

Assessing Pharmacy Professionals' Knowledge, Attitudes, and Practices Regarding COVID-19 and Enhancing the Role of the Pharmacy During the COVID-19 Outbreak in the Philippines

May 26, 2020

Executive Summary

With the aims of understanding the landscape of COVID-19 care at the pharmacy and identifying current health system challenges in the Philippines, a cross-sectional survey on knowledge, attitudes, and awareness among pharmacy professionals on COVID-19 was conducted between May 4, 2020 and May 17, 2020 through a mobile app, SwipeRx. In total, a sample of 306 pharmacy professionals was collected.

Results:

- ❖ The mean knowledge score per respondent was 7.22 questions answered correctly (n=293, SD ± 1.30) out of 11 knowledge questions, which is an average percentage score of 66%. Pharmacy professionals scored poorly on scenario-based questions, such as the criteria for rapid testing (6% correct), self-isolating (49% correct), and care-seeking at the hospital for mildly symptomatic patients (13% correct).
- ❖ Pharmacy professionals reported moderate to high levels of fear with regard to COVID-19 infection (84%); yet, open text responses revealed motivation to provide needed care despite fear. For example, in the qualitative data, respondents expressed that it was their professional responsibility to serve on the frontline amidst increased health risks. Furthermore, they perceived the pharmacy as an accessible source of health information, needed medication for non-COVID-19 diseases, and a potential participant in improved health system management.
- ❖ Respondents also reported facing supply challenges and lack of personal protective equipment for pharmacy staff.
- ❖ Independent retail or small chain pharmacies and hospital or clinic pharmacies experienced significantly greater supply chain disruption, compared to big chain pharmacies ($\chi^2=31.79$, $p<0.001$).

Insights and Recommendations:

Since pharmacies are among the most available and accessible sources of health care in the Philippines, building capacity among pharmacy operators can empower them to take on a participatory role in patient management. This includes providing reliable COVID-19 education for more informed patient counselling and guidance on pharmacy practices during this pandemic. Decision-makers should also work with pharmacies to address challenges in supply and perhaps explore digital methods to monitor and receive real-time data on stockouts, which can lead to proactive policies instead of reactive measures. Finally, as a part of a coordinated approach, the pharmacy can be a channel to educate, triage, and refer patients for testing, contributing to a more efficient and effective health system response to COVID-19.

Background

Since the first confirmed case of COVID-19 on January 30, 2020, the Philippines has reported more than 14,000 cases and 860 deaths.¹ While community lockdowns are being partially lifted for parts of the country, the number of total infected still continues to rise, necessitating sustained focus on the health system response to minimize disease transmission. As a first point of care for many communities, the pharmacy can play a defining role in patient management and health system support, to curtail COVID-19 progression.²

In this study, SwipeRx leveraged its social network and digital community of pharmacy professionals in the Philippines to obtain rapid insight about pharmacy professional knowledge, attitudes, and practices to understand how the pharmacy is responding to the outbreak and to identify potential interventions through this channel.

Furthermore, knowledge is recognized as being necessary for good practice³ and pharmacies have an opportunity to be a reliable source of information on COVID-19 for the community. As such, the findings of this survey will be used to directly build capacity in the pharmacy workforce through awareness campaigns and online education modules, so that professionals can provide trustworthy education and patient care for COVID-19. This work will also provide insight to advise the ministry of health (MOH) and decision-makers on possible emergency planning and activities in the pharmacy sector.

Methods

This cross-sectional study surveyed a sample of pharmacists, pharmacy technicians, pharmacy managers, and pharmacy owners who were registered on the mobile app, SwipeRx between May 4, 2020 and May 17, 2020.

SwipeRx

SwipeRx is Southeast Asia's largest social network of pharmacies. The app is used by more than 30,000 pharmacy professionals across the Philippines, including pharmacists, pharmacy technicians, pharmacy owners, and pharmacy managers.

¹ <https://coronavirus.jhu.edu/map.html>

² Miller, R., and Goodman, C. "Performance of retail pharmacies in low- and middle-income Asian settings: a systematic review." *Oxford Journals, Health Policy and Planning*. 2016 Sep; 31(7): 940-953.

³ Miller, Rosalind, and Catherine Goodman. "Performance of retail pharmacies in low-and middle-income Asian settings: a systematic review." *Health policy and planning* 31.7 (2016): 940-953.

Survey Development

The survey tool for this study was developed with Johns Hopkins University Center for Communication Programs to investigate pharmacy professional knowledge, attitudes, and practices on COVID-19 and included 12 items on demographics, 11 items on knowledge, 5 items on attitudes and beliefs, and 11 items on current practices.

Survey Administration

The survey was built on a survey platform tool called Qualtrics and was administered through the SwipeRx mobile application, to users within the inclusion criteria. A convenience sampling method was used, where online recruitment activities consisted of electronic invitations sent by in-app push messages, SMS, email, and Facebook and Instagram posts.

