

INVITED ARTICLE

Pharmacy education experience in the U.S.A. – implications for Asia

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Keywords

pharmacy education
clinical curriculum model
medication management
Pharm. D. program
primary care pharmacy

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Abstract

Based on personal experiences as well as examining changes in pharmacy education over the past 50 years in the U.S.A., the authors pinpointed three key factors that are considered critical in the development and implementation of a clinically-oriented pharmacy curriculum for producing graduates capable of providing patient care services (e.g., medication therapy management). These are: (1) quality and quantity of faculty; (2) a patient care practice model for pharmacy education programs - what, where and who pays for the services, and (3) curriculum quality control and teaching assessment. The relevance of these factors for an Asian pharmacy curriculum that would prepare graduates capable of providing patient care services that meet the health needs within each country are briefly discussed.

Introduction

The needs of patients for enhanced medication management services are a global phenomenon, leading to changes in pharmacy education. Over a period of decades, pharmacy leaders in practice and education in the United States of America (U.S.A.) have

introduced a more patient-focused or clinical curriculum model leading to the Doctor of Pharmacy (Pharm.D.) degree. A brief historical perspective on that journey and a contemporary view of key issues of quality assurance are provided in this article. It is

hoped that the U.S.A. experience together with key quality issues can provide a reference for the development and/or expansion of clinically-oriented curriculums and practice by Asian countries, which is of great interest at present.

Evolution of pharmacy education in the U.S.A.

The education of pharmacists in the U.S.A. has evolved over several decades as the role of pharmacists has changed. In fact, decisions regarding the preparedness of pharmacists to meet society's needs for medication management as defined by the profession and in public policy have had a dramatic effect on the U.S. pharmacy curriculum.

Most notably, pharmacy education and practice have shifted from a predominant focus on drug products to a more holistic focus on safe and effective medication use. While this seems a fairly simple change to describe in a phrase, the actual evolution from product- to patient-focus was a long and challenging process.

Researchers in medical and pharmacy education began to document problems with medication use in the 1960's and early 1970's, especially with elderly populations and acutely ill patients in hospitals. Dosing errors, drug interactions and adverse drug effects suggested that both physicians and patients might need more assistance in drug selection, dosing and monitoring. As a result, the clinical role of the pharmacist was defined and introduced, primarily in the hospital setting.

The federal government, in crafting legislation that provided increased funding to schools of the health

professions to address health workforce shortages in the 1970's, mandated the introduction of clinical pharmacy coursework and faculty to teach this in colleges and schools of pharmacy. This accelerated the introduction of the Pharm.D. primarily as a two-year degree following the completion of a five-year Bachelors (B.S.) of Pharmacy degree. Most early recipients of the Pharm.D. degree became pioneer clinicians on faculties of schools of pharmacy.

Over the next 20 years, the number of Pharm.D. programs grew and a debate began within both the education and practice communities over whether there should be only one level of education preparing pharmacists for licensure and practice. Proponents of the clinical role of the pharmacist argued for the Pharm.D. as the entry level degree while others advocated maintaining both the B.S. and Pharm.D. degrees. It was very difficult for many to appreciate how a pharmacist not working in an in-patient hospital setting might use advanced clinical skills acquired in Pharm.D. education.

In 1992, members of the American Association of Colleges (AACCP) of Pharmacy House of Delegates voted to recognize the Pharm.D. as the sole entry-level degree. A growing number of schools implemented the conversion in the decade of the 1990's. A revision of the standards and guidelines for accreditation of pharmacy degree programs unfolded across this time and the standards effective in 2000 required all schools to transition to the Pharm.D. degree. The last Bachelor's degrees in pharmacy were awarded in 2004.

Student intake based on pharmacy manpower needs of the country

Part of the debate within the profession regarding whether all future graduates should attain the doctoral level of education with its strong clinical focus stemmed from key questions about where graduates with that knowledge could actually apply it to patient care. The predominant place of practice for

graduates in that time and still today is the community pharmacy setting where the primary practice focus was filling traditional prescriptions. The leaders of this sector of practice were particularly vocal in their opposition to the movement to the entry level Pharm.D.

