



## Doctor of Pharmacy Education in India - Its Genesis and Prospects: A Critical Study based on the Global Vs. Indian Scenario

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### ABSTRACT

The post 1920 period, particularly the 1940 to 1970s, witnessed many scientific developments and achievements in the area of Hospital and Clinical Pharmacy in USA and such developments helped for starting Doctor of Pharmacy (Pharm.D) in American Universities in the 1950s as an innovative program in pharmacy. Pharm.D is a professional doctor degree in Pharmacy and has become a global program by 2000 AD. The Pharm.D students are provided with the opportunity to gain experience in patient care at hospital and community levels, in close association with other health care professionals. Universities conducting Pharm.D have to continuously enhance the curriculum with new course offerings that reflect the pharmacist's importance as a frontline health care provider. The first effort to introduce Pharm.D in India was initiated in Government Medical College; Trivandrum in 1999 when the syllabus and regulations framed with the help of some American Universities got approved by the Board of Studies and the Faculty of Medicine of the University of Kerala. It was designed as a post graduate program, but could not be started for some reasons. Later in 2008, the Pharmacy council of India (PCI) managed to introduce both six year regular Pharm. D and the three year post baccalaureate Pharm.D in the country through a Gazette notification of Government of India dated 16<sup>th</sup> May 2008. The norms and regulations for Pharm.D program were also prescribed and notified. By 2013 November, the PCI had given approval to over 140 institutions mainly in South Indian States. Only four Government institutions have so far started Pharm.D in India. The Indian Pharm.D needs the care and active involvements of pharmacy practice professionals in its growing stages.

**Keywords:** Doctor of Pharmacy in India, Genesis of Indian Pharm.D, Pharm. D in India.

### INTRODUCTION

Pharmacy as a profession and as a health care discipline has gone through phenomenal changes and development during the last few decades, at global as well as regional levels. In the past, Pharmacists were known by names like alchemists, apothecaries and compounders. Modern pharmacists are professionally qualified, scientifically trained and technically competent health care professionals knowing the secrets and facts of drugs and medicines. Contemporary pharmacy education is highly scientific and generally students spend 4 to 10 years at University levels to acquire and mould their competency and skills. Pharmacy Practice has a vital role in drug therapy, health care and other related areas. The areas and activities of community pharmacy, hospital pharmacy and clinical pharmacy constitute the various functions of pharmacy practice. The role of modern pharmacist has evolved dramatically from the product (medicine) orientation to patient care outcomes.

Independent pharmacies were first established in 12<sup>th</sup> century in Italy and then in neighboring countries like France and Germany. However pharmacy education at College/ University level started only in 1777 in Paris in France. Later in 1803 six schools of pharmacy were started in France. Private pharmacy educational institutions arose in Bavaria, the south east state in Germany in 1808. It was in 1821 the first American Pharmacy College - Philadelphia College of Pharmacy- admitted the first batch of pharmacy students which was

followed by Massachusetts College of Pharmacy (1823) and New York College of Pharmacy (1829). Since then the focus of pharmacy education and pharmacy practice got oriented towards USA.<sup>1</sup>

### Innovations in Pharmacy Practice

The post 1920 period, particularly the 1940 to 1970s, witnessed many scientific developments and achievements in the area of Hospital and Clinical Pharmacy in USA. In 1953 Heber .W. Youngken Jr of University of Washington wrote an article entitled "*The Washington Experiment - Clinical Pharmacy*" in the American Journal of Pharmaceutical Education. Through that article H.W. Youngken brought to the notice of the world pharmacists how Prof. L.Wait Rising of Washington had in 1945-46 initiated a research program in teaching pharmacy students utilizing some of the numerous professional prescriptions in Seattle. It has brought forth a storm of protest from American Association of College of Pharmacy (AACP) and the American Council in Pharmaceutical Education (ACPE) in the 1950s.