Participants received incentives of 200 PHP as compensation for their time. Incentives were distributed for the completion of one survey and were administered as mobile credit directly to the number provided by participants. 80% completion rate was considered as complete.

Eligible participants were SwipeRx users who were 18 years of age or older, practiced at pharmacies in the Philippines which were open for business, and identified as either a pharmacist, pharmacy technician, pharmacy owner, or pharmacy manager. The survey was made available in the SwipeRx app from May 4, 2020 to May 17, 2020.

A total sample of 270 pharmacy professional respondents was needed for a 90% confidence level and a 5% margin of error.

Data Analysis

STATA (StataCorp, 13.1) was used to analyze the cleaned, raw survey data. Descriptive analysis of demographic and workplace data was conducted, where variables such as gender, professional background, region, workplace type, and change in pharmacy volume were reported. Chi-squared and Kruskal-Wallis H tests were used to assess whether region, workplace type, and pharmacy volume were significantly different.

For topics on knowledge, attitudes, and practices, percentage answer distributions were calculated for every question. In the knowledge section, individual participant knowledge scores were determined. ANOVA tests were conducted to statistically assess whether mean knowledge scores differed by region and workplace type. Further, categorical and ordinal responses for single selection practice questions were analyzed using chi-squared tests and Kruskal-Wallis H tests, respectively, to assess differences across region and workplace. Where significance was detected for Kruskal-Wallis H tests, a Dunn's post-hoc test was performed for pairwise comparison. P-values less than 0.05 were considered statistically significant.

The attitudes section also include two open-text questions. The qualitative responses were analyzed by text analysis to uncover emerging themes.

Ethical Approvals

This protocol was approved by the Johns Hopkins University Institutional Review Board.

Results

Participant Demographics and Workplace Background

Between May 4, 2020 and May 17, 2020, there were 306 pharmacy professionals who participated in this survey. Among this sample, 80% were female and 98% were frontline workers such as pharmacists and pharmacy assistants, with an average age of 27 years (n=303, SD±6). In terms of workplace distribution (table 1), most operators reported working in big chain pharmacies (50%, n=305), hospital pharmacies (25%, n=305), and independent retail pharmacies (15%, n=305).

Table 1: Participant Demographics

	n (%)
Gender (n=302)	
Male	61 (20)
Female	241 (80)
Professional background (n=306)	
Pharmacist	266 (87)
Pharmacy technician	34 (11)
Pharmacy owner or manager	6 (2)
Region (n=297)	
Metro Manila	100 (34)
Luzon	119 (40)
Mindanao	21 (7)
Visayas	57 (19)
Workplace (n=305)	
Big chain pharmacy (≥5 branches)	151 (50)
Small chain pharmacy (2-4 branches)	24 (8)
Independent retail pharmacy (1 branch)	47 (15)
Hospital pharmacy	75 (25)
Clinic pharmacy	8 (3)

Beginning in March 2020, the Philippines' number of reported COVID-19 cases began to substantially grow, which generated widespread media and public awareness of the disease. Thus, March 2020 was used as a benchmark to indicate how pharmacy volume has changed since COVID-19 became a public domestic concern.

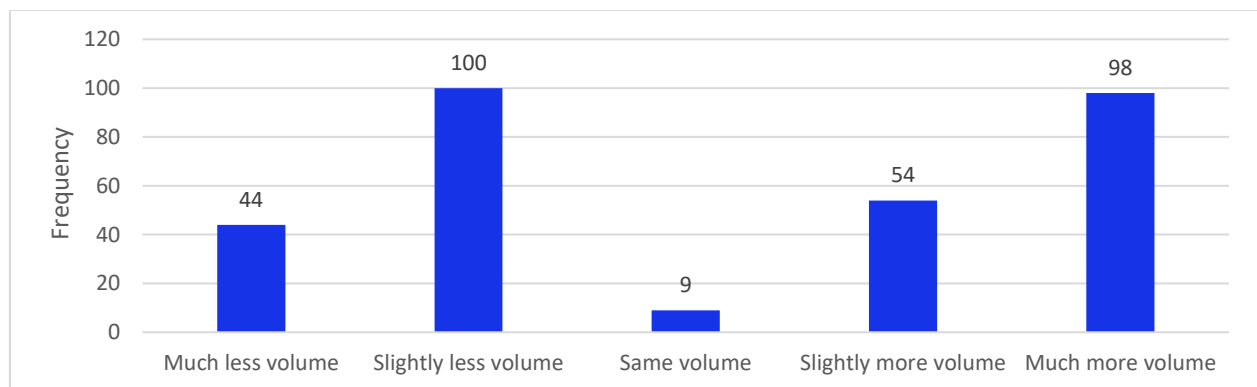
Among this sample, pharmacies receive an estimated 100 pharmacy clients per day (n=302). Relatively low amounts of clients have asked for advice on COVID-19 (approximately 10%) or complained about COVID-19 symptoms (approximately 5%) since March 2020; however, an estimated 20%, or 1 out of 5 clients, purchased products that address COVID-19 symptoms such as fever, pain, and cold medication.

