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Review Article

Review on the historical development, progression and comparison of the pharmacy education system in China and Pakistan

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ABSTRACT

In this review we have discussed the historical development, pharmacy education system, clinical pharmacy program, and challenges in the pharmacy education system of China and Pakistan. For this purpose, literature from different articles, websites, and government official websites was collected, discussed and summarized. According to this study, the pharmacy education system in both countries has revolutionized from drug development to clinical needs. The Doctor of pharmacy or bachelor in clinical pharmacy program was initiated in China and Pakistan. The curriculum of pharmacy was shifted more towards the patient care system. In order to achieve the goals of cultivating pharmacy talents and ensuring the safety and effectiveness of drugs for both countries, we need to deeply understand the domestic situation of the pharmacy education system. The practical significance of improving the use of drugs and enhancing the serviceability of pharmacy students is also required. So, this study will help to understand the present status of the pharmacy education system, clinical education, challenges and their solutions. This study will also be helpful for government official cooperation, teachers and students understanding of the pharmacy education system in both countries.

Keywords: China; Education; Pakistan; Pharmacy; Pharmacy education system; Pharmaceutical history.

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INTRODUCTION

Pharmacy is the art and science concerning the preparation and standardization of the drugs. Pharmacists are responsible for preparing dosage forms of drugs like tablets, capsules, and sterile injection solutions. The history of pharmacy education has been closely followed by medical education and training. The era of globalization including education has affected all sectors of society [1,2]. Such opportunities proved fruitful, rewarding, and enriching [3,4]. With the increased part, pharmacists can play a local and global role in the health care system, setting up purposeful best practices in pharmacy curriculum development. This requires more than ever exchanges of faculty members, staff, professional and graduate students; effective pharmacy practice models; resolving regulatory issues, and other primary pharmacy fields. Several organizations such as World Health Organization (WHO), American Pharmacy College Associations (APCA) [5], International Pharmacy Federation (FIP) [6,7], and Global Pharmacy [8]are working on various aspects of drug safety and education. Pharmacists in many countries are too few and trained to a critically inadequate scale [9]. WHO estimated the current shortage of more than 4 million health professionals [10]. Fifty-seven countries fall below the WHO threshold of 2.5 health professionals per 1000 population, which has a negative impact on health outcomes [11]. Pharmacists and pharmacy support personnel are willing, competent, and cost-effective providers of public health and pharmacy care interventions. Internationally, there is wide acknowledgment of the underutilization of the pharmacy workforce for public health roles [12-15].

Pakistan and China have a long history of friendship and cooperation in many fields. Their relationship based in all spheres of life on the principle of equality and mutual interest [16].According to the officials from the Chinese and Pakistani Ministry of Education (MOE), China is the most popular destination for Pakistani students; about 25,000 students are currently enrolled in various Chinese universities. Education cooperation is Pakistan's need of the hour, as quality education is the main concern [17]. The Belt and Road Project helped governments to work together. With this initiative, Pakistan's students are studying in China. To further strengthen and develop cooperation, it is very important to understand the education system of both countries, especially the pharmacy education system.

This study aimed to discuss and compare the history, education system, and existing problems of the pharmacy education system in China and Pakistan. This is the first time the pharmacy education system of both countries was discussed and compared. On these points of discussion, we have suggested some solutions and points of cooperation between the two neighboring countries.

