

# A cross-sectional survey on the willingness of community pharmacists and community pharmacy owners to provide pharmacy-based immunization services in the city of Manila

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## ABSTRACT

Pharmacy-based immunization services (PBIS) may address vaccine hesitancy, however, only a few pharmacies and pharmacists provide such services despite it being permitted in the Philippine Pharmacy Act. This study aimed to evaluate the willingness of community pharmacists and pharmacy owners in providing PBIS in Manila, prior to the onset of an immunization training and certification program in the country. A cross-sectional self-administered questionnaire was used to collect data from March to May 2019. Descriptive statistics, chi-square, and logistic regression were used in data analysis. From 110 pharmacies, 79 pharmacists and 48 owners participated. Data revealed that pharmacists (72.2%) have average knowledge on basic principles of PBIS. Respondents have a positive attitude (89.9% pharmacists; 87.5% owners), favorable subjective norms (70.9% pharmacists; 68.8% owners), positive perceived behavioral control (68.4% pharmacists; 81.3% owners), and are willing to provide PBIS (76.5% pharmacists; 79.2% owners). Perception of other stakeholders on PBIS was the only variable significantly related to pharmacist willingness. This study can be used for competency assessment as well as PBIS improvement.

**Key words:** pharmacy-based immunization services, willingness, community pharmacists

## 1. Introduction

Immunization is a cost-effective health intervention that is proven to be a critical component in addressing global public health concerns. According to the World Health Organization (WHO) in 2018, immunization currently prevents two to three million deaths every year in all age groups from diphtheria, tetanus pertussis, and measles (WHO, 2018). However, unlike other countries that show a dramatic increase in immunization coverage, the immunization coverage in the Philippines is alarmingly decreasing (Philstar, 2018). Moreover, coverage on adult vaccination is not yet institutionalized based on the Expanded Program on Immunization of the Department of Health (Tanael et al., 2016). This is due to several factors, including the inadequate number of healthcare workers available to provide immunization services.

In Republic Act (RA) 10918, otherwise known as the Philippine Pharmacy Act, enacted in 2016, the provision of

adult immunization services by registered pharmacists in the Philippines is now permitted. With this legal context, even prior to the pandemic, pharmacists can already help increase immunization rates and improve public health efforts if they have proper training in the effective provision of immunization services in community pharmacies (Bach and Goad, 2015).

Pharmacists, especially those practicing in the community area, have an important role in providing services to patients due to their accessibility, especially since they possess the necessary knowledge in medication therapy and preventive measures on health. This is exhibited in a study in Chicago which concluded that there is an increase in the rate of adult tetanus, diphtheria, and pertussis (Tdap) vaccinations after implementing the pharmacist-led vaccination program (Mills et al., 2014). In addition, the implementation of a pharmacy-based adult vaccination program benefits individuals and employers and helps improve patient access (Ko et al., 2014). Since 70% of the population of pharmacists in the Philippines

practice in the community setting, there is a greater chance of implementing the program which can therefore help provide better health outcomes for patients (Loquias and Robles, 2012). Additionally, since the Philippine Pharmacy Act does not require community pharmacy owners to be registered pharmacists, the perspective and support of pharmacy owners who are non-pharmacists would also be critical in the implementation of the program in their pharmacies and drug stores.

This study aimed to evaluate the willingness of community pharmacists and pharmacy owners in providing pharmacy-based immunization services (PBIS) in the City of Manila. Specifically, it aimed to:

1. Characterize the community pharmacists and community pharmacy owners in terms of age, sex, marital status, educational attainment, years of service, type of pharmacy, presence of a medical clinic in the vicinity, work hours per day, and ownership of the pharmacy;
2. Determine the knowledge of community pharmacists on pharmacy-based immunization;
3. Assess the attitudes, subjective norms (SNs), perceived behavioral controls (PBCs), and willingness of community pharmacists and community pharmacy owners to provide PBIS;
4. Determine the relationship between the attitudes and SNs, SNs and PBCs, and attitudes and PBCs of both community pharmacists and community pharmacy owners;
5. Determine the relationship between the background factors and the attitudes, SNs, and PBCs of community pharmacists and community pharmacy owners towards providing PBIS;
6. Assess the effects of community pharmacists' demographic characteristics, knowledge, attitudes, SNs, and PBCs to their willingness to provide PBIS; and
7. Assess the effects of community pharmacy owners' demographic characteristics, attitudes, SNs, and PBCs to their willingness to provide PBIS.

## 2. Methodology

### 2.1. Research design and sampling population

This study utilized a cross-sectional design to evaluate the willingness of community pharmacists and community pharmacy owners to provide PBIS. The population of this study only included licensed pharmacists and pharmacy owners working in independent community pharmacies in the City of Manila who have provided consent to participate in the study, while licensed community pharmacists and community pharmacy owners working in a chain pharmacy were excluded from the study. The number of community pharmacies in the city of Manila was obtained from the list of registered independent community pharmacies given by the

Philippine Food and Drug Administration. A total of 151 independent pharmacies were used as the sampling frame.

Using Yamane's formula, the calculated sampling size resulted in 110 community pharmacist respondents and 110 community pharmacy owner respondents (Israel, 2018), assuming a 1:1:1 ratio of the number of independent pharmacies, community pharmacists, and pharmacy owners. Systematic random sampling was employed to determine which of the 110 pharmacy respondents were to be given a survey questionnaire per category.

### 2.2. Ethical considerations

This study was approved by the University of the Philippines Manila Research Ethics Board (UPMREB 2019-027-UND) on March 26, 2019. Respondents were asked to sign an informed consent form before proceeding to the questionnaire. An information sheet detailing the overview of the study, participant selection, risks and benefits of participation, and the right to refuse or withdraw was also provided. The respondents had the option to decline their participation in the study or ask questions before proceeding to answer the questionnaire. All information given by the participant would be kept for 10 years and used in the study only by the investigators to ensure confidentiality. Overall, the risks anticipated from taking part in this study were very minimal.

