



## Perceptions of Pharmacy Students in Metro Manila towards their Preparedness to Provide Pharmaceutical Care

Binos, Richard Simon R., Lara, Katrice P., Yu, Anne Hazel C., Loquias, Monet M.

College of Pharmacy, University of the Philippines-Manila

### Research Article

Please cite this paper as: Binos, Richard Simon R., Lara, Katrice P., Yu, Anne Hazel C., Loquias, Monet M. Perceptions of Pharmacy Students in Metro Manila towards their Preparedness to Provide Pharmaceutical Care. *IJPTP*, 2011, 2(3),102-107.

### Corresponding Author:

#### Katrice P. Lara

13 Bauza St., Bagumbayan, Navotas City, Philippines, 1403

Telephone Number: +6323515599

Mobile Number: +639184760215

E-mail Address: [katricelara@gmail.com](mailto:katricelara@gmail.com)

### Abstract

**Objective:** The pharmacy profession has experienced a shift towards pharmaceutical care. Thus, as future pharmacists, pharmacy students are presented with the challenge of being confident and competent in providing pharmaceutical care to patients. This study aimed to determine the perception of pharmacy students in Metro Manila towards their preparedness to provide pharmaceutical care and to explore the effects of demographic variables and pharmacy-related attributes on their perceived preparedness.

**Methods:** A cross sectional, non-experimental, analytic research design was employed in this study. A structured survey questionnaire employing a 5-point Likert scale was used to determine the students' perceptions of their skills, which were expressed in terms of their means and standard deviations. Independent t-test, one-way ANOVA, and Pearson's correlation coefficient were also employed to determine associations between demographics, pharmacy-related attributes, and perceived preparedness.

**Results:** A total of 262 students from 9 pharmacy schools participated in this study. Results showed that students had a mean preparedness score of 3.59, which is above average. Among different competency areas, students rated themselves highest in the psychological competency (3.68) and lowest in the administrative competency (3.45). Sex was found to be significantly associated with their perceived preparedness, whereas school was found to be significantly associated with the communication and research competency areas only. Students' knowledge, motivation, experience, interest and expectation relative to pharmacy practice and pharmaceutical care were

found to have significantly direct relationships with the students' perceptions of preparedness.

**Conclusion:** In general, students may perceive themselves to be ready and competent enough to provide pharmaceutical care, although improvements in the curriculum and in pharmacy internship programs were still recommended to increase student preparedness in specific areas of competency.

**Key words:** perception, preparedness, pharmaceutical care, pharmacy students, pharmacy education.

### Introduction

The pharmacy profession has experienced significant growth and development over the past decades – from compounding to dispensing and then finally towards clinical pharmacy and pharmaceutical care<sup>[1]</sup>. Pharmaceutical care, as defined by Hepler and Strand in 1990, is “the responsible provision of drug therapy for the purpose of achieving definite outcomes that improve a patient's quality of life”<sup>[2]</sup>. To accommodate this shift in practice, the pharmacist's role has evolved towards more patient-centered care and counseling, expanded drug use monitoring, appropriate drug selection, and responsibility for the patient's outcomes.

Pharmacists need to have undergone education and training to have the knowledge and skills necessary to be able to provide pharmaceutical care. According to the World Health Organization in 1994, “the contribution of pharmacists to health care is based upon a body of knowledge and expertise acquired from a university degree education, followed by a formally designated period of supervised pre-registration practical experience”<sup>[3]</sup>. Pharmacy schools, being one of the most important sources of pharmacy knowledge, thus possess the primary responsibility of adjusting their curricula to adapt to the changing roles of pharmacists. Schools have already started incorporating pharmaceutical care in some subjects but despite their efforts, students still find problems regarding the actual application of pharmaceutical care<sup>[4]</sup>. As future pharmacists, students need to have a positive and confident attitude towards the provision of pharmaceutical care. The development and continuity of a high standard of patient-centered practice depends upon the level of preparedness of pharmacy students.



Assessment of student learning outcomes is a high priority for schools of pharmacy and is recognized by the Accreditation Council for Pharmacy Education (ACPE) as an essential tool for quality improvement of the curriculum<sup>[5]</sup>. Ried and his colleagues in 2002 developed an instrument called Perceptions of Preparedness to Provide Pharmaceutical Care (PREP), which aimed to obtain measurable data regarding student preparedness through queries to students regarding their ability to perform advanced pharmacy practice competencies<sup>[6]</sup>. By measuring the students' perceptions of their own preparedness, one can determine if students feel confident about their ability to meet future roles and if efforts of pharmacy schools and organizations have been successful.

