



(RESEARCH ARTICLE)



## Assessment of Filipino Immunizing Pharmacist Engagement amidst COVID-19 Pandemic using Knowledge, Attitudes, and Practices (KAP) Model

Reeka Mae Barade Villaluz <sup>1,\*</sup>, Yasmin Digan Abdel Khaleq <sup>1</sup>, Aila Marie Manlosa Gula <sup>1</sup>, Maria Leonor Suazo Urriquia <sup>1</sup>, Marcella Alexandra Kipping Antivola <sup>1</sup>, Vince Patrick Dimalig Ruado <sup>1</sup>, Rayne Christelle Romero Magcalas <sup>1</sup>, Monina Ann Banaira Gayapa <sup>1</sup>, Danah Angela Dela Cruz Cariño <sup>1</sup>, Cecilia Diaz Santiago <sup>1,2</sup> and Mylene Sevilla Andal <sup>1</sup>

<sup>1</sup> School of Pharmacy, Centro Escolar University-Manila, 9 Mendiola St, San Miguel, Manila 1008, Metro Manila, Philippines.

<sup>2</sup> The Graduate School, Centro Escolar University-Manila, 9 Mendiola St, San Miguel, Manila 1008, Metro Manila, Philippines.

GSC Biological and Pharmaceutical Sciences, 2022, 20(01), 032–043

Publication history: Received on 29 May 2022; revised on 30 June 2022; accepted on 02 July 2022

Article DOI: <https://doi.org/10.30574/gscbps.2022.20.1.0264>

### Abstract

The immunization practice of pharmacists has only been recently approved in the Philippines; thus, it is imperative to assess their engagement using the Knowledge, Attitudes, Practices (KAP) model. A descriptive quantitative-correlational study that utilized a convenience sampling technique was conducted with 90 respondents. A 49-item self-made questionnaire was employed through Google forms. The data collected was subjected to various statistical treatments for descriptive and correlational analysis. Results showed that respondents have a high level of knowledge regarding the prevention of Adverse Events Following Immunization (3.81), and critical thinking and decision-making upon its occurrence (3.92). The respondents' attitudes also showed high levels of agreement toward the promotion of immunization (3.89) and patient counseling (3.97). Moreover, the majority of the respondents administered vaccines (87.78%) and COVID-19 was the vaccine given the most (77.78%). Their responses showed a high level of practice in the immunization process (3.95), documentation and record-keeping (3.80), and addressing misconceptions (3.94). Most of their sociodemographic profiles do not have a significant relationship with their KAP except for the area of practice that had a correlation to knowledge. Thus, this study proves that Filipino immunizing pharmacists have a high level of engagement amidst the pandemic and continuous training and certification are needed to further strengthen this, especially during public health emergencies.

**Keywords:** Assessment; Filipino Immunizing Pharmacist; Engagement; COVID-19; KAP Model

### 1. Introduction

Coronavirus disease or COVID-19 is an infection caused by the SARS-CoV-2 virus, where the first cases were discovered last December 2019 in Wuhan, China. The dangerous virus quickly spread over the world, resulting in a pandemic [1]. The first COVID-19 case in the Philippines was discovered in January 2020 [2] and in such a short period of time, the disease's pervasiveness rapidly caused great suffering. In response to this, vaccines were developed with the goal of eradicating the disease on a global scale. Despite the massive arrival of vaccines donated by many countries to aid in the immunization progress of the Philippines, the number of immunizers available in the first quarter of 2021 was inadequate, resulting in a slow rate of vaccination. Concerns in vaccination include not only accessibility issues but also vaccine hesitancy [3]. As a result, the country's vaccination drive required the combined efforts of healthcare workers and pharmacists who play an important role in vaccine advocacy and administration. In 2016, the Philippine Pharmacy

\* Corresponding author: Reeka Mae Barade Villaluz; Email: [reeka.villaluz@gmail.com](mailto:reeka.villaluz@gmail.com)

Centro Escolar University-Manila, School of Pharmacy, 9 Mendiola St, San Miguel, Manila 1008, Metro Manila, Philippines.

Act (R.A. 10918) paved the way for the emergence of pharmacists as immunizers in the Philippines, however, there were still no established immunizing practices in the country at the time [4]. In line with this and the pandemic, rigid training among pharmacists was initiated in 2021 by the Philippine Pharmacists Association (PPhA) in collaboration with the Philippine FDA, to train and certify pharmacists as immunizers. The “Immunizing Pharmacist Certification Program” became a major factor in the emergence of the immunizer roles of pharmacists in the Philippines. Since the practice has only been recently approved in the country, it is imperative to assess the engagement of Filipino immunizing pharmacists using the Knowledge, Attitudes, Practices (KAP) model.

---

## **2. Material and methods**

### **2.1. Method of Research Used**

The study utilized a descriptive quantitative-correlational research method.

