

# Pharm. D: New Born Course in India

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#### **Review Article**

Please cite this paper as: Dibyajyoti Saha\*, Swati Paul. Pharm. D: New Born Course in India. IJPTP, 2012,3(3),287-297.

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# Abstract

A doctor of pharmacy degree program must have a multidisciplinary curriculum that produces pharmacist with best pharmaceutical care. In India, there has been a surge in the number of institutions offering practice based Pharm. D program which was started in 2008.Pharm .D candidates need to work hard and get recognized in the society for patient care by clinical pharmacy services. The information presented in this paper highlights its regulation, duration, syllabus structure, colleges, scope, utility and practice. So, with the Pharm.D clinically oriented program coming in, it will take some years for the clear picture to emerge with regard to producing manpower to solely engage in pharmacy practice and research.

Keywords: Pharm.D, Post Baccalaureate, Pharmacy Practice.

# Introduction

In India, the first batch of Pharm.D took admission in 2008.The Pharm .D candidates will be passed in 2014 and Pharm.D(P.B) candidates already passed in 2011 <sup>[1]</sup> .The pharmacists can provide clinical pharmacy services such as medication history interview, participation in wards rounds and meetings, provision of drugs/poison information, prevention with assessment and management of drug interactions, adverse drug reaction management (ADR), medication order review, therapeutic drug monitoring (TDM), selection of drug therapy, patient medication counselling, liaison with community services etc. In hospital, Pharm.D candidates may give better

services than pharmacy graduates because Pharm.D candidates too much skilled than others with better pharmacy practice and clinical pharmacy potentials [2]

# Pharm. D Regulation 2008 [3]

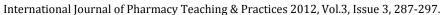
The regulations framed under section 10 of the Pharmacy Act, 1948(8 of 1948) which is approved by the Government of India, Ministry of Health and notified by the Pharmacy Council of India. In exercise of the powers conferred of section 10 of the Pharmacy Act, 1948 (8 of 1948), the pharmacy council of India, with the approval of the central government hereby makes some regulations such as:

- Pharm. D shall consist of a certificate, having passed the course of study and examination as prescribed in these regulations, for the purpose of registration as a pharmacist to practice the profession under the pharmacy Act, 1948.
- Duration of the course i.e.: Pharm.D and Pharm.D (Post Baccalaureate) with minimum qualification, course of study.
- Practical training and project work.

# Course Structure and Admission Criteria [3,4]

Pharm. D course shall be six academic years full time with each academic year spread over a period of NLT 200 working days. The first to fifth year is academic year and sixth involving posting in specialty units. The minimum qualification for admission to-

- i. 10+2 examination with physics and chemistry as compulsory subjects along with Mathematics or Biology.
- ii. A pass in D. Pharm course from an institution approved by Pharmacy Council of India under section 12 of the Pharmacy Act.



iii. Any other qualification approved by the Pharmacy Council of India as equivalent to any of the above examinations.

A student should complete the age of 17 years on or before 31<sup>st</sup> December of the year of admission to the course.

• Pharm. D (Post Baccalaureate) course shall be three academic year spread over a period of NLT 200 working days. This course shall be started from fourth year and continued up to sixth year which is as same as Pharm.D.

The minimum qualification for admission to:

- A pass in B.Pharm from an institution approved by pharmacy council of India under section 12 of the Pharmacy Act
- Number of admission in each academic session are in the following:

Pharm. D: 30 students

Pharm. D (Post Baccalaureate): 10 students

- Under the regulations, which institutions running B.Pharm approved under section 12 of the pharmacy Act, will only be permitted to run Pharm.D Pharm.D (P.B) program will be permitted only in those institutions which are permitted to run Pharm.D.
- The first year courses include the subjects (theory and practical): Human Anatomy and Physiology, Pharmaceutics, Medicinal Biochemistry, Pharmaceutical Organic Chemistry, Pharmaceutical Inorganic Chemistry, Remedial Mathematics and Biology.
- The second year theory courses are Pathophysiology, Pharmacology –I and Community Pharmacy and courses include the subjects (theory and practical): Pharmaceutical Microbiology, Pharmacognosy and Pytopharmaceuticals, Pharmacotherapeutics-I.
- The third year theory course is Pharmaceutical Jurisprudence and courses include the subjects (theory and practical): Pharmacology-II, Pharmaceutical Analysis, Pharmacotherapeutics- II, Medicinal Chemistry, and Pharmaceutical Formulations.
- The fourth year theory courses are Biostatistics and Research Methodology and Clinical Toxicology and courses include the subjects (theory and practical): Pharmacotherapeutics- III, Hospital Pharmacy, Clinical Pharmacy, Biopharmaceutics and Pharmacokinetics.

