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Country Report: Pharmacy education and practice in the context of Mongolia

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Abstract

With the decentralisation of the Soviet Union system, Mongolia has gone through many challenges. The pharmaceutical sector has been privatised and over 80% of drugs are imported with Mongolia largely depending on international sources. Pharmacy education was traditionally orientated towards industry and product formulation. Most pharmacy graduates would seek positions in pharmaceutical marketing or industry. This has resulted in a shortage of pharmacists in other sectors. Pharmacy education has been acknowledged to be one of the important issues to be addressed in Mongolia. In order to improve the quality of the education and keep up with international standards, including Japan and the United States of America, the pharmacy curriculum has been revised seven times. A recent revision of the curriculum now includes clinical pharmacy and pharmacy practice. However, little information has been published describing pharmacy education in Mongolia. The information presented in this report may create discussion and critical analysis and planning, and it is hoped to be useful for further modification of pharmacy programmes to achieve desired educational outcomes.

Keywords: *Pharmacy Education, Clinical Pharmacy, Pharmacy Practice, Mongolia*

Introduction

Mongolia is a central Asian country located between Russia to the north and China to the south. With a vast land area and small population (a little over three million people), it is ranked the 19th largest country and one of most sparsely populated fully sovereign countries in the world (Central Intelligence Agency, 2017).

Pharmacy education in Mongolia began with the establishment of a Department of Pharmaceutical Technology of the Medical Institute of National University of Mongolia in 1961. At that time the curriculum was a combination of pharmaceutical chemistry, technology, phytochemistry and analytical chemistry. In 2002, the first National Medicines Policy of Mongolia (NMPM) was approved by Parliament and the last revision was approved in 2014 (Government of Mongolia, 2002). The Law on Drugs and Medical Devices was first passed in 1998 and subsequently amended twice, with the last revision being approved by the Parliament in 2010 (Government of Mongolia, 1998). Legal provisions were enacted establishing the nation's first minimum standard of educational qualifications for pharmacy practice, to regulate the practice, education and the profession of pharmacy. Provisions in the legislation and rules regarding pharmacy education are implemented through the Ministry of Health, Ministry of Education, Culture, Sciences and Sports (MECSS) of Mongolia, and the Government Agency for Specialised Investigation (Dorj *et al*., 2017). Mongolian is the official language of training at all pharmacy institutions in Mongolia (Government of Mongolia, 2014b).

Educational programmes

To practice as a pharmacy technician a Diploma in Pharmacy (Pharmacy Technician) is required. The pharmacy technician programme requires a minimum of three years study of diploma coursework which is offered at five institutions. Pharmacy degree programmes offered at Mongolian tertiary institutions include the Bachelor of Pharmacy (B.Pharm.), Master of Pharmacy (M.Pharm.) and Doctor of Philosophy in Pharmacy (Ph.D.). The entry point for the B.Pharm. is 12 years of formal education with the following requirements in secondary

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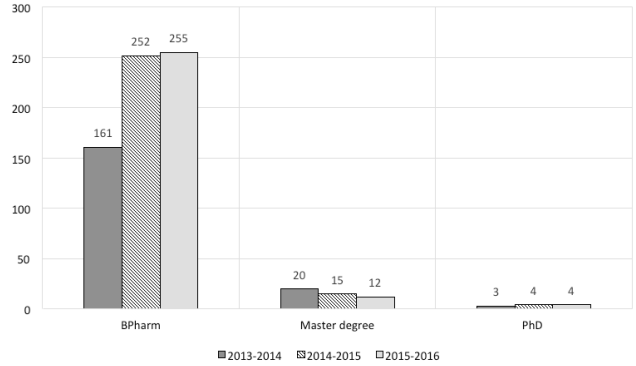
education sciences to enter: chemistry, biology and physics. The B.Pharm. requires five years of study at a university. Students who obtain a B.Pharm. degree can complete an M.Pharm. degree course in two years, of which the last year must be focused on research leading to a dissertation in any pharmaceutical discipline, including pharmaceutics, pharmacology, pharmaceutical chemistry, and pharmacognosy. Students with an M.Pharm. degree can enter the Ph.D. programme with a minimum of three years of study and research. Pharmacy technicians with an extensive training at practice sites can also work towards a B.Pharm. degree with an additional three years of coursework.

