Perceived preparedness of pharmacy students to public health practice: Basis for curriculum improvement

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Abstract: With the growing demand for pharmacists in public health, it is important to prepare pharmacy students for them to assume roles and develop competency in the practice. The main objective of the study is to determine the perceived preparedness of pharmacy students to public health practice based on the competencies stated in Philippine Practice Standards set by the Philippine Pharmacist Association in selected higher education institutions from Luzon, Visayas, and Mindanao that will serve as a basis for curricular improvement. The study utilized the descriptive research design, using a survey questionnaire as the method of data collection. The data were analyzed using the Statistical Package for Social Sciences© Statistics version 23 software. Results show that majority of respondents think that public health is an important field and appreciates the roles of pharmacists in a collaborative health setting in addressing public health issues. Students have a high level of perception about the core competencies across all pharmacy practice areas and competencies in public health practice stated in Philippine Practice Standards. Overall, the students perceive themselves as prepared in some competencies needed in public health practice. However, students need to be exposed more to activities that will help to develop certain important competencies in public health practice.

Keywords: *public health; public health pharmacy; perceived preparedness*

1. INTRODUCTION

In recent years, the pharmacist's role in the healthcare system has slowly been recognized. Pharmacists in developing countries tend to keep to the limits of dispensing roles mainly in community pharmacies (Matowe, Mori, & Mawa, 2012). There is also a question of whether pharmacists possess skills, expertise, or unique opportunities for solving the problem in public health need and, if so, whether there is a strong will among pharmacists and pharmacy's professional and educational communities to do so (Alkhateeb & Truong, 2012). Thus, changes in mindsets, perceptions, curricula, and teaching methodologies are some of the essential matters required to catalyze the process of modernizing the profession of pharmacy in developing countries (Matowe, Mori, & Mawa, 2012). There were recommendations to incorporate concepts of public health in the curricula of pharmacy schools to increase the awareness of the role of pharmacists in public health (Alkhateeb, & Truong, 2012). This can be done through the collaboration of schools of pharmacy with other public health authorities and organizations. It is important to prepare pharmacy students for them to assume roles and develop competency in the practice (Carter & Slack, 2010).

The Philippine Pharmacist Association (PPhA) has set standards as a yardstick to whether pharmacists are highly prepared and competent to perform the tasks expected of them. The Philippine Practice Standards for Pharmacists (PhilPSP) manual serves as guidance for the desired minimum standards of practice for pharmacists in various settings. With the growing demand for pharmacists in public health practice, the question, therefore, are pharmacists prepared to take this role? Is the existing training provided by schools enough for the pharmacists to efficiently fulfill responsibility in the public health sector? Higher Education Institutions (HEIs) may not be graduating pharmacy students with the abilities essential to be successful in the public health practice. By identifying the perceived preparedness of pharmacy students in public health practice, the findings could be beneficial not only to the profession but also to future curriculum development.

The main objective of the study was to determine the level of perceived preparedness of pharmacy students to public health practice based on their general view regarding the practice, the achievement of objectives in public health pharmacy course adapted from the Philippine Association and Colleges of Pharmacy (PACOP) course plan and competencies stated in Philippine Practice Standards set by Philippine Pharmacist Association. This research also aimed to determine the relationship between the respondent's location of HEIs (Luzon, Visayas, Mindanao) and their level of perceived preparedness to public health practice.

2. METHODOLOGY

A descriptive study design was employed in the study in which data were accumulated from student responses and used survey questionnaires as the method of data collection.

The researcher used a survey questionnaire which composed of two parts- the demographic information and perception of preparedness of students on public health. As to the perception-related items, the respondents answered the questions which focused on pharmacy students' perceived preparedness in public health practice. This part was composed of three sets of questions; the first set was based on the general view of the students in public health adopted from the study of Navinan, Wijayaratne, & Rajapakse (2011). The second set was based on the extent of achievement of objectives in public health pharmacy course adapted from the PACOP course plan. The third set was based on the public health competencies stated in Philippine Practice Standards set by the PPHA.