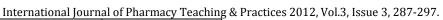
- The fifth year theory courses are Clinical Research, Pharmacoepidemiology and Pharmacoeconomics, Clinical Pharmacokinetics & Pharmacotherapeutic Drug Monitoring. The clerkship also include the course which the students attending ward rounds on daily basis.
- The sixth year consists of internship in minimum 500 bedded hospital or residency training including postings in specialty units. Students should independently provide the clinical pharmacy services to the allotted wards.
- i. Six months in general medicine departments.
- ii. Two months each in three other specialty departments (Surgery, Pediatrics, Gynecology and Obstetrics, Psychiatry, Skin and VD, Orthopedics).
  - Examination: The examination shall be of written and practical (including oral nature). Each examination may be held twice every year. The first examination in a year shall be the annual examination and the second examination shall be supplementary examination.

# Qualification for Faculty Member [3]

As per regulations; Professor, Assistant Professor, Lecturer posts are given under five departments, The departments are Pharmaceutics (Professor: 01, Asst. Professor: 01, Lecturer: 02); Pharmaceutical Pharmaceutical Chemistry including Analysis (Professor 01, Asst. Professor: 01, Lecturer: 03); Pharmacology (Professor: 01, Asst.Professor: 01, Lecturer: 02) Pharmacognosy (Professor 01, Asst. Professor: 01, Lecturer: 01) Pharmacy Practice (Professor:01, Asst.Professor: 02, Lecturer: 03) . The workload of faculty: Professor (8 hours per week), Assistant Professor (12 hours per week), Lecturer (16 hours per week). All faculties shall be full time. However, Part time preceptors in hospital shall be allowed.

Table-01: Subject wise specialization of the Teaching Staff  $^{[4]}$ 

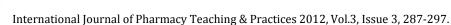
S. No.	Subject	Specialization Required
1.	Pharmacy Practice	M.Pharm in Pharmacy Practice or Pharmacology or Pharmaceutics.
2.	Human Anatomy & Physiology	M.Pharm in Pharmacology or Pharmacy Practice
3.	Pharmaceutics (Dispensing & General Pharmacy)	M.Pharm in Pharmaceutics



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	Pharmacognosy-I	M.Pharm in		
4.	J ,	Pharmacognosy		
5.	Pharmaceutical Organic Chemistry-I	M.Pharm in Pharmaceutical chemistry or Pharmaceutical Analysis or Quality Assurance or Bulk Drug		
6.	Pharmaceutical Inorganic Chemistry	M.Pharm in Pharmaceutical Chemistry or Pharmaceutical Analysis or Quality assurance or Bulk Drug		
7.	Pharmaceutical microbiology	M.Pharm in Pharmaceutics or Pharmaceutical Biotechnology		
8.	Pathophysiology	M.Pharm Pharmacy Practice or Pharmacology		
9.	Applied Biochemistry & Clinical Chemistry	M.Pharm in Pharmacology or Pharmacy Practice or Pharmaceutical Chemistry		
10.	Pharmacology-I	M.Pharm in Pharmacology or Pharmacy Practice		
11.	Pharmaceutical Jurisprudence	M.Pharm in Pharmaceutics		
12.	Pharmacology-II	M.Pharm in Pharmacology or Pharmacy practice		
13.	Pharmaceutical Dosage Forms	M.Pharm in Pharmaceutics or Industrial Pharmacy		
14.	Pharmacotherapeutics –I, II and III	M.Pharm Pharmacy Practice or Pharmacology		
15.	Community Pharmacy	M.Pharm in Pharmacy Practice or Pharmacology or Pharmaceutics		
16.	Hospital Pharmacy	M.Pharm in Pharmacy Practice or Pharmacology or Pharmaceutics		
17.	Clinical Pharmacy	M.Pharm in Pharmacy Practice		
18.	Computer Science or Computer Application in pharmacy	MCA		
19.	Mathematics	M.Sc. (Maths)		

Table-02: Prescribed qualifications and experience for Professor, Assistant Professor, Lecturer and others

SN.	CADRE	QUALIFICATIONS	EXPERIENCE
JIV.	CADRE	QUALIFICATIONS	EXPERIENCE
1.	Lecturer	i) Basic degree in pharmacy (B.Pharm). ii) Registration as a pharmacist under the Pharmacy Act. iii) First Class Master's degree in appropriate branch of specialization in Pharmacy (M.Pharm)	No minimum requirement.
2.	Assistant Professor	i) Basic degree in pharmacy (B.Pharm).  ii) Registration as a pharmacist under the Pharmacy Act.  iii) Master's degree in appropriate branch of specialization in Pharmacy (M.Pharm)  iv) Ph.D. degree (with First Class degree either at Bachelor's or Master's level) in the appropriate branch of specialization in Pharmacy.	Three years experience in Teaching or Research at the level of Lecturer or equivalent.
3.	Professor	Basic degree in pharmacy (B.Pharm). ii) Registration as a pharmacist under the Pharmacy Act. iii) Master's degree in appropriate branch of specialization in Pharmacy (M.Pharm). iv) Ph.D. degree (with first Class either at Bachelor's or Master's level) in appropriate branch of specialization in	Ten years experience in Teaching or Research. ii) Out of which five years must be as Assistant Professor.