Growth of the pharmacy institutions

Since the establishment of the Pharmacy Department at the Medical Institute, it has expanded into the School of Pharmacy, Mongolian National University of Medical Sciences (MNUMS). Currently, there are three institutions offering the B.Pharm. degree and higher degrees, in addition to the five institutions that offer pharmacy technician degrees in Mongolia. Only one of them is a public entity (MNUMS) which offers all degree programmes including the B.Pharm., M.Pharm., Ph.D. in Pharmacy as well as training pharmacy technicians. The remaining four institutions are all private, including University of Pharmaceutical Sciences (former: Monos University), Etugen University, Shine Anagaakh Ukhaan University, and Otoch Mamba University. In 2016, 255 graduates received B.Pharm. degrees and approximately twelve received M.Pharm. and four Ph.D. degrees in pharmacy (Ministry of Health Mongolia, 2016). The following graphical data describes the graduates by the degrees conferred for the period from 2013 until 2016 (Figure 1).

Figure 1: Number of pharmacy degrees conferred between 2013-2016



Admission criteria

Entry qualifications for pharmacy programmes vary in accordance to the degree programme. Both public and private institutions have direct formal application processes. The number of applicants is established by the MECSS based on the statistics and workforce requirements.

B.Pharm. programme

Admission to the first-year

The admission to the B.Pharm. programme is made directly from secondary school on the basis of marks that were obtained in the general entrance exam for both public and private institutions. The general entrance exam is an official graduation examination managed by the MECSS and all students who intend to continue further education at a higher level, *i.e.* university, have to undertake this examination. Grades scored in the general entrance examination are the only criterion in the selection process of students.

In general, applicants who rank higher on the list enter B.Pharm. programmes at public institutions and students with lower scores would select B.Pharm. programmes in private institutions (Khadkhuu, 2015).

Licensed pharmacy technicians with required professional experience are allowed to enter a special B.Pharm. degree programme for three additional years at university and become registered pharmacists.

M.Pharm. programme

The criterion for entry to an M.Pharm. programme is academic achievement of a Grade point Average (GPA) more than three in the B.Pharm. and an entrance test jointly undertaken by the MECSS and the institution. Currently, the M.Pharm. programme is only offered at the Mongolian National University of Medical Sciences (public) and the Mongolian University of Pharmaceutical Sciences (private). The availability of scholarships is limited; hence the majority of students are self-funded during their whole M.Pharm. period of study (Mongolian National Council for Education, 2017).

Ph.D. programme

Applicants with a minimum of an M.Pharm. or M.Phil. degree in pharmacy can apply for the Ph.D. programme which requires undertaking an entrance test of professional subjects and a foreign language test, Russian or English. The entrance test is set by the institution and the number of students is also set by the institution.

Pharmacy Technician programme

Admission to a pharmacy technician programme is on the basis of successful completion of secondary

education. Passing the secondary examination with physics, chemistry, and biology or mathematics entitles a student to enter the pharmacy technician programme. The duration of the programme is three years and graduates can become registered pharmacy technicians in Mongolia.

Regulations and Quality Assurance

Pharmacy education in Mongolia is regulated by the MECSS, under the Standard of Higher Education, approved by the MECSS, No.390, 2010. The MECSS is responsible for regulations regarding the minimum standard of education required for qualification as a pharmacist or a pharmacy technician. The Ministry of Health is the organisation in charge of registration of persons fulfilling the prescribed eligibility criteria and issues a license permitting them to practice in Mongolia. Registration functions are centralised and all pharmacists are required to be registered with the Ministry of Health (formerly the Ministry of Health and Sports). Higher degree programmes, including the M.Pharm. and Ph.D. are regulated, registered ad awarded by the MECSS of Mongolia.

Pharmacy education at all levels is regulated by the MECSS and it approves the programmes. The MECSS of Mongolia is mainly responsible for planning, formulating and maintaining norms and standards in technical education, including pharmacy.

As mentioned earlier, pharmacy practice is regulated by the NMPM which was last revised in 2014. The NMPM controls the manufacture, distribution and sale of drugs. Clinical pharmacy practice is also regulated by the NMPM and the Model Regulation for Hospital Pharmacy Department (Ministry of Health, Mongolia, 2016).