### **2.2. Survey Instrument**

The self-made questionnaire was inspired from a published report [5] and an online webinar on pharmacy-based immunization in the Philippines [6]. The self-made questionnaire was divided into seven (7) parts: consent form (I), identity verification (II), certificate number as a certified immunizing pharmacist (III), respondent's sociodemographic profile (IV), questions related to the respondent's knowledge (V), respondent's attitudes (VI), and respondent's practices (VII) amidst the COVID-19 pandemic. This survey instrument was validated by 5 experts. Moreover, a pilot test was executed to assess the reliability of the questionnaire, and the results gathered a favorable response. A combination of a Likert scale, which comprises a four-point rating scale having 3.26 to 4.00 as Strongly Agree/Always, 2.50 to 3.25 as Agree/Often, 1.76 to 2.51 as Disagree/Rarely, and 1.00 to 1.75 as Strongly Disagree/Never, and a checklist was used in assessing each parameter.

### **2.3. Number of Respondents and Sampling Techniques**

The Cochran technique was used to find the ideal sample size. The level of significance used was 0.05 with a margin of error of 0.10. Thus, the sample size was 90. Furthermore, the study utilized the convenience sampling technique.

### **2.4. Collection of Data**

An online survey conducted via Google Forms was distributed to the respondents through selected social media platforms. Monetary compensation was given to participants who were randomly selected via “Wheel of Names” platform. The survey was conducted between April and May of 2022 and tallying and evaluation of data were performed the following days after the survey was conducted.

### **2.5. Statistical Treatment of Data**

STATA 15 Standard Edition (SE) was the statistical software used for generating all the data presented. For the descriptive analysis, the mean, frequency, percentage, and standard deviation were used. Moreover, Pearson's correlation analysis, Spearman's correlation analysis, Point-biserial correlation, and Chi-squared test of independence were utilized to determine the significant relationship of the Filipino immunizing pharmacists' sociodemographic profile to their knowledge, attitudes, and practices (KAP) depending on the type of variables involved in the analysis of the relationship.

### **2.6. Ethical Consideration**

The study was approved by the Centro Escolar University Institutional Ethics Review Board (IERB) which ensures that the rights of the participants involved in the study were protected.

---

## **3. Results and discussion**

Since the study defined the term “practicing” as an immunizing pharmacist who was able to administer vaccines during the COVID-19 pandemic, and without available data from the Philippine Pharmacists Association (PPhA) on currently practicing immunizers, out of 530 certified Filipino immunizing pharmacists in the Philippines, only 90 individuals responded to the survey that was conducted in Google forms through the said social media platforms.

### 3.1. Sociodemographic Profile

The representative of the sociodemographic profile of the certified Filipino immunizing pharmacists in the Philippines was presented in Table 1. The majority of the respondents were from the age group of 20-29 (64.44%) and most of them were female (72%). For the region of practice, most of the respondents are based in Luzon Island, particularly in the National Capital Region (NCR) of which 41% of respondents reside. The highest numbers of respondents are from hospital pharmacy practice (44.44%). Moreover, the majority of the respondents (34.44%) have 10-12 months of experience.

**Table 1** Sociodemographic characteristics of the respondents

Characteristics	Groups	Frequency (n)	Percentage (%)
Age	20-29	58	64.44
	30-39	17	18.89
	40-49	9	10.00
	At least 50	6	6.67
Gender	Female	72	80
	Male	18	20
Region Practice of	Bangsamoro Autonomous Region in Muslim Mindanao (BARMM)	0	0.00
	Cordillera Administrative Region (CAR)	2	2.22
	National Capital Region (NCR)	37	41.11
	Region I (Ilocos)	3	3.33
	Region II (Cagayan Valley)	4	4.44
	Region III (Central Luzon)	11	12.22
	Region IV-A (Calabarzon)	16	17.78
	Region IV-B (Mimaropa)	2	2.22
	Region V (Bicol)	0	0.00
	Region VI (Western Visayas)	4	4.44
	Region VII (Central Visayas)	3	3.33
	Region VIII (Eastern Visayas)	0	0.00
	Region IX (Zamboanga Peninsula)	1	1.11
	Region X (Northern Mindanao)	1	1.11
Region XI (Davao Region)	2	2.22	
Region XII (Soccsksargen)	3	3.33	
Region XIII (Caraga)	1	1.11	
Area of Practice	Community	29	32.22
	Manufacturing/Industrial	1	1.11
	Hospital	40	44.44
	Academe	12	13.33
	Research and Development	0	0.00
	Public health	3	3.33

	Others	5	5.56
Length Practice	1-3 months	13	14.44
	4-6 months	20	22.22
	7-9 months	22	24.44
	10-12 months	31	34.44
	2-4 years	2	2.22
	At least 5 years	2	2.22

Most of the respondents who took part in the study's online survey were under the generation of Millennials and Generation Z. These young generations of pharmacists are depicted as those who are still exploring new and different roles in the pharmacy practice [7]. This may explain why the study's respondents yearn to innovate and expand their roles such as being certified immunizing pharmacists. Results showed that in this study, the immunizing pharmacist industry is dominated by women. Similarly, it is notable that the gender distribution of pharmacists in the Philippines consists of 90% female [8]. Most of the respondents were also from the hospital pharmacy practice and this is due the reason that hospitals are usually designated as vaccination sites or implementing units for vaccination activities and programs which justifies how almost half of respondents practice in this area [9]. The majority of the respondents have 10-12 months of experience and this is in line with the recent emergence of the Immunizing Pharmacist Certification Program of the Philippine Pharmacists Association (PPhA) which only began on April 5, 2021.