### 2.3. Data collection

The premise for data collection was prior to the implementation of the Immunizing Pharmacist Certification Program in the country during the pandemic. Pilot testing was conducted to five community pharmacists and five community pharmacy owners who were excluded from the study population. Community pharmacies were visited within the City of Manila area and the respondents were informed about the study. The respondents were allowed to read and sign the informed consent and were given five to ten minutes to answer the questionnaires. The data collection process occurred for two months, from March to May 2019.

### 2.4. Instrumentation

The questionnaire was piloted in a group of five community pharmacists and five community pharmacy owners. The respondents also answered a feedback form to validate the clarity of the questions and to gather suggestions to improve the questionnaire. The pilot study participants generally provided positive feedback and no additional suggestions were given, thus requiring no significant adjustments to the questionnaire.

Separate questionnaires for community pharmacists and community pharmacy owners were used in the study, which was based on the study conducted by Herbert et al. (2006). The questionnaires for community pharmacists contained four parts, namely (1) demographics, (2) knowledge, (3)

attitude, SNs, and PBCs, and (4) willingness in providing PBIS. Questionnaires given to the community pharmacy owners consist of similar parts, except for (2) knowledge.

The first part of the questionnaire focused on the demographic characteristics of the respondents including age, sex, marital status, educational attainment, years in service, type of pharmacy, presence of medical clinic in the vicinity, number of working hours per day, and ownership of the pharmacy (for pharmacist only).

The second part assessed the knowledge of the community pharmacists regarding pharmacy-based immunization, which includes basic principles of immunity; timing and spacing of vaccines; adverse effects following vaccination; contraindications and precautions to vaccination; vaccine handling and storage; immunization provisions under the Philippine Pharmacy Act; and adult vaccines permitted to be administered by pharmacists. The questions can be answered by True/False/Don't Know and Yes/No/Don't Know. The classification of the community pharmacists' knowledge, attitudes, SNs, and PBCs was obtained based on a study by Watiri in 2014. Knowledge scores were computed by adding the correct responses to the 40 questions, with each correct answer earning one point, while incorrect or "don't know" answers got zero points. Pharmacists scoring 31 to 40 were classified as having good knowledge, 20 to 30 as having average knowledge, and below 20 as having poor knowledge.

The third part measured the attitude, PBC, and SNs of community pharmacists and pharmacy owners. Questions can be answered using a 5-point Likert scale ranging from 1 (Strongly Disagree) to 5 (Strongly Agree). The scores for attitude, SN, and PBC were computed by adding their responses to the questions, with each one having a minimum possible score of 1 and a maximum of 5. The median was used as the cutoff for the upper and lower range. The upper range was categorized as either positive attitude, favorable SN, or positive PBC, while the lower range was categorized as negative attitude, unfavorable SN, or negative PBC.

The attitude portion for both questionnaires consists of nine questions regarding respondents' attitude towards preventive services, perceived impact on professional services, patient satisfaction, provision of health care, profitability, work-related stress, job satisfaction, and patient's trust. Attitude scores can have a minimum of nine points and a maximum of 45. Those scoring 27 to 45 were classified as having a positive attitude, while those scoring nine (9) to 26 were classified as having a negative attitude.

The SN portion for both questionnaires consists of six questions for pharmacists and five questions for owners regarding support from other immunization providers, consumer interest, refusal and hesitancy of Filipinos, and provision of other pharmacists. An additional item on manager or owner's support was also included in the questionnaire for community pharmacists. Pharmacists scoring 19 to 30 and owners scoring 16 to 25 were classified

as having favorable SNs, while pharmacists scoring six (6) to 18 and owners scoring five (5) to 15 were classified as having unfavorable SNs.

The PBC part for the pharmacist's questionnaire consists of 11 questions for pharmacists and nine questions for owners regarding financial capacity, knowledge and skills, perceived obstacles, availability of pharmacist, suitability of pharmacy environment, support staff, decision making competency training, and level of participation in immunization program. The PBC part for the pharmacy owner's questionnaire consists of financial capacity, availability of pharmacists, suitability of pharmacy environment, support staff, decision making, and level of participation in immunization programmes. Pharmacists scoring 34 to 55 and owners scoring 27 to 45 were classified as having positive PBCs, while pharmacists scoring 11 to 33 and owners scoring nine (9) to 26 were classified as having negative PBCs.

The fourth part was a single question on the willingness in providing PBIS, which can be answered with a Yes/No.

The internal consistency of the knowledge portion of the community pharmacists' questionnaire and the three constructs of theory of planned behavior were tested using Cronbach's alpha. Based on the pilot study of the questionnaire in five pharmacists and pharmacy owners, the reliability of knowledge, attitude, SN, and PBC satisfied the criteria of equal to or greater than 0.7 for all four scales both for community pharmacists and pharmacy owners. The reliability coefficients for pharmacists' knowledge, attitude, SN, and PBC were 0.78, 0.86, 0.79, and 0.85, respectively. The reliability coefficients for pharmacy owners attitude, SN, and PBC were 0.84, 0.73, and 0.89, respectively.

## **2.5. Data processing and analysis**

All answered questionnaires and signed informed consent forms were gathered, sealed in an envelope, and stored in a secure, locked cabinet. Each questionnaire was anonymized and numbered to ensure the confidentiality of the respondents. All information gathered was immediately encoded in Microsoft Excel file and analyzed using STATA 13th edition.

Descriptive statistics was used to summarize the responses. The mean, frequencies, and percentage of the data were calculated. Cronbach's alpha was used to measure the internal consistency and reliability of the data.

Chi-square test was used to confirm the validity and correlation between the independent variables. Logistic regression analysis was used to evaluate the effect of variables on the willingness to provide the service. The statistical tests that were used were 2-sided with an alpha of 0.05.