The term 'Clinical Pharmacy' was not seriously used in any book even in the early 1960's. In 1961 Dr. John Autian at University of Wisconsin used the term 'Clinical Pharmacy' as a proposal to replace 'Compounding and dispensing' and in the same year Dr.Glenn Sperandio coined the term Clinical Pharmacy in American Journal of Hospital Pharmacy in his "Hospital Pharmacy Notes". Dr. Sperandio



explained that direct contact with person or persons is the essential of "Clinical" in any specialty. In 1969, Clinical Pharmacy was linked with "patient orientation". Today Clinical Pharmacy denotes the practice of pharmacy near the bed side of the patient and is practiced by both hospital pharmacists and community pharmacists.<sup>2,5</sup>

The first scientific residency program in pharmacy in USA was developed by Harvey A.K. Whitney at University of Michigan hospital in 1927. Due to the innovative thinking of people like Paul F Parker, many clinical pharmacy activities were introduced in pharmacy in the 1960s. Inspired from the success of Whitney's experiment on Drug Information Center in Michigan University, Paul F Parker opened the first Drug Information Center at a Pharmacy School in 1962. Other Universities like the University of Kentucky had also taken leading roles in developing Clinical Pharmacy programs in the world. The first unit dose distribution program in a hospital set up in USA was initiated at the University of Kentucky in 1965. In 1968 the pharmacy residency program was started at University of Kentucky which helps to award both Pharm.D degree and residency certificates to the students.<sup>1</sup> The introduction of Post graduate programs in hospital pharmacy, clinical pharmacy and starting of Doctor of Pharmacy (Pharm.D) programs contributed positively for the development and popularisation of pharmacy practice in USA and other countries.<sup>3-5</sup>

### What is Doctor of Pharmacy or Pharm.D

The Doctor of Pharmacy degree, abbreviated as Pharm.D. or Pharm.D, is a professional doctor degree in Pharmacy. It is very much similar to professional degrees like Doctor of Medicine (MD) or Doctor of Dental Surgery (DDS) in USA or equal qualifications in other countries. Today Pharm.D became a global program available in all most all countries in the world. The duration of the program varies from five years ( eg. USA, Pakistan) to eight or nine years (eg. Ghana, France) of academic education at the University/ College levels. In some countries like Hungary, Netherland, Portugal etc. It is a post graduate program while in yet other countries Pharm.D is considered as superior to masters qualification and post graduates are admitted to the program. During the last few years, Pharm. D became popular even in the Middle East countries.

Through the Pharm.D programs the pharmacists are trained to become active and integral members of the patient care team. Increasing emphasis on improving quality of medication use and enhancing medication safety have dramatically increased the demand for clinical pharmacy and the Pharm.D program in all parts of the world. The ward rounds, clinical postings, clerkship and the residency are the core components of the Pharm.D program. It is through these the students get accustomed to real hospital practice situation and oriented to the evidence based therapy concepts. The clinical rotations provide students the opportunity to apply knowledge

acquired in the classroom to the practice of pharmacy in different patient care settings.<sup>1,6,7</sup>

The Universities and pharmacy schools through the Pharm.D program prepare pharmacists who can assume expanded responsibilities in the care of patients and assure the provision of rational and effective drug therapy both in public and private set ups. The Pharm.D students are provided with the opportunity to gain experience in patient care in close relationships with health practitioners like physicians, nurses, biochemists, nutritionists and other health care professionals.

The Universities conducting the program have to continuously enhance the curriculum with new course offerings that reflect the pharmacist's importance as a frontline health care provider. Problem-based learning and active exposure to clinical opportunities will help the students attain necessary skills and personalize the education to reflect their individual interests and professional goals.

The Pharm.D program combines rigorous basic science education with extensive and varied clinical and pharmacy practice experiences. It helps the graduates to contribute positively for revolutionizing the future of health care through new discoveries and innovations to improve patient lives. The Universities conducting the program have to continuously enhance the curriculum with new course offerings that reflect the pharmacist's importance as a frontline health care provider.

The Pharm.D is not equal to doctor of philosophy (PhD) and is intended for people who want to practice as pharmacists. The Pharm.D people are in a better position to pursue for the PhD in matters related to health care and drug therapy aspects compared to all other post graduates (M.Pharm) in pharmacy. Many Colleges and Universities in US and other countries offer a dual Pharm.D /PhD degree program for students with strong interest in research who also want to practice as pharmacists. The Pharm.D curriculum is designed to produce pharmacists who have the abilities and skills necessary to achieve outcomes related to pharmaceutical care to patients, and ensure safe and effective drug therapy with the support of professional pharmaceutical knowledge and information.

### First Pharm. D Course and its impact in Pharmacy education

The Pharm.D program as it is understood and popularized today, originated as an innovation program of University of Southern California (USC) in 1950 as a six year program. The USC is a private research University in USA established in 1880 with its main campus in Los Angeles, California. USC started its first Pharmacy School -USC School of Pharmacy- in Southern California in 1905.