### 3.2. Respondents' Knowledge on Prevention of Adverse Events Following Immunization (AEFI) and Critical thinking and decision-making upon the occurrence of Adverse Events Following Immunization (AEFI) Respondents' knowledge

Respondents' Knowledge were presented in Table 2. Responses on the questions related to prevention of AEFI and critical thinking and decision-making upon the occurrence of AEFI both contribute to a high mean score of knowledge. This is characterized by a total mean score of 3.81 in the prevention and AEFI and 3.92 in critical thinking and decision-making upon the occurrence of AEFI.

**Table 2** Knowledge scores

Knowledge		Mean	Verbal Interpretation
<b>1</b>	<b><i>Knowledge regarding on the Prevention of Adverse Events Following Immunization (AEFI)</i></b>		
1.1	The patient should apply a cold compress at the injection site to help reduce pain, redness and swelling	3.86	Strongly Agree
1.2	The patient must take an analgesic/antipyretic, such as paracetamol to help relieve fever, headaches, or body aches that may occur after vaccination.	3.86	Strongly Agree
1.3	The patient needs to do their best to avoid tobacco and alcoholic drinks because these alter immune responses, and may aggravate side effects.	3.80	Strongly Agree
1.4	The patient should rest to lessen the incidence of side effects.	3.59	Strongly Agree
1.5	The patient's reaction to a previous dose of the vaccine must be determined to minimize the risk of side effects for succeeding doses.	3.92	Strongly Agree
TOTAL MEAN		3.81	Strongly Agree
<b>2</b>	<b><i>Knowledge on Critical thinking and decision-making upon the occurrence of Adverse Events Following Immunization (AEFI)</i></b>		
2.1	The immunizing pharmacist should be able to identify that a patient is experiencing a serious AEFI when they have signs and symptoms of an allergic reaction after vaccine administration.	3.91	Strongly Agree

2.2	The immunizing pharmacist should know when and how to administer epinephrine to a patient experiencing an allergic reaction after vaccine administration in the pharmacy and follow the medical emergency protocol of the pharmacy after epinephrine is administered.	3.87	Strongly Agree
2.3	The immunizing pharmacist should know when and how to perform Basic Life Support (BLS) to a patient in the pharmacy after vaccine administration as part of the medical emergency protocol of the pharmacy.	3.97	Strongly Agree
TOTAL MEAN		3.92	Strongly Agree

\*Legend: 3.26-4.00 = Strongly Agree; 2.50-3.25 = Agree; 1.76-2.51 = Disagree; and 1.00-1.75 = Strongly Disagree.

The results showed that practicing immunizing pharmacists consider the prevention of AEFI as well as identifying life-threatening events as a top priority in immunization for they have a strongly agreed response based on the total mean rating. They take all the required steps before administering a vaccine such as assessing patients for contraindications to ensure that side effects are avoided [10]. They are also required to have certifications such as in Basic Life Support (BLS) before undergoing PPhA-Immunization Pharmacist Certification Program (IPCP) [11].

### 3.3. Respondents' Attitudes on the Promotion of immunization to counteract vaccine hesitancy and Patient counseling in relation to their vaccine

**Table 3** Attitudes scores

Attitudes		Mean	Verbal Interpretation
<b>1</b>	<b><i>Promotion of immunization to counteract vaccine hesitancy of the public</i></b>		
1.1	I believe that an immunizer's knowledge about vaccines and vaccination, as well as their injection preparation and administration skills that were gained through training, continuous professional development, and personal experiences, could help minimize a patient's hesitancy about vaccines.	3.94	Strongly Agree
1.2	I believe that the available information about vaccine-preventable diseases in the country (e.g., COVID-19 disease) is timely, reliable, and adequate.	3.71	Strongly Agree
1.3	I believe that encouraging patients for vaccination against vaccine-preventable diseases (e.g., Chickenpox, Flu, MMR, etc.) is one way to counteract vaccine hesitancy.	3.92	Strongly Agree
1.4	I believe that immunizing pharmacists may help promote immunization by creating and sharing posts based on evidence-based information about vaccines and vaccination in social media.	3.87	Strongly Agree
1.5	I believe that public education is important to address vaccine hesitancy and one may start with explaining the benefits of vaccination to the people close to you (e.g., family members, friends, neighbors, etc.)	3.94	Strongly Agree
1.6	I believe that being compassionate and understanding towards different patient types (e.g., PWDs, those with anxiety, senior citizens, patients with fear of needles, etc.) may also help address vaccine hesitancy.	3.96	Strongly Agree
TOTAL MEAN		<b>3.89</b>	<b>Strongly Agree</b>
<b>2</b>	<b><i>Patient counseling in relation to their vaccine</i></b>		
2.1	It is important to address patients' questions and/or concerns regarding vaccines and vaccination prior to vaccine administration.	3.97	Strongly Agree
2.2	Post-vaccination counseling must be provided to patients to equip them with the information on how to recognize vaccination side effects and what to do in case these are experienced.	3.97	Strongly Agree
TOTAL MEAN		<b>3.97</b>	<b>Strongly Agree</b>