## **3. Results**

### **3.1. Socio-demographic factors**

A total of 110 pharmacies were visited around the City of Manila. Community pharmacists and community pharmacy

**Table 1. Pharmacists' and pharmacy owners' demographic and pharmacy characteristics.**

Variable	Community Pharmacists (n=79)		Community Pharmacy Owners (n=48)		
	Frequency (n)	Percentage (%)	Frequency (n)	Percentage (%)	
<b>Demographics</b>					
Age	< 20	0	0	1	2.1
	20–30	36	45.6	8	16.7
	31–40	26	32.9	14	29.1
	41–50	8	10.1	13	27.1
	> 50	9	11.4	12	25.0
Sex	Male	31	39.2	22	45.8
	Female	48	60.8	26	54.2
Civil Status	Single	37	46.8	16	33.3
	Married	36	45.6	23	47.9
	Widowed	5	6.3	5	10.4
	Separated	1	1.3	4	8.4
Highest Educational Attainment	High School	0	0	4	8.3
	Bachelor's Degree	78	98.7	39	81.3
	Graduate Degree	1	1.3	5	10.4
Years of Working	< 5	30	38.0	11	22.9
	5–10	30	38.0	16	33.3
	11–20	16	20.2	14	29.2
	> 20	3	3.8	7	14.6
<b>Pharmacy Characteristics</b>					
Presence of Clinic	Yes	43	54.4	22	45.8
	No	36	45.6	26	54.2
Average Operating Hours per Day	< 8	9	11.4	20	41.7
	8–10	61	77.2	25	52.0
	> 10	9	11.4	3	6.3
Ownership by a Pharmacist	Yes	17	21.5	N/A	N/A
	No	62	78.5	N/A	N/A

owners were asked to participate in the study. A total of 79 community pharmacists participated in the study, resulting in a response rate of 71.8%. The remaining 28.2% were considered as non-respondents due to their refusal to participate, unavailability of the pharmacist, and/or non-operation or closure of the pharmacy. Reasons for refusal to participate include busy schedules, understaffing, and not being allowed to participate in any study. On the other hand, only 48 pharmacy owners agreed to answer the questionnaires resulting in a 43.6% response rate. All questionnaires returned were valid and complete.

The demographic characteristics of the community pharmacist respondents were summarized in Table 1. Majority of the community pharmacist respondents were female, aged between 20–30 years old, single, bachelor's degree graduates, and had worked for less than 10 years with approximately 8–10 hours of work per day. 78.5% of respondent pharmacists do not own the pharmacies they work in, and more than half of pharmacies have a clinic near them.

The demographic characteristics of the pharmacy owner respondents were summarized in Table 1. Most of them were female, aged between 31–40 years old, married, bachelor's degree graduates, and had worked for 5–10 years with approximately 8–10 hours of work per day. More than half of their pharmacies were located far from the clinics.

### **3.2. Knowledge of community pharmacists in pharmacy-based immunization**

The pharmacists' knowledge scores ranged from 11 to 31 with a mean score of  $21.4 \pm 8.5$  (Table 2). The highest mean score obtained was garnered in the provisions under RA 10918 (2.72 out of 3) while the lowest mean score was under timing and spacing of vaccines (2.43 out of 8).

### **3.3. Theory of planned behaviour constructs**

With regards to the attitude of community pharmacists in providing PBIS (Table 3), the highest mean score was 4.3 which showed that participation in PBIS allowed them to move the pharmacy profession forward. However, the lowest mean score of 2.3 revealed decreased participation in PBIS due to an increase in stress level at work.

In terms of SN, community pharmacists generally agreed that patients in the community would like to see them providing PBIS as shown by a high mean score of 3.7 (Table 3). On the other hand, most community pharmacists did not think that patients will be disappointed if PBIS is not provided in their pharmacy as shown by a low mean score of 2.9.

For PBC, most community pharmacists agreed that they can participate in PBIS as an advocate as proven by a high mean score of 4.1 while they tend to disagree that the provision of PBIS will be difficult with a low mean score of

**Table 2. Mean knowledge scores of pharmacists.**

Knowledge Category	No. of Questions (n)	Mean Score of Correct Answer (M)	Percentage (%) (M/n)
Provisions under RA 10918 (Philippine Pharmacy Act)	3	2.7 ± 0.6	90.0
Immunity	5	4.1 ± 1.0	82.0
Vaccine Handling and Storage	4	2.8 ± 1.0	70.0
Adverse Events Following Vaccination	6	3.9 ± 1.3	65.0
Contraindications and Precautions to Vaccination	4	2.2 ± 1.0	55.0
Adult Vaccines Permitted to be Administered by Pharmacists	10	3.3 ± 2.0	33.0
Timing and Spacing of Vaccines	8	2.4 ± 1.7	30.0
TOTAL	40	21.4 ± 8.5	53.5

Note: The maximum score is equivalent to the number of questions.

**Table 3. Mean scores for attitude, subjective norm, and perceived behavioral control of pharmacists and pharmacy owners.**

Construct	Statement	Mean Score	
		Pharmacists	Owners
Attitude	Important step in improving the profession	4.3 ± 0.8	–
	Pharmacist participation in improving the profession	–	4.0 ± 0.8
	Provision of higher level of patient care	4.2 ± 0.8	3.9 ± 0.9
	Easy patient access to preventive services	4.1 ± 0.7	4.2 ± 0.6
	Attraction of more patients to pharmacy	3.9 ± 0.8	3.9 ± 0.9
	Gain more patient trust	3.8 ± 0.8	3.8 ± 0.9
	Improvement of job satisfaction	3.7 ± 1.0	3.6 ± 0.9
	Stay competitive	3.6 ± 1.0	3.4 ± 1.1
	Not profitable for my pharmacy	3.2 ± 0.9	3.5 ± 1.1
Subjective Norm	Increase stress level at work	2.3 ± 0.9	2.7 ± 1.0
	Patients like to see the pharmacy providing PBIS	3.7 ± 0.8	3.9 ± 0.8
	Patients will not hesitate in receiving PBIS	3.6 ± 0.8	3.6 ± 0.8
	Approval of other immunization providers	3.4 ± 0.9	3.4 ± 1.1
	Support of pharmacy owner/manager	3.4 ± 0.8	–
	Intention of other pharmacists	3.3 ± 0.8	–
	Intention of other pharmacy owners	–	3.1 ± 0.7
Perceived Behavioural Control	Disappointment of patient if PBIS is not provided	2.9 ± 0.7	2.9 ± 0.7
	Participating in PBIS as an advocate	4.1 ± 0.9	3.2 ± 1.1
	Participating in PBIS as a partner	3.8 ± 1.0	3.3 ± 1.2
	Participating in PBIS as a provider	3.7 ± 1.0	3.9 ± 0.9
	Availability of pharmacist	–	3.8 ± 0.9
	Conducive pharmacy environment	3.6 ± 0.8	3.8 ± 0.9
	Necessary time to provide PBIS	3.5 ± 0.9	–
	Financial resources to invest on facilities and supply of vaccines	–	3.5 ± 1.0
	Financial resources to undergo training	3.2 ± 0.9	–
	Financial resources to shoulder the fees for undergoing training for PBIS	–	3.5 ± 1.0
	Necessary support staff to provide PBIS	3.2 ± 0.8	3.6 ± 0.9
	Knowledge and skills to provide PBIS	3.1 ± 0.8	–
	Dependence of provision of PBIS to me	2.9 ± 1.1	3.7 ± 1.1
For me, providing PBIS will be difficult	2.5 ± 0.7	–	
Competency training for PBIS will be difficult	2.5 ± 0.7	–	