The objective of this study was to determine the perception of pharmacy students towards their preparedness to provide pharmaceutical care and to explore the effects of demographic variables and pharmacy-related attributes such as knowledge, experience, motivation, and expectation on their perceived preparedness. The students' perceived level of preparedness was derived from the five areas of pharmaceutical care practice as defined in the North Dakota State University (NDSU) PREP survey of Scott and his colleagues (2010): technical, psychological, communication, administrative and research<sup>[5]</sup>. Ten schools of pharmacy in Metro Manila were chosen for this study.

**Methodology**

A cross sectional non-experimental, analytic research design was employed in this study using survey as the method of data collection.

**Participants**

The study population consisted of graduating 4<sup>th</sup> and 5<sup>th</sup> year B.S. Pharmacy students, enrolled for the second semester of the academic year 2010-2011 in the ten schools of pharmacy in Metro Manila. A quota sample of 400 was set. Forty students were conveniently sampled from each school.

**Instrument**

The instrument used in the study was adapted from the NDSU-PREP survey of Scott and his colleagues<sup>[5]</sup>. The questionnaire consisted of 5-point Likert scale items which measured a) pharmacy-related attributes (motivation, interest, knowledge, experience, and expectation towards the pharmacy practice); and b) perceptions of skills in the five competency areas of pharmaceutical care namely, the technical (14 items), psychological (9 items), communication (4 items), administrative (7 items), and research areas (3 items). It also included 4 socio-demographic items, 2 items dealing with the student's familiarity with pharmaceutical care, as well as the subjects from which they learned about the

concept. The instrument was first pilot tested to 20 respondents and revised accordingly.

**Procedure for Data Collection and Analysis**

Prior to data collection, an endorsement from the Philippine Association of the Colleges of Pharmacy (PACOP) was obtained. A letter of permission to conduct the study was then sent to the ten chosen schools of pharmacy. Upon approval of the school, student participants were given an informed consent form, after which the survey instrument was provided. Questionnaires were then collected upon completion. The data collection covered the period from November 2010 to the second week of February 2011.

**Statistical Analysis**

Upon completion of the data collection phase, the participating schools were coded for confidentiality purposes. All collected data were subsequently entered in Microsoft Office Excel 2007© to render the data into an analyzable format. This was then transferred onto Statistical Package for Social Sciences version 17.0© for statistical analysis. Descriptive statistical analysis, which measured the mean and standard deviation, was employed. Inferential statistical analysis, particularly the independent t-test and one-way ANOVA, were also employed to determine if there were significant differences in responses between sexes and among schools, respectively. Pearson's correlation coefficient was employed to determine the relationship between perceiver attributes and the students' perceived competency.

**Results**

**Demographics**

Of the ten schools chosen for this study, only nine agreed to participate. A total of 262 respondents were obtained, representing a 65.5% coverage rate. More females (73.7%) than males (26.3%) completed the survey instrument, with 21 being the mean age of respondents. Table 1 summarizes the respondent characteristics.

**Table 1: Demographics of Study Participants**

School	Number of Respondents	Percent	Male (%)	Female (%)	Mean Age
A	40	15.3	38.5	61.5	20.3
B	22	8.4	50.0	50.0	20.8
C	40	15.3	10.0	90.0	20.5
D	25	9.5	20.8	79.2	23.6
E	40	15.3	15.4	84.6	20.9
F	12	4.6	8.3	91.7	24.9
G	30	11.5	39.3	60.7	19.7
H	13	5.0	38.5	61.5	19.8
I	40	15.3	25.0	75.0	21.2
<b>Total</b>	<b>262</b>	<b>100.0</b>	<b>26.3</b>	<b>73.7</b>	<b>21</b>



**Familiarity with Pharmaceutical Care**

All of the respondents stated that they were familiar with the given definition of pharmaceutical care, and that the pharmaceutical care concept has been taught in their subjects. Among the subjects, Hospital Pharmacy (84.4%), followed by Clinical Pharmacy (74.8%) were answered by most participants. Pharmaceutical Seminar (33.2%), Pharmaceutical Administration (33.6%), and Pharmaceutical Management (33.6%), on the other hand, were least answered.

**Table 2: Perceiver Attributes of Pharmacy Students**

Perceiver Attributes	Mean	SD
Knowledge in the practice of pharmacy	3.79	0.71
Experience in pharmaceutical practice settings	3.68	0.74
Interest in the field of Pharmaceutical Care	3.92	0.80
Motivation to provide Pharmaceutical Care	4.05	0.75
Level of expectation towards pharmacy practice	4.07	0.74

**Perceiver Attributes**

Table 2 reports the students' ratings of the given attributes relating to pharmacy practice and pharmaceutical care. The students rated themselves highest on their level of expectation towards pharmacy practice (4.07) and lowest on their experience in pharmaceutical practice settings (3.68).