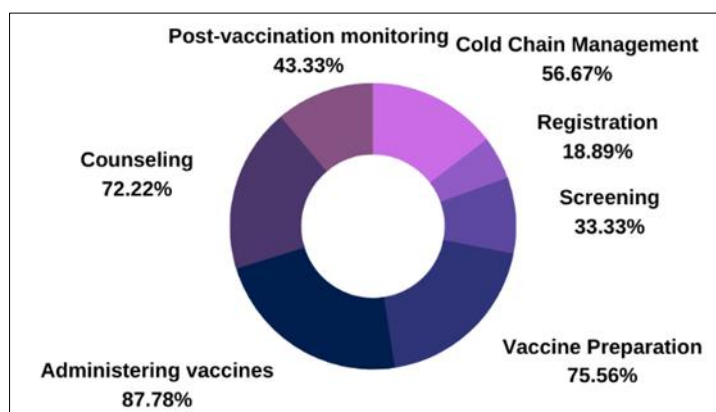
\*Legend: 3.26-4.00 = Strongly Agree; 2.50-3.25 = Agree; 1.76-2.51 = Disagree; and 1.00-1.75 = Strongly Disagree.

Respondents' attitudes were presented in Table 3. Responses on the questions related to the promotion of immunization to counteract vaccine hesitancy and patient counseling in relation to their vaccine both contribute to a high mean score of attitudes. This is characterized by a total mean score of 3.89 in the promotion of immunization to counteract vaccine hesitancy and 3.97 for patient counseling in relation to their vaccine.

Results showed that immunizing pharmacists strongly agree with the promotion of immunization to counteract the public's vaccine hesitancy. Patients have self-determination when it comes to partaking in vaccination and pharmacists are well trained to support and educate patients with relevant clinical information [10]. For vaccine-related decisions, pharmacists are also the most trusted advisors and influencers in the community because of their effective patient-centered interactions [12]. Moreover, they strongly agree that patient concerns must be addressed before vaccination to uphold patient autonomy. Educating patients about their health, concerns about vaccines, and how a pharmacist can assist creates safe and effective services [13].

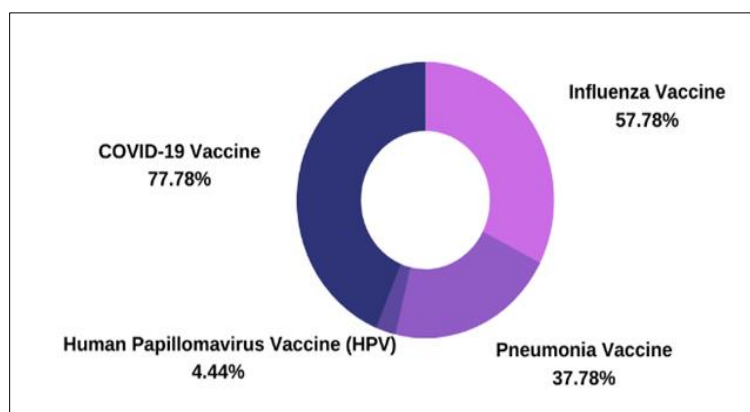
### 3.4. Respondents' Role/s in the vaccination sites, Adult vaccines administration, Compliance with the immunization process, Documentation and record-keeping, and addressing a patient's misconceptions about vaccines

Respondents' practices were presented in Figure 1 and 2 and Table 4. The data gathered showed that among the roles of immunizing pharmacists in vaccination sites, 87.78% of the respondents are administering vaccines. Moreover, the gathered data showed that COVID-19 vaccines are the most administered vaccine which garnered the highest percentage of 77.78%. Furthermore, the overall results in the respondent's practices also showed that most of the responses are close to ideal results. Responses on the questions related to compliance with the immunization process, documentation and record-keeping practices, and addressing patients' misconceptions about vaccines all contribute to a high mean score of practice. This is characterized by a total mean score of 3.95 in compliance with the immunization process, 3.80 in the documentation and record-keeping practices, and 3.94 in addressing patient's misconceptions about vaccines. These results are interpreted as high-level frequency.



**Figure 1** Immunizing Pharmacists' Roles at the Vaccination Sites

The most common roles in vaccination sites are administering vaccines (87.78%), vaccine preparation (75.56%), and patient counseling (72.22%). These results are favorable especially with the ongoing COVID-19 vaccine deployment in the Philippines. The least common role of the respondents is in the registration area comprising 18.89% of the total population, this may be an unpopular role to the respondents because based on the Philippine National COVID-19 Vaccination Deployment Plan 2021 [14], local government units are responsible for the masterlisting and registration.