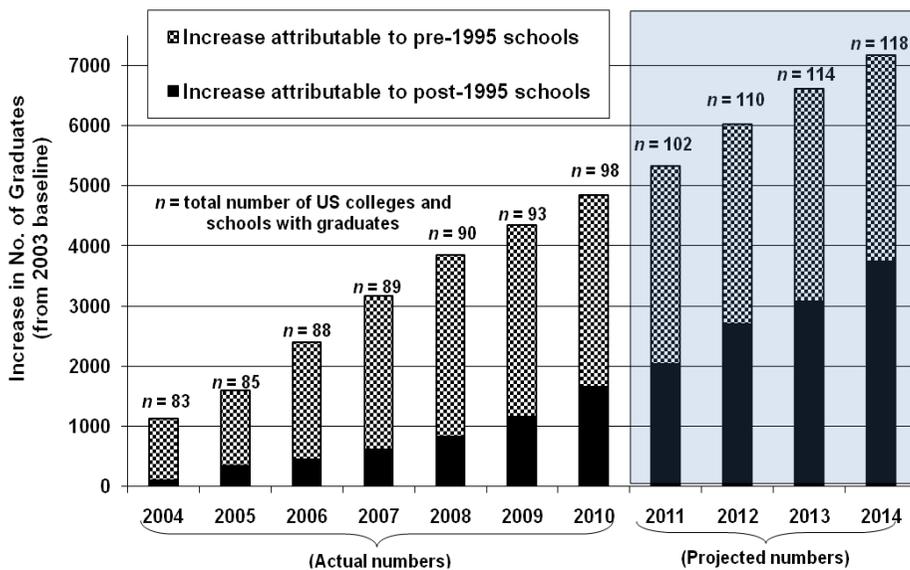


Figure 1 A decade of rapid increasing trend of graduates from U.S. pharmacy schools

Yet pharmacy leaders in both practice and education articulated a vision for new roles for pharmacists in all practice settings. In 1989, AACP charged the Commission to Implement Change in Pharmacy Education (<http://www.aacp.org/resources/historicaldocuments/Documents/BackgroundPaper1.pdf>) with responsibility for articulating a new vision and mission for pharmacy education grounded in the mission for the practice of pharmacy. Recognizing the gap in health care related to the

effective prevention, identification and resolution of patients' drug therapy problems, academic and practice leaders committed to graduating clinical pharmacists for all settings, not just institutional environments.

The ten years following the change in accreditation standards was a decade of dramatic growth in the number of U.S pharmacy schools and enrollment (Figure 1). More than 100,000 Pharm.D. graduates entered the workforce over the decade such that it

is estimated today that more than 50% of U.S. licensed pharmacists are Pharm.D. graduates. This has facilitated a transition in practice, still unfolding, of a more patient-focused, or clinical practice, with pharmacists providing a variety of medication management services across all settings of practice (e.g., community and ambulatory care, in-patient and acute care, specialty practice). It is now clear that there are important patient care roles for pharmacists in every setting, including community chain pharmacies where many graduates are practicing. In these chain pharmacies, pharmacists are expanding their roles to improve clinical outcomes.

Key relevant factors in the consideration of developing a patient-oriented pharmacy education program - U.S.A. experiences relevant to Asia

1. Quality and quantity of faculty (basic science, social/administrative, and pharmacy practice) for a patient-focused or clinical pharmacy curriculum

In the U.S.A. as of July 2012, there were 124 colleges and schools of pharmacy that had full or candidate status accreditation from the Accreditation Council for Pharmacy Education (ACPE; the organization that accredits U.S. colleges and schools of pharmacy), while five additional colleges and schools were classified as having pre-candidate status (AACP, 2012a). All offer the Pharm.D. degree as the first professional degree with 11 also offering the Pharm.D. as a post-baccalaureate degree, while 71 offer graduate degrees (M.S. and/or Ph.D.) in the pharmaceutical sciences (AACP, 2012a).