THE DEVELOPMENTAL HISTORY AND CURRENT STATUS OF THE PHARMACY EDUCATION SYSTEM IN CHINA AND PAKISTAN

The branch of medicine and pharmacy in China was the first in the world, which existed as early as in the 1st century A.D. Nonetheless, medicine and pharmacy in China was always been a unified, not separated into two professions. In China, traditional pharmacy education has a long and extensive history, which began from Southern and Northern Dynasties. The cultivation of traditional pharmacy talents long followed the "father to son" and "teacher to apprentice" education mode. In 1908, an Army Medical School in Tianjin provided set up for the pharmacy department of a 3-year education system and then the pharmacy education system in China has become an independent education subject, which is separate from medicine [18]. The government took out the reforms for education institutes according to requirements of the department's construction (1952). "Cultural Revolution" in 1965, brought 11 pharmacy institutes across the whole country. Whereas in 1987, the State Education Commission delivered the revised "professional catalog", which explained that 11 majors (pharmacy, pharmacology, pharmacy preparations, pharmaceutical analysis, traditional Chinese pharmacy, pharmaceutics of Chinese medicine, chemical pharmaceutics, identification of Chinese medicine, chemical pharmaceutics, bio-pharmaceutics, microbial, pharmaceutics) for pharmacy undergraduates. In 1998, the MOE officially promulgated "*The Catalogue of Undergraduate Majors in General Colleges and Universities"*, which compressed and readjusted the pharmacy major. There were pharmacy, pharmaceutical preparation, and traditional Chinese pharmacy under the medicine category and pharmaceutical engineering under the engineering category after its readjustment [19]. At the end of 2016, 458 general universities counted with pharmacy undergraduate students in China, plus103 medical universities, 137comprehensive universities, 66 normal universities, 2 forestry universities, 101 polytechnic universities,11 ethnic universities, 10 financial universities, and 28 agricultural universities.

In the subcontinent region the herbal and traditional medicines were being practiced and used as health additives. The advent of pharmacy in Pakistan dates back to the practice of traditional medicines as health remedies in the Mughal Empire. After the

Mughals, the subcontinent was governed by the British. British Government was the first in familiarizing pharmacy programs in the subcontinent region. Under the British rule the pharmacy education system advanced in the subcontinent. In 1937 in Banaras Hindu University first pharmacy program started. After partition in 1947, the Government of Pakistan established the first College of Pharmacy in 1948 at the University of Punjab for the bachelor degree program. In 1964, the department of pharmacy was established at the University of Karachi. Initially, the pharmacy program was of 3 years. Through 1978-79 this3-year program was transformed into a 4-year bachelor program (B.Pharm). The B.Pharm program was primarily focused to cover the compounding services and industrial demands[20]. After 2000, an immediate shift occurred in the pharmacy education system due to the paradigm shift of pharmacy scope from industry towards the clinical practice. To meet international standards and requirements of the clinical pharmacist, the Higher Education Commission (HEC) of Pakistan has changed the 4 year B. Pharm degree into a 5 year Doctor of Pharmacy (Pharm. D) program. Pharm-D program is being practiced unanimously in all over the Pakistan [21]. Currently, there are 20 public and 23 private institutes offer a Pharm-D degree and at present4325 students are enrolled in a graduate degree program in different private and public universities of Pakistan [22].

China and Pakistan had a strong historical pharmacy background. It evolved from the traditional medicine towards the industrial revolution and then from industrial towards the clinical. Both countries are facing equal challenges to shift the program towards the clinical implications. So, a better understanding and cooperation based on the strong historical background between the two countries will strengthen and broaden the scope of pharmacy in the Asian continent.

PHARMACY EDUCATION SYSTEM OF CHINA

The comprehensive higher pharmacy education system in China has been fundamentally formed and the degree level structure has also been changed as the increasing number of pharmacy institutes. The pharmacy degree courses include Junior college degree, bachelor degree, master degree, and Doctoral degree, forming a complete model of higher vocational education and continuing education. In this article, we mainly focused on the bachelor degree program.

Bachelor degree in pharmacy in China

Bachelor's degree in pharmacy is awarded to those students who have completed 4 or 5 years of regular study including basic theory, practical skills, passing course examination, and completing graduation practice. There are two types of bachelor's degrees in China, Bachelor of Science (BS) and bachelor of medicine (BM). These degrees are awarded according to various research or application in pharmacy disciplines. According to the last undergraduate program catalog issued in 2012 by the MOE, there were 8 kinds of graduate program registered in China, such as Pharmacy, Pharmaceutical Science, Traditional Chinese Pharmacy, and 5 relatively novel ones, Pharmacy Administration, Clinical Pharmacy, Pharmaceutical Analysis, Pharmaceutical Chemistry, and Ocean Pharmacy. At the end of 2017, MOE approved 44 institutes to set up the clinical pharmacy branch. In 2018, the MOE issued a national standard for teaching quality of which instructs that duration of schooling of clinical pharmacy shall be 5 years called Bachelor of Science [23].