**Figure 2** Adult Vaccination Administered by the Immunizing Pharmacist

In this study, the majority of the respondents administered COVID-19 vaccines (77.78%) during the COVID-19 pandemic, this is explainable by the wide distribution of COVID-19 vaccines as a response to the apparent widespread spread of the disease. The influenza vaccine was also administered by 57.78% of the respondents while 37.78% administered the pneumonia vaccine. The least vaccine administered was the HPV vaccine (4.44%).

**Table 4** Practices scores (4-point Likert scale responses)

Practices		Mean	Verbal Interpretation
<b>1</b>	<b>Data on the Practices of IP on the Compliance with the Immunization Process</b>		
1.1	I perform hand hygiene before and after injection preparation and administration, and whenever other surfaces are touched while preparing and administering vaccines.	3.97	Always
1.2	I use the recommended personal protective equipment (PPE) during injection preparation and administration, such as mask, gloves, and a gown when needed.	3.87	Always
1.3	I verify the patient's information and the vaccine prescribed against the information provided in the prescription presented.	3.97	Always
1.4	I ask the patient to answer a series of screening questions to determine any possible precautions or contraindications to the vaccine requested.	3.92	Always
1.5	I provide the patient with a Vaccine Information Statement (VIS).	3.81	Always
1.6	I review the patient's answers to the screening questions and probe further when necessary.	3.90	Always
1.7	I ensure that all of the patient's concerns or questions about the vaccine are addressed.	3.96	Always
1.8	I explain and ensure that the patient understands the consent form before they sign it.	3.93	Always
1.9	I check the consent form to ensure that it has the patient's signature.	3.96	Always
1.10	I maintain the quality, integrity, and safety of vaccines through cold chain management.	3.99	Always
1.11	I prepare the requested vaccine following the instructions provided by the manufacturer.	3.98	Always
1.12	I verify patient identity and the vaccine requested based on the information in the vaccine administration form before I administer the vaccine.	3.97	Always

1.13	I administer the vaccine following aseptic techniques and taking into consideration patient safety and comfort.	3.98	Always
1.14	I properly dispose of the syringes in a sharps container.	3.98	Always
1.15	I maintain a clean workspace.	3.97	Always
1.16	I provide aftercare instructions to help the patient identify and address both local and serious reactions that may occur after vaccination.	3.97	Always
1.17	I tell the patient to stay in the monitoring area for at least 15 minutes for observation.	3.94	Always
1.18	I provide the patient with instructions on what to do should they experience any local and/or serious post-vaccination reactions, (e.g. calling the pharmacy if they have questions; going to the nearest ER if an allergic reaction occurs, etc.)	3.94	Always
<b>TOTAL MEAN</b>		<b>3.95</b>	<b>Always</b>
<b>2</b>	<b>Data on the Practices of Immunizing Pharmacists in Documentation and Record-keeping</b>		
2.1	I complete the vaccination information in the vaccine administration form and file this in an allotted place in the pharmacy.	3.89	Always
2.2	I update the patient's immunization record in the pharmacy's patient medication profile.	3.79	Always
2.3	I ensure that the patient's information and vaccination record is uploaded and/or updated in the national database to secure their information for the next vaccination. (This refers to a national vaccination database/registry such as the one used for COVID-19 vaccines)	3.71	Always
2.4	I record all ADEs and ADRs reported by patients and file the necessary report with the FDA.	3.79	Always
<b>TOTAL MEAN</b>		<b>3.80</b>	<b>Always</b>
<b>3</b>	<b>Data on the Practices of Immunizing Pharmacists in Addressing Patient's Vaccines Misconceptions</b>		
3.1	Immunizing pharmacists should be able to understand their patients' concerns about vaccines and vaccination and provide them with evidence-based information that will help to address their misconceptions about vaccines, particularly the COVID-19 vaccines.	3.93	Always
3.2	Immunizing pharmacists should be able to address patient's concerns/questions and even misperceptions about booster shots and 3rd doses, and minimize the spread of false information.	3.96	Always
<b>TOTAL MEAN</b>		<b>3.94</b>	<b>Always</b>

\*Legend: 3.26-4.00 = Always; 2.50-3.25 = Often; 1.76-2.51 = Rarely; and 1.00-1.75 = Never

The results showed that most of the respondents from the study always comply with the immunization process that they trained for during the PPhA–Immunizing Pharmacist Certification Program (IPCP). The program had proposed modules for training that were patterned on the established guidelines of the American Pharmacist Association [4] as recommended by the Professional Regulation Commission (PRC). It is also widely known that documentation and record-keeping is not a popular practice in the country [12] but the results of this study show otherwise as seen in the computed mean rating of 3.80. Lastly, the results also showed that the respondents always practice addressing and minimizing a patient's misconception about vaccines. Pharmacists are trained to master patient communication; thus, it is vital that this is applied in the promotion of vaccines because when pharmacists offer vaccine education to patients, immunization rates are actually found to be enhanced [15].



