



PHARMACEUTICAL EDUCATION IN WEST BENGAL

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ABSTRACT

Pharmacy is the art and science of manufacturing and dispensing of drugs prepared by natural and synthetic sources, and using them for the treatment and prevention of diseases. To practice as a pharmacist in West Bengal, one needs at least a diploma in pharmacy, which is awarded after only 2 years and 3 months of pharmacy studies. These diploma-trained pharmacists are the mainstay of pharmacy practice. The pharmacy practice curriculum has not received much attention. In West Bengal, there has been a surge in the number of institutions offering pharmacy degrees at various levels and a practice based doctor of pharmacy (PharmD) degree program was started in some private institutions in 2008. However, relatively little information has been published describing the current status of complex pharmacy education of West Bengal. In this paper we describe pharmacy education in West Bengal and highlight major issues in pharmacy practice including deficiencies in curriculum. The information presented in this paper may stimulate discussion and critical analysis and planning, and will be of value in further adaptation of the pharmacy education to desired educational outcomes.

KEYWORDS: Pharmaceutical education, Pharmacy practice, Institutions, west Bengal, Growth rate, Profession.

INTRODUCTION

Pharmaceutical education is a dynamic professional education for the development of country, individual & with a view to protect public health. Pharmacy encompasses various professional skills such as knowledge for drug synthesis, quality control tests, detection of degradation products & storage of pharmaceutical products, dosage form preparation, and route of administration, drug-drug or drug-food interaction.

Pharmacy as a profession started in India in the 20th century & in West Bengal in 1949. Since then, it has many changes in education and professions. The beginning of pharmaceutical education in India was initiated at Banaras Hindu University in 1932 by professor M.L.Schroff. In west Bengal, the pharmaceutical education was initiated at Institution of Pharmacy, Jalpaiguri in 1949. Later in 1954 Dr. Bidhan Chandra Roy, then the Chief Minister of WB established pharmacy school with Diploma in Pharmacy course and up graded to B. Pharm. in 2003.

▪ **SYLLABUS & CURRICULUM**

D. Pharm: Curriculum change can be undertaken by central government notification through an amendment of the Pharmacy Act. The basic pharmacy courses of the program consist of mostly old and out dated concepts with many unnecessary topics that are of little practical value. The Pharmaceutics-I practical subject is devoted

to preparations of aromatic waters, iodine and other simple solutions, tinctures, extracts, and spirits among others. The Pharmaceutics-II practical devotes 100 hours to learning at least 100 prescription products and their compounding and dispensing methods, and covers mixture, divided powders, liniments, and various incompatibilities in prescription products. All of these topics are of little relevance in an era where manufactured ready-to-dispense medicines are widely used and accepted. The orientation of the pharmacist has changed from the product to the patient. The expansion of the role of pharmacists received an important boost in 1990, when Helper and Strand coined the term pharmaceutical care. Pharmaceutical care is the responsible provision of drug therapy for the purpose of achieving definite outcomes that improve the patient's quality of life. Approximately 30,000 students receive D.Pharm. degree each year and enter the profession without being taught pharmaceutical care concepts and many other areas of contemporary pharmacy.

B. Pharm: There is no standardized B.Pharm. curriculum and it varies across the universities that offer this degree. It is industry and product oriented. The vast majority of pharmacy colleges offering education are away from the practice sites and there is no compulsory training in a practice site. Unlike other countries, the curricular revision and innovation in India have not received adequate attention. The B.Pharm. program of most of the Indian Universities includes mix of basic

science (such as mathematics, physical chemistry, inorganic chemistry, organic chemistry), advanced chemistry and analysis (such as biochemistry, medicinal chemistry, analytical chemistry) and basic pharmacy (such as pharmaceuticals, pharmacology, pharmacognosy, and pharmacy law). The curriculum has 18 laboratory components (82% of theory work). In addition, it devoted around 40% for chemistry and analysis related subjects. The curriculum does not include course work in the behavioural and social sciences, and health care policy.

