

The Ohio State University, College of Pharmacy

Global Pharmacy-Southeast Asian and West Pacific

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Abstract

The role of pharmacist has been evolving overtime all over the world. Pharmacists in Asia have also expanded their scope of practice more towards patient care. This paper mainly investigates pharmacy education, pharmacy practice and regulations in countries in Southeast Asia and western pacific. The focus will be the uniqueness of pharmacy world in different countries.

Education

In Asia, the length of program differs from country-to-country, but increases beyond four years. According to FIP Education Report, the number of pharmacy schools varies among countries¹. Although China and Japan share the same number of pharmacy schools, considering the difference in size and population, Japan has more pharmacy school per person. There is a

Table 1¹, #of pharmacy schools in a country

Country	Number of Schools/Faculties
India	1026
Brazil	417
USA	129
China	74
Japan	74
Mexico	59

Adapted from FIP, 2012 (1)

was offered in Thailand, 6-year pharmacy education system was established under the Pharmacists Law and the Fundamentals of Education Act in Japan in 2006,²⁷ India introduced a PharmD program in 2008, and Nepal started a post bachelor PharmD program in 2010. Vietnam reformed its BPharm curriculum, requiring pharmacy schools to increase the clinical elements and offer a specialization in clinical pharmacy¹². There is one thing in common that all countries require some competency-based assessment and government licensure⁵.

great deal of similarity in content in many countries including increased focus on clinical pharmacy. However, in Vietnam, 50% of core curriculum is laboratory science learning time, comparing to about 10% in Singapore and USA. Furthermore, the degree program differs among countries but they all move towards a more clinical role of pharmacists. Early in 1999, the first 6-year PharmD program

China:

Pharmacy education in China focuses on pharmaceutical sciences while pharmacy programs especially clinical pharmacy varies dramatically institutionally. Clinical pharmacy programs were established in China in 1989 but developed more fully after 2006. In 2012, there were 30 pharmacy colleges with clinical pharmacy undergraduate programs, which included a bachelor's degree in clinical pharmacy and a clinical pharmacy concentration within the BS programs of pharmacy or medicine¹². Five universities offer a PhD program in clinical pharmacy. Three postgraduate programs exist, which train hospital pharmacists and clinical pharmacists, ranging from 1 year to 2 years. In 2012, a new outline recommended that all new hospital pharmacists should attend a 2-phase standardized training program when they graduate

from college with rotations through all sub-department of the hospital pharmacy departments. However, as the standardized training program was not a requirement for every hospital pharmacist, the Ministry of Health did not take measures to promote it. It was therefore not implemented very well¹².

Generally, a clinical pharmacy concentration under a pharmacy MS program focused on clinical research, including pharmacokinetics, pharmacogenetics, pharmacogenomics, and new drug development¹². As of 2014, there was no professional doctoral degree of pharmacy (Pharm. D) in China. And it will be difficult to change pharmacy education from chemistry-centered to patient-centered.

The national board exam is required to get pharmacy license. The tests include pharmacy administration regulation, pharmacology I&II and miscellaneous knowledge⁷. For people seeking traditional Chinese medicine pharmacist, the pharmacology tests are replaced by TCM⁷.

South Korea:

South Korea is currently experiencing a transitional phase from a 4-year to a 6-year pharmacy degree program¹⁴. The 6-year program includes 2yr pre-pharmacy plus 4yr pharmacy program with 1-yr pharmacy practice experience based on internship or residency training. After the 2 year pre-pharmacy courses, students must pass the Pharmacy Education Eligibility Test (PEET) in order to move on to the last four years. Applicants must have finished 2 years or 4 semesters of 4-year-course College¹³ or have appropriate level of life experience and aptitude, who have completed two years in an undergraduate program in a major or college other than pharmacy¹³.

A major change of the 6-year pharmacy program is the inclusion of an experiential rotation, with 1,400 hours of practical training with 800 hours (20 weeks) of common practice and 600 hours (15 weeks) of advanced elective practice. A new board exam is still in progress and in 2015, 1,351 pharmacists will graduate from 35 pharmacy schools to be the first batch with the 6-year pharmacy education¹⁴.