### 3.5. Relationship of the respondent's sociodemographic profile as to their knowledge, attitudes, and practices as immunizing pharmacists

The relationship of respondents' sociodemographic profile to their KAP was presented in Table 5 to 9 using different statistical treatments depending on the type of variables. The results obtained using Pearson's correlation coefficient showed that the respondents' age and KAP have an inverse relationship. All the correlations between the age and KAP scores (0.2264, 0.0886, and 0.4309, respectively) are insignificant. Furthermore, the results obtained using the point-biserial correlation coefficient show that the respondents' KAP has no significant relationship with their gender attributed to a p-value of 0.0814 (K), -0.0327 (A), and -0.0278 (P). The data obtained using the Chi-squared test showed that the correlation between the region and KAP is also not significant which is reflected in their p-value of 0.414 (K), 0.226 (A), and 0.058 (P). The result obtained from the Chi-squared test also showed that only the correlation between the knowledge score and area of practice of the respondents is significant having a p-value of 0.029 while the attitude score and practices score are both not statistically significant having a p-value of 0.251 and 0.999, respectively. Lastly, the results obtained from Spearman's correlation analysis showed that the length of practice and their KAP showed a significant relationship as revealed by the KAP scores' p-value of 0.3067, 0.8615, and 0.1841, respectively.

**Table 5** Results of Pearson's correlation analysis between KAP scores and age

Variable	Pearson's correlation coefficient	P-value	Verbal Interpretation
Knowledge score	-0.1288	0.2264	Not Significant
Attitudes score	-0.1805	0.0886	Not Significant
Practices score	-0.0254	0.4309	Not Significant

\*Interpretation: <0.05 = Significant; ≥ Not Significant

Findings showed that the relationship between age and KAP scores has a negative Pearson's correlation coefficient, which means that there is an inverse relationship between the two variables. Moreover, the relationship between the respondent's age and KAP is found to be not significant due to its high p-values. The results of the study are also relevant to the findings of another study [16], which identified that no significant correlation statistically exists between age and KAP. This implies that as the immunizing pharmacist ages, the less score they have in all categories. However, the reason behind the lack of relationship between the two variables needs to be studied further.

**Table 6** Results of Point-biserial correlation between KAP scores and respondents' gender

Variable	Point-biserial correlation coefficient	P-value	Verbal Interpretation
Knowledge score	0.0814	0.4458	Not Significant
Attitudes score	-0.0327	0.7597	Not Significant
Practices score	-0.0278	0.7949	Not Significant

\*Interpretation: <0.05 = Significant; ≥ Not Significant

There is no significant relationship between the respondent's gender and KAP scores due to its high p-values and limited number of respondents during the data collection period. This is also due to the fact that the Philippine pharmacy became dominated by women in the early twentieth century since educational institutions started catering to women's career aspirations at the time [17].

**Table 7** Results of Chi-square test of independence between KAP scores and island groups where the respondents are practicing

Variable	Chi-square test statistic	P-value	Verbal Interpretation
Knowledge score	18.6471	0.414	Not Significant
Attitudes score	15.2953	0.226	Not Significant
Practices score	33.2914	0.058	Not Significant

\*Interpretation: <0.05 = Significant; ≥ Not Significant

Findings showed that the relationship between the respondents' KAP scores and the island groups where they are practicing has a set of p-values greater than 5% which explains that there is actually no significant relationship between these two variables. However, the practices score reflected a nearly significant result, this is because the nature of care being delivered by professionals is directly influenced by geographical location due to the differences in culture and the accessibility to facilities [18]. Studies also show that less time on immunization activities is spent in healthcare facilities located in rural areas [19].

**Table 8** Results of Chi-square test of independence between KAP scores and respondents' area of practice

Variable	Chi-square test statistic	P-value	Verbal Interpretation
Knowledge score	64.6302	0.029	Significant
Attitudes score	34.7600	0.251	Not Significant
Practices score	25.3703	0.999	Not Significant

\*Interpretation: <0.05 = Significant; ≥ Not Significant

Findings showed that the relationship between respondent's area of practice and KAP scores has a set of different p-values. The relationship between respondents' area of practice and attitude and practice scores are not significant. However, in terms of knowledge score, the respondent's area of practice is found to be significant. In fact, the pharmacy profession has evolved from product-oriented to patient-oriented [20]. Their roles have expanded to a full scope of practice which necessitates their inclusion as a member of a larger health-care team dedicated to improving patient care [21]. Through continuous education and training on immunization, their knowledge was extended to the fullest.