Objectives: Training objectives of the bachelor pharmacy program are to promote pharmacy talent with upright humanistic and moral qualities, comparatively solid basic experimental skills in pharmacy. Pharmacy graduates are supposed to possess abilities to analyze comprehensively and resolve pharmacy problems and to enable for engaging comprehensively in pharmacy management, pharmacy services, and scientific research. These also include training the professionals and advanced thinking of clinical pharmacy to engage with rational drug use in pharmacy care.

Curriculum: In China the curriculum of pharmacy generally takes medicine and chemistry as the fundamentals of pharmacy education. The compulsory subjects mainly comprise of organic chemistry, inorganic chemistry, pharmaceutics, pharmaceutical analysis, analytical chemistry, and pharmacology. The non-compulsory subjects mainly include molecular biology, toxicology, traditional Chinese pharmacy, toxicology, molecular biology, etc. The applied courses include pharmaceutical analysis experiments, analytical chemistry experiments, organic chemistry experiments, etc. Additionally, many colleges and universities arrange seminars, employment guidance, academic lectures, and similar essential links.

Previously, there were not any accreditation standards for clinical pharmacy degrees in China. Every college had established its clinical pharmacy course. In many colleges, Pharm-D courses in pharmacy institutes in the United States were taken as standard during the establishment of the clinical pharmacy curriculum in China. However in comparison with the Pharm-D degree program in

the United States, the curriculum of clinical pharmacy in China persisted more traditional. The subjects were separately set as different course levels for every academic year, rather than as courses that run over complete academic years from low to high level. Though some institutions improved their program and courses while setting new clinical pharmacy programs, trying to modify curriculum structure towards the advanced integrated course model, which can be challenging when the remaining of the education system runs traditionally [24].The requirements for the curriculum of clinical medicine are also comprised of medical ethics, internal science, doctor-patient communication, diagnostics, pediatrics, and related skills, etc. Furthermore, in comparison with the general pharmacy specialty, the clinical pharmacy has more requirements for the practical coaching links, as practice courses which are not less than 600 credit hours, internships which may not less than 2 weeks, while graduation internships may not less than 42 weeks and also social internships.

According to the evaluation report of Chinese Universities and Disciplines (2017-2018), 211 universities having a score of more than 4 stars, 985 universities with a score of 3 stars. The universities offering the clinical degree programs, their evaluation, and the majors courses taught in these universities were given in table 1[25].

Table.1 Evaluation and major courses of clinical pharmacy

Universities	Type of Degree	Evaluation	Major Courses
China Pharmaceutical University	Bachelor of Science (Five Years）	5★	Inorganic Chemistry, Analytical Chemistry, Organic Chemistry, Biochemistry, and Molecular Biology, Microbiology, Anatomical Physiology, Natural Clinical Pharmacotherapeutics, Clinical Pharmacotherapeutics, Pharmacy Analysis, Pharmacology, Pharmaceutics, Clinical Pharmacokinetics, Cell Biology, Drug Toxicology, Pathophysiology, Diagnostics, Internal Medicine, Surgery, Gynecology, Paidology, Clinical Pharmacology, Clinical Pharmacotherapeutics, Pharmacoeconomics, Hospital Pharmacy, Hospital Pharmacy Regulations, Medical Ethics
Sichuan University			Medical Biology, Anatomy, Histology and Embryology, Microbiology and Immunology, Biochemistry, Physiology, Pathology, Pharmacology, Diagnostics, Internal Medicine, Surgery, Gynemetrics, Paidology, Traditional Chinese Medicine , Ophthalmology, Otorhinolaryngology, Psychiatry, Evidence-Based Medicine, Preventive Medicine
China Medical University			Inorganic Chemistry, Organic Chemistry, Analytical Chemistry, Physical Chemistry, Anatomy, Biochemistry, Physiology, Diagnostics, Internal Medicine, Surgery, Clinical Pharmacotherapeutics, Natural Clinical Pharmacotherapeutics, Pharmacy Analysis, Pharmacy Botany and Pharmacognosy, Pharmaceutics, Pharmacology, Clinical Pharmacokinetics, Clinical Pharmacology, Pharmacotherapeutics, Research and Development of New Drugs
Nanjing Medical University		4★	Medical Physics, Basic Chemistry, Organic Chemistry, Physiology, Biochemistry, Medical Microbiology, Medical Immunology, Diagnostics, Pharmacology, Clinical Pharmacotherapeutics, Pharmaceutics, Pharmacy Analysis, Drug Toxicology, Internal Medicine, Clinical Pharmacokinetics, Clinical Pharmacology, Clinical Pharmacotherapeutics, Hospital Pharmacy Management
Shenyang Pharmacy University			Organic Chemistry, Analytical Chemistry, Biochemistry, and Molecular Biology, Microbiology and Immunology, Clinical Pharmacotherapeutics, Pharmacy Analysis, Drug Analysis in Vivo, Pharmacology, Pharmaceutics, Anatomical Physiology, Pathology and Pathophysiology, Diagnostics, Internal Medicine, Surgery, Clinical Pharmacology, Introduction to Clinical Medicine, Clinical Pharmacotherapeutics, Clinical Drug Evaluation, Clinical Pharmacokinetics, Pharmacy Management and Regulations
Anhui Medical			Physiology, Pharmacology, Organic Chemistry, Pharmacy