In addition, according to graph 1, 50% of participating pharmacies have observed greater volume of pharmacy clients since March 2020, while 47% noted a decrease in business at their pharmacy.

Table 2: Workplace volume

	n	mean	SD	median	IQR
Since March 2020, how many pharmacy clients on average has your pharmacy received per day?	302	160	160	100	30-220
Since March 2020, how many pharmacy clients on average have asked your advice on COVID-19 per day?	303	35	73	10	4-30
Since March 2020, how many pharmacy clients on average have complained about dry cough, fever, and/or shortness of breath?	305	25	59	5	2-20
Since March 2020, how many pharmacy clients on average have purchased products that treat symptoms of fever or the common cold?	304	60	102	20	7-50

Graph 1: Change in pharmacy volume since March 2020 (n=305)



For analysis, reported workplace was collapsed into a three-level variable with groupings for similar characteristics such as big chain pharmacies, independent or small chain pharmacies, and hospital or clinic pharmacies.

Region, workplace, and change in pharmacy volume were investigated further for statistical difference among these items. A chi-squared test revealed statistical significance across region and workplace (table 3, $\chi^2=22.23$, $p=0.001$).

Moreover, a Kruskal-Wallis H test found that change in pharmacy volume since March 2020 was statistically different across workplace types (table 4, $\chi^2=52.30$, $p<0.001$). A post-hoc Dunn's test revealed that pharmacies in hospitals or clinics received statistically more clients, than big chain pharmacies and independent retail or small chain pharmacies.

Table 3: Region vs. workplace employment (n=296)

	Big chain pharmacies n(col%)	Independent or small chain pharmacies n(col%)	Hospital or clinic pharmacies n(col%)	Total	χ^2, p
Region					$\chi^2=22.23$, $p=0.001$
Metro Manila	57 (39)	15 (23)	28 (34)	100	
Luzon	51 (35)	27 (41)	41 (49)	119	
Mindanao	5 (3)	11 (17)	4 (5)	20	
Visayas	34 (23)	13 (20)	10 (12)	57	
Total	147	66	83	296	

Table 4: Workplace employment vs. change in pharmacy volume (n=305)

	Median* (IQR*)	Mean rank	χ^2, p	1-2 [†]	1-3 [†]	2-3 [†]
Workplace			$\chi^2=52.30$ $p<0.001$			
Big chain (1)	2 (1-4)	125		ns	p<0.001	p<0.001
Independent or small chain (2)	2 (2-4)	148				
Hospital or clinic (3)	4 (4-5)	208				

*Where 1 = much less volume and 5 = much more volume

[†]Pairwise comparison using Dunn's test with Holm-Bonferroni corrected p-values

Pharmacy Professional Knowledge

Given the opportunity for pharmacy professionals to provide patients with advice and counselling, the present survey also evaluated the level of COVID-19 knowledge among the participants (table 5).

Pharmacy professionals performed well on topics of general prevention such as wearing a mask, hand

washing, and methods of transmission. However, the sample scored poorly on scenario-based questions, such as the criteria for rapid testing, self-isolating, and care-seeking at the hospital for mildly symptomatic patients. 30% of the sample also believed that antibiotics could fully or at least partially treat COVID-19. All this suggests a need for greater education regarding practice-specific knowledge and guideline recommendations.

Table 5: Response distribution of knowledge questions

	Response Distribution n(%)	% of sample with correct response
†What are common symptoms of COVID-19? (select all that apply) (n=305)		61
*Fever	297 (97)	
Constant sneezing	92 (30)	
*Dry cough	295 (97)	
Nausea	34 (11)	
Coughing blood	15 (5)	
*Shortness of breath / difficulty breathing	298 (98)	
†How can COVID-19 be transmitted from person to person? (select all that apply) (n=305)		80
*By inhaling droplets in the air from an infected person who coughs or sneezes	281 (92)	
*By touching a surface or object that is contaminated with the virus and then touching the mouth, nose, or eyes	288 (94)	
*Being in very close proximity with an individual who is infected with COVID-19	265 (87)	
What is the recommended minimum distance between two people who are exercising social distancing? (n=305)		71
Approx. 0.5 meters	2 (1)	
*Approx. 1 meter	217 (71)	
Approx. 2 meters	63 (21)	
Approx. 3 meters	23 (8)	
Only those who are displaying symptoms of COVID-19 are able to transmit the disease to another person. (n=304)		87
*False	263 (87)	
True	41 (13)	
Antibiotics can fully or at least partially treat COVID-19. (n=304)		70
*False	213 (70)	
True	91 (30)	
Washing your hands for at least 20 seconds is recommended to protect against infection. (n=303)		97
False	8 (3)	
*True	295 (97)	