The questionnaires were validated and approved by qualified and expert professionals. Initially, a pilot survey was done in which twenty pharmacy seniors students were asked to answer the questionnaire to determine the time necessary to complete the evaluation and the ease of completing the questions. It also provided an opportunity to receive feedback and questions from the students concerning the survey that could arise during

the survey process. Cronbach alpha was applied to determine the reliability of the questions yielding a value of 0.995.

The non-probability sampling technique, specifically, convenience sampling was used to identify the respondents in the study. The respondents of the study include Pharmacy students in either 4th or 5th-year level of the academic year 2019-2020 enrolled in the determined HEIs from Luzon, Visayas, and Mindanao. Before data collection, a letter of permission to conduct the study was sent via email to the deans of each determined HEIs. Data collection proceeds upon approval of the deans. During the data collection process, respondents were given instructions first about the objectives of the study, risks, confidentiality, and time that will take for the respondents to answer the questionnaires. Respondents were asked to sign the informed consent signifying their approval to participate in the study, the survey instrument was provided after. The collection of data depended on the approval and discretion of each HEIs as to whether it would allow the researcher to administer the questionnaire herself or would require their school representative to facilitate the survey. Questionnaires were collected upon completion and treated with the utmost confidentiality. Participants were given full anonymity when taking the survey, meaning that all responses are confidential and are protected by a numerical code. Only the researcher has access to the documents. The data collection covered the period from December 2019 to February 2020. The researcher obtained an ethical clearance at Philippine Women's University Research Ethics Board before the research.

Cronbach alpha coefficients were used to assess the reliability of the questionnaire, at least 0.7 is considered reliable. Means and standard deviation were used to summarize the results of the ratings while counts and percentages were used to summarize categorical information such as gender and location. For the descriptive interpretations of the mean ratings, the following criteria were used according to the standard formula in the calculation of boundaries of the class interval: Verbal Interpretations- 3.26-4.00 – Strongly Agree; 2.51-3.25 – Agree; 1.76- 2.50 – Disagree; 1.00-1.75 – Strongly Disagree.

For the comparison of ratings according to gender, the Rank Sum Test/Mann-Whitney U test was performed. For the comparison between the level of perceived preparedness and location (Luzon, Visayas, Mindanao), the Kruskal Wallis Test (an extension of the Rank Sum Test when comparing more than 2 groups) was used. All statistical tests were accomplished using Statistical Package for Social Sciences (SPSS) 23.0. Entries were checked individually for discrepancies and any differences corrected Statistical significance was determined at the 0.05% level.

3. RESULTS AND DISCUSSION

3.1 Demographics of Respondents

3.1.1 Gender

Figure 1 indicates that most of the respondents which represent about 9/10 of the study participants are female.

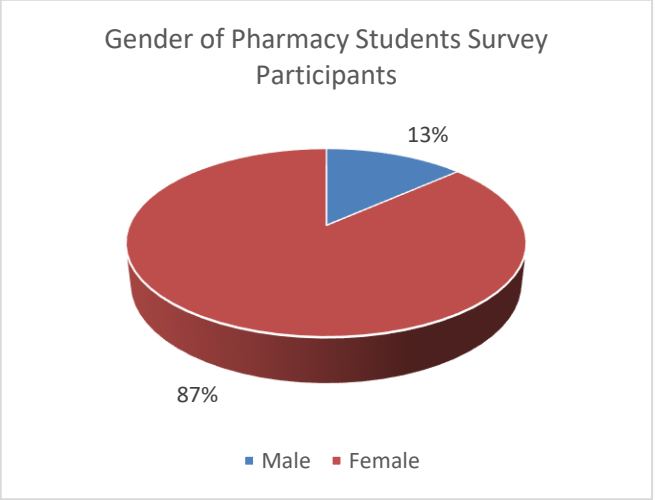

Figure 1. Frequency distribution of gender of participants (N=349)

3.1.2 Locale of the study

Table 1. Frequency distribution of respondents per HEI.