University		Analysis, Pharmaceutics, Clinical Pharmacotherapeutics, Pharmacy Management, Clinical Pharmacology, Clinical Pharmacotherapeutics, Biopharmaceutics, Pharmacokinetics, Systematic Anatomy, Biochemistry, Pathogenic Biology, and Immunology, Biopharmaceutics
Nanchang University	3★	Clinical Pharmacotherapeutics, Analytical Chemistry, Pharmaceutics, Pharmacy Analysis, Systematic Anatomy, Physiology, Biochemistry, Pathophysiology, Pharmacology, Clinical Pharmacokinetics, Clinical Pharmacology, Clinical Pharmacotherapeutics, Diagnostics, Internal Medicine, Surgery, Hospital Pharmacy, Pharmacy Management, Drug Toxicology
Tianjin Medical University		Pharmacology, Clinical Pharmacotherapeutics, Pharmacy Analysis, Pharmaceutics, Biopharmaceutics, Pharmacokinetics, Pharmacy Management, Internal Medicine, Surgery, Gynemetrics, Paidology, Lemology, Neurology, Psychiatry, and Medical Psychology, Diagnostics, Diagnostics, Clinical Pharmacology, Clinical Pharmacotherapeutics, Clinical Pharmacokinetics, Drug Analysis in Vivo, Pharmacoeconomics, Pharmacoepidemiology, Clinical Communication and Communication Skills, Clinical Drug Evaluation, Pharmacogenetics, Molecular Biology, Pharmacy Research Design, Social Pharmacy, Drug Toxicology, Drug Design
Shandong University		Inorganic Chemistry, Organic Chemistry, Analytical Chemistry, Physical Chemistry, Biochemistry, Molecular Biology, Medical Microbiology, Medical Immunology, Anatomy, Physiology, Pathophysiology, Biopharmaceutics, Pharmacognosy, Medical Ethics, Doctor-Patient Communication and Skills, Clinical Pharmacotherapeutics, Pharmacy Analysis, Pharmaceutics, Pharmacology, Clinical Pharmacology, Clinical Pharmacokinetics, Clinical Pharmacotherapeutics, Pharmacy Management
Jilin University		Inorganic Chemistry, Organic Chemistry, Methods of Medical Mathematical Statistics, Anatomy, Histoembryology, Physiological Anatomy, Biochemistry, Anatomy, pathology, Medical Immunology, Medical Microbiology, Pharmacology, Internal Medicine, Surgery, Gynemetrics, Paidology, Diagnostics, Drug Toxicology, Pharmacy Management, Clinical Pharmacotherapeutics, Pharmacy Analysis, Pharmaceutics, Biopharmaceutics and Pharmacokinetics, Clinical Pharmacology, Clinical Pharmacotherapeutics

Admission

Those candidates who have finished their high school or got a diploma for graduation can appear in ordinary high school or students who have the same degree can attend the higher school admission examination on June 7th-8th every year. The MOE organizes a unified scoring process, students according to their grade scan apply to universities and select their majors and the universities will then set up a minimum admission score for each major. The universities of pharmacy major recruit science students whose scores reach the standard.