**Table 9** Results of Spearman's correlation analysis between KAP scores and length of practice as an immunizing pharmacist

Variable	Spearman's correlation coefficient	P-value	Verbal Interpretation
Knowledge score	-0.1089	0.3067	Not Significant
Attitudes score	-0.0187	0.8615	Not Significant
Practices score	-0.1413	0.1841	Not Significant

\*Interpretation: <0.05 = Significant; ≥ Not Significant

Results showed that the relationship between Immunizing Pharmacists' length of practice and KAP scores has a negative Spearman's correlation coefficient, which has the same result as the respondent's age being inversely related to KAP. This is because the length of practice as an immunizing pharmacist is directly correlated to respondents' age (P-value = 0.0003). Moreover, since the results have a set of p-values greater than 5%, the relationship between the two variables is found to be not significant. The results of the study are different from other studies which found that pharmacists with more experience had a higher score of KAP than others with less experience [22]. Further studies must be conducted to identify the cause. In addition, a 2019-study [23] observed that pharmacists who worked for 5 to 10 years showed the lowest score in attitude and practice, this is consistent with the study's results. The study also mentioned that other works of the literature showed how individuals working for a long period of time tend to experience exhaustion and burnout which explains the diminished performance and function.

#### 4. Conclusion

In conclusion, majority of the respondents portrayed high levels of KAP. Hence, the findings prove that Filipino immunizing pharmacists have high engagement during the COVID-19 pandemic due to the favorable responses which reflect their strong foundation in critical thinking and decision-making skills on Adverse Events Following Immunization (AEFI), their positive attitudes toward vaccination promotion to counteract hesitancy, and their meticulous practices on the immunization process, providing patients with utmost services. Moreover, the high level of engagement of immunizing pharmacists can also be accredited due to the program launched by Philippine Pharmacists' Association (PPhA) called Immunizing Pharmacist Certification Program (IPCP) during the start of the pandemic. This program led to the large increase of immunizing pharmacists certified and practicing in the Philippines. Consequently, this resulted to the increased participation of immunizing pharmacists in the vaccination programs. This implies that Filipino immunizing pharmacists play an essential role in immunization amidst the COVID-19 pandemic.

Furthermore, the findings revealed that most of the sociodemographic profiles, particularly the age, gender, region and length of practice, do not have a significant relationship with the KAP of the immunizing pharmacists, depicting that engagement does not correlate to the abovementioned sociodemographic factors, however the area of practice has significant relationship with knowledge which shows that immunizing pharmacists continuously expand their education and training.

Lastly, this study also proves that there is a need for expansion of training and certification to continuously increase the number of immunizing pharmacists in the Philippines which further strengthens their engagement especially during public health emergencies.

---

## Compliance with ethical standards

### *Acknowledgments*

The funds for the study were provided by the Department of Science and Technology (DOST).

### *Disclosure of conflict of interest*

No conflict of interest.

### *Statement of ethical approval*

The study protocol and informed consent were approved by the Centro Escolar University – Institutional Ethics Review Board (CEU-IERB) last April 11, 2022.

### *Statement of informed consent*

Informed consent was obtained from all individual participants included in the study.

---

## References

- [1] Nguyen HTT, Dinh DX, Nguyen VM. Knowledge, attitude and practices of community pharmacists regarding COVID-19: A paper-based survey in Vietnam. *PLoS ONE*. 2021; 16(7): e0255420.
- [2] Department of Health (DOH). DOH confirms First 2019-nCoV Case in the Country; Assures Public of Intensified Containment Measures [Internet]. Manila: Department of Health; 2020. Available from <https://doh.gov.ph/doh-press-release/doh-confirms-first-2019-nCoV-case-in-the-country?fbclid=IwAR1HQRoyDSvH5XN0cvoIFk9NWlnxBMGa1vN5iDNC2pGxw0OuXk18d6gHVN8#:~:text=Press%20Release%20%2F%2030%20January%202020&text=The%20confirmed%20case%20arrived%20in,25%20after%20experiencing%20mild%20cough>
- [3] Valencia, JPA. Vaccine champions: A Doctor to the Barrio on challenges being faced by GIDA areas: A story of a rural health doctor from Datu Blah Sinsuat, Maguindanao [Internet]. Maguindanao, Philippines: UNICEF Philippines; 2021. Available from <https://www.unicef.org/philippines/stories/vaccine-champions-doctorbarrio-challenges-being-faced-gida>
- [4] Ongpoy R, Capistrano N, Santos A. Proposed Adult Immunization Training Program for Filipino Pharmacists. *International Journal of Scientific & Technology Research*. 2019; 8(8).
- [5] Patel C, Dalton L, Dey A, Vette K, McIntyre P, Macartney K, Beard F. A survey of pharmacist vaccination reporting to the Australian Immunisation Register [Internet]. Westmead, New South Wales, Australia: National Centre for Immunisation Research and Surveillance; 2021. Available from: [https://www.ncirs.org.au/sites/default/files/2021-07/A%20survey%20of%20pharmacist%20vaccination%20reporting%20to%20AIR%20report\\_Final.pdf](https://www.ncirs.org.au/sites/default/files/2021-07/A%20survey%20of%20pharmacist%20vaccination%20reporting%20to%20AIR%20report_Final.pdf)
- [6] Esteban-Romero K. R-PHuture Pharmacists: Power Up Your Pharmacy Immunization Skills [unpublished Zoom Webinar]. Philippines: Federation of Junior Chapters of the Philippine Association Program (FJPPHA); webinar happened on 2021 Dec 8.
- [7] Sakr F, Akiki Z, Dabbous M, Salameh P, Akel M. The Role of Pharmacists in Providing Immunization to the General Population: Are Lebanese Pharmacists Ready for this Role? [Internet]. Granada: *Pharm Pract*; 2021. Available from: <https://pharmacypractice.org/index.php/pp/article/view/2565>