Location of HEI	*Frequency (n=349)*	*Percentage (100%)*
Luzon		
A	31	8.9
B	33	9.5
C	22	6.3
D	19	5.4
E	25	7.2
F	54	15.5
Visayas		
G	42	12
H	16	4.6
I	33	9.5
Mindanao		
J	27	7.7
K	47	13.5

There were 11 HEI's included in the study. Six (6) from Luzon, three (3) from the Visayas, and two (2) from Mindanao. Only HEIs having 4th or 5th-year pharmacy students and those who agreed to participate in the study were included. The number of respondents who took the survey was based on the discretion of the respective deans/program heads and the availability

of the students. A total of 349 respondents answered the survey. Because of the Republic Act 10533 "Enhanced Basic Education Act of 2013" of the Philippines in which the number of years for basic education was increased, there is a notable decline in the number of pharmacy students who are in 4th to 5th-year level. Most of the HEIs offering pharmacy programs in the Philippines do not have students in the 4th or 5th-year level at the time when the survey was conducted.

3.2 Level of perceived preparedness of the pharmacy students in public health practice and its relationship between the location of HEI's (Luzon, Visayas, Mindanao)

3.2.1 General view regarding public health

Table 2. Pharmacy student's general view regarding public health and its relationship between location of HEIs (Luzon, Visayas, Mindanao)

General View	*Mean*	*SD*	*Chi square value*	*df*	*P values*
I think public health is an important field.	3.91	0.29	6.704	2	0.035*
What I learnt will benefit me in the future.	3.85	0.38	6.117	2	0.047*
The public health pharmacy course has provided trainings to prepare me well.	3.54	0.59	1.512	2	0.47
I had a good perception regarding public health prior to starting the course.	3.36	0.66	0.915	2	0.633
I am interested in taking up a career in public health pharmacy.	3.24	0.72	1.416	2	0.492
Overall Mean (Overall Perception)	**3.58**	0.18			

Note: Verbal Interpretations: 3.26-4.00 – Strongly Agree; 2.51-3.25 – Agree; 1.76- 2.50 – Disagree; 1.00-1.75 – Strongly Disagree. *Significant at alpha = 0.05

Table 2 shows that respondents in general strongly agreed (Mean = 3.58) to the different criteria on the general view on public health indicating that they are knowledgeable of the practice. The respondents answered "Strongly agree" in four (4) items and "Agree" on one (1) item that signifies their positive view about public health. Among the criteria presented, respondents strongly agreed that public health is an important field. Consistent with the study of Navinan, Wijayaratne, and Rajapakse (2011) wherein they assessed the perceptions of final year medical students regarding the public health curriculum. Table 2 also shows the respondents perceived that public health is an important field and what they learned will benefit them in the future showed a significant difference between Luzon, Visayas, and Mindanao. This means that the respondents' perceived preparedness for public health practice depends on the location of their HEIs.

Although respondents find public health practice as important, most of them are not interested in choosing public health as a career. This is quite contradictory to the fact that they also responded strongly agree to other

statements implying that they were very much prepared by the curriculum and that they were able to acquire the necessary knowledge and skills to practice public health. Moreover, the statement "The public health pharmacy course has provided training to prepare me well" showed no significant difference in the location of HEIs. This is also the same with the respondent's perception regarding public health before starting the course and their interest in taking up a career in public health.