M. Pharm: The M.Pharm. degree program requires an additional 2 years of study after a B.Pharm. degree. The M.Pharm. degree is offered in many disciplines such as pharmaceuticals, pharmacology, and pharmacognosy. The curriculum is divided into 2 parts. The first part consists of 1 year of didactic course work (both laboratory and theory) and the second part involves completing a research project under the supervision of a pharmacy faculty member in a chosen discipline. M.Pharm. in industrial pharmacy may undertake research projects in pharmaceutical industries during their second year of the curriculum. An industrial expert is responsible for part of the research, serving as the student's co-supervisor. An M.Pharm. degree in pharmacy practice / clinical pharmacy was started in 1996 with the aim of training the post-graduate pharmacy students in patient-oriented service. Students of such M.Pharm. program undertake their second-year research projects in either a hospital or community setting.^[1]

Pharm. D.: In 2008, the 6yearsPharmD. and 3years post-baccalaureate PharmD. began to be offered as professional degree programs in India focused mainly toward clinical and community aspects of the profession and mandatory practical training at practice site. The PharmD. program is comprised of 6 academic years, with 5 years of study and 1 year of internship and residency are spent in general medicine department and 2 months each in 3 other specialty departments. The clerkship, coupled with project work covering drug utilization reviews, pharmacoepidemiology, pharmacovigilance, or Pharmacoconomics was also in place. The curriculum emphasizes the clinical and patient-oriented aspects of the profession, it over emphasizes basic sciences (such as chemistry and analysis), while subjects such as pharmaceuticals and health policy have been over looked.^[2]

▪ **Educational Programs:** A variety of pharmacy degree programs are offered in India; Diploma in pharmacy (D.Pharm.), Bachelor of pharmacy (B.Pharm.), Master of pharmacy (M.Pharm.), Master of Science in pharmacy (M.S. (Pharm.)), Master of Technology (M.Tech. (Pharm.)), Doctor of Pharmacy (PharmD.), The Doctor of Philosophy in pharmacy (Ph.D.).

The entry point, for D.Pharm., B.Pharm., and PharmD. programs are 10+2 standards in the science. To practice as a pharmacist in India, needs at least a diploma in pharmacy. The D.Pharm. course requires a minimum of 2 years of course work followed by 500 hours of required practice training percolated to be complete within 3 months in either hospital or community setting. The B.Pharm. involves 4 years of study in colleges affiliated with universities. Students holding a B.Pharm. degree can earn an M.Pharm. degree or Industrial profession. M.Pharm. of 2 years in which the second year is devoted to research leading to dissertation in any pharmaceutical discipline for instance pharmaceuticals, pharmacology, pharmaceutical chemistry, or pharmacognosy. Recently, M.Pharm. courses on industrial pharmacy, quality assurance pharmaceutical bio-technology have been introduced. Students with an M.Pharm. degree in any discipline can work toward a Ph.D. with an addition minimum 3 years of study and research. The PharmD. program was introduced in 2008 with the aim of producing pharmacist who had undergone extensive training in practice sites and could provide pharmaceutical care to patients.^[3]

▪ Regulatory Bodies In Pharmacy Education

Pharmacy education in India is regulated by two main organizations:

1. Pharmacy council of India (PCI), under the pharmacy act of 1948.
2. The all India council for Technical Education (AICTE) which was established under the AICTE act of 1987.

And the other regulatory bodies in West Bengal are

University Grants Commission, India which is an initiative of Indian Union Govt. in accordance with UGC acts 1956.

The West Bengal University of Technology, under the Govt. of WestBengal.

The PCI makes regulations regarding the minimum standard of education required for qualification as a pharmacist. It is responsible for registration of person fulfilling the prescribed eligibility criteria (minimum D.Pharm.) and issuing a license per matting them to practice in an Indian state.

The PCI regulates the D.Pharm., PharmD., and B.Pharm. programs. The B.Pharm. program needs to be recognized by the PCI for the qualifications to be accepted for registration purpose only. The PCI has no control over M.Pharm. and the other higher-level degree programs.^[4]

The AICTE regulates pharmacy education at all levels excluding the PharmD. The AICTE is primarily responsible for planning, formulating and maintaining usual, typical and standards in technical education, which include pharmacy. In all advance countries in the world, the pharmacy profession and education are controlled by

the concerned councils, societies or professional association of pharmacy. In India, such wise counsels did not prevail or not allowed to prevail. As a result, pharmacy education has been put under the control of the alien body namely AICTE also. The pharmacy act 1948 was framed to regulate pharmacy education and profession in India and until 1978 this was the only statutory body which had control over pharmacy education and profession in our country.