The accreditation of pharmacy programmes is completed by the National Board of Accreditation of Mongolia (NBAM), Government of Mongolia (Government of Mongolia, 2014b; Mongolia Lo., 2002; Mongolian National Council for Education Accreditation; 2014). All B.Pharm. programmes have been accredited by NBAM. Accreditation is performed on a voluntary basis; however the process is straightforward; hence all institutions have applied and all have been accredited (Mongolian National Council for Education Accreditation, 2014). Current regulations require all pharmacists and pharmacy technicians to participate in continuing pharmacy training to maintain their licensure (Ministry of Health Mongolia, 2008). Pharmacists are required to complete six credit hours whereas pharmacy technicians have to undertake three credit hours per year in order to extend their license to practice in the pharmaceutical sector (Ministry of Health Mongolia, 2008). On the other hand, once an applicant is registered as a pharmacist, there are no established norms for competency of service. There is no categorisation of practicing and non-practicing pharmacists.

Table I: Overview of the B.Pharm. Degree Curriculum, Mongolian National University of Medical Sciences

Year	Subjects
1	Anatomy I, Communication Skills, Medical English, Mongolian Language and Stylistics, Medical Physics, Biology, Applied Mathematics, Health Management, Histology I, History of Mongolia, Culture and Tradition, Medical Chemistry I, Medical Chemistry II, Human Development and Ethics, Philosophy, Sports and Physical Education, electives: Theory of Economy, Psychology, Ecology and Environmental Health, English, Foundation in Sociology, Information Technology and Information System
2	Anatomy II, Histology II, Physiology I, Physiology II, Pathology, Pathophysiology, Human Embryo physiology, Biochemistry, Microbiology, Immunology, Molecular and Cellular Biology, Medical Genetics, Foundations in Public Health, Pharmacology I, Diagnostics, Laboratory, Diagnostic Imagining, Professional Skills, Introductory Practice, Pharmaceutical Raw Materials
3	Botany, Pharmacognosy I, Pharmacognosy II, Mongolian Traditional Medicine and Raw Materials, Technology of the Mongolian Medicine, Pharmaceutical and Hospital Commodity Research, Pharmacology II, Biostatistics, Epidemiology, Foundations in Preventive Medicine, Pharmaceutical Technology I, Pharmaceutical Chemistry I, Pharmaceutical Chemistry II, Toxicology electives: Tibetan Language, Phytochemistry, Pathobiochemistry
4	Pharmacotherapy I, Pharmacotherapy II, Clinical Pharmacology, Foundations in Biopharmacy and Pharmacokinetics, Medicinal Plant Resources, Pharmaceutical Technology II,Pharmacoeconomics, Pharmaceutical Analysis, Pharmacy Administration, Clinical Pharmacy I, Pharmaceutical Marketing I, Pharmaceutical Care, electives: Pediatric Pharmacy, Geriatric Pharmacy, Pharmacoepidemiology,
5	Pharmacotherapy III, Technology of Galenics, Drug Quality Control, Pharmaceutical Technology III, Drug Quality Assurance, Pharmaceutical Marketing II, Clinical Pharmacy II, Quality Control in Drug Industry, Pharmaceutical Technology IV, Botanical Biotechnology, Technology of Cosmetics and Hygiene Products, Practice: Botany, Pharmacognosy, Community Pharmacy, Pharmaceutical Technology

Curriculum

The B.Pharm. curriculum of the MNUMS has been revised a total of seven times since inception. The basic pharmacy courses of the programme consisted mostly of traditional content, some of little practical value.

Until 2008, the programme was orientated towards the industry and product formulation and manufacture. The curriculum revision is aimed to standardise the programme at an international level, however as stated by others such quality assurance is yet to be achieved (Khadkhuu, 2015).

The programme includes a mix of science (such as mathematics, physical chemistry, inorganic chemistry, and organic chemistry), advanced chemistry and analysis (such as biochemistry, medicinal chemistry, and analytical chemistry) and pharmacy (such as

pharmaceutics, pharmacology, pharmacognosy, clinical pharmacy and pharmacy law). The B.Pharm. degree curriculum of the MNUMS is detailed in Table I.

The curriculum has 18 laboratory components (82% of theory course work). In addition, it devotes approximately 40% to the areas of chemistry and analysis related subjects.

Employment

The B.Pharm. and pharmacy technician programmes were developed and designed to train students to serve as institutional and community pharmacists. Pharmacists with a B.Pharm. degree or pharmacy technicians are eligible to work in a community pharmacy (private), hospitals (either public or private) or in the pharmaceutical industry (private).