Japan:

Japan has a well-established pharmacy education system with 2 pharmacy education programs, a six-year program that aims to educate pharmacists and, a four year program that aims to educate pharmaceutical scientists. People graduated from the four year program are not allowed to register to be pharmacists. In 2012, over 8000 pharmacists graduated from the 6-year program to enter workforce².

Singapore:

The National University of Singapore (NUS) Department of Pharmacy is the first and only Pharmacy school in Singapore. Pharmacists in Singapore currently undertake a four-year Bachelors of Pharmacy degree with pharmacy internship in the 4th year⁹. This is a subsequent 9-month pre-registration, where a student trains in one practice setting only⁹. If a student is placed in a hospital pharmacy, it typically includes rotations in the outpatient pharmacy¹⁰.

Singapore Pharmacy Council is a governmental organization for pharmacist registration. If graduated student want to be a pharmacy specialist in cardiology, geriatric pharmacy, infectious diseases, psychiatric pharmacy and oncology¹⁰. Pharmacy Specialists Accreditation Board (PSAB) under SPC accredits pharmacy specialists. Students are required to have PGY1 and PGY2 or they have to have at least 3 years (continuous or otherwise) of working experience in the same specialty¹⁰. Graduates from other countries from certain schools can also register to be pharmacists in Singapore⁹. These countries include USA UK Malaysia, New Zealand, Ireland Canada and Australia⁹.

Table 1 Comparison of pathways from entry to specialty in clinical pharmacy practice between countries

Topic	Singapore	United States
Entry level	High School + 2 yr of junior college	High School + pre-pharmacy college courses (2-4 yr)
Degree program	Bachelor of Science (Pharmacy) degree with Honors (4 yr)	Doctor of Pharmacy degree (4 yr)
Pre-licensing training	Pre-registration training (12 mo)	+Final year consisting of clinical rotations
Licensure	National	State
Postgraduate training	Post-baccalaureate Doctor of Pharmacy degree (2 yr; optional)	Pharmacy practice residency (PGY1)
	Board of Pharmacy Specialists certification (optional)	Board of Pharmacy Specialists certification (optional)
Specialist	Specialist Pharmacist Registration with specific criteria of completing post-baccalaureate education, full-time specialty residency training with more than 3 yr of relevant experience – current recognized areas include cardiology, geriatrics, oncology and psychiatry	Specialty pharmacy residency (PGY2)

Adopted from Tee. *et al.* 2012 (9)

Thailand:

Thailand implemented their first 6-year PharmD program was offered in 1999 which about the same time when America adopted PharmD as a standard¹⁹. All pharmacy curricula in Thailand will be a 6-yr PharmD mandated by the Pharmacy Council of Thailand in 2014 for pharmacy licenses¹⁹.

Scope of Practice

China:

According to the Chinese Ministry of Health's Annual Health Statistics in 2011, there were 364,000 hospital pharmacists and pharmacy technicians in mainland China, serving 1.28 billion people, 21,979 hospitals and 918,003 primary medical institutions. There were, therefore,

an average of only 2.69 pharmacists per million people, and 16.6 pharmacists and pharmacy technicians per hospital¹².

The major responsibilities of pharmacists were stocking, distributing, and dispensing medications whether in community or hospitals. The public's concept of a pharmacist is generally associated with professionals working in the pharmacy department of hospitals and community pharmacies. Majority of the students graduated from BS in pharmacy goes into research and development. 30% of the students become pharmaceutical manufactures' representatives. 15% find jobs in hospital pharmacy¹⁶. In 2014, it is required for chain pharmacies to have a designated pharmacist to oversee all the activities⁷. For independent pharmacies, the legal person has to be a registered pharmacist. These new roles started in Beijing and will spread all over the country⁷.

The most severe shortage of pharmacists in China is in pharmacists with a clinical background¹⁶. Clinical pharmacy services are at an early stage of development in China with pharmacists are limited to the heavy workload of merely dispensing medications and their roles in providing professional pharmacy services are still at primary stages²².

