

A Needs Assessment Study of Pharmaceutical Care Curriculum

การประเมินความต้องการจำเป็นของหลักสูตรการบริบาลทางเภสัชกรรม

Parinda Aisoonthisarnkul M.Pharm*, Tanattha Kittisopee, Ph.D.** , Rungpetch Sakulbumrungsil, Ph.D.**

Aisoonthisarnkul P, Kittisopee T, Sakulbumrungsil R. A Needs Assessment Study of Pharmaceutical Care Curriculum. Thai Journal of Hospital Pharmacy 2012; 22(2): 153-67.

The objective of this study was to identify the pharmacy competency needs of undergraduate students by the assessment from the two stakeholders: hospital pharmacy preceptors and clinical pharmacy students. A cross-sectional survey was conducted by using self-administered questionnaire divided into three parts; 1) competency domains modified from Pharmacist Practice Activity Classification (PPAC) comprising of ensuring appropriate therapy and outcomes, selection and dispensing medications and health care products, health promotion and disease prevention, and health system management; 2) the significant level of each pharmacy competency domain; and 3) demographic data of respondents. The populations of this study were hospital pharmacy preceptors and final year clinical pharmacy students of Chulalongkorn University. Needs identification was performed using priority need index (PNI) and modified priority need index (modified PNI) to analyze data obtained from hospital pharmacy preceptors and clinical pharmacy students, respectively. Hospital pharmacy preceptors had returned 75% of all questionnaires and clinical pharmacy students had returned 97% of them. The results of the assessment have showed that hospital pharmacy preceptors expected clinical pharmacy students to improve two major competency domains which were ensuring appropriate therapy and outcomes domain (PNI = 2.86), selection and dispensing medications and health care products domain (PNI = 2.69). Clinical pharmacy student self-evaluation showed that the most competency needs development was selection and dispensing medication domain (modified PNI= 0.58), followed by health system management domain (modified PNI= 0.55). Thus, faculty members should focus on the patient-oriented contents especially ensuring appropriate therapy and outcomes domain and selection and dispensing medications and health care products domain in pharmaceutical care curriculum development. Future studies should investigate which factors affect the competency needs, and describe the best strategies for pharmacy curriculum development.

Key words: Needs assessment, pharmaceutical care curriculum, priority needs index (PNI), modified priority needs index (PNI)

* Social and Administrative Pharmacy International Graduate Program, Faculty of Pharmaceutical Science, Chulalongkorn University, Bangkok, Thailand

** Social and Administrative Pharmacy, Faculty of Pharmaceutical Science, Chulalongkorn University, Bangkok, Thailand

ปริยดา ไศุศรัยพิศาลกุล, ฐณัฐรา กิตติโสภี, รุ่งเพชร สกุลบำรุงศิลป์. การประเมินความต้องการจำเป็นของหลักสูตรการบริหารทางเภสัชกรรม. วารสารเภสัชกรรมโรงพยาบาล 2555; 22(2): 153-67.