<p>If a young adult with no pre-existing respiratory conditions is displaying even mild symptoms of COVID-19, such as dry cough, fever, or shortness of breath, they should still seek care at the hospital. (n=304)</p> <p>*False 40 (13)</p> <p>*True 264 (87)</p>	13
<p>If a person is healthy and not a healthcare worker or care giver, the recommendation is still to wear a surgical face mask for protection. (n=303)</p> <p>*False 42 (14)</p> <p>*True 261 (86)</p>	86
<p>If a person is sick, it is recommended that they wear a mask when they are around other people, to limit the spread of viral particles. (n=300)</p> <p>*False 2 (1)</p> <p>*True 298 (99)</p>	99
<p>*Who should get a rapid test for COVID-19? (select all that apply) (n=304)</p> <p>Those who are healthy and have no history of close contact with positive cases 33 (11)</p> <p>Those who have mild COVID-19 symptoms, such as dry cough, fever, or shortness of breath, but no history of close contact with positive cases 215 (71)</p> <p>*Those who do not show symptoms of COVID-19 but have had close contact with people who have tested positive for COVID 271 (89)</p> <p>*Those who have mild COVID-19 symptoms, such as dry cough, fever, or shortness of breath, and has travelled in the past 14 days to a location with local transmission 289 (95)</p> <p>*Those with heavy COVID-19 symptoms Such that day to day functions are impaired, and have travelled in the past 14 days to a location with local transmission 281 (92)</p> <p>Those with no COVID-19 symptoms but have travelled in the past 14 days to a location with local transmission 228 (75)</p>	6
<p>*When should a person self-isolate? (select all that apply) (n=304)</p> <p>A person should self-isolate even if he or she is feeling healthy 50 (16)</p> <p>*If a person is experiencing mild COVID-19 symptoms, such as dry cough, fever, or shortness of breath 291 (96)</p> <p>*If a person is feeling any sort of sickness 199 (65)</p> <p>*If a person is feeling healthy but has a family member who tested positive 296 (97)</p>	49

for COVID-19	
*If a person is feeling healthy but has come in close contact with someone who tested positive for COVID-19	298 (98)

† "Select all" questions report percentage of sample that selected each response

*Denotes correct answers

The mean knowledge score per respondent was 7.22 questions answered correctly (n=293, SD ±1.30) out of 11 knowledge questions, which is an average percentage score of 66%. ANOVA tests were conducted to assess whether mean knowledge scores differed across region and workplace, however, statistical significance was not detected.

Pharmacy Professional Attitudes

Participants also provided insight on pharmacy and community attitudes. 86% (n=305) of participants reported being fearful or very fearful of being infected with COVID-19 and 93% (n=305) perceived a level of fear among their closest social network. Regardless, 93% (n=305) believed that pharmacies and pharmacy professionals play an essential role in the COVID-19 response effort (table 6). This self-perceived importance of pharmacies may explain the willingness to continue to provide essential services to the community amidst fear.

Table 6: Attitude response distribution

	n (%)
How fearful are you of being infected with COVID-19? (n=305)	
Not very fearful	15 (5)
Not fearful	28 (9)
Fearful	130 (43)
Very fearful	130 (43)
Don't know	2 (1)
What is the level of fear amongst your family and close friends regarding COVID-19? (n=305)	
Not very fearful	6 (2)
Not fearful	13 (4)
Fearful	129 (42)
Very fearful	157 (51)
Don't know	0 (0)
I believe that pharmacies and pharmacy professional play an essential role in the response to COVID-19? (n=305)	
Strongly disagree	20 (7)
Disagree	1 (0)
Agree	38 (12)
Strongly agree	246 (81)
Don't know	0 (0)

Two open text questions further explored reasons why participating pharmacies decided to remain open and the roles pharmacies play in COVID-19 care, according to frontline pharmacy workers. Five themes emerged from the qualitative responses. Operators revealed a sense of professional duty to provide essential services. In addition, pharmacies were regarded as accessible sources of care, where the community received trustworthy COVID-19 information and continued service for other health conditions. As such, participants perceived themselves as important components supporting the entire health system response to this public health emergency.

First, survey respondents characterized the role of the pharmacy as essential during this pandemic and expressed commitment to serve clients due a sense of professional duty.

"[Our pharmacy remains open] because we have a mission to help serve customers [and] patients, [regardless of] pandemics, calamities, or any [other] disaster." (Big chain pharmacy)

"[Our pharmacy remains open because] it's our responsibility to provide access [to pharmacy services]." (Independent retail pharmacy)

"Despite the risks during this pandemic, we are always ready to serve and provide [for] the needs of the public. Pharmacies are essential in the midst of this [trying] battle." (Big chain pharmacy)

"Even in the midst of [a] pandemic, the pharmacy has to [remain] open to cater [to] peoples' need of medicine and other medical supplies]. Plus, it is [our] duty to help other people especially in times like these." (Big chain pharmacy)

Importantly, the pharmacy is recognized as an accessible source of care in terms of proximity to the public and affordability of care. Some pharmacy operators also described their workplace as among the few or even the sole provider of health care for their community and due to lockdown measures, the lack of transportation has further increased reliance on these establishments.

