



**PHARMACY EDUCATION IN INDIA: CURRENT STANDARD,
ADMISSION CRITERIA AND REGULATION**

B. BHUYAN*

Department of Pharmaceutical Sciences, Dibrugarh University, Assam, India.

ABSTRACT

The formal pharmacy education in India started long ago in 1937. But in India it turned to be a mostly industry oriented program. In India AICTE and PCI regulates all the education programs. The minimum qualification required for becoming a pharmacist is the Diploma in pharmacy (D. Pharm). But its course contents can be considered to need a revision by PCI in the aim of modification to comply with the present society needs. B. Pharm and M. Pharm courses are industry oriented and newly introduced PharmD program is aimed at pharmacy practice. For taking admission into D. Pharm, B. Pharm or PharmD program one can apply after successful completion of the Higher Secondary in Science stream and pharmacy graduates can take admission in M. Pharm program. In this article a trial is made to describe the present situation of education including course contents, standard, regulation and admission criteria etc.

KEYWORDS: Pharmacy education, India, Standard, Regulation, Admission criteria



B. BHUYAN

Department of Pharmaceutical Sciences, Dibrugarh University, Assam, India.

INTRODUCTION

Pharmacy education indicates the educational program for becoming a Pharmacist. It deals with the art and science of preparing drugs formulations from various natural and synthetic sources, proper materials for their distribution and use of the drugs in the diagnosis, treatment and prevention of diseases. It involves the proper knowledge and skills of synthesis of drugs, preparation of various dosage forms, different quality control tests, drug interaction studies, pharmacokinetic and pharmacodynamic studies, identification, preservation, analysis and standardization of various drug products and medicines. The pharmaceutical education is an integral part of countries' health education programs and plays a very important role in the development of a country. In some developed countries the degree program usually requires five academic years of study and in some European countries one year of compulsory internship program is also included after successful completion of the course. The pharmacy education in India is regulated by two organizations- the Pharmacy Council of India (PCI) and the All India Council for Technical Education (AICTE) – which will be discussed again later. The educational pattern in India is an industry and product oriented¹. Unlike the situation of pharmacy in developed countries where pharmacy graduates involve themselves in pharmacy practice in patient related community pharmacy, in India they want placements in pharmaceutical production and quality control, marketing and research and development section etc. Only the diploma holders in pharmacy go for pharmacy practice in community and institutional pharmacies. For

detailed understanding of the present status and pattern of pharmacy education in India we have to go the time of past at which the pharmacy education was started in India.

A HISTORICAL REVIEW

The formal degree education program of pharmacy began in India when a three year bachelor of pharmacy (B. Pharm) course was introduced at Banaras Hindu University in 1937. At that time, the curriculum contained pharmaceutical chemistry, pharmacy and analytical chemistry, which prepared the graduates for working in pharmaceutical industries and not in community pharmacy². Before that time, a pharmacy class was also started at Madras Medical College in 1860, but it was only for providing instructions to the students who newly qualify for medical degree or diploma, apothecary or hospital assistance grade etc. and not for producing professionals^{2,3}. But soon during 1870s the “chemists and druggists” class was started at Madras Medical College for preparing professionals². So it was the first institution in India to provide education in pharmacy. Later in 1937, the Medical College, Vishakapatnam also started a similar chemists and druggists class and before independence of India there total became three institutions to offer pharmacy degree programs- the Punjab University (1944) and the L.M. College of Pharmacy (1947) along with Banaras Hindu University. The first 10 pharmacy colleges/universities offering pharmacy degree programs in India are listed below¹ in table 1.