การวิจัยนี้มีวัตถุประสงค์เพื่อศึกษาความต้องการจำเป็นของสมรรถนะทางเภสัชศาสตร์ของนิสิตสาขาเภสัชกรรมคลินิกเพื่อใช้เป็นแนวทางในการพัฒนาหลักสูตรการบริหารทางเภสัชกรรม จากการประเมินโดยผู้มีส่วนได้ส่วนเสียกับหลักสูตร ได้แก่ เภสัชกรโรงพยาบาลที่เป็นแหล่งฝึกและนิสิตเภสัชศาสตร์สาขาเภสัชกรรมคลินิก การสำรวจนี้เป็นแบบภาคตัดขวางโดยใช้แบบสอบถามให้ผู้ตอบตอบด้วยตนเอง แบบสอบถามประกอบด้วยข้อมูล 3 ส่วน ได้แก่ 1) สมรรถนะทางเภสัชกรรมซึ่งปรับปรุงมาจาก Pharmacist Practice Activity Classification (PPAC) อันประกอบด้วย การบริหารทางเภสัชกรรมเพื่อให้เกิดผลการรักษาที่เหมาะสม การคัดเลือกและจ่ายผลิตภัณฑ์สุขภาพ การส่งเสริมสุขภาพและป้องกันโรค การบริหารจัดการระบบยาและสุขภาพ 2) การกำหนดระดับความสำคัญของสมรรถนะทางเภสัชกรรม 3) ภูมิหลังของผู้ตอบแบบสอบถาม ประชากรในการศึกษานี้ คือ เภสัชกรโรงพยาบาลที่เป็นแหล่งฝึกและนิสิตเภสัชศาสตร์สาขาเภสัชกรรมคลินิกชั้นปีสุดท้ายของมหาวิทยาลัยจุฬาลงกรณ์ โดยกำหนดความต้องการจำเป็นในการประเมินสมรรถนะทางเภสัชกรรมของนิสิตเภสัชศาสตร์จากมุมมองเภสัชกรโรงพยาบาลด้วย priority needs index (PNI) ในขณะที่กำหนดความต้องการจำเป็นในการประเมินสมรรถนะทางเภสัชกรรมของนิสิตเภสัชศาสตร์จากมุมมองของนิสิตสาขาเภสัชกรรมคลินิก ด้วย modified priority needs index (modified PNI) ผลการวิจัยพบว่า เภสัชกรโรงพยาบาลตอบแบบสอบถามกลับคืนมาร้อยละ 75 และนิสิตเภสัชศาสตร์สาขาเภสัชกรรมคลินิกตอบกลับคืนมาร้อยละ 97 โดยสมรรถนะทางเภสัชกรรมที่เภสัชกรแหล่งฝึกโรงพยาบาลประเมินนิสิตเภสัชศาสตร์สาขาเภสัชกรรมคลินิกว่ามีความต้องการจำเป็นต้องได้รับการพัฒนามากที่สุด คือ การบริหารทางเภสัชกรรมเพื่อให้เกิดผลการรักษาที่เหมาะสม (PNI = 2.86) และการคัดเลือกและจ่ายผลิตภัณฑ์สุขภาพ (PNI = 2.69) สำหรับการประเมินตนเองของนิสิตเภสัชศาสตร์สาขาเภสัชกรรมคลินิกพบว่า ความต้องการจำเป็นที่ต้องได้รับการพัฒนามากที่สุด คือการคัดเลือกและจ่ายผลิตภัณฑ์สุขภาพ (modified PNI= 0.58) และการบริหารจัดการระบบยาและสุขภาพ (modified PNI= 0.55) ดังนั้น ในการพัฒนาหลักสูตรการบริหารทางเภสัชกรรม ควรให้ความสำคัญกับเนื้อหาทางด้าน การดูแลผู้ป่วยโดยเฉพาะเรื่องการบริหารทางเภสัชกรรม เพื่อให้เกิดผลการรักษาที่เหมาะสม และการคัดเลือกและจ่ายผลิตภัณฑ์สุขภาพ การวิจัยในอนาคตควรศึกษาถึงปัจจัยที่มีผลต่อความต้องการจำเป็นของนิสิตสาขาเภสัชกรรมคลินิก และหาแนวทางที่ดีในการพัฒนาหลักสูตรเภสัชศาสตร์ต่อไป

คำสำคัญ: การประเมินความจำเป็นหลักสูตรการบริหารทางเภสัชกรรม priority needs index (PNI), modified priority needs index (modified PNI)

Introduction

Pharmacists are important health care professionals who take a responsibility for the effectiveness and safety of medication, i.e. drug dispensing and clinical pharmacy.¹ Further-

more, they also have a critical role in research and development, pharmaceutical production, distribution, and drug utilization of consumers. Although pharmacists can work in various governmental organizations and private

business such as hospitals, pharmaceutical industries, pharmaceutical companies, and drug stores. Of all job careers, about fifty percent of pharmacists are working in the hospitals.² Hospital pharmacists play an important role in dealing-directly with patients including drug dispensing, drug counseling with patients, and solving medical problems with doctors.

Nowadays, the expectations of pharmacist's competency have been raised especially in the hospital pharmacy area. A Thai manpower study showed that most of the pharmacists who have been already graduated had a poor ability to integrate all basic knowledge that have learned in their pharmacy study and lacked several pharmacist's skills such as clinical pharmacy skills and clinical problem solving skills.³ Therefore; the undergraduate pharmacy curriculum should be reviewed.

The faculty members of the Faculty of Pharmaceutical Sciences, Chulalongkorn University had realized the importance of improving their pharmacy curriculum to respond the needs of patients and other health care professionals. They reviewed the curricula content of their Bachelor's Degree in Pharmaceutical Sciences in the year 2000, and found that the content ratios of patient-oriented, product-oriented, and social and administrative pharmacy-oriented areas were different from Thai pharmacy competency standard recommendations.⁴⁻⁶ The pharmacy competency standard were more likely to be emphasized on product-oriented contents.

The content related to patient-oriented topics in Pharmacy curriculum of Chulalongkorn University was not sufficient for the students. Therefore, further revision of Pharmacy curriculum of Chulalongkorn University was required in order to increase patient-oriented content. Furthermore, the university aimed to generate new pharmacists to be more specialized in Pharmaceutical Care or Pharmaceutical Sciences, exclusively. Therefore, they created two new Pharmacy curricula. To create Pharmaceutical Care curriculum requires an assessment of pharmacy student's competency as guidance, this-study was therefore conducted to assess competency needs. Results of this study was expected to be used as a resource for a new Pharmaceutical Care curriculum emphasizing patient-oriented content.