In community pharmacies, B.Pharm. holders are eligible to be employed as dispensing pharmacists or pharmacy managers (owners) whereas the pharmacy technicians are allowed to work as technical staff that prepare and compound certain prescriptions. Pharmacy technicians are not eligible to dispense prescriptions. Industrial pharmacists are eligible to work as pharmacists in charge of quality control, pharmacy managers or pharmaceutical representatives. Pharmacy technicians can work as compounding or sales staff in the pharmaceutical manufacturing companies. In addition, the pharmaceutical industry consists of pharmaceutical wholesaling companies where B.Pharm. holders are again employed as quality control managers and dispensing pharmacists. On the other hand, pharmacy technicians assist pharmacists and mainly work in store management, logistic tasks and auxiliary tasks in offices.

The salary of pharmacists in government positions employed as officers and professional staff, including at Ministry of Health, Centre for Health Development, and Government Agency for Specialised Investigation is lower than the salary of pharmacists employed in privately owned community pharmacies. This is due to the Government's decision on establishing the salary for public servants Resolution #332, 2014 (Government of Mongolia, 2014c).

A majority of medicines are imported from overseas into Mongolia. Hence, there are more than 30 drug importing wholesaling companies and most pharmacists with a B.Pharm. degree seek positions (such as production, quality control, and marketing) with the thriving pharmaceutical industry in which services are defined and industrial pharmacists are remunerated. They also have the opportunity to be appointed to drug regulatory agencies or quality control laboratories for the state or central government.

Additionally, pharmacists are able to work in the academic area, typically as researchers or faculty members (Dorjbal, 2015)..

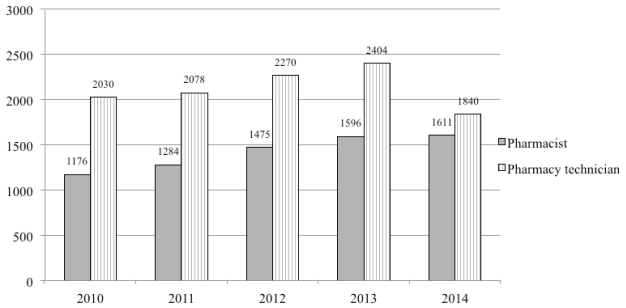
The Government strives to improve the situation and along with international support, a total of five manufacturing companies were granted support to improve and qualify for the Good Manufacturing Practice (GMP) standard. The demand for pharmacists is rising with the growth of the pharmaceutical industry in Mongolia. Pharmacists with a Ph.D. degree mainly work in academic or research institutions (Ministry of Health Mongolia, 2014).

Pharmacists wishing to work in the clinical areas (i.e. hospitals) are required to complete a six- month course in clinical pharmacy before being eligible to apply. These post-graduate courses are offered at two institutions, MNUMS and the Mongolian University of Pharmaceutical Sciences. The clinical pharmacy training involves behavioural and science coursework, focusing on patient counselling, monitoring patient outcomes, drug selection and treatment compliance. After obtaining the certificate of clinical pharmacy, pharmacists are able to join either public or private hospitals.

Pharmacy technicians are also able to work in hospitals and they are mostly responsible for preparation and compounding of prescriptions ordered by the doctor.

Figure 2 describes the number of pharmacy technicians and pharmacists engaged in the health sector in Mongolia (Ministry of Health Mongolia, 2015). The varying number of graduates and workforce is due to the number of applicants set by the MECSS).

Figure 2: Number of pharmacy professionals employed in the health sector of Mongolia (adapted from Health indicators, Ministry of Health and Sports, 2015)



According to the latest report, the majority of graduates (n=42) sought placements in the pharmaceutical industry (wholesaling company) (n=18, 43.4%), followed by the public institutions (n=8, 19.3%), and international organisations based in Mongolia (n=4, 10.4%). Only a few selected further training (n=4, 8.5%), and research (n=3, 7.5%), (MNUMS, 2010). Public institutions include the Ministry of Health, Centre for Health Department, Generalised Agency for Specialised Investigation, MECSSS, Health Department of Mongolia, MNUMS and public hospitals whereas

international organisations are Asian Development Bank, United Nations Children Education Fund, World Health Organisation, World Vision and others.

Conclusions

Recently, pharmacy education has been revised and expanded significantly both in terms of curriculum content and number of institutions offering pharmacy programmes at various levels. The revisions achieved, such as introducing clinical pharmacy into the curriculum are designed to create employment opportunities in practice areas and improve the level of pharmaceutical care.

Pharmacy graduates often seek employment in regulatory affairs management, pharmacy industry and marketing rather than in community or hospital pharmacy practice. A pharmacy workforce study is required to establish future requirements for pharmacists in Mongolia, to review pharmacy education programmes and ensure they meet international standards.

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