The takeoff of the Pharm.D in USA was not smooth and resistance free. It has to face some unfriendly reactions and resistances from certain corners within the country. In 1955, the University of California at San Francisco



(UCSF) also started Pharm. D and by 1960 many other Universities in USA started Pharm.D. It took about two decades for getting Pharm. D popularized in USA and other parts of the world. Those who opposed the program in the beginning later started welcoming it and by 1970s students from other countries joined the program in large number. In 1973 UCSF started Department of Clinical Pharmacy as an independent unit which was responsible for the development of the first clinical pharmacy curriculum in the world. Today the clinical pharmacy residency program of UCSF is the largest in USA.<sup>1,8,9</sup>

The US authorities adopted Pharm.D as a national professional degree program by 1980s. In 1992, the American Association of College of Pharmacy (AACCP) and other pharmacy professional organizations took a joint decision to make Pharm. D as the minimum requirement for practice of Pharmacy in USA. The Accreditation Council for Pharmaceutical Education (ACPE), the national organization that accredits pharmacy degree courses, also endorsed the decision. For the next few years they were jointly doing the homework for implementation of the decision. All the existing pharmacists with B.Pharm / B.S and M.Pharm qualifications were provided sufficient opportunities to take Pharm.D through various modules in the 1990s. The Universities framed their own modules for part-time and distance/ e-learning process of Pharm.D for existing licensed pharmacists.

Till 1998 both B.S (Pharmacy) and Pharm. D programs of 5 year duration were conducted in America. In 1998 orders were issued to all American Universities to replace their B.S (Pharmacy) and B.Pharm with Pharm. D focusing on clinical and community pharmacy practice. Since the graduating class of 2006, the BS Pharm / B.Pharm degree has been completely replaced by Pharm.D degree in USA (Carrie 2008). All these developments have positively influenced the pharmacy educational institutions and authorities in other countries in the world to take proper precautions in their education system. Today Pharm.D or its equivalent degree is required to sit for the North American Pharmacist Licensure Examination (NAPLEX), one component of the licensure process required to practice as a pharmacist in U.S. states.<sup>10</sup>

### Professional status of Pharmacy after Pharm. D

The 'Gallup poll' in USA is well known among professionals all over the world. It was initiated by George Gallup in 1978 with the objective of evaluating various professions which are supposed to serve humanity in the country. The main question asked to the participants of the Gallup poll is "How would you rate the honesty and ethical standards of people in these different fields?" The Americans rate the honesty and ethical standards of 28 or more professions/ occupations surveyed by the Gallup poll. The pharmacists are ranked in No 1 or No 2 positions among all professionals in USA for the last thirty or more years (See Figure 1).

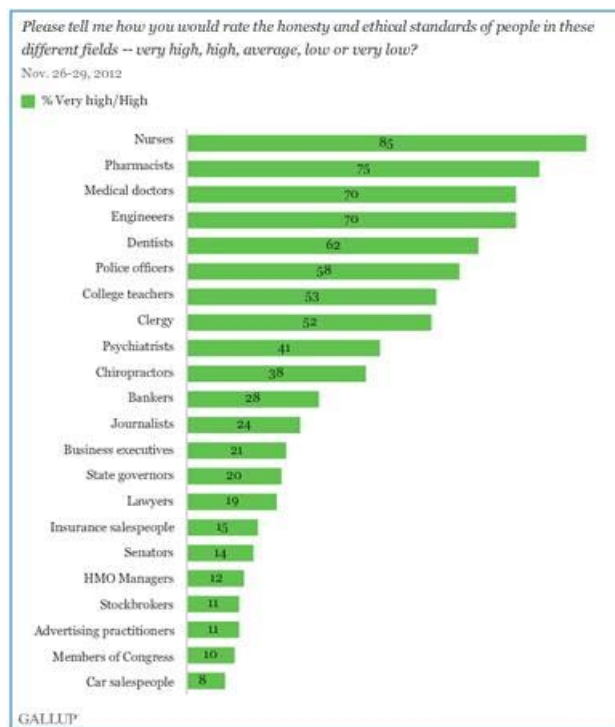


Figure 1: 2012 Gallup poll Result

A similar type of rating known as 'Morgan poll' is conducted in Australia since 1994. The Australians too rate their professions based on ethics and honesty. The nursing profession and pharmacy were closely ranked as No 1 and 2 up to 2002. Since then there is always a tight fight between Pharmacy and Nursing for the first position. In Canada in 2012 Pharmacists were ranked at No 1 position among all professionals (See Figure 2).