- **Experts' Opinions:** There is currently a perception in some innovators that experts in pharmacy education hold the view that it would be ideal to have pharmacy education under the exclusive control of AICTE. This is fallacious assumption not supported by real facts. In recently held 69th Indian pharmaceutical congress (IPC) in Chitkara University, Rajpara, Punjab from 22nd to 24th December, 2017, a unanimous resolution has been passed that pharmacy education should be brought exclusively under the control of the PCI, i.e. under one umbrella. This resolution has been sent to the Govt. of India for consideration.

- **Is Money The Only Criteria In Life & Education??**

There is no denying the reality that money for research and for providing stipends for the student is a factor which cannot be ignored completely. Ideal solution to this issue is to divert the funds allocated to the AICTE for pharmacy sector to the PCI and so that PCI can carry out the allocation of the funds.^[5]

- **The Pharmacy Education In International Context**

WHO has contributed effectively towards encouraging and defending the role of pharmacist worldwide. All health care providers and the public are rationally involved in using drug, WHO has recommended a special role for pharmacist, particularly in quality assurance and the safe and effective administration of drug. Unlike in India, in no other country in the world pharmacy education comes under the technical education around the dual control of two regulatory bodies. Even in Pakistan, pharmacy profession and education are regulated by the pharmacy council of Pakistan (PCP). In all the other countries in the world pharmacy education and profession are regulated by their own parent bodies like pharmaceutical societies, pharmaceutical associations etc. Namely general pharmaceutical council of USA, general pharmaceutical council of UK, Canadian council or accreditation of pharmacy programs, Australian pharmacy council, Chinese pharmaceutical association, pharmacy council of Nigeria.^[6]

- **Pharmacy Profession In India**

Pharmacy is the health profession that links the health science with the basic sciences; it is committed to ensuring the safe and effective use of medication. The pharmaceutical care concept has transformed the

pharmacy profession to be more accountable in-patient care, especially to ensure that a patient achieves positive outcomes from drug therapy.

Currently there are over a million pharmacist in India with around 55% of them in community, 20% in hospital, 10% in industry & regulatory and 2% in academia in India, formal pharmacy education leading to a degree began in 1937, with the introduction of 3 years industry-oriented Bachelor of pharmacy course. Diploma – trained pharmacist is currently the mainstay of pharmacy practice in India. Every year nearly 20000 Dpharm, 30,000 Bpharm, 6000 M.Pharm., and 700 PharmD. students graduate in the country.

Pharmacy council of India (PCI) is the statutory body established in 1949, for regulating pharmacy education and practice of pharmacy profession in India. In 2003, the pharma vision 2020 charter was released by then president of India, Late Dr. A.P.J. Abdul Kalam, at the 55th Indian pharmaceutical congress at Chennai. The vision 2020 is focused on promoting the highest professional ethical standard of pharmacy, focusing the image of pharmacist and competent healthcare profession, sensitizing the community, government and others on vital professional issues and supporting pharmaceutical education and sciences in all aspects.^[7]

Some of the roles that a qualified pharmacist has to fulfil are:

1. **Providing Pharmaceutical Care To Patients-** This means moving away from the traditional role of filling prescriptions to being concerned with requirements of the patients on an individual basis. In addition, they should monitor the treatment regimen and advise patients for the judicious use of prescribed medicines.^[8]
2. **Redesigning The Medication Use System-** The certified pharmacist could tackle these undesirable drug- induced issues by reporting to the doctors and advising patients regarding their prescribed medicines, thus helping to choose a better treatment regimen.^[9]
3. **Authentic Source of Pharmaceutical Information** – The pharmacist must be updated with the latest information concerning the benefits and risks of the drug and their interaction with other xenobiotics. This will help in providing the best pharmacotherapeutic care possible.^[10]
4. **Adherence To Ethics-** More and more certified pharmacist are advocating professional ethics. It not only helps to foster a sense of trust among the patients towards pharmacist, but also enables them to treat the patients better with authentic medicines.^[11]

In many parts of the world, pharmacists have played a significant role in provision of pharmaceutical care services. In addition, it is also widely believed that pharmacist can make a great contribution to the

provision of the primary health care, especially in developing countries. Their role varies in different parts of the world: some deal with the preparation and supply of medicines, while some focus on sharing pharmaceutical expertise with doctors, nurses and patients.^[12]