Table 1**First 10 pharmacy colleges/universities offering pharmacy degree programs in India.**

| Zone | State | College/ University | Category | Year of inception |
|--------|---------------|---|--------------------|-------------------|
| North | Uttarpradesh | Department of Pharmaceutical Engineering, Institute of Technology, Banaras Hindu University, Varanasi | Central University | 1937 |
| | Punjab | University Institute of Pharmaceutical Sciences, Punjab University, Chandigarh | State University | 1944 |
| East | Westbengal | Department of Pharmaceutical Technology, Jadavpur University, Kolkata | State University | 1963 |
| South | Tamilnadu | Department of Pharmacy, Madras Medical College, Chennai | Medical College | 1950 |
| | Andhrapradesh | College of Pharmaceutical Sciences, Andhra University, Visakhapatnam | State university | 1951 |
| | Maharashtra | Department of Pharmaceutical Sciences, Nagpur University, Nagpur | State University | 1956 |
| | Maharashtra | Pharmaceutical Department, University Institute of Chemical Technology, Mumbai University, Mumbai | State University | 1958 |
| Middle | Madhyapradesh | Department of Pharmaceutical Sciences, Dr. H. S. Gour University, Sagaur | Central University | 1952 |
| West | Rajasthan | Birla Institute of Science and Technology, Pilani | Private university | 1950 |
| | Gujarat | L. M. College of Pharmacy, Ahmadabad | Private college | 1947 |

The only medium for instruction and learning was English in all of these pharmacy institutions¹.

CURRENT SCENARIO OF EDUCATION

Since 1937 the numbers of institutions providing pharmacy education program are increasing gradually in India and now a large number of institutions in India are providing various kinds of educational programs in pharmacy such as diploma in pharmacy (D. Pharm), bachelor of pharmacy (B. Pharm), master of pharmacy (M. Pharm), master of science in pharmacy [MS(Pharm)], master of technology in pharmacy [MTech(Pharm)], doctor of pharmacy (PharmD) and doctor of philosophy in pharmacy (PhD). Until early 1980s, there were only 11 universities and 26 colleges which provided pharmacy degree programs in India². But in 2005, as per PCI 2005 diary calendar, there were 220 recognized degree institutions with a total intake of 12506 students and as per AICTE, the total number of degree colleges were 445 with a total of 24672 intakes. In 2007, the number raised to 854 with a intake of more than 52,000 students and there were also 583 institutions providing diploma in pharmacy with a capacity of more than 34,000 students³. Out of them most of the institutions are privately

funded. This private sector included about 10% of the total pharmacy students admitted in 1980s but now it includes about 91% of all the pharmacy students admitted¹. In India the number of pharmacy institutions in all the states is not same and more numbers of privately funded institutions are present in states like Maharashtra, Tamilnadu, Gujarat, Andhra pradesh and Karnataka⁴. Recently the number of pharmacy institutions also has increased in Sikkim due to the presence of a large number of pharmaceutical companies there. The educational environment, faculty strength and facilities are not same in all of the institutions and in some institutions these are not good enough for a quality output. But there are still some centers of excellence like National Institute of Pharmaceutical Education and Research (NIPER) where students get all the facilities even for their research work but number of such institutions are very few in India.

As already mentioned above, variety of pharmacy education programs are offered by the institutions today. The D. Pharm program

contains 2 years of classroom study followed by 500 hours of practical training in a hospital/medical college required to be completed in 3 months. The B. Pharm program is of 4 years time and should be completed in a university department or in a college recognized by a university. The M. Pharm degree program is of 2 years time and pharmacy graduates are eligible for admission. It contains one year of classroom program followed by one year of research work in any one of the pharmacy disciplines such as pharmaceutics, pharmaceutical chemistry, pharmacology or pharmacognosy. Recently, some other subjects such as industrial pharmacy, quality control and assurance, pharmaceutical biotechnology etc also have been introduced in M. Pharm program. MS(Pharm) and MTech(Pharm) programs are offered in NIPERs. M. Pharm in pharmacy practice is available at Jagadguru Sri Shivaratreeswara (JSS) College of pharmacy, Mysore and at Ooty⁵. One having an M. Pharm degree in any discipline can go for PhD which is consisted of a minimum of 3 years of study and research. The PharmD program is relatively newer in India (introduced in 2008) and this is introduced not for industrial purpose but for pharmacy practice so that proper pharmaceutical care can be offered to patients. It is a 6 year study program. Now there is a total of 47 institutions (46 private and 1 public) offering the PharmD program in India, with a total intake of 1410 students per year.