**Perceived Competencies**

The mean preparedness score of the students is 3.59, which is above average based on the Likert scale rating. Among competencies, students rated themselves highest in the psychological area (3.68) and lowest in the administrative area (3.45). Looking at specific skills, communicating medical records information to patients had the highest ratings (3.74), whereas managing fiscal resources had the lowest (3.33). Students' ratings of their skills and competencies are further illustrated in Table 3.

**Effects of Different Attributes to Perceived Preparedness**

Males had significantly higher scores than females on their perceived competencies and overall preparedness (Table 4). Among competencies, it was only in the psychological area where difference in scores was not significant.

The mean overall preparedness scores for the different schools were varied although not significant (Table 5). School I revealed the highest overall preparedness score (3.78) while school E had the lowest (3.35). Similarly, School I consistently scored highest in almost all

**Table 3: Perceived Skills, Competencies, and Overall Preparedness of Pharmacy Students**

Competency Areas	Mean	SD
<b>Technical Competency</b>	3.54	0.74
Evaluate information from patient's history and assessment	3.63	0.69
Evaluate medications based on safety, affordability, necessity and efficacy	3.73	0.69
Recommend the appropriate drug/ non-drug therapy	3.64	0.71
Interpret laboratory test results for a specific patient	3.35	0.77
Calculate pharmacokinetic properties	3.37	0.73
Evaluate pharmacokinetic properties	3.42	0.72
Determine the appropriate drug delivery system	3.70	0.71
Recommend medication doses and dosage schedules	3.57	0.78
Monitor therapeutic plan for a patient	3.57	0.77
Create a drug therapy problem list (side effects, drug interactions, improper drug use)	3.60	0.77
Collect information to resolve a health related problem or inquiry	3.65	0.70
Make reasonable conclusions when data is incomplete	3.51	0.78
Provide counseling to patients	3.71	0.81
Seek ways to ensure patient compliance	3.73	0.75
<b>Psychological Competency</b>	3.68	0.73
Gather information to resolve a patient-related problem	3.69	0.74
Synthesize gathered information	3.65	0.72
Decide a course of action for a problem	3.62	0.73
Incorporate social, cultural, and ethical issues in decision-making	3.68	0.75
Apply ethical theories to professional decisions	3.70	0.73
Understand social and cultural impact on health-related decisions	3.71	0.72
Understand practice related to changing societal expectations	3.66	0.74
Apply appropriate interpersonal behaviors during patient interactions	3.69	0.74
Contribute opinions/insights to healthcare team	3.68	0.73
<b>Communication Competency</b>	3.66	0.77
Communicate medical records information to other health professionals	3.60	0.78
Communicate medical records information to patient	3.74	0.78
Collect information to respond to a patient drug information request	3.66	0.75
Respond to an information request from a patient	3.65	0.77
<b>Administrative Competency</b>	3.45	0.76
Evaluate and select pharmaceuticals to	3.55	0.76



be purchased		
Develop a pharmacy inventory control system	3.45	0.76
Implement a pharmacy inventory control system	3.47	0.81
Manage fiscal resources	3.33	0.74
Manage human resources (pharmacy staff, employees)	3.47	0.73
Develop drug use evaluations and formulary	3.46	0.77
Implement drug use evaluations and formulary	3.43	0.77
<b>Research Competency</b>	<b>3.60</b>	<b>0.76</b>
Describe the research process	3.54	0.75
Undertake research related to pharmacy practice	3.61	0.76
Evaluate references based on validity and reliability of information	3.64	0.76
<b>Overall Preparedness</b>	<b>3.59</b>	<b>0.75</b>

competency areas, and school E scored lowest. Among the different competencies, significant differences in scores were observed for communication and research. All pharmacy-related attributes had a significant positive or direct correlation with the students' overall preparedness score (Table 6). Among attributes, Knowledge ( $r = 0.46$ ) was most strongly correlated to overall preparedness, while expectation ( $r = 0.32$ ) was most weakly correlated. Consistent findings were observed among competency areas, with all correlations being significant.

#### Discussion:

The results of this study provided an insight into pharmacy students' perceptions of their preparedness to provide pharmaceutical care.