To summarize the whole information, the BS and BM are the two major degrees awarded by different universities under the regulation of MOE to their pharmacy graduates. The clinical program is either 4 years and in some universities are the 5 years. The basic admission criteria in pharmacy institutes are the school certificate with science and passing marks in the annual admission examination organized by MOE. The curriculum is designed based on degree programs and comprised all major courses from drug development to patient care. It is better to say that the pharmacy education system of china is much related to drug development and safety and now forwarding towards the clinical pharmacy and patient care.

PHARMACY EDUCATION SYSTEM IN PAKISTAN

The pharmacy education system of Pakistan comprised upon the five-year bachelor degree program (Pharm. D), two years master's degree program (M.Phil) and three-year doctoral program (Ph.D.) in different pharmacy disciplines. The Pharmacy Council of Pakistan (PCP) established under the provision of the Pharmacy Act 1967

regulates the education and practice of pharmacists in Pakistan [26]. This is also responsible for the registration and for issuing the license to start a pharmacy program in universities.

Bachelor degree of pharmacy in Pakistan

HEC of Pakistan introduced a five-year degree program for bachelor degree students. The pharmacy syllabus from 4 years bachelor of pharmacy (B Pharm) degree revised and converted into a 5 year Pharm. D program in 2003. Currently, Pharm. D is the only basic degree program offered in Pakistan by universities for bachelor studies.

Objectives: The objectives of Pharm. Dis to educate graduates having the capability, updated knowledge, firm ethical and moral values, good social behavior, better communication, advanced writing skills which enable them to pursue their careers in:

1. "Pharmacy care" in the health care system and community for patient's safety appropriate medication practice.
2. Academia, research and development.

Curriculum: PCP is responsible for the curriculum setting according to the pharmacy act (1967). PCP has approved Pharm.D degree and curriculum in the year of 2003. After 10 years, this curriculum was reviewed and revised to focus more on industrial programs to clinical, patient-oriented programs [22]. The revised curriculum of Pharm. D (Table. S1) comprised five major disciplines i.e: Pharmaceutics, Pharmacy chemistry, Pharmacology and pharmacy practice. For further, these courses are divided into their respective major disciplines. This curriculum comprised of all major subjects.

Admission: The minimum academic qualifications for securing admission to the First Professional degree are:

1) The candidate should have passed the Intermediate Science Examination (F.Sc) in the Pre-Medical category, or an equivalent exam from Board of Intermediate and Secondary Education (BISE) in Pakistan; or candidate should have passed an exam from a foreign examining body equivalent to Intermediate Examination in Pakistan. Equivalence is to be decided and granted by the Inter Board Committee of Chairmen (IBCC) Pakistan.
2) The candidate should have passed a higher exam of Pakistani universities with Biological Sciences providing that he has passed the Intermediate Exam (Pre-Medical category) from a BISE Pakistan. The admissions approved on this criterion will not exceed more than 10% of the total seats available.

So briefly in Pakistan 5 year Pharm.D program is uniformly followed in all universities of Pakistan. The basic admission criteria are intermediate examination and evaluation exams by universities. The curriculum of Pharm.D is multidiscipline which is comprised of all major courses. The pharmacy bachelor degree program is under the transition and development phase and more efforts and cooperation are needed for the betterment of the pharmacy professional program.

Comparison of the pharmacy education system:

The historical advancement of the pharmacy profession in China and Pakistan was very old, traditional, and strong, since the start of the industrial era from the 19th century. After the Chinese revolution and independence of Pakistan from the British, the pharmacy education system of both countries started to nourish and initially focused on industrial needs. After paradigms shift in pharmacy scope (2000), the education system was changed from drug development to patient care. China and Pakistan tried to focus more on clinical programs. China started its clinical programs after the year of 2000, but still there is no unanimous curriculum and program in the whole country. A Bachelor degree in pharmacy is further divided into three major programs. Various programs and courses are offered by different universities. After the issuance of the National Standards of Under-graduate Professional Teaching Quality in 2018by MOE, the requirements for clinical pharmacy settings have formally been unified. Currently, the clinical pharmacy system of China constitutes a 05 years training model, where the four-year system run by universities and colleges had gradually been adjusted. Conversely, the theoretical clinical medicine system is complicated relatively and changeable, which requires higher abilities for clinical workers.