ADMISSION CRITERIA FOR DIFFERENT PROGRAMS

Depending upon the type of degree program, type of institutions (whether public or private) and the states to which the candidate belongs (requirements for admission varies across different states slightly), the admission procedure may differ. The admission criteria for different programs are briefly discussed below. Admission to D. Pharm program in any government college is based on performance in Higher Secondary Examination held at the end of 12 years of formal study program. Private colleges generally follow their own admission procedures which comply with the education

regulations of the PCI. The present D. Pharm program is based on the education regulations of the Pharmacy Act in 1991 (ER91) and is the same throughout the country. Also institution has no authority to modify the syllabus of the course. During 1990s, an effort was made by the pharmacy council of India for upgrading the pharmacy curriculum by making degree course of pharmacy as the minimum qualification for registration as a pharmacist. The draft of the proposed new education regulation was a mixture of training both for pharmacy practice and pharmaceutical technology⁶. But ultimately the effort failed due to lack of consensus. Students generally do not choose to undertake the D. Pharm program as their first choice, but when fails to take admission in another degree program in college they come to the program.

Admission to the first-year B. Pharm program is either based on performance in Higher Secondary Examination or on a merit list rank prepared based on scores on an entrance examination held by a state or individual institution. The procedure of preparing a merit list of candidates also differs depending on the state or the institution. Some states and institutions use the marks obtained in the entrance examination as the only criterion for the selection process. But a few private universities and some Indian states like Assam and Tamil Nadu consider only the marks/grades scored in the Higher Secondary Examination for the same. Some government institutions use a combination of both Higher Secondary Examination marks and entrance examination marks as the basis in selection process. The B. Pharm course is also not of first choice for students and students are generally seen to select the course when they fail to take admission in medical colleges or any of the disciplines of a B. Tech program.

A pharmacy graduate can enter the M. Pharm program on the basis of his/her academic performance in the B. Pharm or an entrance test or both. Currently, there is an increasing demand for the M. Pharm program in the country. An criterion important but not essential always is a valid and high Graduate Aptitude Test in Pharmacy (GPAT) score- which qualifies

a student to receive government scholarship for his/her M. Pharm study. Although this criterion is optional for admission to the program, many public institutions require both academic performance and GPAT score for admission to their M. Pharm program. Admission to PharmD program is also based on performance in Higher Secondary Examination or that of in the D. Pharm program. The B. Pharm graduates can enter the PharmD program directly in the fourth year.

STANDARDS OF CURRENT PHARMACY EDUCATION IN INDIA

It is a fact that currently there exists an enormous gap between education and practice of pharmacy in India⁷. The degree courses contain clinical pharmacy too but few graduates go for pharmacy practice in India. Some of the academic institutions providing pharmacy education do not have any practice environment. I have already mentioned that the present D. Pharm program is based on the education regulations of the Pharmacy Act in 1991 (ER91) and is same throughout the country. The contents of the course are mostly old and outdated and also unnecessary that has very little or no practical value today. The Pharmaceutics practical subjects of the course are devoted to preparations of aromatic waters, simple solutions, tinctures, extracts, etc. and learning of prescription products and their compounding and dispensing methods along with various formulation incompatibilities. All of these topics are of no use in this modern era where finally manufactured and packaged ready-to-use medicines are widely available and also well accepted. So a need for revision of the contents of the course should be considered by PCI to upgrade the course contents according to the present society need.

The industry oriented B. Pharm degree course does not have any standard curriculum and the course varies according to the university it belongs to¹. In most of the universities the program is offered as set of basic pharmacy such as pharmaceutics, pharmacology, pharmacognosy and forensic pharmacy; analytical chemistry; physical,

organic and inorganic chemistry including chemistry of medicinal substances; microbiology and biotechnology of pharmaceutical importance etc. In most of the institutions there is a compulsory training program for the students in a pharmaceutical industry but the schedule and time duration for the training program also varies according to the universities. In contrast to other countries, the curricular revision and innovation is not given importance in India. Here although the course contains clinical pharmacy in theory part, there is no practical exposure of the students to patients for pharmacy practice in most of the institutions.