Note: 1 = Strongly Disagree; 5 = Strongly Agree.

## 2.5 (Table 3).

With regards to the attitude of pharmacy owners in providing PBIS (Table 3), a high mean score of 4.2 showed that participation in PBIS helps the patient access preventive services easily. However, a low mean score of 2.7 showed less involvement in PBIS due to an increase in stress level at

the pharmacy.

In terms of SN, community pharmacy owners generally agreed that patients in the community would like to see the pharmacy providing PBIS as shown by a high mean score of 3.9 (Table 3). On the other hand, pharmacists generally disagreed that patients will be disappointed if PBIS is not

**Table 4. Classification of knowledge of pharmacists, and attitude, subjective norm, and perceived behavioral control of pharmacists and pharmacy owners.**

Community Pharmacists				Community Pharmacy Owners			
Constructs	Classification	Frequency (n)	Percentage (%)	Constructs	Classification	Frequency (n)	Percentage (%)
Knowledge				Attitude			
0–19	Poor knowledge	21	26.6	9–26	Negative attitude	6	12.5
20–30	Average knowledge	57	72.2	27–45	Positive attitude	42	87.5
31–40	Good knowledge	1	1.3	Subjective Norm			
Attitude				Subjective Norm			
9–26	Negative attitude	8	10.1	5–15	Unfavorable subjective norm	15	31.3
27–45	Positive attitude	71	89.9	16–25	Favorable subjective norm	33	68.8
Subjective Norm				Perceived Behavioural Control			
6–18	Unfavorable subjective norm	23	29.1	9–26	Negative perceived behavioral control	9	18.8
19–30	Favorable subjective norm	56	70.9	27–45	Positive perceived behavioral control	39	81.3
Perceived Behavioural Control				Perceived Behavioural Control			
11–33	Negative perceived behavioral control	25	31.6				
34–55	Positive perceived behavioral control	54	68.4				

**Table 5. Chi-square test of all independent variables for community pharmacists and all variables for community pharmacy owners.**

	Community Pharmacists				Community Pharmacy Owners		
	Knowledge	Attitude	Subjective Norm	PBC <sup>a</sup>	Attitude	Subjective Norm	PBC <sup>a</sup>
Age	0.071	0.032 <sup>b</sup>	0.218	0.013 <sup>b</sup>	0.042 <sup>c</sup>	0.282	0.486
Sex	0.680	0.511	0.745	0.925	0.274	0.838	0.164
Marital Status	0.274	0.096	0.033 <sup>b</sup>	0.054	0.143	0.036 <sup>c</sup>	0.176
Education	0.822	0.736	0.532	0.493	0.525	0.162	0.155
Years of Operating	0.198	0.171	0.139	0.054	0.812	0.262	0.708
Presence of Clinic	0.155	0.629	0.623	0.768	0.049 <sup>c</sup>	0.413	0.516
Work Hours/Day	0.789	0.291	0.840	0.663	0.383	0.105	0.212
Ownership by a Pharmacist	0.144	0.118	0.654	0.161	–	–	–
Knowledge	–	0.937	0.177	0.158	–	–	–
Attitude	–	–	0.000 <sup>b</sup>	0.000 <sup>b</sup>	–	0.000 <sup>c</sup>	0.000 <sup>c</sup>
Subjective Norm	–	–	–	0.000 <sup>b</sup>	–	–	0.000 <sup>c</sup>

<sup>a</sup> Perceived Behavioural Control<sup>b</sup> Significant at  $p < 0.05$ ,  $n = 79$ <sup>c</sup> Significant at  $p < 0.05$ ,  $n = 48$ 

provided in the pharmacy as shown by a low mean score of 2.9.

For PBC, most pharmacy owners agreed that they can participate in PBIS as a provider with a high mean score of 3.9 (Table 3). Moreover, most community pharmacy owners disagree to participate in PBIS as an advocate with a low mean score of 3.2.

The results showed that 72.2% have average knowledge, 89.9% have a positive attitude, 70.9% have favorable SN, and 68.4% have positive PBC towards the provision of PBIS (Table 4). Classification of the community pharmacy owners' attitudes, SNs, and PBCs show that 87.5% have a positive

attitude, 68.8% have favorable SN, and 81.3% have positive PBC towards the provision of PBIS (Table 4). Furthermore, results also indicate that most community pharmacists (74.68%) and community pharmacy owners (79.17%) are willing to provide PBIS.

Bivariate analysis was conducted using a chi-square test to determine the association between variables. The chi-square test results for the community pharmacists are summarized in Table 5. Age is significantly associated with attitude ( $p = 0.032$ ) and PBC ( $p = 0.013$ ). Moreover, marital status is significantly associated with SN ( $p = 0.033$ ). Furthermore, attitude is significantly associated with SN

(p = 0.000) and PBC (p = 0.000). SN is also significantly associated with PBC (p = 0.000).

The chi-square test results for community pharmacy owners are also summarized in Table 5. Age is significantly associated with attitude (p = 0.042). Moreover, marital status is significantly associated with SN (p = 0.036). The presence of a clinic in the vicinity is also significantly associated with attitude (p = 0.049). Furthermore, attitude is significantly associated with SN (p = 0.000) and PBC (p = 0.000). SN is also significantly associated with PBC (p = 0.000).

