COMPETENCY ASSESSMENT OF CLINICAL PHARMACY EDUCATION IN THE PHILIPPINES: A BASIS FOR CURRICULUM FRAMEWORK

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ABSTRACT
Clinical pharmacy education should have an extensive framework of curriculum to develop globally competitive clinical pharmacy professionals. This study examined the competency of clinical pharmacy education in the Philippines, which is the basis for the development of curriculum framework. It investigated the offered clinical pharmacy program in terms of employability, life-long learning, competency, relevance of curriculum and view of graduates on the quality of clinical pharmacy curricula. Purposive sampling was used to identify the participants. Narrative interviews were done given their academic experiences from universities and current workplace. The study revealed graduate’s employability was influenced by their competencies on therapeutic knowledge skills, medical literature evaluation, and communication skills. Moreover, current curriculum must review its current protocols on research and electives that influence the graduates' specialization on clinical pharmacy based from institutional needs. It was apparent that certain subjects were not significant on the specialization of clinical pharmacy, but taken mandatory. Thereby, creating a need to refocus the program. On the other hand, professional subjects, seminars and core courses were relevant for their current job. It provided insightful findings for universities to develop curriculum framework for internship programs. This will organize systems to meet global quality standards of clinical pharmacy education.
KEYWORDS: Clinical pharmacy, Curriculum Framework, Philippines.

INTRODUCTION
Clinical pharmacy is the branch of Pharmacy where pharmacists provide patient care that optimizes the use of medication and promotes health, wellness, and disease prevention.[1] Currently, the demand for clinical pharmacists internationally has constantly grown.[2,3,4] The universities around the world have offered additional degree on clinical pharmacy to meet the growing demand such as China, Australia, United States of America, and other developed countries.[5, 6] The intention of this research study is to develop the student’s clinical skills. Hence, clinical pharmacy curricula have been consistently reviewed for improvement in order to produce competent clinical pharmacy graduates.

Clinical Pharmacy Education and its practice has been clearly defined and standardized to improve the competencies of clinical pharmacist. According to the American College of Clinical Pharmacy (ACCP), Clinical Pharmacy is an area of pharmacy concerned with the science and practice of rational medication use. It adapted the concept of optimizing therapy and promoting health, wellness, and disease prevention by focusing on both pharmacologic and non-pharmacologic strategies for promoting patient health. Furthermore, it embraces the philosophy of pharmaceutical care - emphasizing that the discipline relies on caring values with specialized knowledge, experience, and judgment underscores the critical importance of the synergy achieved by combining a caring ethos, in-depth therapeutic knowledge, clinical experience, and expert judgment. With this ideology, strategic plans were imposed in clinical pharmacy education to develop the competencies of the clinical pharmacist. Clinical Pharmacist competencies includes: Clinical problem solving, judgment, and decision making, Communication and education, Medical Information evaluation and management, Management of patient’s population and therapeutic knowledge.[11]

In addition, clinical pharmacists should have a broad scope and depth of pharmacotherapy knowledge and clinical skills. Knowledge is obtained and clinical skills are developed through formal education and training programs, including doctor of pharmacy degree and postgraduate residency programs, lifelong learning, and continuing professional development. Clinical pharmacist’s competence is achieved when one possesses the knowledge, skills, and attitudes required to provide direct care to patients and to ensure rational medication use. Although many pharmacists possess some clinical knowledge or skills and perform some clinical functions or tasks, they must demonstrate comprehensive
clinical competence in order to become a clinical pharmacist. Clinical pharmacists spend the majority of their time providing pharmacotherapy independently or in collaboration with other health care providers. Clinical pharmacists must be engaged in the provision of patient care for a sustained period of time to become fully competent and proficient. Although a number of pharmacists have been educated and trained in some aspects of clinical pharmacy, their current work responsibilities may not be characterized as practicing clinical pharmacist because they are not fully engaged in providing direct patient care and do not provide complex, in-depth clinical services.\(^{[11]}\)

In order to optimize medication therapy, one competency of a clinical pharmacist involves the combination of comprehensive therapeutic knowledge, experience, problem-solving skills, and judgment, which is necessary in order to become a competent clinical pharmacist. This includes the processes by which patient-specific data are collected, interpreted, and analyzed; medical problems are assessed; current drug therapy is evaluated; and therapeutic plans are developed. Clinical pharmacists must be able to identify patient problems, implement and manage patient pharmacotherapy, dispense and administer medications as needed, educate patients, monitor drug therapy, and consult with other health care providers to improve patient outcomes. Although monitoring of therapy is often taught as the final step in the patient care process, it must occur before, during, and after the start of drug therapy. To effectively monitor therapy, the clinical pharmacist must be able to collect and interpret patient data from a variety of sources.