- [8] Gall D, Bates I, Bruno A. FIP Global Pharmacy Workforce Report 2012 [Report]. Fédération Internationale Pharmaceutique (FIP): The Netherlands: UCL Discovery; 2012.
- [9] Paudyal V, Fialová D, Henman MC, Hazen A, Okuyan B, Lutters M, Cadogan, C, da Costa FA, Galfrascoli E, Pudritz YM, Rydant S, Acosta-Gómez J. Pharmacists' involvement in COVID-19 vaccination across Europe: a situational analysis of current practice and policy. *Int J Clin Pharm.* 2021; 43: 1139–1148.
- [10] Terrie YC. The Role of the Pharmacist in Overcoming Vaccine Hesitancy [Internet]. Virginia: US Pharmacist; 2021. Available from <https://www.uspharmacist.com/article/the-role-of-the-pharmacist-in-overcoming-vaccine-hesitancy#:~:text=Pharmacists%20can%20overcome%20vaccine%20hesitancy,address%20patient%20concerns%20and%20fears>.
- [11] Professional Regulatory Board of Pharmacy, Professional Regulation Commission. Accrediting Philippine Pharmacists Association, Inc (PPhA) as the Training Provider to Conduct the Immunizing Pharmacist Certification Program [Internet]. Manila: Professional Regulation Commission; 2021. Available from: <https://www.prc.gov.ph/sites/default/files/pharma2021-05%20published.PDF>
- [12] International Pharmaceutical Federation (FIP). FIP Vaccination handbook for pharmacists: Procedures, safety aspects, common risk points and frequent questions [Internet]. The Hague: International Pharmaceutical Federation; 2021. Available from: [https://www.mps.org.my/view\\_file.cfm?fileid=2660](https://www.mps.org.my/view_file.cfm?fileid=2660)
- [13] Garling, K Ashley. Optimizing Patient Experience with Immunization Counseling [Internet]. University of Texas at Austin College of Pharmacy: Pharmacy Times; 2021. Available from: <https://www.pharmacytimes.com/view/optimizing-patient-experience-with-immunization-counseling>
- [14] Department of Health (DOH). The Philippine National Deployment and Vaccination Plan for COVID-19 Vaccines [Internet]. Manila: Department of Health; 2021. Available from: <https://doh.gov.ph/sites/default/files/basic-page/The%20Philippine%20National%20COVID-19%20Vaccination%20Deployment%20Plan.pdf>
- [15] Bach AT, Goad JA. The role of community pharmacy-based vaccination in the USA: current practice and future directions. *Integrated pharmacy research & practice.* 2015; 4: 67-77.
- [16] Moradzadeh R, Nazari J, Shamsi M, Amini S. Knowledge, Attitudes, and Practices Toward Coronavirus Disease 2019 in the Central Area of Iran: A Population-Based Study. *Front. Public Health.* 2020; 8: 599007.
- [17] Nery LA. *Feminine Invasion: Women and Philippine Pharmacy in the Early Twentieth Century.* Vol. 66, No. 2. Philippines: Ateneo de Manila University. 2018.
- [18] Rice N, Smith PC. Ethics and geographical equity in health care. *J Med Ethics.* 2001; 27(4):256-61.
- [19] Magambo NK, Bajunirwe F, Bagenda F. Geographic location of health facility and immunization program performance in Hoima district, western Uganda: a health facility level assessment. *BMC Public Health.* 2020; 20: 1764.
- [20] Toklu HZ, Hussain A. The changing face of pharmacy practice and the need for a new model of pharmacy education. *Journal of young pharmacists: JYP.* 2013; 5(2): 38–40.
- [21] Hays C, Sparrow M, Taylor S, Lindsay D, Glass B. Pharmacists' Full Scope of Practice: Knowledge, Attitudes and Practices of Rural and Remote Australian Pharmacists. *Journal of Multidisciplinary Healthcare.* 2020; 13: 1781-1789.
- [22] Al-Tameemi NK., Sarriff A. Knowledge, attitude and practice of pharmacists on medication therapy management: a survey in Hospital Pulau Pinang, Penang, Malaysia. 2019; 5(1).
- [23] Athiyah U, Setiawan CD, Nugraheni G, Zairina E, Utami W, Hermansyah A. Assessment of pharmacists' knowledge, attitude and practice in chain community pharmacies towards their current function and performance in Indonesia. *Pharmacy Practice.* 2019; 17(3): 1518.