Growth of Pharmacy Education: Prior to mid 1980s, the growth of publically funded institutions higher education (including pharmaceutical institutions) was very slow. Until early 1980s, there were 11 universities and 26 colleges offering pharmacy education at the bachelor's and master's levels. There was at least 1 Govt. school in every Indian state offering the D.Pharm. program. Since the late 1980s, due to rapid industrialization in the pharmaceutical sector, privatization, and economic growth, pharmacy education has been developing faster in India than anywhere in the world. In 2007, there were 854 institutions that admitted more than 52,000 students to the B.Pharm. degree program and 583 institutions that trained more than 34,000 students in the D.Pharm. degree program. Most of the institutions, however, are privately funded colleges or privately funded universities. The private sector, which accounted for about 10% of the students admitted in the 1980s, now accounts for 91% of all pharmacy students admitted.

Past scenario of Pharmaceutical Education

The earliest traditional systems of medicine practiced in India have been Ayurveda and Siddha. The Unani Greco-Arabic medical system come from West Asia. The colonial period brought the new western system of medicine and paved the way emerge pharmacy houses in India. Through pharmacy was practiced since ages in India, it is recognized as a profession from 18th century only. Pharmacy as a concept was practiced in India from an ancient period. For example, the Ayurveda and Siddha systems of medicine contain extensive literature on the selection of sources for natural medicines, and compounding and dispensing of those primitive medications, without describing their short and long – term adverse effects. The origin of modern pharmacy institutions in India dates back to 1899. At that time, training of pharmacist was mostly conducted at madras (now at Chennai). The state faculty of Bengal followed this pharmacy training procedure by starting a similar program in 1928.^[13]

In India, formal pharmacy education leading to degree began with the introduction of a 3-year bachelor of pharmacy (B.Pharm.). The first undergraduate (UG) course in pharmacy was started at Banaras Hindu University in 1937 by Professor Mahadeva Lal Schroff, fondly called the “Father of Pharmaceutical Education in India”. In West Bengal, the first diploma pharmacy college was started at institution of pharmacy in Jalpaiguri in 1949 by Dr. Bidhan Chandra Roy, then the chief minister of West Bengal. It has been granting diploma degree in pharmacy since 1920, upgraded to B.Pharm. in 2003. In those days, the curriculum was presented as a combination of pharmaceutical chemistry, analytical chemistry, and pharmacy, which prepared graduates to work as specialist in quality control and standardization of drugs for pharmaceutical industries, but not for pharmacy practice or community pharmacy shops.

At independence in 1947, India inherited a system for the pharmacy profession from British rulers that was unorganized and there was no legal restriction on the practice of pharmacy. The concept of pharmacy practice was not realized until after independence was gained. There were malpractices abound done by the pharmacists, druggists and chemists. Keeping such negative occurrences in mind, regulations concerning pharmacy practice were passed by the Central Government.

Modern pharmaceutical training institutions were established and the pharmacy profession itself was regulated by the enactment of pharmacy act in 1948. The pharmacy act was enacted as the nation's first minimum standard of educational qualification for pharmacy practice to regulate the practice, education, and profession of pharmacy. Currently, one needs at least a diploma in pharmacy to practice as a pharmacist. Provisions of the act are implemented through the pharmacy council of India (PCI). The act requires individual states to establish state pharmacy councils that are responsible for controlling and registering pharmacist in their respective states.

The pharmacy council of India (PCI) was established in the year 1949 and the first education regulations (ER) framed in 1953, which were subsequently amended in 1972, 1981 and 1991. The syllabus of PCI is more industry oriented and mainly focused to cater the needs of pharmaceutical industry.^[14]

Table 1: First 10 pharmacy colleges/ universities offering degree programs in West Bengal.

Year of inception	Colleges/ Universities	Affiliated To	Current degrees offered
1949	Institute of Pharmacy, Jalpaiguri	West Bengal University of Health Sciences, Kolkata	B.Pharm., D.Pharm.
1953	Shree Ramakrishna Silpa Vidyapith, Birbhum	West Bengal state council of technical education, Kolkata	D.Pharm.
1955	Jadavpur University, Kolkata	State university, UGC	B.Pharm., M.Pharm., Ph.D.