Figure 2: Canadian Poll 2011 – a report

This is not the case with USA or Australia or Canada alone. Throughout the world where well regulated pharmacy education and practice systems are in existence, pharmacy or pharmaceutical sciences has emerged as a high profile, sought after profession. It is mainly because



of the services, innovations and achievements in the areas of hospital, community and clinical pharmacies.

### Pharmacy education in India

The pharmacy education in India is not very old. It was started at the University level only in 1932 in Banaras Hindu University (BHU) by a thirty year old youth, Mahadevalal Schroff popularly known as M.L. Schroff. Originally it was a B.Sc. programme and got converted into a B.Pharm course in 1937. Schroff could start pharmacy education in India just because of the encouragement and support he got from Pandit Madan Mohan Malaviya, a national figure who was the Vice chancellor of the BHU those days.<sup>11</sup>

The growth of pharmacy education in India was in 'bonsai style' till 1980s. At the time of independence there were only five pharmacy colleges in the country which increased to 16 by 1967. However during the period 2000- 2008 hundreds of new pharmacy degree colleges were started in India. The number of degree colleges increased to around 900 by 2009 and by 2013 there are about 1500 pharmacy colleges imparting diploma, degree, M.Pharm, Pharm.D and PhD programs. Only about 15 per cent of the Indian Pharmacy Colleges are situated in the health care campus attached to the hospitals or medical institutions and most of them are in the South Indian states like Kerala, Tamil Nadu and Karnataka.

Right from 1950s, highly qualified graduate and post graduate pharmacists started working in the hospital pharmacies attached to major hospitals like Medical colleges in India. They were engaged in different teaching positions in the department of pharmacology and were well respected and accepted by the medical professionals in those institutions. In the 1970s, some academicians like Dr.P.C.Dandiya, Professors Gode and Gambir (Department of Pharmacology, Institute of Medical Sciences, BHU), Prof. R.D. Kulkarni (Department of Pharmacology, Grant Medical College, Bombay) and Dr.B.D.Miglani (Delhi University) tried to bring the evolution of clinical pharmacy in the West, into the Indian pharmacy profession. However, clinical pharmacy could make an impact in Indian pharmacy only by 1990s.

Dr. B.D. Miglani, the father of Indian Hospital Pharmacy and a living giant of pharmacy practice in the country was responsible for starting the first post graduate course in Hospital and Clinical Pharmacy in India in Delhi College of Pharmacy( now known as DIPSAR) in 1984. In 1996 CMC Vellore started a post graduate diploma course in Clinical Pharmacy and in the next year (1997) the J.S.S Hospital & College of Pharmacy Mysore started a post graduate programme (M.Pharm) in Pharmacy Practice giving special importance to Clinical Pharmacy. In the next 5 years period, many institutions in India, from various states and Universities, (K.M.College of Pharmacy, Madurai; Periyar College of Pharmacy, Trichy; SRIPMS, Coimbatore; JSS Ooty; Govt. Medical College. Trivandrum; Annamalai University, Chidambaram, College of

Pharmacy, Manipal; KLE's College of Pharmacy, Belgaum; Al-Ameen College of Pharmacy, Bangalore, Hamdard College of Pharmacy, Delhi, NIPER, Chandigarh etc.) Initiated similar post graduate programmes in Pharmacy Practice. By 2013, there are over 100 institutions in India imparting such programs.

The important pharmacy education programs currently offered in India include -:

- i) Diploma in pharmacy (D.Pharm, a 2 year program after 10+2)
- ii) Bachelor of pharmacy (B.Pharm, a 4 year program after 10+2)
- iii) Master of pharmacy ( M.Pharm, a 2 year program after B.Pharm)
- iv) Doctor of pharmacy (Pharm.D, a 6 year program after 10+2)
- v) Doctor of Pharmacy ( Pharm.D) P.B. 3 year program after B.Pharm
- vi) Doctor of philosophy (Ph.D, generally 3 years work after M.Pharm).

India is perhaps the only country in the world which is having a diploma course (D.Pharm) as the minimum qualification for registering as a professional pharmacist with the statutory Council or agency for getting approval or license for the practice of pharmacy. Other countries have made degree in pharmacy (B.Pharm /M.Pharm/ Pharm.D) as the minimum qualification for the practice of pharmacy. In countries like US, one must have a Pharm.D degree and then pass the state pharmacy licensure examination and complete pharmacy internship for a period (500- 2000 Hrs. depending upon the individual states) for getting registered as a pharmacist.