Enrollment for the first professional degree was 58,915 in fall 2011 while enrollment for the post-B.S. Pharm.D. degree was 1,341 (AACP, 2012a). It has been projected that 13,822 Pharm.D. degrees will be awarded in 2014 (Crabtree, 2011). The total number of faculty members noted in fall 2011 (based on 123 colleges and schools of pharmacy) was 5,882 working full-time and 530 part-time (AACP, 2012a). These figures do not include practitioners who serve as preceptors for pharmacy students during experiential rotations (introductory pharmacy practice experiences [IPPEs] and advanced pharmacy practice experiences [APPEs]) and are employed by community pharmacies, clinics, hospitals/medical centers, pharmaceutical industry, government, etc (AACP, 2012a). A breakdown of full-time faculty members by discipline during the 2010-2011 academic year was as follows: pharmacy practice (2,806), pharmacology/biological sciences (831), pharmaceuticals (603), medicinal chemistry (567), social/administrative sciences (401), continuing education (33), libraries/educational resources (32), and liberal arts (31) (Crabtree, 2011; AACP, 2012b).

Most pharmacy practice faculty members have Pharm.D. degrees and have completed at least a general residency (postgraduate year 1 [PGY1] residency) with many having an additional year in a specialty residency (PGY2) or additional practice experiences. Some have completed fellowships in specialty areas and typically have more research responsibilities, but reduced clinical activities, when compared to those with only residency training. Other pharmacy practice faculty may

have a M.S. and/or Ph.D. in addition to their Pharm.D. Most of these individuals have significant research responsibilities. Many pharmacy practice faculty have received Board of Pharmacy Specialties certification in pharmacotherapy or other specialty areas.

A general recommendation concerning faculty qualifications has been noted by ACPE in Standard 25 of *Standards 2007*. It states that faculty "must possess the required professional and academic expertise, have contemporary knowledge and abilities in current educational philosophy and techniques, and be committed to the advancement of the profession and the pursuit of research and other scholarly activities" (ACPE, 2012). "Faculty should have earned doctoral degrees appropriate to their responsibilities in the program" (ACPE, 2012). In addition, faculty involved in the practice of pharmacy must have proper licensure for the state in which they practice.

When looking at the quality of pharmacy educators, it is important that faculty members are not only excellent in research and service (including clinical service), but are also excellent teachers who possess scholarly teaching ability. The 2011-12 AACP Academic Affairs Standing Committee explored the role of scholarly teaching for current and future faculty members as well as the scholarship of teaching and learning (Medina *et al*, 2012).

In addition to quality, the number of faculty members required for a patient-focused or clinical education program is higher than for non-clinical programs. While ACPE does not dictate student-to-faculty

or student-to-preceptor ratios, it states in Standard 24 under Guidelines 24.1–24.3 that there should be an adequate number and mix of faculty with appropriate academic titles and experiences within each discipline (ACPE, 2012). It is also stated that there should be adequate faculty numbers to undertake faculty responsibilities without the involvement of administrators to ensure that the curriculum is effectively organized and delivered, mentoring and development of faculty occurs, students are advised and mentored, research and scholarly activities take place, service (clinical, committee, etc.) is undertaken, and assessment and evaluation activities occur (ACPE, 2012). There should be adequate numbers of part-time and voluntary faculty to complement full-time faculty to help cover curricular areas such as IPPEs and APPEs. Adequate numbers of staff (e.g., secretaries, administrative assistants, teaching assistants, laboratory assistants, student services personnel, technology personnel) should be employed to support program needs (ACPE, 2012).

Based on the U.S.A. experience, it is important for colleges and schools in Asia that are contemplating the establishment of a Pharm.D. program (entry-level or post-B.S.) or other patient-focused or clinical degree program to realize that they must have adequate financing and sufficient numbers of qualified faculty with appropriate credentials, especially pharmacy practice faculty, before opening new educational programs. Beyond the initial number of faculty members needed to start the program, others will be required later to educate increased

student populations as warranted to meet societal needs while faculty are also recruited away from academia for non-academic positions in the health care system, pharmaceutical industry, etc.