1959	Jnan Chandra Gosh polytechnic, Kolkata	Maulana Abul Kalam Azad University of Technology, Kolkata	D.Pharm.
1964	Cooch Behar Polytechnic, Cooch Behar	West Bengal State Council of Technical Education, Kolkata	D.Pharm.
1982	Burdwan Institute of Pharmacy, Burdwan	West Bengal State Council of Technical Education, Kolkata	D.Pharm.
1990	Contai Polytechnic, Contai	All India Council for Technical Education (AICTE), New Delhi	D.Pharm.
1995	Siliguri Government Polytechnic, Jabrabhita	West Bengal state council of technical Education, Kolkata	D.Pharm., B.Pharm.
1999	Netaji Subhas Chandra Bose Institution of Pharmacy, Nadia	Maulana Abul Kalam Azad University of Technology	D.Pharm., B.Pharm., M.Pharm.
2000	Gupta College of Technological Sciences, Asansol	Maulana Abul Kalam Azad University of Technology, Kolkata	B.Pharm, M.Pharm.

Current Scenario of Pharmaceutical Education

Currently, there are more than 1500 institutions offering various pharmacy training programs across the country. With an annual enrolment of around 100,000 students, the influx of students into pharmacy colleges is at an all-time high.^[15]

The pharmacy degree programs offered in India include

Diploma in Pharmacy (D.Pharm.), Bachelor of Pharmacy (B.Pharm.), Master of Pharmacy (M.Pharm), Master of Science in Pharmacy [M.S. (Pharm.)] and Master of Technology in Pharmacy [M.Tech. (Pharm.)], Doctor of Pharmacy (PharmD.), and Doctor of Philosophy in Pharmacy (Ph.D.). Integration of two courses like B.Pharm. + M.B.A. or M.Pharm. + M.B.A. has also been initiated by some institutions. Until the early 1980's, only 11 universities and 26 colleges offered pharmacy degree programs in India. A growth spurt followed, and according to the PCI 2005 calendar, there were 220 recognized degree institutions with an enrolment of 12,506 students and as per AICTE, the total number of degree colleges were 445 with a total admission of

24,672 students. In 2007, the number increased to 854 with an 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 students. The majority of these pharmacy institutions are privately funded, and the private sector now accounts for an astounding 91% of all pharmacy students admitted.

With such a large number of pharmacy colleges in India, one would expect that the whole country would have somewhat of an equal share of pharmacy training programs, but alas, this is not the case. Disparity reigns and hence an excess of privately funded universities is situated more in the states of Gujarat, Andhra Pradesh, Maharashtra, Tamil Nadu and Karnataka. An increased presence of pharmaceutical companies in the North-Eastern state of Sikkim resulted in pharmacy colleges being started in this state too. There are six National Institutes of Pharmaceutical Education and Research (NIPERs) in India offering M.S. (Pharm.), M.Tech. (Pharm.), and doctoral-level degrees. The NIPERs are the prime institutions in the country for pharmaceutical education and research.^[16]

20 COLLEGES/UNIVERSITIES OFFERING PHARMACEUTICAL DEGREE PROGRAMS IN WEST BENGAL:

University Name	Estd Year	Type	Approval	Ranking	Accreditation	B.Pharm. (Seat Availability)	D.Pharm. (Seat)	M.Pharm. (Stream & Seat)
Jadavpur University	1955	State University	UGC	NIRF: 13th	NAAC A	100	100	Pharmaceutical Technology-25, Pharmacy Practice-25
Calcutta Institute of Pharmaceutical Technology & Allied Health Sciences, Howrah	2002	Private	Affiliated	-	-	60	60	Pharmaceutics-10, Pharmacology-10, Biotechnology-10
Techno India University	2002	Private	UGC	PCI	-	60	60	Pharmaceutics
Gupta College of Technological Sciences, Asansol	2000	Private	Affiliated	-	-	100	-	Pharmaceutics-15, Pharmacology-15
NSHM Knowledge Campus, Kolkata	2005	Private	Affiliated	NIRF: 68th	NAAC B++	100	-	Pharmaceutics-24, Pharmacology-24
Bengal College of Pharmaceutical Sciences,	2008	Private	Affiliated	-	-	100	60	Pharmaceutics-18