		Pharmacy.	
4.	Director or	Basic degree in	Fifteen years
İ	Principal or	pharmacy	experience in
	Head of	(B.Pharm). ii)	Teaching or
	institute	Registration as a	Research. ii)
		pharmacist under	Out of which
		the Pharmacy Act.	five years must
		iii) Master's	be as Professor
		degree in	or above in
İ		appropriate	Pharmacy.
		branch of	Desirable :
		specialization in	Administrative
		Pharmacy	experience in
		(M.Pharm) iv)	responsible
		Ph.D. degree (with	position. The
		first Class degree	maximum age
		either at	for holding the
İ		Bachelor's or	post shall be
		Master's level in	65 years.
		the appropriate	
		branch of	
		specialization in	
1		Pharmacy.	

If a class or division is not awarded at Master's level, a minimum of 60% marks in aggregate or equivalent cumulative grade point average shall be considered equivalent to first class or division, as the case may be.

# Clarification of Pharm. D (P.B)

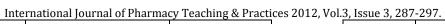
Pharm.D and Pharm.D (Post Baccalaureate) qualification from an institution approved by the PCI U/S 12 of the Pharmacy Act 1948 is an approved qualification for teaching D.Pharm , B.Pharm,M.Pharm, Pharm.D/Pharm.D (Post Baccalaureate) courses. As such a candidate holding these degrees from an institution approved by the PCI u/s 12 of the pharmacy Act, 1948 shall be eligible for consideration for teaching posts at appropriate level in pharmacy institutions. Pharm.D is a post graduate qualification and passed out students can directly register for Ph.D.

The Pharm .D and Pharm .D (P.B) Colleges in India which are in the following:

Table- 03: Pharm.D and Pharm.D (P.B) Colleges in India [3, 5]

State	Name of the Institutions	Courses
	Smt.Sarojini Ramulamma	
Andhra	College of Pharmacy,	Pharm.D ,
Pradesh	Seshadrinagar,	Pharm.D (Post
	Mahbubnagar-509 001.	Baccalaureate)
	Raghavendra Institute of	
	Pharmaceutical Education	Pharm.D ,
Andhra	and Research(RIPER) ,KR	Pharm.D (Post
Pradesh	Palli Cross, Cheyyedu	Baccalaureate)
	Anantapur-515 721.	
	Deccan School of	
Andhra	Pharmacy,Zafargarh,P.O.	Pharm.D
Pradesh	Kanchanbagh, Hyderabad-	
	500 058.	