The M. Pharm degree program is a 2 years course for study and research after a B. Pharm degree (a total of 6 years of pharmacy study). The degree is offered in various disciplines such as pharmaceutics, pharmacology, pharmacognosy, medicinal chemistry and recently in quality control and assurance, pharmaceutical biotechnology etc. The curriculum contains 2 parts- the first part consists of 1 year of classroom program (contains both theory and practical) and the second part involves a research project under the supervision of a pharmacy faculty member of the institution. Students may undertake research projects in pharmaceutical industries also. An M. Pharm degree in pharmacy practice/clinical pharmacy was also started in 1996 for the purpose of involvement of the postgraduate pharmacy students in patient-oriented service.

During 2008, the 6-year PharmD program was begun in India focusing mainly on clinical and community aspects with a mandatory practical training program. The program is comprised of 6 academic years including 1 year of mandatory internship. Six months of the internship are to be spent in a general medicine department and 2 months each in 3 other specialty departments. The course contents are fixed and like D. Pharm, the curriculum cannot be changed or upgraded by the institution. It has been observed that the curriculum emphasizes the clinical and patient oriented aspects, overemphasizes the basic

sciences, while overlooking the pharmaceuticals and health policy subjects. It can be concluded that the program may be unable to upgrade the clinical pharmacy education and practice in India due to the unclear professional advantage over the present D. Pharm course⁸ and inadequacies within the PharmD curriculum.

REGULATION OF THE PHARMACY EDUCATION IN INDIA

As mentioned before the pharmacy education in India is regulated by 2 organizations- the Pharmacy Council of India (PCI) which was established under the Pharmacy Act of 1948, and the All India Council for Technical Education (AICTE) established under the AICTE Act of 1987. The PCI is responsible for making education regulations regarding the minimum standard required for qualification as a pharmacist and also for registration of diploma and degree holders and issuing a license permitting them to practice in any state of India. The registration activity is not centrally controlled and the state pharmacy councils are responsible for registration of the qualified persons as pharmacists in their respective states. The PCI regulates both the D. Pharm and the PharmD program but does not regulate the B. Pharm program. But it recognizes the B. Pharm program for registration purpose similar to D. Pharm and PharmD program. The PCI by no way is related to M. Pharm and other higher-level degree programs of pharmacy. On the other hand except the PharmD program, pharmacy degree education program is fully regulated by the AICTE and so all the degree programs require approval by AICTE. The AICTE controls and regulates all the aspects regarding norms and standards in all technical educations including pharmacy. The AICTE is also responsible for quality assurance of

pharmacy degree programs through accreditation by the National Board of Accreditation (NBA). The pharmacy practice is also ruled by the Drugs and Cosmetic Act of 1940.

CONCLUSION

Pharmacy education in India today has become industry and product oriented although the course contents contain clinical and community pharmacy too along with industrial pharmacy, but such a situation is unlikely to be seen in western countries where the pharmacy professionals involve themselves in community pharmacy practice in patient care. The pharmacists with a B. Pharm or M. Pharm degree in India generally seek placements in production, management, quality control and assurance etc in a pharmaceutical company. Only very few of these graduates and postgraduates prefer to work in community and institutional pharmacies. In India, diploma holders can be called the only practicing pharmacists as they engage in pharmacy practice. The newly introduced PharmD program is supposed to effect the current pharmacy practice in India. Almost one thousand four hundred students have enrolled in 47 colleges for the program as discussed above but success from the program is also doubtful in the presence of D. Pharm course. But perhaps all will agree to one matter that the current course should be modified according to actual need of the society and the country and proper placements also should be created in government level so that the course turns to be one of the first choices for the students seeking a university degree.

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