The pharmaceutical industry in India has attained tremendous growth and development during the last few decades. However the pharmacy practice is only in the developing stage. With growing internationalization of the pharmaceutical industry and the globalization of the pharmacy education program, the standards of pharmacy education and pharmacy practice needs to be of world class standards.

### Starting of Pharm. D in India

The first effort to introduce Pharm.D in India was initiated in Trivandrum Government Medical College in 1999 when the syllabus and regulations framed by K.G.Revikumar, the head of Hospital and Clinical Pharmacy, of the Medical College with the help of some American Universities got approved by the Board of Studies and the Faculty of Medicine of the University of Kerala. However the program could not be started as Revikumar was transferred to Calicut Medical College subsequently.<sup>1</sup> It was designed as a post graduate program aimed at moulding a team of young pharmacy practice professionals and teachers (Figure 3).



**Figure 3:** Pharm. D regulations 2000 as approved by Kerala University, Trivandrum.

In 2002 the Foreign Pharmacy Graduation Equivalency Committee (FPGEC) in USA mandated a 5 year pharmacy graduation program to be eligible to take their Foreign Pharmacy Graduation Equivalency Examination (FPGEE). Naturally the pharmacists from South Asian countries including India got upset and put in a quandary. Indian pharmacy graduates with 4 year B.Pharm degree were not permitted to appear for the North American Pharmacist Licensure Examination (NAPLEX) as a prequalification for practice of pharmacy. It was in that background the Indian authorities started thinking seriously about the introduction of Pharm.D in India.

The Pharmacy council of India (PCI) managed to introduce a six year regular Pharm.D and the three year post baccalaureate Pharm.D in 2008 in the country through a Gazette notification of Government of India dated 16<sup>th</sup> May 2008. The norms and regulations for Pharm.D program were also prescribed and notified. Interestingly by the time the notification for Pharm.D came out, the University Grants Commission (UGC) has sanctioned Rs. 50 lakhs to Annamalai University in Tamil Nadu, a public University, for starting Pharm.D as an innovative program. By the time Govt. notification came for Pharm.D, Annamalai University got the grant from UGC for the program. Annamalai University is the first institution in India notified for Pharm.D admission in the first week of June 2008 (Figure 4).



**Figure 4:** First Indian advertisement dated June 5, 2008 for Pharm.D admissions.

Immediately after starting Pharm.D, Annamalai University tried to establish some tie-up with certain American Universities. In February 2009 Dr. James Scott from Western University, California visited Annamalai University to study the situation and the facilities available at the University for running the program. In that connection Dr. Scott visited and studied the facilities in some other centres in south India like Amrita School of Pharmacy (Amrita University, Kochi, Kerala), Alshifa College of Pharmacy (Kerala University of Health Sciences), KLE College of Pharmacy (KLE University, Belgaum) and Sri Ramachandra University, Porur, Chennai.

The opportunity to popularise the Pharm.D in India with the help of UGC and AICTE was not exploited and used by PCI. Pharmacy professionals working in public Universities and Govt. institutions are not taking steps to popularise Pharm.D in the country. By 2013 November, the PCI had given approval to over 140 institutions covering states like Kerala, Tamil Nadu, Karnataka, Andhra Pradesh, Maharashtra, Gujarat, Rajasthan, UP and Punjab for starting Pharm.D in India. Rajasthan, Punjab and UP have one each, Gujarat two and Maharashtra three colleges. Out of them about 130 have already started the Pharm.D program. However the fact that only four Government institutions- two in Maharashtra, one each in Andhra Pradesh and Tamil Nadu, have started Pharm.D course. It shows that involvement of government institutions in the course is currently nominal and insignificant. In Maharashtra out of the three PCI approved institutions, two are in government sector one at Aurangabad and another at Amarabati. In Tamil Nadu out of 18 institutions one, Annamalai University, is in Government sector. In Kerala the Pharm.D was not started in Trivandrum Medical College even though they got the PCI approval in 2011. Some Pharmacy teachers propagate the message that it is a program designed for exporting Pharm.Ds to other countries and that it is designed for the rich and affordable sections of society.