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	Talla Padmavathi College	Pharm.D ,
Andhra	of Pharmacy, Orus-	Pharm.D (Post
Pradesh	Kareemabad, Warangal-	Baccalaureate)
	506 012	
	Bharat Institute of	Pharm.D ,
Andhra	Technology, Mangalpalli	Pharm.D (Post
Pradesh	(Vill),Ibrahimpatnam(Man	Baccalaureate)
	dal),R.R.Distt501 510	,
	(Andra Pradesh)	
	St. Peter's Institute of	
Andhra	Pharmaceutical Sciences,#	Pharm.D ,
Pradesh		Pharm.D (Post
Prauesii	2-4-1211 Vidyanagar,	•
	HANAMKONDA-506 001	Baccalaureate)
A allaa	Sri Venkateshwara College	Dia D
Andhra	of Pharmacy,86. Hitech	Pharm.D ,
Pradesh	City Road, Madhapur,	Pharm.D (Post
	Hyderabad-500 081.	Baccalaureate)
	GIET School of Pharmacy,	
Andhra	NH-5, Chaitanya Nagar,	Pharm.D
Pradesh	Rajahmundry-533 294, EG	
	District.	
	Malla Reddy College of	
	Pharmacy,	Pharm.D ,
Andhra	Malsammaguda,	Pharm.D (Post
Pradesh	Dhullapally(Post Via	Baccalaureate)
	Hakimpet ),	
	Secunderabad- 500 014.	
	Vaagdevi College of	
	Pharmacy, H.No. 2-2-	Pharm.D ,
Andhra	457/3 ,	Pharm.D (Post
Pradesh	Ramnagar,Hanmakonda,	Baccalaureate)
	Warangal-506 001.	
	P.Rami Reddy Memorial	
Andhra	College of Pharmacy, 1-	Pharm.D ,
Pradesh	35, Prakruthi	Pharm.D (Post
Traucsii	Nagar,Utukur, Kadapa-	Baccalaureate)
	516 003.	Baccalaarcate
	Chalapathi Institute of	
Andhra	Pharmacetical Science ,	Pharm.D
Pradesh	Chalapathi Nagar, Lam,	i ilaiiii.D
riauesii	Guntur- 522 034.	
جا ام م ۸	Annamacharya College of	Dhama D
Andhra	Pharmacy, New	Pharm.D
Pradesh	Boyanpalli, Rajampet- 516	
	126 Kadapa Distt.	
	KVSR Siddhartha College	
Andhra	of Pharmaceutical	Pharm.D
Pradesh	Sciences, Siddhartha	
	Nagar, Vijayawada.	
	Malla Reddy Institute of	
	Pharmaeutical Sciences,	Pharm.D ,
Andhra	Malsammaguda,	Pharm.D (Post
Pradesh	Dhullapally(Post Via	Baccalaureate)
	Hakimpet ),	
	Secunderabad- 500 014.	
Andhra	AU College of	
Pradesh	Pharmaeutical Sciences,	Pharm.D
	Andhra University,	
	Vishakhapatnam.	
	Aditya Institute of	
	Pharmaeutical Sciences	
Andhra	and Research, Aditya	Pharm.D
Pradesh	Nagar,	u.iii.b
Tuucsii	Surampalem;A.D.B.	
	Jaramparem,A.D.B.	