3.2.2 Achievement of objectives in public health pharmacy course adapted from the PACOP course plan

Table 3. Mean score of achievement of objectives in public health pharmacy course and its relationship between the location of HEIs (Luzon, Visayas, Mindanao)

Objectives	*Mean*	*SD*	*Chi-square value*	*Df*	*P values*
I understand Public Health and its related concepts.	3.42	0.53	1.443	2	0.486
I can explain the relationship between public health and pharmacy practice.	3.34	0.57	1.324	2	0.516
I can identify health issues or concerns at local, national, and international levels.	3.21	0.58	0.271	2	0.873
Appreciate the roles of pharmacists in a collaborative health setting in addressing public health issues.	3.70	0.49	5.087	2	0.079
I can understand the existing policies, laws, interventions, and programs that address public health issues.	3.29	0.61	0.506	2	0.776
I can apply concepts, methods, strategies, and interventions addressing Public Health issues and concerns.	3.26	0.56	0.593	2	0.744
Overall Mean (Overall Perception)	**3.37**	0.04			

Note: Verbal Interpretations: 3.26-4.00 – Strongly Agree; 2.51-3.25 – Agree; 1.76- 2.50 – Disagree; 1.00-1.75 – Strongly Disagree. *Significant at alpha = 0.05

An overall weighted mean is 3.37 interpreted as "Strongly agree" was obtained. This indicates that respondents show a very positive perception that the objective of the public health course is attained, refer to table 3.

Among the objectives that were perceived to be highly achieved are understanding public health and its related concepts; explaining the relationship of public health and pharmacy practice; appreciating the roles of pharmacists in a collaborative health setting in addressing public health issues; understanding the existing policies, laws, interventions, and programs that address public health issues and applying concepts, methods, strategies, and interventions addressing public health issues and concerns. The only objective that was satisfactorily achieved is identifying health issues or

concerns at local, national, and international levels. Although students perceived to have acquired knowledge on public health, based on their strong agreement to the attainment of these objectives, there is a problem in terms of the application of these concepts in a real-world setting. Thus, the curriculum should also focus on exposing students to meaningful experiences that will improve their awareness and participation in public health programs in terms of determination of public health problems and issues, identification of relevant intervention programs including planning, implementation, and evaluation.

Results also show that all six (6) items have no significant difference in all locations of HEI's. This means that the achievement of the public health course objective does not depend on the location of HEIs. This indicates that instructional delivery is similar among schools in the different island groups. This probably because the syllabus/ course plans are prepared by the academic organization and are adopted by all schools of Pharmacy nationwide.

3.2.3 Public health competencies set by the PPHA

Table 4. Public health competencies and its relationship between the location of HEIs (Luzon, Visayas, Mindanao)

Performance criteria	*Mean*	*SD*	*Chi-square value*	*df*	*P values*
Competency Standard No. 1 Identifies appropriately the health and pharmaceutical needs of the population as well as the appropriate interventions to address them					
I am competent in the use of technology, especially the internet.	3.52	0.56	8225.5	2	0.113
I often use technology to obtain relevant information about the community and its' health needs.	3.51	0.57	6.943	2	0.031*
I am knowledgeable in critiquing reports especially research for public health.	3.10	0.62	4.488	2	0.108
Competency Standard No. 2 Supports activities aimed at protecting and improving the health and well-being of the population					
I can actively participate in health and other health programs (e.g., smoking cessation, health promotion).	3.47	0.62	11.255	2	0.004*
I am knowledgeable about medication and adverse effects.	3.26	0.53	9.364	2	0.009*
I can perform pharmaceutical counseling with less supervision.	3.10	0.64	5.538	2	0.063
Competency Standard No. 3 Participates in policy and strategy development and implementation					
I am knowledgeable of pharmacy-related laws and regulations especially those related to public health.	3.21	0.55	7.98	2	0.019*

Cont'd.