**Table 1:** Pharm.D Colleges in India approved by PCI (As on Oct 2013)

State	Private Colleges	Government Colleges
Andhra Pradesh	70	01
Gujarat	02	Nil
Karnataka	32	Nil
Kerala	11	Nil
Maharashtra	01	02
Punjab	01	Nil
Rajasthan	01	Nil
Tamil Nadu	17	01
Uttar Pradesh	01	NIL

Since government institutions are the only shelter for poor and financially backward sections of society, such institutions have to encourage taking new and emerging

programs like Pharm.D. Steps have to be taken steps to promote, popularise, encourage and support public sector institutions to start Pharm.D. The involvement of government institutions is essential in popularising and ensuring job opportunities for Pharm.D in India.

After the 16<sup>th</sup> May 2008 Gazette notification of Pharm.D, PCI invited first applications for starting Pharm.D in India in July 2008 giving just one month time for the institutions to plan and apply for the course. Still they received about 50 applications from pharmacy colleges in states like Andhra Pradesh, Karnataka, Tamil Nadu, Kerala, Maharashtra, Madhya Pradesh and Orissa. Inspections were conducted in August 2008 and in September PCI approved about twenty pharmacy institutions from Tamil Nadu, Andhra Pradesh, Karnataka, Maharashtra and Kerala for starting Pharm.D course from the academic year 2008- 09. Subsequently few more institutions were approved for starting the program. Some of them were given the permission to start both Pharm.D and Pharm.D post bacalaureate.<sup>1</sup>

The PCI condition that permission to start Pharm.D will be given to only such institutions which were conducting B.Pharm course for the previous four years is not a wise decision. Such a condition indirectly helped to make Pharm.D a parallel B.Pharm course in India. Teachers started teaching Pharm.D students many subjects (like anatomy, physiology, biochemistry, pharmaceuticals, pharmaceutical chemistry, pharmacognosy etc.) in the same manner they were teaching B.Pharm students. The practical classes and the examinations are also carried out and conducted in an identical manner. In some colleges both B.Pharm and Pharm.D classes are clubbed together for certain subjects. There are no specific guidelines for practical, assignments, clerkship, internship and residencies.

Hardly 15 per cent of Indian pharmacy colleges are situated in health care campus or attached to a hospital. As per the 2008 Pharm.D Regulations of PCI hospitals with 300 bed capacity is required for starting Pharm.D with 30 students intake. It can be either an own or a 'rented' hospital with the support of an MOU. The hospital is needed for providing training, clerkship and residencies for the students. The tie- up or memorandum of undertaking (MOU) provision is found misused or improperly used by majority of Pharm.D Colleges in the country. Many Pharm.D colleges use the MOU only for PCI inspection purpose and not for academic activities.

### **Job Opportunities for Indian Pharm.D**

What is the employment potential for the Pharm.D graduates in India? From the experiences of other countries, the job opportunities for the Pharm.D rests mainly with the Pharmacy Practice areas like Community Pharmacies, Hospital Pharmacies, Clinical Pharmacies, Clinical Research including clinical trials, Pharmacovigilance and Pharmaco-economic centres in industries, government and private institutions.

The Indian community Pharmacies have to be made professional both in outlook and practice. Innovative practice culture is required in Indian community pharmacies. Qualified pharmacist have to be attracted to community and hospital pharmacies. Registered pharmacists alone should be given licence and permission to establish and run community pharmacies.

The current Pharm.D syllabus and Regulations give very little focus for employability of the graduates coming out of the Universities and schools/colleges of Pharmacy. Those who frame the syllabus and Regulations of a course should be responsible like the parents of well brought up children. Why and for what purpose Pharm.D was introduced in India have to be reflected in the syllabus and Regulation. Students who join the course and spend six years at the universities should be able to contribute positively for the development and popularisation of pharmacy practice in the country.

### **Preceptorship and Mentoring in Pharm.D**

In countries where the Pharm.D program is well established and developed, they have by this time established a system for providing clerkship (rotation ship), internship, residency and fellowship components of Pharm.D programs. Unfortunately in India no existing facilities are available for such activities and the Pharm.D teachers are not trained or oriented for such works. Terms like preceptors, clerkship administrator, rotations director, mentor etc. may be new to Indian pharmacy teachers.

Students should be lead to where they should be. Both clerkship and residency components of Indian Pharm.D needs to be made more effective and practical to ensure placements in India. Clerkship and residency should help for the acquisition and development of required professional skills. Clerkship is a gateway to world of real pharmacy practice and should be developed as an excellent opportunity to find career path for Pharm.Ds.