Needs assessment is defined as a formal analysis that shows and documents the gaps or discrepancies between current needs and desired needs. The needs are then arranged in the priority order and selected to be resolved.^{7,8} In this study, we used competency needs assessment as a formal analysis to determine gaps or discrepancies between the actual and the expected performance of pharmacy student's competency and focused only on these performance that are relative to contents in the Pharmacy curriculum. The extent of gap indicated the competency needs of pharmacy students that have to be improved and would be seen in Pharmacy curriculum as the outcome of this study.

Objectives

The objective of this study was to identify the competency needs of pharmacy undergraduate students in Chulalongkorn University using questionnaires answered by hospital pharmacy preceptors and clinical pharmacy students.

Methods

A cross-sectional study using questionnaire was conducted to assess the competency needs of clinical pharmacy students. The assessment was performed by two stakeholders: hospital pharmacy preceptors and the final year clinical pharmacy students of Chulalongkorn University who had been trained by these preceptors. The responses from hospital pharmacy preceptors and clinical pharmacy students were analyzed and interpreted to describe the true learning needs, and the perceived learning needs, respectively.

The Pharmacist Practice Activity Classification (PPAC) was generally used as guidance for identifying pharmacy competency needs.⁹ The modified PPAC was developed according to the distinct of clinical pharmacy works and system used in Thailand relative to other countries. The modified PPAC includes four competency domains which are ensuring appropriate therapy and outcomes; selection and dispensing medications and health care products; health promotion and disease prevention; and health system management.

A self-administered questionnaire containing the same questions for hospital pharmacy preceptors and clinical pharmacy students served as the data collection tool in our descriptive survey. The questionnaire composed of 3 parts. The first part contained 40 competency elements that were grouped in four competency domains of modified PPAC. In the second part, hospital pharmacy preceptors and clinical pharmacy students were asked to rank the significance of each competency domain and express any additional opinions about the strengths and weaknesses of the current pharmacy curriculum. The last part comprised of personal information of respondents such as education level and working experiences. In addition, hospital pharmacy preceptors and students were asked to score the actual and expected performances of students by using a 5-point Likert's scale of pharmacy competency. The scale was ranged from 1 to 5, where 5 indicated the best performance for each competency element.

Descriptive statistics were performed to determine the general characteristics of the samples. The ranked significance of competency domain by hospital pharmacy preceptors and clinical pharmacy students were analyzed by using Priority Needs Index (PNI) and modified PNI, respectively.

PNI is defined as difference between average of expected and actual performance of students multiplied by the expected perfor-

mance level.^{7,8}

$$\text{PNI} = (\text{I} - \text{D}) \times \text{I}$$

Where; I (Importance) was referred to expected performance level of competency elements in each domain.

D (Degree of success) was referred to actual performance level of competency elements in each domain.

The range of PNI was 0 to 20. The higher PNI value of competency elements was referred to a lower competency of students. The average value of PNI for each competency domain was considered as the cut-off point to determine the importance of each competency element. PNI was used to rank the priority of the needs of students to improve their competency regarding to the expected student's performance in the perspective of preceptors.

To rank the needs of clinical pharmacy students, modified PNI formula was adopted. Modified PNI is the mean difference between the expected and actual performance level of students divided by actual performance level of students.^{8,10}

$$\text{Modified PNI} = (\text{I} - \text{D}) / \text{D}$$

Similarly to PNI, modified PNI analysis can reflect the competency needs of students to be fulfilled by further developing a new curriculum. The higher value of modified PNI refers to the greater significance of such a need. However, the ranking was performed in the perspective of students rather than the preceptors. The competency elements showing

a high value of modified PNI would result in the higher priority of that competency element to be further developed.

The modified PNI value was normally in the range of 0.00-1.00 to facilitate an interpretation. Yet, the modified PNI value above this range is also acceptable.^{9,11} The average score of modified PNI of each competency domain was considered as the critical point to determine the performance of students in the view of students. For instance, if the average of modified PNI value was 0.35, the competency elements that had modified PNI value above 0.35 would be required to be improved urgently. The modified PNI value of 0.35 means that students have to improve themselves for 35% to achieve their expected performance based on their actual performance. In case of the modified PNI values lower than 0.35, the extent of the efforts to improve themselves becomes less.