Recognizing and identifying important information, and then interpreting and analyzing it in the context of complex clinical situations, require practice and repetition. Only after sufficient experience is acquired can the clinicians know which situation demands urgent attention and which merely requires ongoing monitoring and only after a clinical pharmacist has cared for many patients in a variety of situations will he or she be able to monitor patients efficiently and effectively. Similarly, assessing medical problems is an important clinical ability that must be developed and practiced. Although pharmacists are not responsible directly for establishing a patient’s medical diagnosis, it is essential that the pharmacist be able to define patient-specific problems and effectively evaluate current therapy for those problems. Hence, clinical pharmacists cannot focus only on medications, but must take into account all patient-specific medical problems as well.

Observing patient-specific responses to medications is critical to anticipating potential
outcomes of initiating and adjusting drug therapy. Sound clinical judgment should be based on a combination of in-depth knowledge of diseases, expertise in drug therapy, and practical experience involving patients’ use of medications. Collaborating with patients, caregivers, and other health professionals is another essential ability that deserves attention. Clinical pharmacists must be able to work with patients and other health care professionals to determine which treatments will best meet the patient’s therapeutic needs. They must understand their roles, and the roles of collaborators, in the clinical problem-solving process.[11]

In Australia, several competencies of Pharmacists have been established but two factors are important in the practice of clinical pharmacy, which includes: Participation in therapeutic decision-making, promotion and contribution to optimal use of medicines[12]

The ability of the clinical pharmacist to participate in therapeutic decision making is evident on capacity of the pharmacist to access medication records in the pharmacy/institution with patients consent, ability to interview patients, including those where sensitivity to cultural issues must be observed. The ability to develop an accurate medication history from the patient (and other health professionals and patient notes when necessary) that includes detail of current and previous medications, relevant medical and social history and test results, previous adverse drug reactions and known allergies and sensitivities. Likewise the ability to describe what additional information needs to be obtained and why it is relevant in selecting an appropriate therapy.[12]

Pharmacist has the competency of promoting and contribution to the optimal used of medicines when they have the ability to discuss the value and limitations of readily available information sources for supporting the development of a complete and accurate patient history. They can identify and/or describe relevant information sources for specific types of information, such as that required in specialized areas of practice. Explain clinical aspects of diseases/medical conditions of individual patients and the signs and symptoms commonly associated with them. Show ability to understand medical terminology and interpret patient medical records, including a limited number of commonly used laboratory test result. Be able to assess the clinical significance to medication treatment of results of common laboratory tests and investigations (e.g. renal function, liver function and serum electrolytes) that are outside the normal or desired range.[12]
Another important competency of clinical pharmacist that must be developed is the ability to effectively communicate and educate patients and other health care professionals to ensure optimal patient outcomes. In this manner, the clinical pharmacist maybe able to assess patient’s level of understanding, identification of issues important to the patient, and delivers information and give appropriate advice to patients. The clinical pharmacist must identify those issues that are particularly pertinent for patients and physicians to help optimize drug therapy. Like other health care providers, it is the clinical pharmacist’s responsibility to document medication reconciliation, clinical problem solving activities, therapeutic interventions, and patient education activities in the medical record. As with verbal communication, practice is required to become proficient at writing notes in the medical record.[11]

The clinical pharmacist must keep abreast of current medical and therapeutic information to provide quality patient care. This requires a knowledge base that is continuously expanding and being updated. A clinical pharmacist must be able to identify situations beyond his or her own expertise or that requires new information to reach a decision. This necessitates carefully defining the question and using a variety of information sources to derive the answer. New information is then incorporated into one’s existing knowledge base and integrated with prior clinical experiences to help develop sound clinical judgment. Experience with a wide variety of information resources is essential. A strong foundation of knowledge must first be developed so that new information can be readily combined with prior knowledge. Students and trainees often lack the clinical experience necessary to recognize new information that should be incorporated into their knowledge base. Skills in interpreting and evaluating biomedical literature assist the clinical pharmacist in effectively integrating new information with prior knowledge.[12]