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	Road, Peddapuram, East Godavari Distt. 533 437.	
A al la a	MESCO College of	Dhama D
Andhra	Pharmacy, Hyderabad.	Pharm.D
Pradesh	A C N DI	
	A.S.N Pharmacy College,	DI D
Andhra	Burripalem Road,	Pharm.D
Pradesh	Nelapadu, Tenali- 522	
	201, Guntur.	
	CMR College of Pharmacy,	
Andhra	Kandlakoya, (V) , Medchal	Pharm.D
Pradesh	Road, Hyderabad -501	
	401.	
	G. Pulla Reddy College of	
Andhra	Pharmacy, Mehdipatnam,	Pharm.D
Pradesh	Hyderabad-500 028.	
	Sri Padmavathi School of	
	Pharmacy, Mohan	
Andhra	Gardens, Behind R.K.	Pharm.D
Pradesh	Kalyanamandapam	
	Vaishnavi Nagar,	
	Tiruchanoor,	
	Chittoor(dt.)-517 503	
	(Andra Pradesh).	
	Shri Vishnu College of	
Andhra	Pharmacy, Vishnupur,	Pharm.D
Pradesh	Bhimavaram, West	T Harm.D
Traucsii	Godavari Distt (Andra	
	Pradesh).	
	Hindu College of	
Andhra	_	Pharm.D
	Pharmacy, Amaravathi	Pharm.D
Pradesh	Road, Guntur-522 002	
	(Andra Pradesh).	Diam. D
A!!	Lalitha College of	Pharm.D
Andhra	Pharmacy, Venkatapur	
Pradesh	(V), Ghatkesar (M), R.R.	
	Distt. (Andra Pradesh).	
	Care College of	
Andhra	Pharmacy, Oglapur (V),	Pharm.D
Pradesh	Atmakur (M), Distt.	
	Warangal (Andra	
	Pradesh).	
	Vagadevi Institute of	
Andhra	Pharmaeutical Sciences,	Pharm.D
Pradesh	Bollikunta, Village	
	Warangal 506 005 (Andra	
	Pradesh).	
	Creative Educational	
	Society, College of	
Andhra	Pharmacy, N.H.7,	Pharm.D
Pradesh	Chinnatekur Kurnool 518	
	218 (Andra Pradesh).	
	Chebrolu Hanumalah	
	Institute of Pharmaeutical	
Andhra	Sciences, Chandramoulipu	Pharm.D
Pradesh	ram, Chowdavaran,	
	Guntur 522 019 (Andra	
	Pradesh).	
	Shree Dattha Institute of	
	Pharmacy, Nagarjuna	
Andhra	Sagar Road, Sheriguda(V),	Pharm.D
Pradesh	Ibrahimpatnam (M), R.R	
	.Dist 501 510 (Andra	
	Pradesh).	
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	M.S. Ramalah College of	
Karnataka	Pharmacy, M.S. Ramalah	Pharm.D
	Nagar, M.S.R.I.T. Post,	
	Bangalore-560 054.	
	Novodaya Education	
		Dl D
	Trust's N.E.T., Pharmacy	Pharm.D ,
Karnataka	College, P.B. No. 26,	Pharm.D (Post
	Mantralayam Road,	Baccalaureate)
	Raichur-584 101.	
	HKES's Matoshree	
Karnataka	Taradevi Rampure,	Pharm.D ,
	Institute of Pharmaeutical	Pharm.D (Post
	Sciences, Gulbarga.	Baccalaureate)
	Sri Jagadguru Mallikarjuna	Dadda.da. cate,
Karnataka	Murugharajendra College	Pharm.D ,
Namataka		
	of Pharmacy, Chitradurga-	Pharm.D (Post
	577 502.	Baccalaureate)
	B.V.V. Sangha's Hanagal	
Karnataka	Shri Kumareshwar College	Pharm.D ,
	of Pharmacy,Bagalkot-587	Pharm.D (Post
	101.	Baccalaureate)
		,
	Visweswarapura	
	· · · · · · · · · · · · · · · · · · ·	
	Hanumalah Institute of	
Karnataka	Pharmaeutical	Pharm.D ,
	Sciences,24 <sup>th</sup> Main, Opp.	Pharm.D (Post
	BDA Complex, B.S.K .2 <sup>nd</sup>	Baccalaureate)
	stage, Bangalore-560 070.	
	J.S.S. College of Pharmacy,	
Karnataka	Sri Shivarathreeshwara	Pharm.D ,
	Nagar, Mysore - 570 015	Pharm.D (Post
	11agar, 111y3512 370 013	Baccalaureate)
	Manipal College of	Buccaldurcutcy
		Dhawa D
	Pharmaceutical Sciences,	Pharm.D ,
Karnataka	Manipal University,	Pharm.D (Post
	Madava Nagar, Manipal -	Baccalaureate)
	576 104, Udupi District	
	Sri Adichunchanagiri	
	·	Pharm.D ,
Karnataka	Sri Adichunchanagiri College of Pharmacy, B.G.	
Karnataka	Sri Adichunchanagiri College of Pharmacy, B.G. Nagara - 571 448,	Pharm.D (Post
Karnataka	Sri Adichunchanagiri College of Pharmacy, B.G. Nagara - 571 448, Nagemangale Taluk, Tq.	
Karnataka	Sri Adichunchanagiri College of Pharmacy, B.G. Nagara - 571 448, Nagemangale Taluk, Tq. Mandye Distt.	Pharm.D (Post
	Sri Adichunchanagiri College of Pharmacy, B.G. Nagara - 571 448, Nagemangale Taluk, Tq. Mandye Distt. Bapuji Pharmacy College,	Pharm.D (Post Baccalaureate)
Karnataka Karnataka	Sri Adichunchanagiri College of Pharmacy, B.G. Nagara - 571 448, Nagemangale Taluk, Tq. Mandye Distt. Bapuji Pharmacy College, Shamanur Road, S.S.	Pharm.D (Post
	Sri Adichunchanagiri College of Pharmacy, B.G. Nagara - 571 448, Nagemangale Taluk, Tq. Mandye Distt. Bapuji Pharmacy College, Shamanur Road, S.S. Layout, Davangere - 577	Pharm.D (Post Baccalaureate)
	Sri Adichunchanagiri College of Pharmacy, B.G. Nagara - 571 448, Nagemangale Taluk, Tq. Mandye Distt. Bapuji Pharmacy College, Shamanur Road, S.S. Layout, Davangere - 577	Pharm.D (Post Baccalaureate)
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Karnataka	Sri Adichunchanagiri College of Pharmacy, B.G. Nagara - 571 448, Nagemangale Taluk, Tq. Mandye Distt. Bapuji Pharmacy College, Shamanur Road, S.S. Layout, Davangere - 577 004 B.L.D.E.A's College of Pharmacy, Post Box No.40, BLDE University Campus, Solapur Road, Bijapur - 586 103 The Oxford College of Pharmacy, 1st Phase, J.P.	Pharm.D (Post Baccalaureate)  Pharm.D  Pharm.D , Pharm.D (Post Baccalaureate)  Pharm.D ,
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	Thiruvananthapuram.	
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Kerala	Pharmacy, Post:	Pharm.D
	Kodunthirappully 678 004,	
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	St.James College	
Kerala	of Pharmaceutical	Pharm.D
	Sciences,	
	Medical Academy	
	Chalakudy	
	Devaki Amma Memorial	
	College of Pharmacy,	
Kerala	Chekembra, Pulliparamba	Pharm.D
	P.O., Malappuram (Kerala)	
	Shri Ramnath Singh Instt.	
	of Pharmaceutical	
Madhya	Sciences & Technology,	Pharm.D
Pradesh	Opp. Sitholi Railway	
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	Sitholi, Gwalior - 474 001.	
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Maharashtr	University, Poona College	Pharm.D ,
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	Kondappanaickenpatty,	Pharm.D (Post	
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1	KMCH College of		
Tamil Nadu	Pharmacy, Kovai Estate,	Pharm.D ,	
1	Kalapatti Road,	Pharm.D (Post	
	Coimbatore - 641 035.	Baccalaureate)	
	Nandha College of		
	Pharmacy, Koorapalaym		
Tamil Nadu	"Pirivu",	Pharm.D	
1	Pitchandamplayam Post,		
	ERODE - 638 052		
	J.K.K. Nataraja College of		
	Pharmacy, P.B. No. 151,		
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		Komarapalayam-638 183, Namakkal Dt.		
	Tamil Nadu	C.L. Baid Metha College of Pharmacy, Rajiv Gandhi Salai, Thorapakkam, Chennai - 600 097.	Pharm.D	
	Tamil Nadu	R.V.S. College of Pharmaceutical Sciences, 242-B, Trichy Main Road, Sulur Coimbatore.	Pharm.D	
	Tamil Nadu	J.K.K. Munirajahh Medical Research Foundation, Annai J.K.K. Sampoorani Ammal College of Pharmacy, Ethirmedu, B.Komarapalayam- 638183, Namakkal District.	Pharm.D	
	Tamil Nadu	Padmavathi College of Pharmacy, Krishnagiri Main Road, Periyanahalli Post, Dharmapuri 635 205 (Tamil Nadu)	Pharm.D	
	Tamil Nadu	Swami Vivekanand College of Pharmacy Elayampalayam- 637 205	Pharm.D	
	Tamil Nadu	Deptt. of Pharmacy, University Institute of Pharmaceutical Technology, Faculty of Engg. & Technology, Annamalai University, Annamalainagar-608 002.	Pharm.D , Pharm.D (Post Baccalaureate)	