"[Our pharmacy remains open because] our pharmacy is the only pharmacy available in [the] area. If we close [operations] during this pandemic, the people living in [this area are] forced to go to the next available pharmacy, which is a 20-minute drive away." (Independent retail pharmacy)

"[Our pharmacy remains open] to serve the community, especially those who seek immediate medical attention and those [who are] unable to buy medicines due to lack of transportation." (independent retail pharmacy)

"[Our pharmacy remains open because] we are arguably the largest pharmacy chain in Negros Occidental, so a lot of the populace is depending on our services for their medical needs." (Big chain pharmacy)

"[Our pharmacy remains open] because customers need us. Our customers [include] local government health units and [customers from] barangays of different towns. There are also walk in [customers] from our neighborhood." (Independent retail pharmacy)

"Our pharmacy decided to stay open during the COVID 19 outbreak in order to serve our customers with their needs (i.e. maintenance medicine, first aid, etc.) during this pandemic. We believe [our maintained services are] a [great] help for them...especially [since] there are no [public] transportation [options] at the moment and most of them don't have a private vehicle to use." (Independent retail pharmacy)

"Pharmacies, especially community pharmacies, are often the first contact [for] Filipinos regarding health care. Pharmacy staff can advise [the public] regarding [the] appropriate response to COVID-19." (Hospital pharmacy)

"Even without [the] COVID-19 outbreak, Filipinos opt to directly go to the pharmacy instead of seeking consultation costing 500 pesos [which] they may use for their maintenance drugs and other essential [medicines]." (Big chain pharmacy)

"We offer information for the public [and] for those who can't afford consultations from doctors. We give basic information and provide basic needs for the community." (Big chain pharmacy)

"Pharmacies and pharmacy professionals are vital healthcare providers during this outbreak. We remain on the frontline of public health by serving as direct points of access for our patients." (Small chain pharmacy)

Given their convenience within communities, one key role that pharmacies have played during this outbreak is as trusted public educators on the disease and how to protect oneself, ultimately tackling misinformation and harmful COVID-19 myths.

"As the most accessible health practitioner, we [pharmacy professionals] can disseminate reliable information to our community and patients." (Big chain pharmacy)

"[My pharmacy remains open because] pharmacies are trusted and accessible resources for [the] public during this pandemic and [we] educate our patients regarding the COVID-19." (Big chain pharmacy)

"As pharmacy professionals we provide proper instructions to our patients and customers on how to prevent the spread of the COVID-19, [such as] washing [one's] hands frequently, wearing a facemask when going out, using alcohol frequently, [and] social distancing." (Big chain pharmacy)

"Pharmacists are the first provider of health information to the patients who are not capable to go to the hospital." (Hospital pharmacy)

"[The role of pharmacy professionals is] to break the myths [and] false rumors about the treatment of COVID-19." (Small chain pharmacy)

"[The role of pharmacy professionals is] to educate pharmacy clients or patients about the pandemic, and how they [can] protect themselves. We counsel them if they [are experiencing] any symptoms of COVID-19." (Independent retail pharmacy)

"Patient counseling is really needed during this pandemic to avoid false information from social media and hearsay. Pharmacists should only tell their patients information following DOH guidelines." (Independent retail pharmacy)

"Pharmacists are the most accessible health professional to relay quality information, debunk myths, and keep our community protected." (Big chain pharmacy)

While respondents expressed the importance of pharmacies in COVID-19 patient management, their pharmacies have also remained open to service non-COVID-19 related diseases that require attention. Thus, in the midst of the pandemic that has captured the world's attention, in the background, individuals on treatment regimens or maintenance medication for other infectious or chronic diseases still rely on functioning supply chains and operating pharmacies to receive needed drugs.

"Pharmacies and pharmacy professionals play a very important role during this COVID-19 outbreak by ensuring that the community is still getting the right medication and information that they need to help fight this virus." (Big chain pharmacy)

"As a hospital pharmacist, we ensure that the availability of drugs needed for the treatment of our patients are well monitored." (Hospital pharmacy)

"[My pharmacy remains open] because [our services are] essential, especially [for] the elderly who have been affected by the lockdown in some areas. They need to buy their maintenance [medication] in pharmacies nearby." (Independent retail pharmacy)

"[My pharmacy remains open] because there are still other people who need pharmacy services. We must serve, ...especially those who need regular [maintenance] medication. We should serve not only those who are infected with COVID-19 but other patients as well." (Big chain pharmacy)

"[My pharmacy remains open because we are] essential [for] supplying maintenance regimens [for] seniors and those with chronic illnesses." (Independent retail pharmacy)

"[My pharmacy remains open] because we still wanted to continue to serve the community especially those who are on maintenance [treatment]. We worry for the public that they might not be able to have access to their medications if we do not continue to operate, especially in these trying times." (Big chain pharmacy)

Lastly, professionals described their pharmacies within the overall health system, instead of viewing themselves as independent and isolated health care agents. Thus, they are affected by volumes in nearby health facilities and used cooperative language in explaining their perceived responsibility to share the COVID-19 burden and manage needed supplies.