Durgapur									
Dr. B.C. Roy College & Allied Health Sciences, Durgapur	2005	Private	Affiliated	NIRF <100	NBA	100	-		Pharmaceutics-18, Pharmacology-18
Bengal Institute of Pharmaceutical Sciences, Kalyani	2006	Private	Affiliated	-	-	60	-		Ayurvedic pharmaceutics, Ayurvedic plant sciences
Guru Nanak Institute of Pharmaceutical Science & Technology, Kolkata	2008	Private	Affiliated	NIRF: 64th	NAAC B	100	60		Pharmaceutical Chemistry-18, Pharmaceutics-18, Pharmacology-18
Institute of Pharmacy, Jalpaiguri	1949	State University	Affiliated	-	-	60	60		-
Bengal School of Technology, Hooghly	2006	Private	Affiliated	-	NAAC B	90	-		Pharmaceutics-16, Pharmacology-16
JIS University	2015	Private	UGC	-	-	120	-		-
BCDA College of Pharmacy & Technology, Hridaypur	2004	Private	Affiliated	-	-	100	-		-
Netaji Shubhas Chandra Bose Institute of Pharmacy, Nadia	2004	Private	Affiliated	-	-	100	-		Pharmaceutics-18, Pharmacology-18, Pharmaceutical Chemistry-6
Brainware University, Kolkata	2016	Private	UGC	-	-	60	60		-
NIPER, Kolkata	2007	Institute of National Importance/Govt	Rank in Pharmacy: 21 st						MS (Pharm.) Pharmacology & Toxicology-seat: 12, Medical Chemistry-seat: 7, Natural Products-6, Pharmacoinformatics-4, Ph.D.: Pharmacology & Toxicology-seat: 1
Global Institute of Technology, Nadia	2009	private	Affiliated	-	-	60	-		-
Eminent Collage of pharmaceutical Technology	2015	Private	PCI, AICTE	-	-	50	50		-
Neotia University, Kolkata	2015	Private	PCI,UGC	-	-	60	-		-
Calcutta Institute of Technology (CIPT), Howrah	2004	Private	Affiliated	-	-	60	-		-
Bengal institute of technology, Hooghly	2006	Private	PCI, AICTE	-	-	60	12		Pharmacology – 18 Pharmaceutics - 18

- NAAC – National Assessment & Accreditation council
- NIRF –National Institution Ranking Framework

Future scenario of pharmaceutical education: The pharmaceutical education imparted to students in India concentrates more on increasing self-employability quotient, and enhancing their entry into academia and the pharmaceutical industry. This approach has succeeded, and will continue to prove to be an important cog in the wheel for the growth of the pharmaceutical sector. In

July 2010, Her Excellency Smt. Pratibha Devising Patil, Former President of India, in a speech regarding “Recent Trends in Pharmacy Education and Practice”, articulated, “The Indian pharmaceutical industry has a wide range of capabilities and is ranked amongst one of the foremost industries of the country. It has grown from a meager turnover of US\$ 0.32 billion in 1980, to about US\$ 21.3

billion in 2009-10, and it is poised to grow at a compounded annual growth rate of 19 percent". [http://pci.nic.in/PDF-Files/NSP.pdf (accessed Mar 18, 2014)].

The growth of the pharmaceutical industry will, of course, depend on the employment of able and competent pharmacists, and this seems to be one of the major reasons for the proliferation of pharmacy colleges in India. However, apart from the pharmaceutical industry-related employment, practicing pharmacists are also supposed to cater to the needs of general public and patients. But the latter aspect is lacking in the country. Pharmacy stores are handled primarily by diploma holders and patient pharmacist interaction is seldom present. To bridge this divide, the inclusion of courses designed for Pharmacy Practice is needed in various UG programmes. In addition, the students entering into pharmacy schools have to diversify their horizons and look beyond the tunnel vision of industrial employment to the wider fields of public healthcare. Already, some institutions have started Pharmacy Practice courses but they are nascent. Expansion of training programmes by the teachers and greater acceptance by students is required to cater to the health care needs of patients.^[17]

- **Wind of Change:** The PCI has tried to have addressed the challenge of quality in pharmacy education through a strategy involving three domains of action: quality assurance, academic and institutional capacity building and more emphasis on experiential education and competency building. Moreover, pharma education is heading towards a lot of change after the introduction of uniform PCI syllabus for pharmacy across the country.

According to Dr. B. Suresh, President, PCI, "pharmacy education in India is presently in a very challenging phase. Due to an increase in the growth of the industry, there is growing need for qualified and highly knowledgeable human resources. As a result, there is now a sudden spurt of interest from students to pursue pharmacy in India. The sudden interest and consequent increase in demand has resulted in a rush to start new pharmacy colleges in India, in an already overcrowded space. This sudden growth has precipitated issues related to the quality of education being delivered at these institutions."

