life context of the labor market that is required in Egypt by guidelines from (1) the Supreme Council of Universities and (2) the National Authority for Quality Assurance and Accreditation of Education.

### Author Contributions

Mohamed Bahlol: Conceptualization, Methodology, Validation, Formal analysis, Investigation, Data Curation, Writing – Review and Editing, Visualization, Project administration. Zachary Z. Sum:

Writing – Review and Editing. Rebecca Dewey: Writing – Review and Editing.

### Declaration of Conflicting Interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

### Funding

The author(s) received no financial support for the research, authorship, and/or publication of this article.

### Ethical approvals

Approval of Study Protocol by the Research Institute. Copy of the Policy Detailing the Confidentiality and use of Participant Data.

### ORCID iD

Mohamed Bahlol  <https://orcid.org/0000-0002-2990-2708>

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