In comparison to China, Pakistan has a unified degree program and it is implemented in all universities. This unified curriculum is quite advantageous for Pakistani students and is a need of the day. Pharm-D is recognized in the whole world and students having this degree are eligible to apply for registration abroad. But unlike China, this degree program is very inflexible and not any specialization is being offered for bachelor students. All major subjects were taught, but not specialized and expert in a single one. Pharm-D syllabus is in a transition state from industry towards patient care system. Nonetheless, improvements should be encouraged for therapeutic and clinical courses. However, this is also a fact that the Pharm-D program even in the US, took many years to develop fully. Through cooperation, both countries can develop and progress their pharmacy education system and can overcome these challenges.

EXISTING PROBLEMS OF PHARMACY EDUCATION SYSTEM

The decline of training and quality education caused by blind enrollment expansion

In recent years, the pharmacy education system has sustained a speedy growth pace may be due to little market demands and employment difficulties of talents. However, the faculties in some universities and colleges are in a lag state not meeting the teaching requirements, management systems, education systems, particularly in some new immature majors. This has led to an uneven level of running in institutions, and the cultivation of some pharmacy talents is not up to the standards, this affects the overall excellence of pharmacists training to some extent in both countries.

The weakening differentiation between academic degree and professional degree

The professional degree has been led by the direction of professional practice, but universities and colleges do not distinguish the cultivation of professional program from the academic degrees. For completing the graduation thesis which is the requirement of the degree, the cultivation of students not necessarily focus on practical capability and internal quality assurance standards, external environmental support, and related systems, which are not so perfect and fails in achieving the expected results [27].

The separation of medical, chemistry and pharmacy discipline

In the past, pharmacy education generally belonged to the medical colleges that focused on chemistry that resulted in an academic framework for "giving emphasis to chemistry, but neglecting management and medicine". Mainly teaching and research sectors of many pharmacy colleges are chemistry, like analytical chemistry, natural pharmacy chemistry.

Though, new hospitals require interdisciplinary pharmacy talents which are better at hospital pharmacy management and require the reforms of the pharmacy education system. The training plans for numerous education levels, the sub-divisions of pharmacy administration, and research are comparatively complete, but the cultivation of pharmacy services is low. Medical and Pharmacy education is separate and lack the inter-disciplinary integration, specialized practicing experience, training, and guidelines for pharmacy services, resulting in clear knowledge of the trained pharmacy talents. So, graduates of pharmacy colleges possess strong research and development abilities but their contributions and competencies in hospitals and social drugstores are relatively low due to lack of training for providing direct services to patients. To comply with these reforms, Pakistan followed the American and European pharmacy education model, and made parallel forms; amendments are made and familiarized with the Pharm-D program into domestic pharmacy higher education and introduced a Pharm. D degree into pharmacy higher education. However, the current pharmacy education model in Pakistan still faces numerous challenges in practical research work. At the same time, few universities and institutes in China have added majors in clinical pharmacy. Lack of patient-oriented pharmacy education courses makes the graduation pharmacists still incapable to meet the actual clinical needs [20]. The overall pharmacy education still has an outdated pharmacy education concept and many institutes and universities usually face the problem to focus too much on chemistry subject and drug research areas [28].

CONCLUSION AND SUGGESTIONS

In this study we have discussed the historical development, pharmacy education system, and challenges of both countries in the field of pharmacy education. China and Pakistan's pharmacy education system is in the transit phase from industrial towards patient care and clinical. Both countries are facing some challenges in quality education. To meet the international requirement and to further strengthen the relationship in the pharmacy education sector both Governments need to mutually cooperate. The quality of education can be improved by the faculty exchange program. A uniform curriculum and unified pharmacy program must be developed by coordination between both countries. To meet the shortage of pharmacists in the community and clinical sectors, Governments should form a policy to practice their graduates in both countries. Governments need to introduce clinical pharmacists in government hospitals and effectively deploying human resources to grow the career of pharmacy professionals. Governments should introduce Clinical pharmacists in the public health sector and board in deciding alarming diseases. So, this study will be valuable for researchers and policymakers to understand the education system and problems of both neighboring countries.