The student's competency expectation from hospital pharmacy preceptors is assumed to be more important than the students' expectation. Therefore, PNI was used to analyze data collected from preceptors since expected performance level (I) was designated to be the most impactful factor in the calculation, especially when the differences of I and D (I-D) were equal in two different groups. In contrast, the value of modified PNI was not influenced by "I" when compared to PNI value. However, the value of modified PNI describes

how much gap/discrepancy or competency needs that students are required to improve their actual performance to reach their expected performance. The higher value of modified PNI, the more efforts they have to put to achieve their expected performance. The data assessed from the needs of hospital pharmacy preceptors and clinical pharmacy students are both important for developing curriculum. However, when the priority of competency elements required to be developed in the perspectives of hospital pharmacy preceptors do not agree with those of the clinical pharmacy students, PNI rather than modified PNI was selected to rank the priority of the competency elements.

Results

Sixty questionnaires for hospital pharmacy preceptors were distributed to 23 hospitals where 60 clinical pharmacy students were trained. Forty-five questionnaires (75% of all questionnaires) were returned from 19 hospitals. Seventy-five questionnaires were distributed to the final year clinical pharmacy students, and seventy-three of them (97%) were returned.

Both hospital pharmacy preceptors and clinical pharmacy students rated the expected performance higher than the actual performance for all four competency domains. The data collected from hospital pharmacists were used to calculate PNI, whereas data from clinical pharmacy students were used to calculate modified PNI.

According to hospital pharmacy preceptor assessment, the highest value of PNI was from domain 1 which was referred to an ensuring appropriate therapy and outcomes (PNI = 2.86), followed by the selection and dispensing medications and health products (PNI = 2.69) (Figure 1). However, the assessment by clinical pharmacy students revealed that the highest modified PNI was from a selection and dispensing medication and health care products domain (domain 2) (modified PNI = 0.58), followed by health system management (modified PNI = 0.55) (Figure 2).

Considering the ensuring appropriate therapy and outcomes domain, hospital pharmacy preceptor suggested that clinical pharmacy students should improve 7 of 13 competency elements, whereas clinical pharmacy students suggested that 10 of 13 competency elements should be improved. We also found that there were 7 domains that both hospital pharmacy preceptors and clinical pharmacy students rated as a need of students to be improved (Table 1).

Regarding to selection and dispensing medications and health care product domain, it was found that the pharmacy student competency assessment of pharmacy preceptors differed from the clinical pharmacy student selfassessment. Hospital pharmacy preceptors considered that 5 of 14 elements of this domain, in which the contents were related to the knowledge and skills of dispensing me-

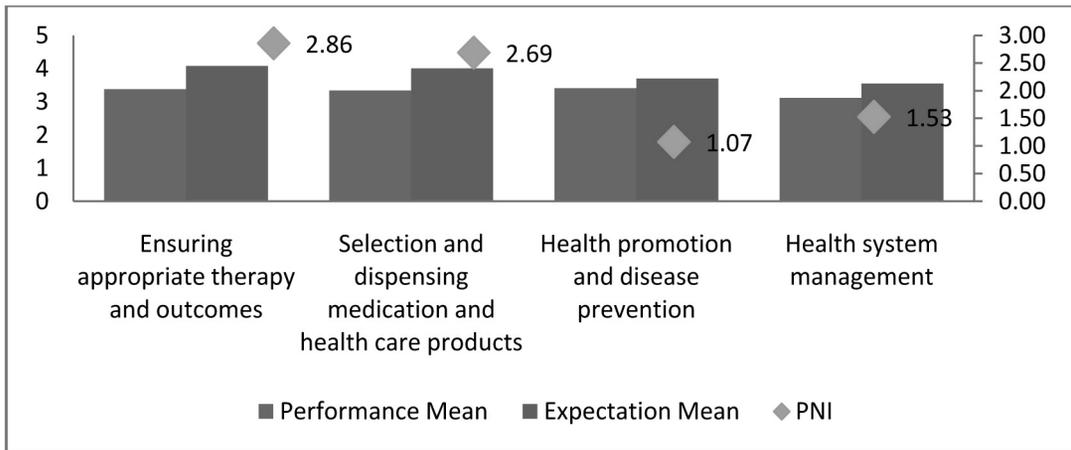


Figure 1. Competency needs of students assessed by the hospital pharmacy preceptors