# At a Glance: Foreign Countries Concept about Pharm. D

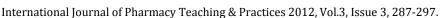
A Doctor of Pharmacy is a professional doctor degree in pharmacy. In some countries, it is a first professional degree, and a prerequisite for licensing to exercise the profession of pharmacist.

# In Africa

The University of Nairobi, Kenya offers a 6 year Pharmacist education program. Presently, The University of Benin, Nigeria Edo State is the only institution offering the Pharm D degree. It is a six year undergraduate program. The Pharm.D program has been available in Tunisia since 2005.

# In Asia

The University of Dhaka, Bangladesh took first initiative about Pharm. D. program. On 6 November 2007, an Academic Committee Meeting of the Faculty presided by Professor M. A. Rashid, form a sub-committee to review the Pharm. D. courses of



different universities in USA, Japan ,India etc. The subcommittee reviewed the syllabus of the Pharm. D. program of different universities around the world and submitted a proposal on 8 April 2008 to the Dean of the Faculty to upgrade the present 4-year B. Pharm. program to 5-year Pharm. D. program with internship in hospitals. The proposal was approved by the academic committee meeting and subsequently faculty meeting and was sent to the highest authority of the university of Dhaka for approval. On 25 August 2010, the Academic Council of the University of Dhaka approved a 5-year B. Pharm. program from the academic session 2010-2011 instead of the Pharm. D. program. The Academic Council will reconsider this proposal soon and approve the name of the 5-year B. Pharm. program to Pharm. D. as per the international standard [6,7,8].

In the Pakistan a total of 21 universities are registered with Pharmacy Council of Pakistan for imparting Pharmacy courses. In 2004 Higher Education Commission of Pakistan and the Pharmacy Council of Pakistan revised the syllabus and changed the 4-year B.Pharmacy Program to 5-year PharmD. program. All 21 universities have started the 5-year PharmD Program [9]. In the Philippines, only the Centro Escolar University offers the degree Doctor of Pharmacy (PharmD). It is a 2-year post baccalaureate degree open to licensed pharmacists in the Philippines.

In Thailand Doctor of Pharmacy (Pharmaceutical Care) program first curriculum in Asia was established at Faculty of Pharmaceutical Sciences, Naresuan University in 1992.

#### In Europe

In Czech Republic and Slovakia, the Pharm. D. (Pharmaciae doctor) diploma can be obtained by pharmacists who have previously graduated in pharmacy (Magister, Mgr.) (the undergraduate study of pharmacy takes 5 years). The Pharm Dr. title is highly prestigious and written in front of the name. In France, pharmacy studies can only be accessed through a competitive examination ("concours", with *numerus clausus*) happening at the end of the first year of health studies. Most candidates hold a Scientific Baccalaureate from the equivalent to high schools (lycée). In case of failure, it is possible to retry once.