Management of patient’s population is another key component on determining the competency of a clinical pharmacist. Clinical pharmacists can apply their therapeutic knowledge and clinical experience to identify and correct problems that contribute to adverse events in patients. This may involve the collection and evaluation of information regarding how a medication or class of medications is being used such that changes can be implemented to improve care. Drug therapy protocols can be developed to ensure the proper use and monitoring of medications. A clinical pharmacist must possess sufficient experience and clinical judgment in the care of individual patients to effectively contribute to this
process. Clinical pharmacists routinely contribute to the development and implementation of critical pathways. Because studying pharmacy must be evidence-based the clinical pharmacist must be able to recognize and interpret relevant biomedical literature to formulate and justify valid drug therapy recommendations. These skills are clearly beyond those acquired in a doctor of pharmacy program and require development during postgraduate training and practice. Many clinical pharmacists not only are involved in providing care to individual patients, but work within a health system or other organization to develop protocols and critical pathways that optimize the care of patient populations.\textsuperscript{[11]}

To characterize the breadth of knowledge minimally required for clinical practice, clinical pharmacists must possess a therapeutic knowledge base of sufficient breadth and depth to effectively promote rational medication use. In general, to be considered a clinical pharmacist, one must be sufficiently knowledgeable about the diseases and principles to effectively assess and treat these problems in the given patient population one serves. It is important to emphasize that a clinical pharmacist must be competent in the therapeutic management of the disease states that may affect a given patient, not simply those currently identified as problems commonly encountered in the field.

To optimize a patient’s therapy, the clinical pharmacist must be able to identify and solve new problems as they arise. This competency can be acquired during residency training. The residency training must be structured to deepen one’s knowledge of many disease states, provide a supervised environment for the application of this knowledge, and promote the development of patient care skills and clinical judgment. Although some clinical pharmacists may distinguish themselves by developing a sub-specialty area of expertise (e.g., cardiology, infectious diseases), the maintenance of a sound foundation of therapeutic knowledge over a wide range of topics is necessary to meet their professional demands. Other clinical pharmacists may have a practice that focuses on a specific patient population (e.g., pediatrics). Recognizing that such knowledge will grow and evolve with changes in medicine, the guiding principle is that a clinical pharmacist who possesses a sufficient breadth and depth of therapeutic knowledge and experience is capable of comprehensively managing pharmacotherapy in the patient population being served. If an individual’s knowledge is limited to a few therapeutic classes of drugs, one’s experience and clinical judgment will also be limited.\textsuperscript{[11]} These led to flexibility when it comes to teaching clinical pharmacy education.
Most universities adapted experiential method of teaching in Clinical Pharmacy.\textsuperscript{[7,8]} Their students were exposed to work closely with doctors, patients and nurses in the hospital wards to strengthen their role and responsibilities on pharmacotherapy and drug prescription for patients.\textsuperscript{[9]}

In the Philippine setting, tertiary hospitals like St. Luke's Medical Centre have discerned the vital role of clinical pharmacists.\textsuperscript{[10]} Their active involvement in patient health care delivery system has contributed to optimal delivery of drug therapy to patients. Likewise, Region XI (St. Elizabeth hospital in General Santos City) has earlier started to incorporate clinical pharmacy in their health care services. Locally, the Davao Doctors Hospital has integrated clinical pharmacy practice as an integral part of multi-disciplinary team of health care providers. This means that local hospitals in Davao City, Philippines recognize the important role of clinical pharmacists. As such, Philippine universities have been ultimately challenged to improve their respective clinical pharmacy programs to meet not only the global demands for clinical pharmacists but to ensure effective and efficient delivery of clinical pharmacy services of their graduates.

Hence, this study examined the competency of clinical pharmacy education in the Philippines, which is the basis for the development of curriculum framework. Specifically, this study attempted to trace Bachelor of Science in Pharmacy (Clinical Pharmacy) graduates for the period of 2005 to 2010 to become a basis for curriculum development. Several questions were asked to the graduates such as demographic profile, educational background, employment profile, competencies learned in university, usefulness of the overall course curriculum for professional work, academic suggestion of respondents and more.

**MATERIALS AND METHODS**

This study utilized a descriptive survey method to evaluate the data in the study. In addition, descriptive research design involved the process of recording, describing, interpreting, comparing and analyzing the events.