I am given instructions by the school on how to prepare a conceptual framework relevant to healthcare policy development.	3.22	0.62	9.543	2	0.008*
I have the capability of drawing/ generating conclusions based on available health data (e.g data related to a person's medical history, including symptoms, diagnoses, procedures, and outcomes).	3.11	0.59	7.153	2	0.028*
I have the capability of formulating recommendations based on the results of studies on public health.	3.08	0.60	8.270	2	0.016*
Competency Standard No. 4 Contributes to the evidence base on how medicines-related interventions, programs, and policies improve and protect the health of the population through academic and/or pharmacy practice research					
I am knowledgeable of the different sources of information that can be used for research.	3.19	0.58	11.674	2	0.003*
I can prepare a review of related literature to summarize knowledge in any area of research interest.	3.16	0.57	14.848	2	0.001*
I am provided by the school of avenues for student research documentation.	3.13	0.61	14.848	2	0.001*
I have experienced presenting research findings to a group.	3.25	0.63	17.053	2	0.00*
Competency Standard No. 5 Ensures clinical governance and continuous quality improvement in service design and delivery					
I can evaluate evidence-based information on disease.	3.13	0.58	15.162	2	0.000*
I can evaluate evidence-based information in treatment given to patients with a particular disease through subjective, objective, assessment, and plan format.	3.13	0.57	13.849	2	0.001*
I am aware of the responsibilities of each healthcare worker	3.42	0.52	23.664	2	0.00*
I can participate in the monitoring and evaluation process to ensure if interventions are clinically effective, provide efficient use of resources, support health literacy, and deliver good outcomes.	3.29	0.52	6.933	2	0.031*
Overall Mean (Overall Perception)	3.22	0.58			

Note: Verbal Interpretations: 3.26-4.00 – Strongly Agree; 2.51-3.25 – Agree; 1.76- 2.50 – Disagree; 1.00-1.75 – Strongly Disagree. *Significant at alpha = 0.05

Table 4 shows the result for the different competencies in public health practice based on the Philippine Practice Standards set by Philippine Pharmacist Association (PPHA).

For the first competency, respondents perceived themselves as competent in the use of technology, especially the internet. However, the competency of being knowledgeable in critiquing reports especially research for public health obtained the lowest mean score of 3.10. There is a significant difference between the statement "I often use technology to obtain relevant information about the community and its' health needs" and the location of HEIs. This is expected as technology is more advanced in urban areas than in rural areas indicating that some schools are equipped with advanced technology for instruction and other purposes.

For the second competency, the majority of the respondents agreed on the criteria that they can actively participate in health and other health programs (e.g smoking cessation, health promotion) (weighted mean = 3.47). In the article of Law, Maposa, Steeb, and Duncan (2017), it was mentioned that pharmacy students can easily adapt to activities such as tobacco, alcohol, and lifestyle counseling during frequent interactions with patients. However, the competency on being able to perform pharmaceutical counseling with less supervision obtained the lowest score of 3.10, thus, there is a need to enhance the skills of the students in this area. The result also shows that there is a significant difference between all groups about actively participating of respondents in health and other health programs (e.g smoking cessation, health promotion) and being knowledgeable about medication and adverse effects. This may probably be due to the opportunities provided by schools in the different island groups for student participation. However, there is no significant difference between Luzon and Visayas in performing pharmaceutical counseling with less supervision.

In the third competency, the respondents answered "Agree" in all items that signify their positive perception towards their preparedness in participating in policy and strategy development and implementation. According to American Public Health Association (2006), many local, state, and federal agencies have begun to recognize the need for pharmacists' input. The need to increase pharmacists' involvement in regulatory agencies along with other public health stakeholders is essential. However, the competency on the capability of formulating recommendations based on results of studies on public health obtained the lowest mean of 3.08 which is also in agreement with the objective that was least met by the curriculum. Result also shows that there is a significant difference between all HEI locations of respondents in terms of being knowledgeable of pharmacy-related laws and regulations especially those related to public health. There is also a significant difference in all groups in terms of being given instructions by the school on how to prepare a conceptual framework relevant to healthcare policy development and that they have the capability of drawing/ generating conclusions based on available health data (e.g

data related to a person's medical history, including symptoms, diagnoses, procedures, and outcomes). There is also a significant difference between all groups that they have the capability of formulating recommendations based on results of studies on public health, explain the importance and relevance of public health policy strategy (e.g community-wide campaigns, improve access to outdoor recreational facilities) in meeting local and national public health promotions and they have the confidence to discussing issues especially on public health to other health professionals. Again, variation in instructional delivery may have been the factor leading to these results.