Logistic regression analysis was done to evaluate the relationship of the community pharmacists' demographic characteristics, knowledge, and TPB constructs (attitude, SN, and PBC) on willingness. After conducting univariate logistic regression analysis (Table 6), variables with a significant relationship (p < 0.05) were selected for multivariate logistic regression analysis. Variables such as marital status, highest educational attainment, years of working, attitude, and PBC were omitted in the final analysis due to collinearity with willingness. Results showed that only SN (p = 0.000) (Table 7) was considered significantly related with the community pharmacists' willingness to provide PBIS. For each point increase in SN score, there is a 0.023-point increase in the odds of willingness to provide PBIS.

Similarly, the results for the univariate logistic regression analysis for pharmacy owners such as attitude (p = 0.003), SN (p = 0.002), and PBC (p = 0.001) (Table 6) were selected for multivariate regression analysis. Results showed that

**Table 6. Multivariate logistic regression analysis for community pharmacists.**

Willingness	Odds Ratio [95% Confidence Interval]	p-value
Age		
31–40	0.20 [0.01–3.32]	0.261
41–50	0.04 [0.00–1.02]	0.051
> 50	0.13 [0.00–4.26]	0.254
Marital Status		
Married	0.34 [0.03–4.28]	0.400
Widowed	0.91 [0.02–33.91]	0.958
Separated	1	
Subjective Norm	0.02 [0.00–0.15]	0.000 <sup>a</sup>

<sup>a</sup> Significant at p < 0.05, n = 79

**Table 7. Multivariate logistic regression analysis for community pharmacy owners.**

Willingness	Odds Ratio [95% Confidence Interval]	p-value
Attitude	0.15 [0.01–2.20]	0.165
Subjective Norm	0.22 [0.03–1.88]	0.168
Perceived Behavioural Control	0.29 [0.03–2.73]	0.277

there was no variable that is significantly related to the willingness of pharmacy owners among the study variables since there were no variables with a p-value less than 0.05 (Table 8).

**Table 8. Univariate logistic regression analysis for community pharmacists and community pharmacy owners.**

	Community Pharmacists			Community Pharmacy Owners		
	Variable	OR [95% CI]	Willingness (p-value)	Variable	OR [95% CI]	Willingness (p-value)
Age	31–40	0.11 [0.02–0.57]	0.009 <sup>a</sup>	20–30	5.00 [0.46–54.51]	0.187
	41–50	0.04 [0.00–0.27]	0.001 <sup>a</sup>	31–40	2.62 [0.47–14.58]	0.272
	> 50	0.07 [0.01–0.51]	0.008 <sup>a</sup>	41–50	8.57 [0.83–89.04]	0.072
Sex		0.79 [0.27–2.26]	0.654	Female	0.73 [0.16–3.31]	0.688
Marital Status	Married	0.16 [0.04–0.61]	0.008 <sup>a</sup>	Married	0.68 [0.11–4.24]	0.678
	Widowed	0.06 [0.01–0.50]	0.010 <sup>a</sup>	Widowed	0.21 [0.02–2.19]	0.194
				Separated	0.14 [0.01–1.67]	0.121
Education			Collinear	Bachelor's Degree	5.50 [0.64–46.95]	0.119
				Graduate Degree	1.5 [0.11–21.31]	0.765
Years of Operating	5–10	0.31 [0.07–1.29]	0.107	5–10	3.33 [0.26–42.21]	0.353
	11–20	0.11 [0.02–0.52]	0.005 <sup>a</sup>	11–20	0.40 [0.06–2.63]	0.340
	> 20	0.22 [0.02–3.24]	0.271	>20	0.56 [0.06–5.24]	0.608
Presence of Clinic		0.79 [0.29–2.18]	0.646	No	2.06 [0.50–8.53]	0.318
Work Hours/Day	8–10	1.53 [0.34–6.90]	0.577	8–10	2.25 [0.54–9.44]	0.268
	> 10	1.75 [0.22–14.22]	0.601			
Attitude			Collinear		0.03 [0.00–0.28]	0.003 <sup>b</sup>
Ownership by a Pharmacist		0.14 [0.02–1.14]	0.067		–	–
Knowledge	(2)	1.69 [0.56–5.07]	0.348		–	–
Subjective Norm		0.04 [0.01–0.16]	0.000 <sup>a</sup>		0.07 [0.01–0.38]	0.002 <sup>b</sup>
Perceived Behavioural Control			Collinear		0.06 [0.01–0.32]	0.001 <sup>b</sup>

<sup>a</sup> Significant at p < 0.05, n = 79

<sup>b</sup> Significant at p < 0.05, n = 48

#### 4. Discussion

Majority of the community pharmacists were classified to have average knowledge with about a quarter of the respondents having poor knowledge. This may be attributable to the prevailing pharmacy curriculum in the Philippines at the time of the study, which does not include the basics of immunization. Notably, only one respondent was assessed to have good knowledge on the basic principles of immunization. The highest mean scores that were obtained were on provisions on PBIS under RA 10918. This can be attributed to how updated pharmacists are on their roles as indicated in the law. The lowest mean scores of pharmacists were found to be in the category of timing and spacing of vaccines followed by knowledge on adult vaccines permitted to be administered by pharmacists. This can be attributed to the lack of training provided for pharmacists to increase their knowledge on the basic principles of immunization.

With the launching of the Immunizing Pharmacist Certification Program (IPCP) in April 2021 and the integration of immunization topics in the pharmacy curriculum as guided by Commission on Higher Education (CHED) Memorandum Order No. 25 Series of 2021, it is expected that there will be an improvement in the level of knowledge of pharmacists who have undergone the training program and of future pharmacy graduates (Peña, 2022). A 2022 study assessing Filipino immunizing pharmacists reported a high mean score on knowledge, particularly with regard to preventing adverse events following immunization (AEFI) and on decision making upon the occurrence of AEFI (Villaluz et al., 2022).

During the COVID-19 pandemic, there was a heightened need to increase the number of immunizing pharmacists in order to quickly expand the immunization coverage in the country. The government, in partnership with a number of large chain drugstores and clinics, launched the “Resbakuna sa Botika” program in Metro Manila last January 2022 to increase public access to COVID-19 vaccines (Moaje, 2022). The program also aims to tap drugstores and clinics nationwide to serve as vaccination sites and permit certified immunizing pharmacists to administer vaccines, thereby increasing vaccination uptake.