This study was conducted in a university in Davao City, Philippines. The university started offering Bachelor of Science (BS) in Pharmacy program since 1948. The site of study is the pioneering institution in the Philippines and the only school in Mindanao offering Bachelor of Science in Pharmacy (Clinical Pharmacy).
The distributions of questionnaire were made both online and using service courier. However, clinical pharmacists working in various hospitals, educational institutions and several were interviewed personally.

The respondents of this study were the graduates of a university in Davao City. This graduates finished Bachelor of Science in Pharmacy (Clinical Pharmacy) from 2005 to 2010, which were employed, as clinical pharmacy lecturers, community pharmacists, hospital pharmacists and clinical pharmacists in various hospitals in the Philippines and abroad. There were 150 respondents in this but due to the proximity of place of the respondents who were currently working abroad and outside Davao City; about fifty-eight of them have fully coordinated with the researcher to answer the questionnaire. The researchers used social network working sites (Facebook, Twitter, etc.) to conduct interview while the researcher personally interviewed others. The respondents were requested for anonymity as a condition for the approval for the conduct of the study in their respective institutions.

In the gathering of data, the instruments that were used in this study were adapted from different sources. However, some items were modified and contextualized to the academic setting. It underwent a validation process by the members of the panel with a validation rating of 4.65.

The tracer study questionnaire was adapted and modified by the researcher from several sources. The questionnaire was divided into three major categories that aimed to determine the demographic profile, educational background and employments status of the 2005 – 2010 clinical pharmacy graduates. Each category was subdivided into various components to provide details of demographic characteristics, employability and education of the respondents. Likewise, a part of the questionnaire aimed to quantify the level of competencies such as clinical problem solving, judgment, Medical Information evaluation and management; and some therapeutic knowledge in clinical pharmacy learned by the respondents.

The statistical analysis of this research relies solely on the numerical and descriptive response of the subjects. In this case, the presentation and summary of data were done using graphical and tabular presentation of the percentage (%) response for each parameter stipulated in the questionnaire.
RESULTS AND DISCUSSIONS

Table 1. Competencies Learned in University Useful in First Job

<table>
<thead>
<tr>
<th>Item</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Communication skills</td>
<td>41</td>
<td>21.03</td>
</tr>
<tr>
<td>Human relation skills</td>
<td>37</td>
<td>18.97</td>
</tr>
<tr>
<td>Clinical problem solving judgment and decision making skills</td>
<td>28</td>
<td>14.36</td>
</tr>
<tr>
<td>Medical information evaluation and management skills</td>
<td>41</td>
<td>21.03</td>
</tr>
<tr>
<td>Management of patient’s population skills</td>
<td>17</td>
<td>8.72</td>
</tr>
<tr>
<td>Therapeutic knowledge skills</td>
<td>31</td>
<td>15.90</td>
</tr>
<tr>
<td>Total</td>
<td>195</td>
<td>100.00</td>
</tr>
</tbody>
</table>

Table 1 shows the competencies learned in the university, which were useful in their first job. The frequency ratings were as follows; 41 or 21.03% on both items for communication skills and medical information evaluation and management skills; 37 or 18.97% on human relation skills; 28 or 14.36% on judgment and decision making skills, Medical Information evaluation and clinical problem solving judgment and decision making skills; 17 or 8.72% on management of patients population skills; and 31 or 15.90% on management skills, Management of patient’s population skills and Therapeutic Knowledge skills.

It is the aim of this study to track which of these competencies are very important in Clinical Pharmacy graduates in their first job so that future graduates of Clinical Pharmacy program will be more equipped with knowledge and skills prior to their graduation.

Results showed that 21.03% of Clinical Pharmacy graduates learned the competencies on medical information evaluation and effective communication skills during their university days. Both skills were so important in the practice of clinical pharmacy considering that they need to interview and advise patients for proper medication and work closely with other medical professionals on how to effectively handle complicated cases. In addition, 18.97% and 15.90% of them replied that respondents acquired the competencies on human relation and therapeutic knowledge skills in their Clinical Pharmacy education.