The result for the fourth competency shows that respondents perceived themselves as prepared in contributing to the evidence base on how medicines-related interventions, programs, and policies improve and protect the health of the population through academic and/or pharmacy practice research. In the article of Toklu (2015), it was mentioned that evidence-based medicine aims to optimize decision-making by using evidence from well-designed and conducted research. However, the competency on being provided by the school of avenues for student research documentation obtained the lowest mean. This suggests that the curriculum should be enhanced to provide the acquisition of research skills to students. Result also shows that there is a significant difference between HEI locations of respondents in terms of being aware of the factors being considered in conducting research studies such as research design, ethical considerations, and confidentiality. Also, there is a significant difference between all groups, that respondents are knowledgeable of the different sources of information that can be used for research, they can prepare a review of related literature to summarize knowledge in any area of research interest, they are provided by the school of avenues for student research documentation and they have experienced presenting research findings to a group. This implies that research culture may be different among higher education institutions. Research is often given more attention in bigger universities with bigger research funding. Further, the qualifications framework makes use of research as a yardstick in categorizing higher educational institutions.

For the fifth competency, results in Table 4 show that the respondents perceived themselves as prepared in ensuring clinical governance and continuous quality improvement in service design and delivery. Clinical governance is a framework to ensure continuous quality improvement in health care. In the article by Andalo (2005), pharmacists are becoming increasingly involved in clinical governance. However, the competencies on evaluating evidence-based information on the disease and evaluating evidence-based information in treatment given to patients with a particular disease through subjective, objective, assessment, and plan format obtained the lowest mean thus indicating that students should be exposed to higher-order learning skills. It has been found out earlier that students have a high degree of knowledge, however, have a low degree of practical skills requiring synthesis and evaluation of information. Result also shows that there is a significant difference between HEI locations of respondents in terms of

evaluating evidence-based information on the disease and in treatment given to patients with a disease through subjective, objective, assessment, and plan format. There is also a significant difference in all groups in terms of being aware of the responsibilities of each healthcare worker, being able to participate in the monitoring and evaluation process to ensure if interventions are clinically effective and providing efficient use of resources, support health literacy, and deliver good outcomes. This means that all the performance criteria were dependent on the location of HEI s and that HEIs vary in terms of the attainment of these outcomes.

Public health competencies with significant differences imply that learning exposure varies and was dependent on the location of HEIs. Variation in instructional delivery may have been the factor leading to these results.

There are several limitations associated with the study. First, most of the HEIs offering pharmacy programs in the Philippines do not have students in the 4th or 5th-year level. Thus, a generalization of study findings is limited. Second, time was inadequate in surveying because of the pandemic. Third, the basis for public health practice was limited to the competencies stated on the Philippine Practice Standards set by Philippine Pharmacist Association (PPHA).

4. CONCLUSION

The results of the study show that pharmacy students have a good perception of public health and are aware of the importance of pharmacist's roles in public health practice. Students are capable to practice public health however certain skills should be enhanced to prepare themselves better in practice. Moreover, the result implies that students should be exposed to higher-order learning skills. It has been found out that students have a high degree of knowledge, however, have a low degree of practical skills requiring synthesis and evaluation of information. The curriculum should also focus on exposing students to meaningful experiences that will improve their awareness and participation in public health programs in terms of determination of public health problems and issues, identification of relevant intervention programs including planning, implementation, and evaluation. The curriculum should be enhanced to provide the acquisition of research skills to students. Furthermore, there are some specific competencies set by Philippine Pharmacist Association that shows a significant difference in Luzon, Visayas, and Mindanao which mainly due to respondent's academic experiences.

The following findings can serve as a basis for enhancing the Bachelor of Science in Pharmacy curriculum focusing on- (1) Low interest of pharmacy students in choosing public health as a career, (2) Challenge in terms of the application of knowledge in a real-world setting, (3) Challenge inpatient counseling skills, and (4) Challenge in research skills.

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