"The pharmacy in [the] community is an extension of the hospital, [which is receiving] more [of the burden during] the outbreak. [In the] community [we provide] public information and awareness regarding the outbreak to lessen COVID-19 cases." (Big chain pharmacy)

"[My pharmacy remains open because] our community lacks hospitals to accommodate patients. As a private clinic health care worker, we need to help our community in battling this pandemic because it's our duty to [care for] people who are sick." (Clinic pharmacy)

"It is our role to stop the hoarding of essential products for our fellow front liners and to give simple medical advice. Also, we need to monitor the use of some antibiotics and antiviral drugs because some people easily believe in fake news; we need to educate them." (Big chain pharmacy)

"The role of pharmacies and pharmacy professionals is to provide patient counseling in response to the COVID-19 pandemic. With hospitals restricting unnecessary visits, patients need other healthcare professionals that can help give them advice on the pandemic." (Hospital pharmacy)

"I believe that we are essential to the community's health care needs. Filipinos have the attitude of consulting pharmacies first whenever they feel any kind of signs or symptoms of a disease. That being said, pharmacy professionals in the Philippines [can] help lessen the healthcare load on hospitals, [which cater to] serious cases of illnesses [and] COVID-19 cases." (Big chain pharmacy)

Pharmacy Professional Current Practices

COVID-19 practices at the pharmacy were also assessed to identify areas of needed improvement and ways in which pharmacies can be supported (table 7).

The surveyed sample reported good practice regarding professional protection, with more than 90% (n=305) engaging in various prevention measures and 96% (n=305) of pharmacies implementing guidelines or policies to protect their workforce.

In terms of capacity, most participants reported stockouts of masks, hand sanitizers, and vitamins. Furthermore, 25% (n=304) noted that many or most of their wholesalers or distributors have reduced or completely stopped business operations due to COVID-19, 89% (n=305) revealed lack of supplies from wholesalers or distributors, and 74% (n=305) reported lack of personal protective equipment (PPE) for pharmacy staff. When asked about specific challenges met by their respective communities, 83% (n=304) and 78% (n=304) of respondents shared that there was a lack of testing-kits and insufficient financial protection on income losses due to COVID-19.

Lastly, while 97% would recommend that patients visit the health facility if they had severe COVID-19 symptoms, 81% would also refer mild symptom-presenting patients to the health facility, which is not the current recommendation. Due to the high volume and capacity limitations currently faced by hospitals and health facilities during COVID-19, the recommended guideline is for mildly symptomatic individuals who have no history of contact with positive cases or international travel to stay home and self-isolate, rather than immediately consult with a physician.

Table 7: Current practices response distribution

	n (%)
†What measures do you take to protect yourself from COVID-19? (select all that apply) (n=305)	
Wear a face mask	305 (100)
Wash hands frequently	302 (99)
Use hand sanitizer	282 (92)
Clean surfaces frequently	288 (94)
Other	89 (29)
Has your pharmacy implemented or shared guidelines or policies to protect working pharmacy professionals from COVID-19 infection? (n=305)	
No	13 (4)
Yes	292 (96)
†In the past month, which of the following products have been out of stock in your pharmacy? (select all that apply) (n=303)	
Masks	280 (92)
Hand sanitizer	236 (78)
Vitamins and other supplements	262 (86)
Cough medicine	54 (18)
Antipyretic medicine	44 (15)
Other	66 (22)

In the past month, have any of your pharmacy's wholesalers or distributors reduced functions or completely stopped operations, due to COVID-19? (n=304)	
None	43 (14)
Few	186 (61)
Many	51 (17)
Most	24 (8)
Do you know of a health facility near you with COVID-19 testing kits? (n=304)	
Yes, there is at least one health facility with testing kits within a 30 minute walk from my pharmacy	113 (37)
No, there are no health facilities with testing kits within a 30 minute walk from my pharmacy	86 (28)
There is at least one health facility within a 30 minute walk from my pharmacy, but I do not know whether they have testing kits	34 (11)
The nearest health facility is greater than a 30 minute walk from my pharmacy	71 (23)
†If a pharmacy client has mild COVID-19 symptoms, such as dry cough, fever, or shortness of breath, what would you do or recommend? (select all that apply) (n=305)	
Refer them to the nearest health facility for consultation with a physician	247 (81)
Encourage them to stay home	221 (72)
Encourage them to practice social distancing	261 (86)
Offer them medicine to treat symptoms	148 (49)
Encourage them to wash their hands and avoid touching their face	253 (83)
Dispense them antibiotics	3 (1)
Encourage them to wear a mask if they have them	276 (90)
Offer them vitamins or other "immune-boosting" supplements	249 (82)
Other, please specify	15 (5)
I would not know what to recommend	0 (0)
†If a pharmacy client has severe COVID-19 symptoms, such that day to day function is impaired, what would you do or recommend? (select all that apply) (n=305)	
Refer them to the nearest health facility for consultation with a physician	295 (97)
Encourage them to stay home	105 (34)
Encourage them to practice social distancing	201 (66)
Offer them medicine to treat symptoms	85 (28)
Encourage them to wash their hands and avoid touching their face	191 (63)
Dispense them antibiotics	5 (2)
Encourage them to wear a mask if they have them	220 (72)
Offer them vitamins or other "immune-boosting" supplements	174 (57)
Other	11 (4)
I would not know what to recommend	0 (0)
†What challenges has your pharmacy faced during the COVID-19 outbreak? (select all that apply) (n=305)	
Lack of supply from distributors or wholesalers	271 (89)
Lack of sources of reliable and consistent information on COVID-19	84 (28)