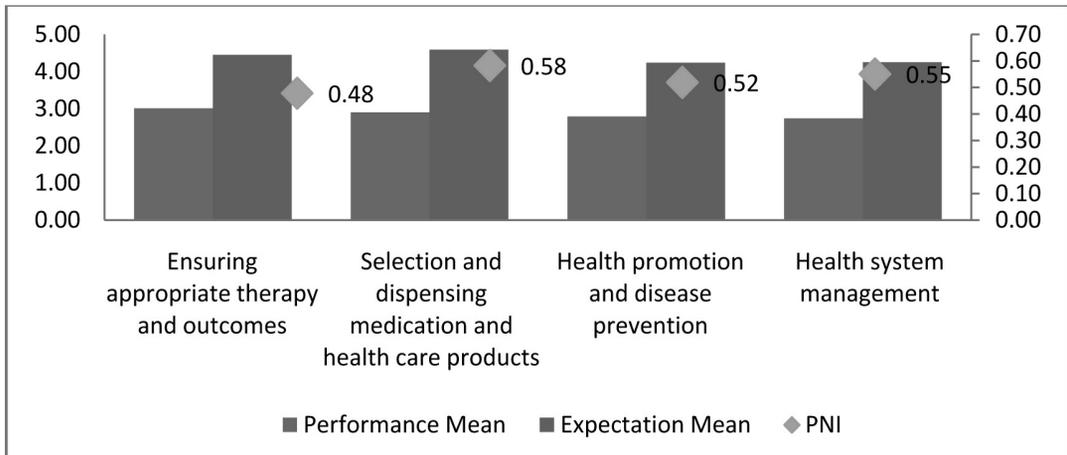


Figure 2. Competency needs of students assessed by the final year clinical pharmacy students

dicines, were needed to be improved, whereas, pharmacy students thought that 7 of 14 elements of pharmacy competency, in which the contents were related to the knowledge of pharmaceutical product, were not sufficient for them and needs to be developed (Table 2). For health promotion and disease prevention domain, the hospital pharmacy preceptors considered that 2 of 5 competency elements were needed to be improved. In addition, the

clinical pharmacy students believed that they should improve 3 of 5 competency elements of this domain (Table 3).

Considering health system management domain, hospital pharmacy preceptor considered 4 of 8 elements were needed to be developed (Table4). Clinical pharmacy students indicated more number of competency elements required to be developed compared to hospital pharmacy preceptors.

Table 1. Competency needs results of competency domain 1

Competency Elements of Domain 1 ensuring appropriate therapy and outcomes	Hospital preceptor assessment		Clinical pharmacy student self-assessment	
	PNI	Priority	Modified PNI	Priority
1. Design the prevention plan and prepare the information to resolve the medication use problems	3.76	1	0.53	3
2. Develop the pharmaceutical care process based on the patient records and any other evidence	3.55	2	0.60	1
3. Access health problem and drug use problem with integration of pharmaceutical knowledge	3.54	3	0.52	4
4. Apply pharmaceutical care for disease management	3.28	4	0.53	3
5. Follow up and change the pharmaceutical care plan as deemed appropriate	3.00	5	0.53	3
6. Assess the documentations and research related to the patients' care	2.95	6	0.53	3
7. Assess the patient's medication record including clinical, economic, social record	2.91	7	0.53	3
8. Prepare, document and collect the patient's medication history and/ or current medication treatment			0.54	2
9. Assess the plan of pharmaceutical care as deemed appropriate			0.48	5
10. Obtain diagnostic patient information			0.47	6
11. Obtain the information for patient's medication use	2.70	8		
12. Assess, follow up and change the pharmaceutical care plan as deemed appropriate	2.67	9		
13. Record the review of drug treatment, the benefits arisen from the recommendation and pharmaceutical care	2.27	10	0.39	7
14. Establish the relationship and co-ordinate with the public health personnel	2.22	11	0.27	8
15. Establish good relationship with the patients and the patient's representative	1.96	12	0.26	9
16. Prepare, record and collect the patient's medication history and/ or current medication treatment	1.75	13		
Mean score	2.81		0.47	