The Theory of Planned Behaviour (TPB) is an expectancy value model built on the framework of Fishbein’s Theory of Reasoned Action (Ajzen, 1991). According to TPB, individual behavior is driven by behavior intentions which have three components: an individual’s attitude towards behavior (multiplicative sum of the individual’s relevant likelihood and evaluation related to behavioral beliefs), SNs (multiplicative sum of two sets of normative beliefs), and PBC (the product of control beliefs and self-efficacy and a direct influence on behavior additional to intention) (Taylor et al., 2006). Generally, the more favorable the attitude and the SN with respect to the behavior and the greater the PBC,

the stronger should be an individual’s intention to perform the behavior.

Attitude, the first important determinant of intention, refers to the degree to which a person has a favorable or unfavorable evaluation or appraisal of the behavior in question (Ajzen, 1991). In this case, it refers to the perception of community pharmacists and community pharmacy owners on the importance of providing PBIS.

Both community pharmacists and community pharmacy owners showed generally high scores for questions under the attitude construct, which reflects their favorable perception on the importance of providing PBIS. Albeit the respondents’ belief that involvement in PBIS will improve their job satisfaction, the increase in stress level at work is still a prime concern. This is attributable to the potential increase in customers and the burden of providing PBIS in terms of the additional work needed. Additionally, both pharmacists and pharmacy owners generally believe that participation in PBIS would help patients access preventive services easily, provide a higher level of care to patients, and is an important step in moving the pharmacy profession forward. This indicates that both have a favorable regard of PBIS in terms of providing better and more accessible healthcare. Furthermore, increase in trust, attraction of more customers, and a greater profitability are expected from this intervention.

SN refers to the effect of perceived social pressure in performing a certain behavior (Ajzen, 1991). This indicates how other people’s perceptions of community pharmacists and community pharmacy owners affect their willingness to provide PBIS. The results showed that most community pharmacists and community pharmacy owners had favorable SN towards providing PBIS. In line with this, SN was considered to have a significant relationship with the community pharmacists’ willingness. This implies that perception of other stakeholders is an important matter to be considered by the pharmacist in providing PBIS.

Both community pharmacists and pharmacy owners have relatively high scores in relation to patients’ perception in that they would like to see the pharmacist or pharmacy provide PBIS. Additionally, both generally agreed on a high approval from other immunization providers in the community for them to provide PBIS. This implies that community pharmacists are motivated and thus have a higher productivity and better quality of service. In addition to this, a better performance of the pharmacy can be attained.

PBC is described as the perceived ease or difficulty of performing the behavior (Ajzen, 1991). This determines the perception of the pharmacist and pharmacy owners on how to perform PBIS. Majority of the community pharmacists and pharmacy owners have positive PBC but results of this study revealed that it does not have a significant relationship to that of their willingness. The result of the study is comparable to that of Herbert et al. (2006) and Gavaza et al. (2012) where PBC is not directly related to willingness. This means that



even though both knew the difficulty or ease of performing PBIS, this will not affect their willingness to provide the service.

Most community pharmacists are willing to participate in PBIS as advocates (highly favorable), partners, and providers (least favorable). However, providing and undergoing competency training for the service may pose some difficulties. Awareness of such requirements may influence reluctance to be providers and partners, preferring to be advocates instead.

For community pharmacy owners, participation in PBIS as providers was shown to have the highest score in the measurement of PBC. It was also recognized that necessary financial resources and available pharmacists for such services are other factors that may contribute to their PBC. As providers, patient satisfaction can be ensured.

Willingness refers to how community pharmacists and pharmacy owners recognize the importance in performing PBIS. Based on the results, both are willing to provide the service. Consistent with Kangwol and Anantachoti (2016) and Herbert (2006), community pharmacists show a positive response in providing pharmacy-based services.

SN is the only variable that is significantly related to the willingness of community pharmacists to provide PBIS. Ideally, the three constructs of the theory of planned behavior are of the same importance in the prediction of intention, but these vary across behaviors and situations (Ajzen, 1991). In this study, only the perception of other affected individuals mattered to pharmacists in considering providing PBIS. This means that the approval and support of other people, such as patients, doctors, and nurses, will affect how willing they are to provide the service.

Results showed that there is no variable that is significantly associated with the willingness of community pharmacy owners to provide PBIS. Provided that there is a lack of primary data, presence of varied confounders among pharmacy owners may be a reason for insignificant results.

Results in some sections of the study may be affected by social desirability bias. There may also be a limitation in the generalizability of the findings due to the number of respondents being less than the target sample size. Additionally, participants of this study may be seen as underqualified due to their years of experience, with most respondents having ten years or less, and lack of post-job specialized training. Despite these limitations, this study provides a deeper understanding of determinants affecting pharmacist willingness to provide PBIS using TPB.

## 5. Conclusions

Generally, community pharmacists have average knowledge on PBIS. Both pharmacists and pharmacy owners have positive attitudes, favorable SNs, positive behavioral controls, and are willing to provide PBIS. SN is considered as a variable significantly related to the willingness of

pharmacists to provide PBIS while there is no variable significantly related to the willingness of pharmacy owners to provide PBIS. This study can help the pharmacy organizations in the Philippines assess the current competency levels of community pharmacists and improve existing plans for pharmacy-based immunization programs in the country. Improving and developing the program based on the factors covered in this study will benefit the community pharmacists, community pharmacy owners, and the public for future PBIS.

## Conflict of Interest

Dr. Imelda G. Peña reports a previous relationship with the Philippine Pharmacists Association Inc. through board membership as potential competing interest. The other authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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**Appendix A: Questionnaire Items for Community Pharmacists for the study entitled, “A Cross-Sectional Survey on the Willingness of Community Pharmacists and Community Pharmacy Owners to Provide Pharmacy-Based Immunization Services in the City of Manila”**

I. Demographics

Answer each item as accurately as possible by checking on the box that best corresponds to your answer.