In Hungary, pharmacists obtain their Master's degree, after 5 years of study. At the end of this period, the student must pass a nationwide exam to be legally entitled for practicing the profession of pharmacy, after acquiring the pharmacist work license. According to the new law in 2008, all pharmacists, who have acquired the Masters degree of Pharmacy, are entitled to the Doctor of Pharmacy.

The education of pharmacists in the Netherlands requires a minimum of six years of university study. EU-harmonisation has led to division into three bachelor and three master years.

A bachelor title is, however, not used at all professionally. The Dutch consider the educational level of their current (M.Sc.)

Degree in Pharmacy to be comparable to the PharmD title in use in the United States.

In Portugal, the student takes the Master's degree in Pharmaceutical Sciences (equivalent to the PharmD program) in one of the 9 Pharmacy faculties with their own respective numerous clauses which comprises a 6 year rigorous study (5 with the uniformities in EU teaching). Finished the degree, the academic title of Doctor of Pharmacy is issued. In Spain, Pharmacy studies can be accessed after completing five and a half years of University College (with at least 6 months of initiation to Pharmacy Practice). The *Licenciado en Farmacia* or *Grado en Farmacia* (equivalent to the PharmD program) Spanish degree is the only title that allows practicing the profession of Pharmacy in Spain.

#### Middle East

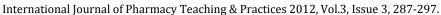
In 1930 Tehran University, Iran changed the Pharmacy degree from Masters to doctorate and the duration of the study was increased to 5 years [10,11]. In Jordan, this program was first offered in hajj. This program is not to be confused with Pharmacy Program. When the program was first offered, students shared their first 3 years with medicine student, the last two with pharmacy students and one year of clinical work. After 2006, the program's nature had changed; a new curricula was developed .Students now complete 5 years of academical work and 1 year of clinical practice to earn their Doctor of Pharmacy (B.Sc.) degree.

In Lebanon, the first Doctor of Pharmacy degree was awarded by the Lebanese University Faculty of Pharmacy (upon a decree by the Lebanese government) in 1992. The 6-year entry level PharmD program at the Lebanese University adopted the US PharmD curriculum and training.

In Qatar, pharmacy degrees are offered by the new College of Pharmacy at the Qatar University. Students were accepted into the 5-year BSc (Pharm) program commencing in 2007. Students will be accepted into the final year of the 6-year PharmD program in 2011.

The PharmD programs was started in 2001 at King Abdulaziz University, then in 2005 at Ibn-Sina University, then 2006 at KFU, then 2007 at Qassim University. In 2008, KSU College of Pharmacy at Riyadh, College of Pharmacy at Kharj, and Taif University started their PharmD programs. The degree duration in Saudi Arabia is six years in total, including one academic year of clinical rotations.

The PharmD programs were started in 2008 at Gulf Medical University, Ajman, United Arab Emirates. The first university in UAE to offer Pharm D and approved by the Ministry of Higher Education. This



course is an advanced practice degree specialized in advanced clinical practice. Pharm D is five and half year program for high school graduates and three year (Post Baccalaureate) program for B.Pharm graduates.

#### In North America

In Canada, the PharmD program is offered in both English and French. As of fall 2007, the PharmD program is offered at the Université de Montréal (in French) and, as of fall 2011, at the Université Laval (in French). The Université de Montréal was the first Canadian university to give this program instead of the baccalaureate program in pharmacy. A PharmD degree may also be obtained upon completion of a post-graduate program through the University of British Columbia and the University of Toronto.

In the United States, the PharmD (Doctor of Pharmacy) degree is a professional degree that prepares the graduate for pharmacy practice. It is awarded after completing at least 2-3 years of undergraduate prerequisites and then four (or three continuous) years of pharmacy school, which include at least one year of practical experience. Most schools require students to take an entrance test (PCAT) and complete 60-90 credit hours (2–3 years) of university coursework in the sciences, mathematics, composition and humanities before entry into a professional program. Many pharmacy students complete a bachelor's degree before entry to pharmacy school.Total time: 4 years undergraduate (Bachelor degree), 4 years professional degree (PharmD), optional 1–3 years of specialization (residency/fellowship).

# Scope, Utility and Practice

Out of the services patient medication counseling is considered to be the most important part from a patient's point of view. The information that may be discussed while a counseling session purpose, expected action, storage, method of administration of drugs and medical devices. Overall skills required to provide better clinical pharmacy services are upto-date knowledge of clinical aspects of drugs and good communication skills [12,13].