- **Industry-Academia Gap:** There exists an undeniable gap between industry and academia. Some of the major reasons for the gap are:
 - Academia often fails to adopt technology changes as compared to the industry.
 - The faculty involved in the design, development and delivery of the course content lacks industry experience and exposure which also reflects in the overall outcomes of the course.

- The lack of proper representation/ contribution by subject experts from industry while framing the syllabus.
- Minimum industry-institution collaboration in grooming future pharmacists.^[18]
 - Making Students Industry Ready: The professors unanimously believe that there is need to strengthen industry-academia collaborations in terms of education, training and research, through continuous interaction with the pharma industry leaders and involving them in the framing of the pharmacy curriculum.
 - Firstly, students can be made industry ready by training them within pharma companies and in community pharmacy practice to keep abreast of the demand and supply gap in the health industry.
 - Keeping pace with the industry needs and continuous technology up gradation, thinking out-of-the-box for solving problems, both for pharma industry and healthcare needs are other ways towards this goal.
 - Regular faculty exposure to the changing scenario in the industry would help them understand industry needs as would periodic skill and competency-based evaluation
 - Industry sponsored projects, enhanced alumni engagement
 - Starting practice schools/finishing school for pharmacy profession are also important initiatives.
 - Campus recruitment and training would be the final step in this endeavour.

Vision 2020

- Essential drugs at affordable prices are available and also continue providing employment for millions.
- Major global player in the field of pharmaceuticals exports and as a provider of quality medicines at low costs.
- Major Player in the generic drugs market in USA & Europe.
- Attain new heights in herbal drugs research in shaping Indian systems of medicine into a popular system of medicine of the future for holistic health care and ensuring health care for all – especially for the welfare of the poor.
- **Growth of Pharmaceutical Education In Year Wise (Graphical)**
 - 392 new pharmacy institutes approved by AICTE in 2018 including 290 pharmacy colleges certified to give diplomas along with 102 technical institute aiding under- graduate and post- graduate degrees.
 - 589 new institutes approved in 2019 that will be offering diploma programmes and 253 new institutes will offer undergraduate courses.^[19]

SUMMARY

Pharmacy education in India, both at the B.Pharm. and M.Pharm. levels, is taught as an industry- and

product-oriented profession with a focus on the basic sciences.²³ During the past decade, pharmacy education has expanded significantly in terms of number of institutions offering pharmacy programs at various levels. However, pharmacy education in India continues to be one of the last options for students aspiring to a university degree. The pharmacists with a B.Pharm. or M.Pharm. generally seek avenues other than pharmacy practice. These pharmacists prefer placements in production, regulatory affairs, management and/or quality assurance, and marketing with the pharmaceutical industry. Only small numbers of these graduates and postgraduates opt to work in community and institutional pharmacies. In India, diploma holders (D.Pharm. holders) are practicing pharmacists in the global sense as they engage in community or institution pharmacy practice. A specialized M.Pharm. in pharmacy practice program launched in the 1990s failed to create employment opportunities in practice areas for these postgraduates. The main change that is currently affecting pharmacy practice is the introduction of the PharmD. program in India. One thousand four hundred ten students have enrolled in 47 colleges (mostly private sector) localized in a small geographical part (South India) of India. Going by the experience of socioeconomic status of our country, this steep increase in the required study period from the 2-year D.Pharm. to the 6-year PharmD. for producing practicing pharmacists raises issues of PharmD. trained pharmacists who seem to be “unavailable” to serve for India. In order to demonstrate the requirements for pharmacists in India, it is necessary to undertake a pharmacy workforce study, to review pharmacy education programs, and to compare them with the roles that have been accepted internationally. Then, to design and develop pharmacy degree programs—perhaps one program exclusively for industry and another for practice. The treatment of a patient lies in the hands of medical and paramedical professionals. Pharmacists being one among them have to try and live up to their professional capabilities. This will only be possible if the pharmacists obtain proper knowledge about the safety and efficacy of medicines and patient counselling during their studies, which unfortunately, is not currently the case in India. An improved educational system will enable pharmacy graduates to satisfy the requirements of the Pharmaceutical Industry, which currently is missing. In addition, a knowledgeable and competent pharmacist can help the Indian Pharmaceutical Industry to move away from being a Generic Titan to a R&D hub. In short, an educational revamp is required, which will not only benefit the patients, but also the nation as a whole.

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