The importance of clinical roles of pharmacists starts to be noticed. Surveys have shown that an estimated 50% of antibiotic use may be unnecessary or inappropriate²². In China, the situation of inappropriate antibiotic use and bacterial resistance is more severe²². However, several studies have demonstrated that pharmacist interventions could play a vital role in the optimization of antibiotic use²² by positively influencing the physicians' prescribing behaviors and play an important role in implementing strategies aimed at optimizing antibiotic use, which not only reduced drug consumption and promoted cost containment, but also provided real time interventions to minimize exposure to drugs, eliminate redundant therapy, recommend intravenous to oral conversion, perform dosage adjustments, and control treatment duration when appropriate²². From this study, the role of clinical pharmacists in China has a potential to grow in many other disease management and thus the need for clinical pharmacists is pressing.

South Korea:

The responsibilities of pharmacists are expanding with the change from a 4-year course to a 6-year course in 2009¹³. Ratio of community pharmacy to population in South Korea is higher than other OECD countries. Community pharmacists usually work in a neighborhood, medical buildings, or in large department stores to ensure that patients receive optimal drug therapy¹³.

The demand for industrial and clinical pharmacists is increasing¹⁴. In hospitals, their role is critical to ensuring that patients in hospitals, frequently on complicated and potentially toxic medications, receive safe and effective therapy¹³. Pharmacists in an industry are very important because they are working to discover, develop, manufacture and market prescription and nonprescription medicines, providing challenging environments¹³. Pharmacists can also help evaluate the drug and help get the drug approved¹³.

Japan:

The general roles of pharmacists in Japan include compounding and dispensing, focus on preparing and delivering, dispense parenteral drugs, pharmacokinetics and drug therapy consults,

drug information services and some DUE/DUR⁴. In the hospital's formulary committee, if there is a committee, their role appears to take a back seat to the physician's. The physician's dominance extends to drug purchasing and negotiation of purchase prices. And the pharmacy is responsible for procuring and distributing these medications¹⁵. Intravenous admixtures, including total parenteral nutrient solutions, are primarily prepared by nurses or are purchased from commercial sources¹⁵. In 2014, a new reimbursement model for clinical pharmacy services provided to outpatient cancer chemotherapy patients, including medication counseling, monitoring side effects and cooperation of supportive care was added²¹.

Pharmacies in the ambulatory care setting in Japan can be divided into nonprescription pharmacies, prescription pharmacies, and combined nonprescription–prescription pharmacies. Many of the nonprescription pharmacies have no front door (to facilitate entry and increase shelf space), only a roll-down barrier for securing the pharmacy when it is closed¹⁵.

Community pharmacies can be classified into two groups. Some pharmacies focus on dispensing and patient counseling, while others deal with drug supply and also cosmetic good, usually involving a chain drug store group². The government offers a financial incentive for community pharmacists to counsel patients about their prescription medications. For a pharmacist to provide this counseling legally, the pharmacist must know the patient's diagnosis. This is somewhat problematic and increases counseling time requirements, since many physicians still do not tell the patient what disease or condition him or her has¹⁵.

Other than traditional pharmacist roles, all schools (except universities), require and designated school pharmacist to monitor appropriate environmental conditions (class illumination, air ventilation and examine tap water)². Other pharmacists work in the pharmaceutical industry to develop new drugs and formulation and provide drug information to health care professionals. They can also be teachers in pharmacy schools and other related organizations².

Singapore:

Singapore has a well-established health care system, public and private, with an excellent reputation for quality medicine. In the world health report on health systems, Singapore was ranked #1 in Asia and 6th globally. VS US rank 37².

Hospital Pharmacy practice in Singapore is similar in structure to the US practice model. Major responsibilities in Singapore include medication dispensing, counseling and involvement in distribution and supply of inpatient medications¹⁰. The hospital pharmacist also documents, reports and manages adverse drug reactions, and evaluates the appropriateness of drug use¹⁰. For pharmacists who are more experienced, they will take the initiative to attend ward rounds with doctors and optimize the pharmacotherapy for their patients¹⁰. Sterile products and total parenteral nutrition are processed and compounded usually by a central pharmacy lab¹⁰. Unlike the US, pharmacists in Singapore never participate in emergency¹⁰.

Pharmacists can also conduct chronic disease management through pharmacist-run clinics, antibiotic stewardship, specialty practice (oncology, infectious disease, critical care and psychiatry), medication review, medication reconciliation, and MTM². The pharmacists-run

clinics in the hospitals include the anticoagulation clinic, heart failure clinic and lipid clinic, which are in collaborations with doctors to optimize patient care¹⁰.