Table-04: Role of (Pharm D) candidates in hospitals

Activity	Role
Medication	To ask the patient about his medication history to
history interview	optimize the further therapy
Participation in	To enable prescribing to be influenced at the time of
ward rounds	decision making
and meetings-	To contribute to patient care through the provision of
	drug information and promotion of rational drug therapy
Provision of	To provide accurate and relevant information on drug
drug/poison	related matters (generally clinical aspects of drugs, e.g.
information-	use, administration)verbally or in written to persons
	involved in prescribing, administration, monitoring and
	use of medicines
	To prepare specific drug related resources such as
	protocols and patient information leaflets
	To provide poison information to physicians
Prevention,	To review the medication order for the adverse drug
assessment and	interactions
management	To identify patients at risk of adverse drug interaction
of drug	To suggest suitable method of management for the
interactions	interaction
	To take appropriate steps to avoid recurrence of
	interaction with adverse sequlae
	To ensure early recognition of drug interactions to
	prevent adverse sequiae
Adverse drug	To detect, assess and correlate, manage, document and
reaction	to prevent ADRs
management	To encourage nursing and medical staff as well as
(ADR)	patients, to report ADRs
Medication	To ensure the patient receives most appropriate drug,
order review	dose, dosage form
	To minimize drug related problems
Clinical review	To determine the priorities of the treatment with
	reference to therapeutic outcomes desired by the patient
	To evaluate and monitor patient's therapy
	To review the outcomes of the treatment
Therapeutic	To optimize therapy for the drugs for which there is
drug	known relationship between therapeutic effect and measured concentrations
monitoring (TDM)	
Selection of	To identify the desired therapeutic outcomes To ensure the drug selection follows local guidelines,
drug therapy	formulary and availability limitations where applicable
	To promote quality use of medicines
Dationt	To optimize the clinical outcomes and quality of patient car
Patient	To provide the information directed at encouraging safe
medication	and appropriate use of medication for the enhancement
counseling	of better therapeutic outcomes
Liniana!th	To monitor new dosage and medications
Liaison with	Ex To communicate concerning special problems, e.g.
community services	provision of medication aids
act AICG2	Ex To encourage the patient to contact to their
	hospital pharmacist

Table-05: Difference between M. Pharm (Pharmacy Practice) and Pharm D (Post Baccalaureate)

	M. Pharm (pharmacy practice)	Pharm D (post baccalaureate)
Regulatory body	All India Council for Technical Education (AICTE) and Pharmacy Council of India (PCI)	Pharmacy Council of India (PCI)
Duration of course (after B. Pharm)	2 years	3 years
Project/thesis work	1 year	Six months
	(during 2 <sup>nd</sup> year)	(during 2 <sup>nd</sup> year)
Internship	No	Yes (for 1 year)
Prefix 'Dr.' (Doctor) after course	No	Yes



After completion and during the course Pharm.D candidates may provide the clinical pharmacy services in the hospital in areas Clinical Research Organization Pharmacovigilance, Pharmaco-economics, Community Services, Research and Academics.Pharm. D candidates need to work hard and get recognized in the society for patient care by clinical pharmacy services. They have to create a support with other healthcare providers such as physicians, nurses, and also with patients. Pharm D candidates have to generate the need of clinical pharmacy services in the society and prove its importance [14, 15]

As the Pharm D is mostly patient-centered curriculum, therefore, patients will be benefited the most. The patients would be able to know all the information about their disease, drugs and lifestyle modifications for the disease in future which would definitely increase prognosis of the patients. The clinical pharmacy services would also minimize the work-load of physicians from their busy schedule as well as it would decrease the load on the Indian health-care system <sup>[16]</sup>.

As a summary, it can be expected that the Pharmacists, i.e., Pharm D would play a major role in Indian health care system in future. This course will give an opportunity to pharmacists to work more prominently in Indian health care system <sup>[17]</sup>.

## Conclusion

According to the International Pharmaceutical Federation (FIP), there must be well –planned execution of good pharmacy practice in developing countries. Thus, the implementation of the Pharm.D program must largely emphasize pharmaceutical care encompassing areas of patient care such as hospital and clinical pharmacy. It should not be used as a tool for the pharmacist to be employed internationally or as a sole instrument of professional power and status. If it is so, then implementation of the Pharm. D degree is certainly questionable and merits justification [18].

The profession of pharmacy in India is not just the "change from D. Pharm to Pharm.D" but change in quality pharmaceutical education to meet the challenges and the needs of the nation in the 21<sup>st</sup> century <sup>[19]</sup>.

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# **AUTHORS' CONTRIBUTIONS**

Authors contributed equally to all aspects of the study.

#### **PEER REVIEW**

Not commissioned; externally peer reviewed

# **CONFLICTS OF INTEREST**

The authors declare that they have no competing interests