Table 2. Competency needs results of competency domain 2

Competency Elements of Domain 2 selection and dispensing medication and health product	Hospital preceptor assessment		Clinical pharmacy student self-assessment	
	PNI	Priority	Modified PNI	Priority
1. Manage risks of drug usage for patients	4.83	1	0.55	6
2. Assess the prescription for completeness	4.07	2		
3. Select the appropriate pharmaceutical products for patients based on their factors, e.g., clinical, behavioral, economic, and social factors	3.64	3		
4. Examine medication in the prescriptions before dispensing	3.48	4		
5. Communicate with patients to promote adherence	2.94	5		
6. Read and interpret the result of health product analysis such as Bioavailability, Bioequivalence			0.83	1
7. Demonstrate the knowledge of pharmaceutical control to meet the specified standard			0.81	2
8. Compound pharmaceutical products including the extemporaneous preparation			0.77	3
9. Evaluate medication and health product			0.74	4
10. Select the appropriate pharmaceutical product to patients based on the their factors e.g., clinical, behavioral, economic, social factor			0.62	5
11. Apply structure activity relationship (SAR) and biopharmaceutical knowledge to select the appropriate treatment options or disease prevention for patients.			0.54	7
12. Prepare ancillary labels or cautionary or advisory statements for specific patients	2.46	6		
13. Compound pharmaceutical products with the details on the standard formulation	2.31	7	0.52	8
14. Apply SAR and biopharmaceutical knowledge to select the appropriate treatment options or disease prevention for patients	2.29	8		
15. Demonstrate the knowledge of pharmaceutical control to meet the specified standard	2.13	9		
16. Describe and/or demonstrate administrative technique for commonly used medicines, including inhalers, eye ointments, and eye, ear and nose drop	1.92	10	0.38	13
17. Read and interpret the result of health product analysis such as Bioavailability, Bioequivalence	1.76	11		
18. Dispense medications to patients	1.70	12	0.41	10
19. Evaluate medication and health product	1.38	13		

Table 2. Competency needs results of competency domain 2 (Cont.)

Competency Elements of Domain 2 selection and dispensing medication and health product	Hospital preceptor assessment		Clinical pharmacy student self-assessment	
	PNI	Priority	Modified PNI	Priority
20. Compound pharmaceutical products including the extemporaneous preparation	1.34	14		
21. Assess the prescription for completeness			0.48	9
22. Communicate with patients/curers to make them on adherence			0.40	11
23. Examine medication in the prescriptions before dispensing			0.39	12
Mean score	2.55		0.52	

Table 3. Competency needs results of competency domain 3

Competency Elements of Domain 3 health promotion and disease prevention	Hospital preceptor assessment		Clinical pharmacy student self-assessment	
	PNI	Priority	Modified PNI	Priority
1. Manage education programs and proceed with promotions of drug therapy and health products.	2.33	1		
2. Determine promoting and preventing activities on drug therapy and health.	1.03	2	0.56	2
3. Analyze and evaluate drug and health product problems that impact the community and society			0.64	1
4. Search for, collect and combine health information of the community			0.56	2
5. Select appropriate options of promotion, surveillance, and prevention in drug therapy and health product for individual and community	0.95	3	0.42	5
6. Search, collect and combine health information of community	0.61	4		
7. Analyze and evaluate drug and health product problems that impact community, social	0.39	5		
8. Select appropriate options of promotion, surveillance, and prevention in drug therapy and health product for individual and community			0.42	
Mean score	1.03		0.52	

Table 4. Competency needs results of competency domain 4

Competency Elements of Domain 4 health systems management	Hospital preceptor assessment		Clinical pharmacy student self-assessment	
	PNI	Priority	Modified PNI	Priority
1. Comply with the Drug Act, the Pharmaceutics Professional Act, etc.	2.67	1	0.58	5
2. Understand and realize of the importance of the role of professional toward the society	1.81	2		
3. Apply the ethical/moral principles to perform the professional duties.	1.73	3		
4. Understand and use the management principle to develop medical system in community	1.31	4	0.68	2
5. Analyze and evaluate the impact of drug policy			0.7	1
6. Ability to develop drug selection, procurement, distribution for all level user			0.65	3
7. Analyze and assess the impact of internal and external factors regarding economics, society, ethics toward medication			0.64	4
8. Provide an platform for consumer protection	1.18	5		
9. Develop drug selection, procurement, distribution of all level users	0.62	6		
10. Analyze and assess the impact of internal and external factor regarding of economics, society, ethics toward medication	0.43	7		
11. Analyze and evaluate the impact of drug policy and health	0.31			
12. Provide a platform for consumer protection			0.58	5
13. Apply the ethical/moral principles to perform the profession			0.44	6
14. Understand and realize of the importance role of professional towards the society			0.35	7
Mean score	1.20		0.57	

Discussion

Hospital pharmacy preceptors considered that all four domains, ensuring appropriate therapy and outcome was the most important competency domain that clinical pharmacy students should improve, followed by selection and dispensing medications and health products.

However, clinical pharmacy students thought that the first competency domain that they need to improve was selection and dispensing medication and the second competency domain was health system management. Hospital pharmacy preceptor perspectives of the clinical pharmacy students' competencies differed from the clinical

pharmacy student perspective. Pharmacy preceptors might focus on the importance of hospital activities or tasks while the clinical pharmacy students tend to focus on their knowledge or skills receiving from the contents in pharmacy curriculum. For example, hospital pharmacy preceptors could identify competency needs/gaps of clinical pharmacy students' competencies based on their work experience and student training experience, and their expectation of the students' competencies may be based on the activities related to the works and comparison of students' competencies that they trained. In contrast, clinical pharmacy students' perspective tends to be limited by their working experiences. Therefore, they may rank the importance of each competency elements according to their working skills during their training rather than their expected performance.