1. Age

- 20-30                       31-40                       41-50                       >50

2. Sex

- Male                       Female

3. Marital Status

- Single                       Married     Widowed                       Separated

4. Highest Educational Attainment

- Bachelor’s Degree                       Master’s Degree                       Doctoral Degree

Others: *(Please indicate)* \_\_\_\_\_

5. Years of Operating Pharmacy

- <5                       5-10                       11-20                       >20

6. Presence of Medical Clinic Near the Vicinity of the Pharmacy

- Yes                       No

7. Work Hours Per Day

- <8                       8-10                       >10

8. Ownership of the Pharmacy

*Are you the owner of the pharmacy?*

- Yes                       No

*For II-IV, the following definition shall apply:* Pharmacy-based Immunization Services (PBIS) – A program under the immunization advocacy of the Philippine Pharmacists Association (PPhA) wherein community pharmacists will provide immunization services to Filipino patients (as defined by the PPhA).

II. Knowledge

Indicate if the following statements are true or false by placing a check mark under the corresponding answer.

Statement	<i>True</i>	<i>False</i>	<i>Don't know</i>
1. Immunity is the ability of the human body to tolerate the presence of materials indigenous to the body and to eliminate foreign material.			
2. There is no contraindication to the simultaneous administration of any vaccine.			
3. An adverse event following immunization (AEFI) is any untoward medical occurrence which follows immunization and which does not necessarily have a causal relationship with the usage of vaccine.			
4. Vaccines are very rarely contraindicated.			
5. Maintaining cold chain at all levels for vaccines is important and necessary.			

6. Licensed pharmacists must hold a certificate of training issued by an institution duly accredited by the Professional Regulation Commission (PRC).			
7. There are two basic mechanisms for acquiring immunity, active immunity and passive immunity.			
8. Inactivated vaccines are not substantially affected by circulating antibodies in blood products.			
9. Vaccine product-related reactions are caused by a vaccine due to one or more of the inherent properties of the vaccine.			
10. Live vaccines should be given to immune-deficient children.			
11. Vaccines must only be reconstituted with a specific diluent supplied by the manufacturer.			
12. Licensed pharmacists who shall administer adult vaccines shall ensure that the vaccine to be administered shall have a doctor's prescription which is not more than 7 days old.			
13. Herd immunity is a type of immunity that occurs when the vaccination of a portion of the population provides protection to unprotected individuals.			
14. Live Vaccines are substantially affected by circulating antibodies in blood products.			
15. Vaccine quality defect-related reactions are caused by a vaccine that is due to one or more quality defects of the vaccine product including its administration device as provided by the manufacturer.			
16. Live vaccines should not be given to persons receiving large doses of corticosteroids for 14 days or longer.			
17. Reconstituted vaccines can be used for more than 6 hours after reconstitution.			
18. Licensed pharmacists who shall administer vaccines must submit a monthly vaccination report and AEFI report to DOH regional offices using the prescribed form.			
19. An antigen is a live or inactivated substance capable of producing an immune response.			
20. Antibodies can be given 1 week after the administration of vaccines.			
21. Immunization error-related reactions are caused by inappropriate vaccine handling, prescribing, or administration and thus by its nature is preventable.			
22. Live vaccines can be administered to HIV/AIDS patients.			
23. No other drugs or substances should be stored within the same refrigerator as vaccines.			
24. Antibodies are protein molecules produced by B lymphocytes which help eliminate an antigen.			
25. Vaccines can be administered 2 months after giving antibodies.			
26. Coincidental events are caused by something other than the vaccine product, immunization error or immunization anxiety.			
27. Two live vaccines can be administered simultaneously.			
28. All AEFI cases should be reported to the next higher administrative level on a weekly basis using the AEFI Case Report Form.			
29. If two live parenteral vaccines are given <4 weeks apart, the second vaccine should be repeated.			
30. Increasing the interval between doses of a multi-dose vaccine diminishes the effectiveness of the vaccine.			

Which of the following adult vaccines can be administered by licensed pharmacists? Place a check mark under “Yes” for those that can be administered and “No” for those that cannot be administered.

Adult Vaccine	Yes	No	Don't know
31. Hepatitis A			
32. Hepatitis B			
33. Influenza			
34. Measles, Mumps, Rubella (MMR)			
35. Pneumococcal			
36. Tetanus, Diphtheria, Acellular Pertussis (Tdap)			
37. Varicella			
38. Cervical Cancer			
39. Dengue			
40. Herpes Zoster			

III. Indicate your level of agreement to the following statements by encircling the number corresponding to your answer: 5 = strongly agree, 4 = agree, 3 = neutral, 2 = disagree, 1 = strongly disagree

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
1. Participation in PBIS will allow me to provide a higher level of care to my patients.	5	4	3	2	1
2. Other immunization providers in my community would approve of me providing PBIS to my patients.	5	4	3	2	1
3. I have the necessary financial resources to undergo training for PBIS.	5	4	3	2	1
4. Pharmacists providing PBIS is an important step in moving the profession of pharmacy forward.	5	4	3	2	1
5. Patients in my community would like to see me providing PBIS.	5	4	3	2	1
6. I have the necessary knowledge and skills to provide PBIS.	5	4	3	2	1
7. For me, providing PBIS will be difficult.	5	4	3	2	1
8. Participation in PBIS will attract more patients to my pharmacy.	5	4	3	2	1
9. Patients at my pharmacy will be disappointed if we do not provide PBIS.	5	4	3	2	1
10. I will have the necessary time to provide PBIS.	5	4	3	2	1
11. Participation in PBIS will help patients to access preventive services more easily.	5	4	3	2	1

12. Patients will not hesitate in receiving PBIS.	5	4	3	2	1
13. The pharmacy environment is conducive for providing PBIS.	5	4	3	2	1
14. Providing PBIS is not likely to be profitable for my pharmacy.	5	4	3	2	1
15. My pharmacy manager(s) or store owner(s) will support me in providing PBIS to my patients.	5	4	3	2	1
16. I will have the necessary support staff to provide PBIS.	5	4	3	2	1
17. I will have to provide PBIS in order for my pharmacy to stay competitive.	5	4	3	2	1
18. Other pharmacists I know intend to provide PBIS to their patients.	5	4	3	2	1
19. It is entirely up to me whether or not PBIS will be provided at my pharmacy.	5	4	3	2	1
20. Participation in PBIS will increase my stress level at work.	5	4	3	2	1
21. Involvement in PBIS will improve my job satisfaction.	5	4	3	2	1
22. Undergoing competency training in preparation for PBIS will be difficult.	5	4	3	2	1
23. My patients will trust me more if I provide PBIS.	5	4	3	2	1
24. I will be capable of participating in PBIS as an advocate.	5	4	3	2	1
25. I will be capable of participating in PBIS as a partner.	5	4	3	2	1
26. I will be capable of participating in PBIS as a provider.	5	4	3	2	1

IV. Indicate your response by placing a check on the corresponding answer.

I am willing to provide PBIS in my pharmacy.