Students generally felt positive and confident towards their pharmacy-related attributes. Among attributes, students were most positive towards their level of expectation towards pharmacy practice. This may mean that they have high regard towards the profession. Students, however, were least positive towards their experience in pharmaceutical practice settings. This may be due to the early introduction of students, normally within the first two years of study, into different pharmacy practice settings through internship programs. Although the internship aims to expose students to different aspects of professional practice, most pharmacy subjects which can be applied in these practice settings are taught during the third and fourth year of the curriculum. Because of this, students often lack the technical ability to assume greater responsibilities during internship programs, which limits the experiences they can gain therein. In addition, the lack of integration of pharmaceutical care activities into actual pharmacy practice may cause the students to feel less confident and dissatisfied of their internship experiences.

The students' perceived preparedness to provide pharmaceutical care was determined to be above average, which is surprisingly higher compared to the perception of students taking the Doctor of Pharmacy program in the United States of America<sup>[5][6]</sup>. This may mean that students of pharmacy schools in Metro Manila have a high level of confidence in their ability to provide pharmaceutical care.

**Table 4: Perceived Competencies and Overall Preparedness According to Sex**

Competency Areas	Male		Female		p-value ( $\alpha = 0.05$ )
	Mean	SD	Mean	SD	
Technical Competencies	3.72	0.59	3.54	0.51	0.039
Psychological Competencies	3.78	0.64	3.65	0.56	0.156
Communication Competencies	3.91	0.77	3.59	0.66	0.003
Administrative Competencies	3.64	0.69	3.39	0.60	0.015
Research Competencies	3.83	0.75	3.52	0.67	0.005
<b>Overall Preparedness</b>	<b>3.79</b>	<b>0.59</b>	<b>3.54</b>	<b>0.50</b>	<b>0.006</b>

Among competencies, students perceived themselves to be most prepared in the psychological area of pharmaceutical care practice. In the studies conducted by Ried (2002) and Scott (2010) students also perceived themselves as most prepared in this particular area, indicating that current pharmacy education may be geared towards this area of practice<sup>[5][6]</sup>. This is of importance since pharmacists are increasingly called upon to solve problems, incorporate ethical decisions based on their understanding of socio-cultural issues, and apply appropriate interpersonal behaviors during interaction with patients and other members of the health care team. Students, however, felt least prepared in the administrative competency area, again consistent with findings by Ried (2002) and Scott (2010)<sup>[5][6]</sup>. This may indicate that skills under this area may not be well-addressed by current pharmacy curricula and that internship programs are not oriented towards this area of practice. Since students also believed that the pharmaceutical care concept was least incorporated in their Pharmaceutical Administration and Pharmaceutical Management subjects, these areas may serve as targeted points for improvement among schools.

Generally, among all other skills, students perceived themselves to be most competent in communicating medical records information to patients. These findings may reveal that pharmacy students perceive themselves to be ready for patient communication and counseling, and that the academe's effort to instill a patient-oriented



approach to pharmacy practice may have been successful. Notably, students perceived themselves to be more competent in communicating to patients than to other health care professionals. This may be due to the lack of health care professional interaction sessions during counseling simulations in class and during community and hospital pharmacy internship experiences. Furthermore, pharmacy subjects may lack emphasis on the concept of inter-professional collaboration in health care and on the important role of pharmacists in the health care team. This lack of confidence of pharmacy students in conveying information to other health care professionals translates to existing barriers in health care collaboration in real practice settings.

confident with respect to their abilities and competencies. It should be noted that in the past 20 years, females have been graduating from colleges and schools of pharmacy at a higher rate than males<sup>[8]</sup>, and that in other countries like Nigeria and Saudi Arabia, female pharmacy students had significantly higher positive attitudes toward pharmaceutical care than males<sup>[9][10]</sup>.

Students of different schools have significantly varying perceptions towards their communication and research competencies. This may mean that schools place varying emphasis on these areas of pharmaceutical care, with some schools being more successful in training students in these areas than others.