Many of the students may stick with what they know and believe. However a few will be prompted to step out of their comforts and traditional locations and dare to see a different and challenging side of practice because of Preceptorship and mentoring. Home infusion, geriatric care homes, prison pharmacy, pet animal pharmacy, satellite pharmacies, part-time pharmacies, family planning pharmacies, managed care pharmacies and insurance pharmacies are examples of concepts originated in the minds of Pharm.Ds during their clerkships, internships and residencies. Mentorship helps to support, inspire, motivate and guide students in both professional and personal growth and developments. Good mentorship is essential to polish the thinking power of students and prompt them for challenging and innovative professional activities.

The term Preceptorship is well known to the American Pharmacists and medical doctors right from the beginning of 20<sup>th</sup> century, though it was introduced in their nursing





profession only in late 1970s. However the concept of preceptors and Preceptorship are new to Indian pharmacy education. Preceptorship implies one-to-one teaching leaning relationship involving an experienced preceptor and a novice transitioning into practice. Preceptor helps the preceptee to connect the link between the theory taught in class rooms and the practice set up in hospitals and communities.

Clerkship for obtaining clerical workmanship in pharmacy practice aspects and will be very much useful during residencies. It is not equal to ward rounds or clinical postings. Clerkship is usually done outside own hospital while internship is within the hospital by performing in-house jobs. The clerkship co-ordinator or director will take the students in small groups of 3-5 to other institutions including primary health centres to speciality or super-speciality hospitals and pharmacies during clerkship to acquire the skills for practice in various situations with the support of departmental teachings and discussions. It is not a simple requirement for obtaining a degree. The work hours are that of full time jobs but with week-end and on-call works as decided by the clerkship director or administrator. Issues like why the student cohort is divided into small groups for clerkship/rotations or who can be appointed as a clerkship administrator/ coordinator or director and what are their duties etc. need to be defined to Indian Pharm.D teachers and students. Problem solving and decision makes skills have to be developed in the students with the support of clerkship and residencies.

The course duration has to be re-designated as 5+ 1 = 6 years for Pharm.D regular program. Currently it is specified as 6 years. Since the students through P1 to P5 years of study acquire the skills for handling public health, physiological investigations, biochemistry tests, lab data interpretation etc. required for the hospital and community practice situations they can contribute seriously for the hospital health care programs during the general residency in P6. They also have to practice hospital pharmacy and clinical pharmacy in the hospitals. Above all, the P6 Pharm.D have to act as preceptors and guides for all the junior students. If properly utilised, they will be more effective in teaching and training junior students than their teachers. The students have to be paid proper stipend in P6 without charging any tuition fee.

For finding suitable jobs in Indian hospitals, the Pharm.D have to be specialised in disciplines like Nephrology and Urology, Psychiatry, Neurology, Oncology, Dermatology, Paediatrics, Endocrinology/ Diabetology etc. so that the concerned medical specialists will seek their support for drug therapy and various clinical studies. The students have to be specialised in the drugs used in those specialities.

## CONCLUSION

The pharmaceutical industry in India has attained tremendous growth and development during the last few

decades. So also the Pharmacy education. However the pharmacy practice community and hospital levels are not yet modernized and made professional compared to international standards and practices. The Pharm.D program has to be utilized to rectify that gap. With globalization of the pharmacy education program, the standards of education and practice needs to be of world class levels.

The 6 year Pharm.D program in India should help to establish an effective and trustworthy relationship between the pharmacy practice department and the health care professionals in the hospitals and community set ups. The Pharm.D students have to exhibit their calibre, competence and capabilities in making the drug therapy and health care safer, cost-effective and user friendly. In hospitals, the practicing pharmacists, including pharmacy practice teachers, have to work in tandem with other health care professionals. They have to acquire knowledge about other health care professions through interactions, discussions and team work.

In spite of the number of deficiencies and weaknesses of the Indian Pharm.D programmes, the experiences of the first 4 or 5 years of Pharm.D in India show that it is a sought after pharmacy course in the country, though currently limited to certain south Indian states. Students with brilliant academic background and visions are joining the course. The educated classes of people including the NRIs and internet information from across the world help students to choose Pharm.D course. It is the responsibility of the profession and the professionals to help them materialise their dreams and lead them to a better tomorrow. They need the leadership by teachers who are good and capable guides, influential mentors and skilled preceptors.

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