Lack of personal protective equipment for pharmacy professionals	226 (74)
Other	13 (4)
†What challenges has your community faced during the COVID-19 outbreak? (select all that apply) (n=304)	
Lack of awareness and reliable education about COVID-19	186 (61)
Lack of available testing kits	253 (83)
Lack of willingness to comply with recommended guidelines	212 (70)
Lack of financial protection for those whose jobs are impacted by COVID-19	237 (78)
Lack of essential food or goods at the grocery store	153 (50)
Other	1 (0)
If testing kits were made available at the pharmacy, would you be willing to sell and assist pharmacy clients with testing for COVID-19 at your pharmacy? (n=304)	
No	81 (27)
Yes	223 (73)

† "Select all" questions report percentage of sample that selected each response

Responses for single choice practice questions were assessed for statistical differences across region and workplace. Significance was detected for reduced operation of wholesalers or distributors across workplace type (table 8, $\chi^2=18.74$, $p<0.001$), where independent or chain pharmacies and hospital or clinic pharmacies reported more suppliers with interrupted business functions, than big chain pharmacies.

Table 8: Workplace employment vs. reported number of wholesalers or distributors who have reduced functions or completely stopped operations, due to COVID-19, in the past month

	Median* (IQR*)	Mean rank	χ^2, p	1-2 [†]	1-3 [†]	2-3 [†]
Workplace			$\chi^2=18.74$			
Big chain (1)	2 (2-2)	135	$p<0.001$			
Independent or small chain (2)	2 (2-3)	182		$p<0.001$	$p=0.014$	ns
Hospital or clinic (3)	2 (2-3)	158				

*Where 1="None", 2="Few", 3="Many", 4="Most"

[†]Pairwise comparison using Dunn's test with Holm-Bonferroni corrected p-values

Discussion

Since March 2020, the Philippines has been struggling to control COVID-19 management nationwide. In efforts to minimize the health crisis, the executive branch, with support from Congress, has implemented a series of executive orders and proclamations reacting to the state of public health

emergency in the Philippines.^{4,5,6,7,8} Within regions under enhanced community quarantine guidelines, one of the very few establishments allowed to remain open are pharmacies and drugstores which provide essential medicines.

Further, while these actions may help to curtail the speed with which the disease progresses, cases continue to rise, putting immense strain on the Philippine health system. In this regard, the findings of the present research provide insight on how pharmacies can be used to bolster the health system response to COVID-19.

Insight 1: Pharmacies can be a source of trustworthy information on COVID-19

According to the qualitative responses, pharmacies are access points of health information and care because they are affordable and available. Under community quarantine, the limitation of public transportation has increased dependence on drug shops, which are among the few operating health providers in the community. During this pandemic, community pharmacies have been recognized as potential key role players in prevention, preparedness, response, and recovery phases by transferring knowledge to the public, adhering to sanitation guidelines, maintaining dispensing services, acting as a referral channel, and continuing to care for vulnerable groups.⁹

To support these activities, pharmacy professionals should have access to convenient education and training on COVID-19, enabling them to give reliable and evidence-based counselling to their communities, nationwide. Particularly, strengthening knowledge on criteria for rapid testing, self-isolation, and hospital-seeking behavior, while reinforcing topics such as appropriate prevention methods and government guidelines can equip operators to provide sound advice on COVID-19 and to follow best practices (table 5).

Insight 2: Challenges in supply chain need to be addressed through pharmacy management and monitoring stock levels

Disruption in the supply chain has been a common challenge for pharmacies during COVID-19 (table 8). Independent and small chain pharmacies, which are vital in servicing smaller towns and harder to reach regions, report that significantly more of their distributors or wholesalers have reduced operations due

⁴ "Proclamation No. 922". Official Gazette of the Republic of the Philippines. March 8, 2020. <https://www.officialgazette.gov.ph/downloads/2020/02feb/20200308-PROC-922-RRD-1.pdf>

⁵ "Proclamation No. 929". Official Gazette of the Republic of the Philippines. March 16, 2020. <https://www.officialgazette.gov.ph/downloads/2020/03mar/20200316-PROC-929-RRD.pdf>