It should be remembered that the U.S.A. had entry-level Pharm.D. programs in California as early as the 1950's, and small post-B.S. Pharm.D. programs established in various universities as early as the late 1960's. Thus, entry-level programs in the U.S.A. were not started without the presence of experienced Pharm.D.-educated faculty. These individuals were the foundation for the growth of entry-level Pharm.D. programs that exist in the U.S.A. today. It is therefore important that colleges and schools of pharmacy in Asia develop an adequate cadre of pharmacy practice faculty before starting a Pharm.D. program or another type of patient-focused or clinical program. This may be accomplished by partnering with colleges and schools in the U.S.A. through relations that have developed between AASP and AACP as well as among individual colleges and schools on both sides of the Pacific. This will require the financing of individuals to obtain Pharm.D. degrees or other patient-focused or clinical degrees abroad along with residency training and/or other needed credentials. Also, small Pharm.D. programs might initially be established to educate an even larger cadre of future pharmacy practice faculty. This may be done by individual institutions or as a joint undertaking by groups of colleges and schools or countries. The relationship developed between Thailand and the U.S.A. has enabled Thailand to establish the Pharm.D. as its entry-level degree in pharmacy. AASP can play

an important role by setting up conferences and workshops to address this important issue and improve the capabilities of current faculty members in enhancing patient care services.

2. *Patient care practice model for pharmacy education programs - what, where and who pays for the services*

In the U.S.A., the Pharm. D. curriculum is aimed at education graduates to provide patient care services. Thus the emphasis of the curriculum is the application of cognitive knowledge (to provide patient care services or specifically medication therapy management) in addition to technical skill (dispensing) training. While dispensing skills are relatively simple, the application of cognitive knowledge to be translated to patient care is complicated. To achieve a recognized level of competency in patient care requires didactic learning to cover basic knowledge in biomedical sciences, pharmaceutical sciences, social/behavioral/administrative sciences, and clinical sciences together with experiential learning of pharmacy practice in a variety of practice settings.

The provision of advanced patient care services or medication therapy management (MTM) is increasingly emphasized nowadays in the U.S.A. In fact, MTM is considered the most desired and highly recognizable level of primary care pharmacy practice at present. Common examples of MTM include the management of diabetes, coagulation, lipid disorders, hypertension, asthma or chronic obstructive pulmonary disease, pain, heart failure, osteoporosis and transplant patient manage-

ment (Muraswskiet *al*, 2011, Scott *et al*, 2003, Maldonado *et al*, 2012). Other examples of disease states and clinical situations managed by pharmacists include migraines, mental health, oncology, immunizations, hematology, anemia, thyroid disease, obesity, wellness, metabolic syndrome, amino-glycosides, upper respiratory infection and urinary tract infections (Muraswski *et al*, 2011). Pharmacists must also take into consideration patient age (e.g., pediatric and geriatric populations), gender, ethnicity, etc. when providing MTM services.

Except for immunization, all of the above disease states require significant drug therapy which can be managed well by pharmacists. The specific activities usually involve patient consultation, medication review, notation of patient condition, prescribing of medication, diagnosis, laboratory testing, chart review and providing drug information. Most often the practice sites are hospital clinics, physician offices, free-standing clinics and managed care organization designated pharmacies although increasingly they are offered in community pharmacies as well.

The mechanism by which the advanced practice is carried out is usually via collaborative drug therapy management (CDTM) – an agreement between the pharmacist and physician to allow the pharmacist to initiate, modify and continue medication regimens, order laboratory tests and perform patient assessments under a defined protocol (Muraswski *et al*, 2011, Hammond *et al*, 2003). Under CDTM, reimbursement for services can be provided by

insurance companies, Medicare or self-pay by the patient.

Although the majority of MTM services carried out by pharmacists as part of a service role model associated with experiential student rotations are not directly reimbursed, these advanced services provided by pharmacists can reduce the cost of health care and improve patient outcomes. Thus, these types of advanced patient care practices are viewed as a desirable component in Pharm.D. education. The challenge is getting the recognition for adequate reimbursement of such services, which is complicated because of the complexity of health care service and financing in the U.S.A. Recognition of pharmacists in providing patient care services by statute via legislation and policy is being urged (US Public Health Service).