However, 14.36% and 8.72% replied that they learned the competency on clinical problem solving and patient's management in Clinical Pharmacy education. These indicate the need to improve the level of competency among students on these aspects especially that clinical problem solving and patient management are important criteria.
Table 2. Usefulness of the Overall Course Curriculum for Professional Work

<table>
<thead>
<tr>
<th>Item</th>
<th>Very Useful</th>
<th></th>
<th>Useful</th>
<th></th>
<th>Not Useful</th>
<th></th>
<th>No Answer</th>
<th></th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>F</td>
<td>%</td>
<td>F</td>
<td>%</td>
<td>F</td>
<td>%</td>
<td>F</td>
<td>%</td>
<td>F</td>
</tr>
<tr>
<td>General Education</td>
<td>25</td>
<td>43.10</td>
<td>31</td>
<td>53.45</td>
<td>0</td>
<td>0.00</td>
<td>2</td>
<td>3.45</td>
<td>58</td>
</tr>
<tr>
<td>Core Courses</td>
<td>30</td>
<td>51.72</td>
<td>26</td>
<td>44.83</td>
<td>1</td>
<td>1.72</td>
<td>1</td>
<td>1.72</td>
<td>58</td>
</tr>
<tr>
<td>Professional Courses</td>
<td>32</td>
<td>55.17</td>
<td>24</td>
<td>41.38</td>
<td>0</td>
<td>0.00</td>
<td>2</td>
<td>3.45</td>
<td>58</td>
</tr>
<tr>
<td>Elective Courses</td>
<td>13</td>
<td>22.41</td>
<td>34</td>
<td>58.62</td>
<td>8</td>
<td>13.79</td>
<td>3</td>
<td>5.17</td>
<td>58</td>
</tr>
<tr>
<td>Undergraduate Thesis</td>
<td>16</td>
<td>27.59</td>
<td>34</td>
<td>58.62</td>
<td>6</td>
<td>10.34</td>
<td>2</td>
<td>3.45</td>
<td>58</td>
</tr>
<tr>
<td>Seminar</td>
<td>27</td>
<td>46.55</td>
<td>23</td>
<td>39.66</td>
<td>6</td>
<td>10.34</td>
<td>2</td>
<td>3.45</td>
<td>58</td>
</tr>
</tbody>
</table>

Table 2 shows the usefulness of the overall course curriculum for professional work. The frequency ratings were as follows: 55.17% and 51.72% of the respondents replied that professional courses, seminars and core course are very useful in their current job. While about 27.59 and 22.41% of them found out that both elective courses and undergraduate thesis are significant courses in their Clinical Pharmacy education.

These results indicate the need to improve the Clinical Pharmacy curricula since past graduates of the program proved that some of the subjects offered need to refocus in enhancing their skills as clinical pharmacists. These results a call for curriculum enhancement especially in bridging the gap of theory and practice particularly on elective courses and undergraduate thesis subjects (13.79% and 10.34% respectively) which need to be re-evaluated. On the other hand, it was indicated that Clinical Pharmacy graduates find all the 6 courses “relevant” to their current jobs.

Furthermore, a dispersed practice placement curriculum model is being implemented in the Philippines. Few enhancements are perceived to be beneficial on this matter. These include the provision of a holistic 5-year period of formation with an integrated curriculum and assessment at the end of year 5 students. This shall enable them to embed learning from their university more effectively. In addition, early exposure to practice in support of students in understanding the changing nature of work in pharmacy, and more informed choices about their respective careers in the future. Moreover, a review of the current assumptions that underpin the relation between theory and practice among pharmacy stakeholders are deemed beneficial. Another facet to consider is the closer collaboration between higher education institutes (HEI) and employers (possibly on the basis of regional structure and national structure) to strengthen their partnerships to support the initial formation of pharmacists (i.e.
through professional and academic mentoring and better management of work based learning and assessment to pave the way for their subsequent professional development.

In addition, with the advent of current educational changes such as K to 12 program and the shift to Outcome Based Education (OBE) Curriculum, there will be a dynamic reinforcement of competencies in the pharmacy curriculum to be integrated in the Philippine Practice standards for Pharmacists (PhilPSP). This will refocus the program more in meeting the global quality standards of clinical pharmacy education in the Philippines.

**CONCLUSION**
Pharmacists operate in diverse employment sectors with different duties and it is clear that the efficacy of the program in terms of the: Employability, educational and professional competency, and the retrospective view of graduates on the quality of the Clinical Pharmacy curricula is essential to be analyzed and improvised. This study concludes that a majority of the components in the current Clinical pharmacy curricula aspects of the Clinical Pharmacy program are still essential and relevant in developing competent pharmacists in their chosen discipline. Therefore, the current Clinical pharmacy curriculum should be refined so as to ensure the competency of graduates. The results of this study as well as similar ones in the future will be used as a guide during curriculum reviews for the continuous improvement of the university’s standards of education.

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**Conflict of Interest:** The authors declare that they have no conflict of interest.

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