Yes             No

## Appendix B: Questionnaire Items for Community Pharmacy Owners for the study entitled, “A Cross-Sectional Survey on the Willingness of Community Pharmacists and Community Pharmacy Owners to Provide Pharmacy-Based Immunization Services in the City of Manila”

### I. Demograpiko

Sagutan ang bawat numero sa pamamagitan ng paglalagay ng tsek (/) sa bawat kahon.

1. Age (in years)

<20                       20-30                       31-40                       41-50                       >50

2. Sex

Male                       Female

3. Marital Status

Single     Married     Widowed                       Separated

4. Highest Educational Attainment

Elementary                       High School                       Bachelor's Degree  
 Graduate Degree     Others: *(Please indicate)* \_\_\_\_\_

5. Years of Operating Pharmacy

<5                       5-10                       11-20                       >20

6. Presence of Medical Clinic Near the Vicinity of the Philippines

Yes                       No

7. Work Hours Per Day

<8                       8-10                       >10

*Para sa II-IV ang sumusunod na depinisyon ay maaaring gamitin: Pharmacy-based Immunization Services (PBIS)- isang programa ng Philippine Pharmacists Association (PPhA) kung saan ang ‘pharmacist’ na nagtatrabaho sa botika ay magbibigay ng serbisyo ng pagbabakuna sa mga “adult patients”.*

II. Saloobin ukol sa PBIS (*Attitude*), Pag-unawa sa nararapat na pagsasagawa ng PBIS (*Subjective Norm*), at Pag-unawa sa mga kahirapan sa pagsasagawa ng PBIS (*Perceived Behavioral Control*)

*Bilugan ang numero ng napiling sagot ayon sa antas ng pagsangayon.*

*5 = Labis na sumasangayon, 4 = Sumasangayon, 3 = Alanganin, 2 = Hindi pagsangayon, 1 = Labis na hindi pagsangayon.*

	<i>Labis na sumasangayon</i>	<i>Sumasangayon</i>	<i>Alanganin</i>	<i>Hindi sumasangayon</i>	<i>Labis na hindi sumasangayon</i>
<i>1. Ang paglahok sa serbisyong pagbabakuna ay makatutulong sa pasyente na makakuha ng serbisyong pangkontra sa mga sakit sa mas madaling paraan</i>					
<i>2. Ang ibang propesyong nagbibigay ng bakuna (halimbawa: nars) ay aapobahan ang aking mga pharmacist na magbabakuna</i>					
<i>3. Mamumuhunan ako para sa pasilidad, bakuna, at mga kagamitan para makapagbigay ng serbisyong pagbabakuna.</i>					

4. Ang paglahok ng mga pharmacist sa pagbibigay ng bakuna ay isang mahalagang hakbang patungo sa pag-unlad ng propesyon ng parmasya.					
5. Ang mga pasyente sa aking komunidad ay magugustuhang makita na ang aking botika ay nagbibigay serbisyong pagbabakuna.					
6. Nasa kakayahan kong saluhin ang kabayaran ng pagsasanay sa pagbabakuna ng aking mga pharmacist.					
7. Ang paglahok sa serbisyong pagbabakuna ay makaka-akit ng karagdagang pasyente/customer sa aking botika.					
8. Ang mga pasyente sa aking botika ay madi-dismaya kung hindi kami magbibigay ng serbisyong pagbabakuna.					
9. Ang iyong mga pharmacist ay laging nariyan para magbigay ng bakuna sa mga pasyente.					
10. Ang paglahok namin sa pagbibigay serbisyong pagbabakuna ay papahintulutan kaming makapagbigay ng mas mataas na antas ng pag-aalaga sa aming pasyente/customer.					
11. Ang mga pasyente ay walang pangamba sa pagsailalim sa pagbabakunang pinangangasiwaan ng mga pharmacist.					
12. Ang kapaligiran ng aking botika ay kaaya-aya sa pagbibigay ng bakuna.					
13. Ang pagbibigay serbisyong pagbabakuna ay hindi kapaki-pakinabang sa aking botika.					
14. Ang ibang may-ari ng botika na kilala ko ay nagbabalak magbigay ng serbisyong pagbabakuna sa kanila pasyente.					
15. Mayroon ako ng kinakailangang tauhan sa pagbibigay ng serbisyong pagbabakuna.					
16. Kailangan naming ng serbisyo ng bakuna para makipagsabayan ang aking botika sa ibang botika					



17. Nakasalalay sa akin lamang kung ang serbisyong pagbabakuna ay magkakaroon sa aking botika.					
18. Ang paglahok sa serbisyong pagbabakuna ay makadadagdag sa aking stress level.					
19. Nasa kakayahan kong magturo at mangampanya tungkol sa kahalagahan ng bakuna.					
20. Ang aking paglahok sa serbisyong pagbabakuna ay mapapabuti ang kasiyahan sa trabaho ng aking pharmacist.					
21. Nasa kakayahan kong mag-imbida ng mga doktor at nars upang magbigay ng serbisyong pagbabakuna.					
22. Ang mga pasyente/customer ay mas magtitiwala sa aking botika kung kami ay mag-aalok ng serbisyong pagbabakuna.					
23. Nasa kakayahan kong magbigay ng serbisyong pagbabakuna sa tulong ng aking pharmacist.					

### III. Willingness

Maglagay ng tsek (/) sa kahon ng napiling sagot.

Ako ay may balak na magkaroon ng serbisyong pagbabakuna sa aking botika.

Yes

No