The pharmacist's capability of providing advanced services as described above did not evolve overnight. There has been a gradual evolutionary process from the primary dispensing role to the incorporation of clinical roles for pharmacists beginning in 1960's in the U.S.A. In the 1970's-1980's, after pharmacists learned the clinical management of patients from physicians, many branched out to specialize in pharmacotherapy in areas such as psychiatry, cardiology, infectious disease, therapeutic drug monitoring (pharmacokinetic monitoring), oncology, pediatrics, etc. Current MTM services require incorporating patient data with various disciplines that have matured over time. These include clinical pharmacology (1960's-1970's), pharmacokinetics (1970's-1980's), pharmacoconomics

(1980's-1990's), and pharmacogenomics (1990-present). Thus, modern-day pharmacy education has all these disciplines incorporated in the curriculum. The translation of the knowledge from these disciplines to providing advanced service should be a curriculum model to be considered in the development of Asian pharmacy education and practice.

3. Curriculum quality control and teaching assessment

To ensure quality, standards for a contemporary curriculum and educational assessment should be put in place. The standards for the Pharm.D. degree in the U.S.A. have been established by ACPE (ACPE, 2012). Briefly, the specific standards include:

- a. Requirement of graduates to achieve professional competencies, acquire sufficient knowledge, foster good leadership, judgment and ethical standard.
- b. Requirement of quality control of curriculum development, organization, delivery and its improvement by the faculty.
- c. Requirement for variety of teaching and learning methods and assessments of student learning together with systematic and sequential evaluation of curricular structure, content organization and outcomes.

Compliance with the above standards for curriculum and teaching assessment is essential for maintenance of good quality of contemporary pharmacy education in a nation. These standards are the basis for the accreditation of each pharmacy education program in the U.S.A. and can serve as an important consideration

for Asian pharmacy school education programs.

Discussion and Conclusion

Pharmacy education in the U.S.A, over the past half century, has changed from a primarily basic science oriented curriculum to a "standardized" Pharm. D. curriculum to educate graduates who are capable of providing MTM in response to the projected need of such pharmacy services as well as contributing to the overall health care in the U.S.A. Is current pharmacy education in the U.S.A. relevant to Asian countries? The degree of relevance will depend on the health care system of a particular country and the scope of pharmacy practice that can best fulfill the health care needs of an individual society. Theoretically, the current U.S.A. core Pharm.D. curriculum should be applicable to pharmacy education across Asia, since every Asian country already has institutional health care and pharmacy practice in place (and in many countries institutional health care providers are the primary providers of health care). The degree to which patient care pharmacy practice, e.g., MTM, is utilized will primarily depend on health care financing and reimbursement. Since government plays a pivotal role in many Asian countries' health care finances, the recognition by the government of patient care pharmacy services can be a deciding factor. It is encouraging that the governments of some Asian countries (e.g., China, Korea, and Japan) recognize the role of pharmacists in performing patient care services such as MTM. Because of this recognition, it is anticipated that in these countries a Pharm. D.-type of curriculum to educate new graduates as well as acceptance of the expanded pharmacists' patient care role will evolve much faster than what has happened in the U.S.A.

In the near future, Asian countries will need to develop sufficient numbers of pharmacy faculty, especially practice faculty, along with sufficient practice model sites to provide education and training for graduates to be competent in patient care services. Since education and training of sufficiently qualified faculty cannot be done overnight (like changing hardware), a stepwise approach in enhancing the quantity and quality of pharmacy practice faculty is needed. Perhaps organizations such as AACP and AASP can play an important role in this regard.

Should there be accreditation of pharmacy education programs in Asia as is required in the U.S.A.? Ideally the answer is yes, but it is unlikely to be a practical step in the near future since vast differences in the scope of pharmacy practice as well as culture exist among Asian countries. However, an organization such as AASP may help enhance the future of patient care pharmacy practice education in Asia if guidance on core curriculum and educational assessment can be developed and adopted by AASP-member countries. This is likely a long process but will be needed with the increasing acceptance and development of a Pharm.D.-type of curriculum in Asia and with the expectation for improved health care and drug usage for Asian populations.

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