Domain 1 ensuring appropriate therapy and outcomes: From PNI scored by both hospital pharmacy preceptors and clinical pharmacy students, it was apparent that the number of competency elements to be improved in the clinical pharmacy students' opinion was higher than those elements in the hospital pharmacy preceptors' opinion (Table 1). However, there were some similar competency elements that both groups thought that clinical pharmacy students needed to improve. Our results implied that the new curriculum should focus on the abilities of students to record patient profiles and any other evidences for designing the prevention plan and

resolving medication problems and improve these skills such as "ability to design the prevention plan and prepare the information to resolve the medication use problems", "ability to develop the pharmaceutical care process based on the patient records". These abilities are major activities in pharmaceutical care provision. These results agreed with the study conducted in 2008 showing that practical pharmacists rated high values and expectations of pharmacy competency in providing pharmaceutical care.¹¹ These findings suggested that development of a new pharmacy curriculum emphasizing ensuring appropriate therapy and outcomes should be performed at Faculty of Pharmaceutical Sciences, Chulalongkorn University.

Domain 2 selection and dispensing medications and health care products: The majority of competency elements that hospital pharmacy preceptors considered as the critical needs and students should improve were abilities to manage risks of drug usage for patients; assess the prescription for completeness; select the appropriate pharmaceutical products for patients; examine medication in the prescriptions before dispensing; and communicate with patients to promote adherence. On the other hand, clinical pharmacy students needed to improve skills related to pharmaceutical products such as reading and interpreting the result of health product analysis; compounding pharmaceutical products including the extemporaneous preparation; applying structure activity relationship

(SAR) and biopharmaceutical knowledge to select the appropriate treatment options or disease prevention for patients; evaluating medication and health product; and selecting the appropriate pharmaceutical product to patients based on their factors e.g., clinical, behavioral, economic, social factor.

Both hospital pharmacy preceptors and clinical pharmacy students thought that clinical pharmacy students should improve the ability to manage risks of drug usage for patients. Cohen JL, et al.¹² also suggested in their study that health care professionals should focus on the design of medical use systems regarding patient safety. In order that pharmacists can play a major role in safe and efficient use of medication in patients, the new curriculum must include these concerns. Thus, the contents about medication-related errors in health care system, analysis of an adverse event, standards of practice for patient safety, and standards of drugs and devices were suggested to be included in the new curriculum.

Hospital pharmacy preceptors also considered that students must improve the ability to assess the prescription for completeness in the process of dispensing the medication. Maitremit and colleagues¹³ also mentioned that “pharmacist should dispense the prescription in the right way with professional knowledge and be able to solve patient drug related problems” in their study.

However, clinical pharmacy students

considered that they lacked the competency in product-oriented contents such as the ability in extemporaneous preparation for individual patients and knowledge of pharmaceutical products. This finding may imply that students may lack an ability to apply their knowledge to the practical situation. Furthermore, the instructional methods may not be appropriate. Thus, there may be a need for further training in pharmaceutical product skill for clinical pharmacy students. Further study should be conducted to identify which factors affect their competency in the product oriented skills of clinical pharmacy students.

Domain 3 health promotion and disease prevention: Since Thai ministry of public health currently emphasizes on the disease prevention rather than treatment by using medications, “management in education programs and preceding promotions of drug therapy and health product” in patients was then ranked as the first need to improve in the clinical pharmacy student from the perspective of hospital pharmacy preceptors in this study. Our results suggested that pharmacy curriculum should inculcate student skills in management and preceding promotions of drug therapy and health product in patients.

Domain 4 health systems management: In accordance with current society, pharmacists are expected to be an honest health care professional person. Our data suggested that both hospital pharmacy preceptors and clinical phar-

macy students thought that students need to improve their abilities to comply with Drug Act, Pharmaceutics Professional Act. Maitreemit, et al.¹¹ found that pharmacy practitioners should practice their professions under laws, professional standards, and ethics. Moreover; they also mentioned that most pharmacists have comparable knowledge or ability in pharmaceutical activities but they may have differences in professional ethics and the good attitude in pharmaceutical professions. In order to generate a unique good attitude of pharmacists in professional ethics, faculty members should emphasize on teaching of pharmacy law and ethics in the new curriculum.