⁶ "Republic Act 11469". Official Gazette of the Republic of the Philippines. March 24, 2020. <https://www.senate.gov.ph/Bayanihan-to-Heal-as-One-Act-RA-11469.pdf>

⁷ "Executive Order No. 112". Official Gazette of the Republic of the Philippines. April 30, 2020. <https://www.officialgazette.gov.ph/downloads/2020/04apr/2020030-EO-112-RRD.pdf>

⁸ "IAFT Resolutions 9-39" April-May 2020. <https://www.covid19.gov.ph/issuances/>

⁹ Cadogan, Cathal A., and Carmel M. Hughes. "On the frontline against COVID-19: Community pharmacists' contribution during a public health crisis." *Research in Social and Administrative Pharmacy* (2020).

to COVID-19 (table 8), in comparison to big chain pharmacies with established supply networks. This suggests that resources and challenges to access of pharmacy services may be disproportionately experienced across communities.

Lessons from the experiences in China and International Pharmaceutical Federation (FIP) guidelines highlight the importance that community pharmacy operators play in managing sufficient stock for their respective catchment area.¹⁰ The ministry of health and key decision-makers should continue to strategize mechanisms to maintain the supply chain to pharmacies. For example, anticipating high demand of products such as masks due to COVID-19, Macao involved pharmacies in "The Guaranteed Mask Supply for Macao Residents Scheme", mobilizing them to guide pharmacy clients on mask-type effectiveness, to control face mask prices, and to prevent panic stockpiling by implementing reasonable purchasing limits.¹¹

Importantly, pharmacies not only provide personal protective equipment and symptom-treating products for COVID-19, but also dispense medicines for treatment of other conditions such as tuberculosis, HIV, and chronic diseases. In recent weeks and months, COVID-19 has captured the attention of the public, governments, and health organizations. Yet, while COVID-19 continues, so do other serious diseases, whose progress have been threatened by the incoming pandemic.¹² Thus it is essential to actively monitor the supply chain for needed drugs and empower pharmacy professionals to continue providing patients with dedicated support through maintenance regimens.

Lastly, governments across the world have been implementing plans and guidelines in reaction to rapidly evolving conditions. When the next outbreak occurs, the Philippines can learn from the current lessons to deploy proactive policies rather than reactionary measures. During this pandemic, information and speed can equip policymakers in the race to get ahead of the disease. In this regard, mobile mechanisms that allow pharmacies to record dispensed drugs and report levels of stock for essential products and medicines, would give the government real time access to data. Such a tool would be powerful in accurately understanding the magnitude of challenges in supply, promptly intervening before stockouts occur, and efficiently allocating limited resources.

Insight 3: Pharmacy professionals should be trained to effectively triage presumptive COVID-19 and manage health system load

¹⁰ Zheng, Si-qian, et al. "Recommendations and guidance for providing pharmaceutical care services during COVID-19 pandemic: a China perspective." *Research in social and administrative pharmacy* (2020).

¹¹ Ung, Carolina Oi Lam. "Community pharmacist in public health emergencies: quick to action against the coronavirus 2019-nCoV outbreak." *Research in Social and Administrative Pharmacy* (2020).

¹² Adepoju, Paul. "Tuberculosis and HIV responses threatened by COVID-19." *The Lancet HIV* 7.5 (2020): e319-e320.

With hospitals and clinics continuing to receive excessive patient loads, prioritization of care received at these facilities is needed.^{13,14} As the first community resource for health care, pharmacies can also serve as gatekeepers in managing appropriate referrals.

However, the professionals in this sample revealed that they would advise clients with mild COVID-19 symptoms to visit the hospital (table 7), putting further strain on facilities with already limited capacity. Pharmacy professionals should thus be sufficiently trained on COVID-19 detection and best referral practices. They can then participate in triaging cases that require testing and physician consultation (i.e. severe symptoms, reported contact with a positive case, etc.) by asking clients basic questions and subsequently referring them to nearby health facilities only if necessary. Moreover, most respondents reported being willing to sell and assist clients with COVID-19 testing if rapid test kits were made available for retail (table 7). Thus, engaging pharmacies to participate in COVID-19 management can help to distribute the burden away from hospitals, contributing to a more effective total health system response.

Conclusion

As the world continues to acclimatize to the "new normal", efforts to protect the population and mitigate COVID-19 should not be allowed to reach complacency. Strong leadership and system coordination are needed now more than ever. While decision-makers strive to ensure that COVID-19 care is provided equitably across communities, pharmacy professionals can be mobilized to disseminate reliable information and adopt roles to meaningfully support overall health system management across the Philippines.

¹³ Boccia, Stefania, Walter Ricciardi, and John PA Ioannidis. "What other countries can learn from Italy during the COVID-19 pandemic." *JAMA Internal Medicine* (2020).

¹⁴ Emanuel, Ezekiel J., et al. "Fair allocation of scarce medical resources in the time of Covid-19." (2020).