**Table 5: Perceived Competencies and Overall Preparedness According to School**

Competency Areas	Mean per School (SD)								
	A	B	C	D	E	F	G	H	I
Technical	3.60 (0.60)	3.66 (0.51)	3.62 (0.49)	3.51 (0.63)	3.42 (0.48)	3.52 (0.49)	3.67 (0.54)	3.44 (0.63)	3.76 (0.46)
Psychological	3.77 (0.64)	3.53 (0.52)	3.62 (0.55)	3.62 (0.69)	3.49 (0.45)	3.67 (0.46)	3.83 (0.70)	3.67 (0.55)	3.85 (0.50)
Communication	3.75 (0.77)	3.47 (0.87)	3.56 (0.55)	3.80 (0.82)	3.34 (0.53)	3.60 (0.49)	3.80 (0.72)	3.63 (0.58)	3.89 (0.66)
Administrative	3.51 (0.71)	3.54 (0.69)	3.42 (0.50)	3.71 (0.86)	3.26 (0.50)	3.43 (0.67)	3.59 (0.63)	3.29 (0.64)	3.41 (0.61)
Research	3.69 (0.68)	3.56 (0.66)	3.55 (0.61)	3.62 (0.83)	3.24 (0.48)	3.47 (0.77)	3.58 (0.73)	3.37 (0.46)	4.02 (0.68)
<b>Overall Preparedness</b>	<b>3.67 (0.59)</b>	<b>3.55 (0.56)</b>	<b>3.55 (0.44)</b>	<b>3.65 (0.71)</b>	<b>3.35 (0.40)</b>	<b>3.54 (0.50)</b>	<b>3.69 (0.60)</b>	<b>3.47 (0.46)</b>	<b>3.78 (0.48)</b>

Students perceived themselves to be least competent in managing fiscal resources, which was consistent with the findings of Scott (2010)<sup>[5]</sup>. Consequently, professional pharmacists also see themselves as least competent when it comes to managing financial resources<sup>[7]</sup>. This is of importance since the pharmacy profession is a business-driven one, and pharmacists are often expected to make decisions which would lead to desirable profit for the pharmacy while still providing optimal care to patients. Sex and school were considered to be factors that may affect the students' perceived competencies. Generally,

While this study provided very interesting data, it is not without limitations. It did not cover schools of pharmacy other than the nine schools of pharmacy which were included. Also, not all students fitting the inclusion criteria within each school were taken as participants, as only those who made the quota or who were chosen by their respective schools were included. There was also an uneven distribution of respondents from the participating schools. Furthermore, the skills evaluated in this study were limited to those included in the NDSU-PREP survey; other skills which may be relevant in pharmaceutical care practice were not covered.

**Table 6: Pearson Correlation Coefficients for Perceiver Attributes vs. Perceived Competencies and Overall Preparedness**

Competency Areas	Perceiver Attributes				
	Knowledge	Experience	Interest	Motivation	Expectation
Technical	0.48	0.48	0.39	0.39	0.32
Psychological	0.42	0.39	0.32	0.30	0.28
Communication	0.36	0.36	0.23	0.25	0.23
Administrative	0.40	0.36	0.30	0.26	0.27
Research	0.30	0.32	0.27	0.27	0.18
<b>Overall Preparedness</b>	<b>0.46</b>	<b>0.45</b>	<b>0.42</b>	<b>0.37</b>	<b>0.32</b>

males significantly perceived themselves to be more competent in providing pharmaceutical care. This is an interesting factor and may relate to males feeling more

Perceiver attributes were also measured using single items and were not regarded as multi-dimensional in nature. Lastly, the skills, competencies, and overall



preparedness of students were measured based on their self-ratings only; thus, the results presented herein does not necessarily translate to the students' actual skills, competencies, and overall preparedness. Despite these limitations, though, the study still provided relevant information on areas of pharmaceutical care where students felt most confident in, and which factors may play a role in influencing student competence.

### Conclusion

This study examined the perceived preparedness of pharmacy students in Metro Manila towards the practice of pharmaceutical care. Generally, it was found that students felt positive and confident with respect to their motivation, interest, knowledge, experience, and expectation in the field of pharmacy and pharmaceutical care. The students' perception of their preparedness to provide pharmaceutical care was also determined to be above average, indicating that students generally felt ready to accept future roles.

Sex was found to be a factor influencing the students' perceived preparedness, with males constantly having higher self-ratings than females. School was found to be a factor in the students' perceived level of competency in communication and research.

Motivation, interest, knowledge, experience, and expectation in the field of pharmaceutical care were significantly correlated with the students' perceptions of their preparedness, with knowledge and experience having the strongest correlation to the students' perceptions.

Improvements may be done in current pharmacy curricula to optimize student learning in certain areas of practice, such as the administrative area. Likewise, pharmacy internship programs may also serve as areas of improvement, as they play an important role in providing students exposure to actual settings.

### Declaration

The full paper will be orally presented in the 11<sup>th</sup> Asian Conference on Clinical Pharmacy on June 24-27, 2011. The abstract of this study will be included in the said conference's abstract compilation.

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### AUTHORS' CONTRIBUTIONS

Authors contributed equally to all aspects of the study.

### PEER REVIEW

Not commissioned; externally peer reviewed

### CONFLICTS OF INTEREST

The authors declare that they have no competing interests