Limitations

The data presented in this study were collected from hospital pharmacy preceptors and clinical pharmacy students of the Faculty of Pharmaceutical Sciences, Chulalongkorn University. Therefore, the results of this study may not be applied for using as a guideline in pharmacy curriculum development for other universities. Another limitation was that hospital pharmacy preceptors and clinical pharmacy students had to work on the 5-point Likert-type scaled questionnaire to give both for the expected performance level and actual performance level of each competency element. Since the double-scaled format of 5-point Likert-type was complicated and were possible to lead to difficulties in data collection and analysis, and might lead to a small return rate.¹⁴

Conclusions

A needs assessment of pharmacy competency based on hospital pharmacy preceptors and clinical pharmacy students has provided much useful information about pharmacy competency needs. First, from ensuring appropriate therapy and outcomes domain, both clinical pharmacy students and hospital pharmacy preceptors considered that there may be a need to improve the abilities to record patient profiles and any other evidences for designing the prevention plan and resolving medication problems and improve these skills. Second, according to selection and dispensing medications and health products domain, hospital pharmacy preceptors suggested that clinical pharmacy students should improve the ability to manage risks of drug usage for patients and the ability to assess the prescription for completeness in the process of dispensing the medication. In contrast, clinical pharmacy students need to improve their pharmaceutical product related skill such as the ability in extemporaneous preparation for individual patients. Third, about health promotion and disease prevention domain, hospital pharmacy preceptors and clinical pharmacy students thought that clinical pharmacy students should learn more in management of educational programs and precede promotions of drug therapy and health product. Lastly, for health system management domain, hospital pharmacy preceptors and clinical pharmacy students considered that clinical pharmacy students need to improve abilities to comply Drug Act, Pharmaceutics

Professional Act. Our data suggested that there may be a need for including more patients-oriented contents emphasizing pharmaceutical care concept into new pharmacy curriculum which agree with trend of pharmaceutical education in Thailand, European countries and the United States. Finally, this study has provided basic information and the guidance for the revision of the pharmacy curriculum in the future.

References

1. Hepler CD, Strand LM. Opportunities and responsibilities in pharmaceutical care. *Am J Hosp Pharm* 1990;47:533-43.
2. Thai Pharmacy Council and Faculty of Pharmaceutical Sciences, Chulalongkorn University. Thai pharmacy consortium 95 years anniversary towards new pharmacy era. Available from: <http://www.pharm.chula.ac.th/thaihealth/RxSamatcha/RxSamatcha095-25511208.pdf> Accessed August 4, 2010.
3. Pongcharoensuk P, Chalongsuk R, Chulavatnatol S. Manpower research: Pharmacy work force in Thailand. Bangkok; 2000. Sponsored by the Pharmacy Council.
4. Thai Pharmacy Council. Competency standard for pharmacy practitioners. Bangkok; 2002.
5. Faculty of Pharmaceutical Sciences, Chulalongkorn University. Pharmacy curriculum for undergraduate students, revised in 2000. September, 2000.
6. Kapol N, Maitreemit P, Pongchroensuk P, et al. Evaluation of curricula content based on Thai pharmacy competency standards. *Am J Pharm Educ* 2008; 2(1):1-5.
7. Witkin BR. Assessing needs in education and social program. San Francisco: Jossey-Boss Publishers, 1984.

Acknowledgements

We thank Chulalongkorn University for the 90th Anniversary of Chulalongkorn University Fund (Ratchadaphiseksomphot Endowment Fund) for research and for the Chulalongkorn University Graduate Scholarship to Commemorate the 72nd Anniversary of His Majesty King Bhumibol Adulyadej for the candidate academic support.

8. Wongwanich S. Needs assessment research. Bangkok: ChulaPress, 2005;275-9.
9. American Pharmacists Association 1998. Pharmacy Practice Activity Classification (PPAC). Available from: <http://www.pharmacist.com/AM/Template.cfm?Section=Home2&CONTENTID=2908&TEMPLATE=/CM/HTMLDisplay.cfm>. Accessed October 10, 2008.
10. Wongrugsak K. A comparison of quality and consistency of priority setting techniques in needs assessment based on discrepancy model. Doctoral dissertation. Graduate School, Chulalongkorn University, 1997.
11. Maitreemit P, Pongcharoensuk P, Kapol N. Pharmacist perception of new competency standards. *Pharm Prac* 2008;6(3):113-20.
12. Cohen JL, Nahata MC, Roche VF, et al. Pharmaceutical care in the 21st century: from pockets of excellence to standard of care: Report of the 2003-04 Argus Commission. *Am J Pharm Educ* 2004; 68 (3):S9.
13. Maitreemit P, Pongcharoensuk P, Kapol N. Desired competency for pharmacy graduates. *Thai Pharm Sci J* 2008;3:121-6.
14. Lee Y-F, Altschuld JW, White JF. Problems in needs assessment data: discrepancy analysis. *Eval Program Plann* 2007;30:258-66.