Russia:

The Russian government has historically allocated no more than 3% budget to medication provision because this is not a means of production, like manufacture¹⁸. The health care budget covers only certain populations like geriatrics, veterans, children and disabled, as well as people with certain disease states HTN TB, DM cancer, mental rheumatologic disease and transplant. They all got their free medications from government pharmacies¹⁸. Russian government also imports 60% medications out of the country due to drug shortage, making the drugs more expensive and unaffordable. Poorer patients must rely on the generally inferior products available in government pharmacies which are imported mostly from third-world countries¹⁸. Private pharmacies are not obligated to provide free medications. They have medications with better quality for people who can afford them. Pharmacist can refill prescriptions without prior physician authorization¹⁸.

There are two kinds of pharmacists work in Russia—those who have advanced education and can prescribe medications onsite and chemists who prepare many commercially unavailable medications. There is no front store in a pharmacy, just an open waiting area. All medications are kept behind the counter or in glass display cases, under the control of pharmacists¹⁸. All over-the-counter (OTC) purchases require, without exception, consultation with the pharmacist. After discussing, patients either receive OTC or are advised to visit the clinic or hospital¹⁸. Interestingly, pharmacists in Russia do not process any monetary transactions as they consider it unprofessional for pharmacist to handle cash¹⁸.

Hospital pharmacists never work on individual prescriptions⁴. The hospital formularies include a high proportion of parenteral administered medications, because patients, especially elders, expect injections when in hospital. They will discard the pills which they consider inferior treatment¹⁸. The hospitals have heavy in-house sterile and non-sterile manufactured also due to lack of medications⁴. Drug information from pharmacy focus on what is available and what can be substituted based on inventory¹⁸.

Pharmacy and Regulations

China:

The Chinese FDA (CFDA) regulates all the activities related to drugs. As mentioned in the scope of practice, all business involves in drug manufacture, drug sale and drug use require licensed pharmacists⁷. New independent pharmacies require licensed pharmacists to be the legal person of the business⁷.

Japan:

Japan has a single payer: the government. Over 80% of Japan's hospitals and approximately 95% of physicians' offices (clinics) are private. There are no for-profit hospitals and no multihospital systems in Japan; such practices are prohibited either by law or by practicality¹⁵. Universal health insurance was established in 1961 and currently consists of three broad types: insurance for corporate employees; for farmers, the self-employed and retired

employees; and for the elderly. There are, however, exclusions to the products and services covered, such as prescription drugs not on the NHS formulary, nonprescription medications, physical examinations, and corrective lenses¹⁵.

There are three main classifications of OTC drugs. Type 1 Drugs are classified as having side effects that could "interfere with daily life" as well as the potential for serious health risks if used improperly¹⁷. A pharmacist must be on hand for a store to dispense these drugs, and the pharmacist must give adequate advice at time of sale about side effects and necessary precautions when taking the drug¹⁷. Type 2 Drugs are classified as having potential side effects that can interfere with daily but not with the severity of Type 1 medication. Type 3 Drugs are considered to have non serious side effects and, in most cases, won't impair one's functionality in any major way. A pharmacist or a "registered seller" must be on staff to sell these drugs and provide consultation if necessary¹⁷ when selling type2 and type 3 OTC medications.

Vietnam:

Vietnam and other low-income countries have found that pharmacy customers commonly request specific drugs and that the pharmacies dispense prescription-only drugs such as corticosteroids and antibiotics, often without any questions²⁰. There are cases Self-reported practice and actual practice to dispensing of prednisolone on request for treatment of lower back pain²⁰.

In Vietnam, like in many developing countries, pharmacies are often the first place people go for common health issues. They are often a preferred—and sometimes the only—source of health care information and services²². However, the low compliance with prescription regulations and the discrepancy between stated practice and actual practice raises concerns. Commercial pressures exceed the deterrent effect of current drug regulations and their implementation and hence enforcement of regulations needs to be improved²⁰.

Summary

Pharmacies in Asia differ dramatically in all aspects from education, practice to regulation. One thing in common is that they are all trying to make changes to improve the health of the people and to meet the international standards of patient care. Based on the information provided, the practice of pharmacists is evolving towards more clinical responsibilities in the future.

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