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REFERENCES

1. Audus KL, et al. Going global: the report of the 2009–2010 research and graduate affairs committee. Am J Pharm Educ 2010; 74(10) : Article S8.
2. A survey of current global affiliations of US colleges and schools of pharmacy: 2010. http://www.aacp.org/. (Accessed May 30, 2012).
3. Anderson C, et al. The Who UNESCO FIP pharmacy education task force: enabling concerted and collective global action. Am J Pharm Educ 2008; 72(6): Article 127.
4. First International Congress on Clinical Pharmacy education. Am J Pharm Educ 1976; 40:365.
5. Bruno A, et al. Towards a global competency framework. Am J Pharm Educ 2010; 74(3): Article 56.
6. The basel statements on the future of hospital pharmacy. Pharm Times 2010; 42(10):15-20.
7. Anderson C, Bates I, Beck D. Action! Update on the global pharmacy education consultation. Intl Pharm J 2008; 22:6-8.
8. Anderson C, Bates I, Beck D. FIP roundtable consultation on pharmacy education: developing a global vision and action plan. Intl Pharm J 2006; 20:12-13.
9. Chan XH, Wuliji T. Global pharmacy workforce and migration report. International Pharmacy Federation (FIP); 2006. Available at http://www.fip.org/hr. (Accessed November 11, 2008).
10. World Health Organization. The world health report 2006: working together for health. 2006. Available at: http://www.who.int/whr/2006/en/. (Accessed November 11, 2008).
11. Working group on access to Essential Medicines. Prescription for healthy development: increasing access to medicines. Report of the Task Force on HIV/AIDS, Malaria, TB and Access to Essential Medicines. UN Millennium Project; 2005. Available at: http://www.unmillenniumproject.org/reports/tf_essentialmedecines.htm. (Accessed November 11, 2008).
12. Ward K, Butler N, Mugabo P. Provision of syndromic treatment of sexually transmitted infections by community pharmacists: a potentially underutilized HIV prevention strategy. Sex Transm Dis 2003; 30:609-13.
13. Blenkinsopp A, Anderson C, Armstrong M. Systematic review of the effectiveness of community pharmacy-based interventions to reduce risk behaviors and risk factors for coronary heart disease. J Pub Health Med 2003; 25:144-53.
14. Mayhew S, et al. Pharmacists' role in managing sexually transmitted infections: policy Issues and options for Ghana. Health Policy Plann 2001; 16:152-60.
15. Brock T, Taylor D, Wuliji T. Curbing the global tobacco pandemic: the global role for pharmacy. International Pharmacy Federation (FIP) and School of Pharmacy, University of London; 2007. Report No: 5. Available at: http://www.pharmacy.ac.uk/fileadmin/documents/News/etp.pdf. (Accessed November 11, 2008).
16. Kataria JR, Naveed A. Pakistan-China social and economic relations. Res J South Asian Studies 2014 ;29(2): 395-410.
17. Hussain K, Hashmi FK. Standardization in the evaluation system of Pakistan's Pharmacy Institutes. Am J Pharm Educ 2011; 75(8).
18. Ye X. The last education chief of military medical colleges- Dr. Zhang Jian (I) [N]. Chicago Chinese News, 2006; 06-30.
19. Peng S. Chinese pharmaceutical year book. Beijing: People's Medical publishing House, 1985: 143.
20. Khan T. Challenges to pharmacy and pharmacy practice in Pakistan. Aus Med J 2011; 4(4): 230.
21. Malhi S, et al.Current status and future suggestions for improving the Pharm. D curriculum towards clinical pharmacy practice in Pakistan. Pharmacy 2017; 5(3):46.
22. Pharmacy Council of Pakistan: http://www.pharmacycouncil.org.pk/. (Accessed January 13, 2020)
23. Tan Q, et al. Talent cultivation model of clinical pharmacy professionals in our university. J Central South Pharmacy 2019; 17(2):308-312.
24. Hu M, et al. Development and current status of clinical pharmacy educationi in China. Am J Pharm Educ 2014; 78 (8):1-8.
25. Qiu J, et al. Evaluation report of Chinese universities and disciplines Science Press, 2017.
26. Jamshed S, Baber ZUD, Masood I. The Pharm.D degree in developing countries. Am J Pharm Educ 2007; 71(6).
27. Babar ZUD. Pakistan national university of pharmacy sciences. Am J Pharm Educ 2006; 70(5): 2-4.