

HISTORY OF PHARMACEUTICAL EDUCATION IN INDIA

Early Pharmacy Education:

- The evolution of pharmacy education in India can be traced to first pharmacy course started in 1860 in Madras Medical college in which art of compound, dispensing and labeling of drugs were taught.
- Later, a two years diploma course of Chemists and Druggists was started in Madras Medical College and Vishakapatnam in 1937 with subjects of Materia medica, Chemistry and Practical Pharmacy.
- Compounder course was started in Bengal, Bihar, Bombay and United Provinces (now called as Uttar Pradesh).
- Advanced Diploma in Pharmacy course was implemented in Panaji, Goa when it was a portugese colony

Modern Pharmacy Education:

- First degree level pharmacy course (B.Sc Pharmaceutical chemistry 2 years course) was started in Banaras Hindu University (BHU) in 1932 under the pivotal role of Prof. Mahadev Lal Schrof, for which he is regarded as Father of modern education.
- In 1937, a three years degree course, Bachelor of Pharmacy was started in the BHU under the services of G.P Srivatsava, N.K Basu, GB Singh, S. Prasad, D.N. Majumdar and NC Neogi.
- This led to the momentum in pharmaceutical education which led to establishment of pharmacy course in various other places like Andhra University, Madras Medical college (Madras university), Department of Chemical technology (University of Bombay), Punjab University and Lallubhai Motilal college of Pharmacy, Ahmedabad.
- In 1950, Department of pharmacy was started at Birla college (Now called as BITS, Pilani) by Prof. M.L.Schroff. University of Sangar, University of Nagpur also followed the same footsteps by starting B.Pharm course.
- In 1940, M.Pharm course (one year duration) was started in Banaras Hindu University. The course duration was increased to 1.5 years in 1952-53. Other universities which started M.Pharm are Punjab Univerrity, Andhra University, University of Sangar, University of Madras, Birla college, SMS Medical college (Jaipur). Later, Doctor of Philosophy (research programme) was also started in pharmacy.
- In 1994, Government of India established National Institute of Pharmaceutical Education and Research (NIPER) under the directorship of Dr. CL Kaul for advanced studies and research. BV Patel Pharmaceutical Education and Research Development Centre (BV Patel PERD) established in 1990 near Ahmedabad is another pioneering institute that contributes high standards in pharmaceutical education and research by organizing continuous education programs and national, international symposia.

Pharmacy Education- Current Scenario and Future prospects:

- The origin and development of pharmacy education in India over the past 150 years is indicative of continuous changes with the time. Nevertheless, pharmacy education has to keep pace with the emerging sceanario as there has been tremendous change in the number of drugs prescribed, methods of manufacturing, introduction of computers in drug designing and the current emphasis on the development of novel drug delivery systems.

- For more than 50 years after independence, the pharmacy education and practice in India was confined to pharmaceutical industry. The pharmacy education emphasized on knowledge and skills in pharmaceutics, pharmaceutical chemistry, pharmacology and industrial pharmacy forcing the upstanding pharmacy graduates to find employment in pharmaceutical industrial sector mainly in the areas of production, quality control, formulation and marketing.
- In the period of 1980s and 1990s there was great misuse of drugs which resulted in harmful consequences, poor wealth outcomes, resistance, adverse reactions. All these created a demand for the setup of special body of branch of pharmacy which could bring about safe and effective use of drugs.
- As a result an improvised and collective branch of pharmacy called clinical pharmacy came into existence which required the pharmacists to work in close collaboration with the physicians. The ideology of clinical pharmacy is to impart immense knowledge to the hospital as well as community pharmacists in understanding the patient compliance and their necessities.
- The clinical practice metamorphosed the Indian Pharmacy profession such that it played a significant role in healthcare system rather than being confined Only to technical or industrial level.
- The pharmaceutical courses currently offered in India are broadly classified into: Diploma in pharmacy(D.Pharm), Bachelor in Pharmacy (B. Pharm), Doctorate of Pharmacy (Pharm.D), Master in Pharmacy (M. Pharm), Doctor of Philosophy (Ph. D). The pharmacy education is under the dual control of All India Council of Technical Education (AICTE) and Pharmacy Council of India (PCI) which are responsible for maintaining the academic standards.

HISTORICAL BACKGROUND AND DEVELOPMENT OF PROFESSION OF PHARMACY AND PHARMACEUTICAL INDUSTRY IN BRIEF

Pharmaceutical Industry in India:

1. For the First time in India, a chemist shop was opened in 1811 in Calcutta by Mr. Bathgate who came to India through East India Company. In 1910, this firm started manufacture of Tinctures and spirits.
2. Another firm, Smith Stanistree and Co., started Apothecary shop in 1821 and commenced the manufacturing in 1918.
3. Bengal Chemicals and Pharmaceutical Works, a small factory was started in Calcutta in 1901, by Acharya Prafulla Chandra Roy
4. In 1903, under the leadership of Prof. T.K. Gajjar, a small factory at Parel was started which led to the development of other pharmaceutical units, like Alembic Chemical Works Ltd., at Baroda.
5. The other relatively big units added during the early part of the century were the Sarabhai Chemical works, Bengal Immunity Laboratory and a few governmental laboratories for the manufacture of vaccines and sera.
6. Modern Drug Research in India started in 1920, when Sir Ramnath Chopra setup an active research centre at the school of Tropical medicine in Calcutta.
7. The efforts of Dr. Upendranath Brahmachari at the Camp-bell Medical School, Calcutta led to the introduction of Urea Stibamine in 1922 for the treatment of Kala-Azar.
8. During World war-I, when the local demand of allopathic medicines increased sharply and imports got completely cut off, a number of foreign and National residents who had experience in Ayurvedic preparations started manufacturing simple cough syrups, tablets and capsules.

9. Production of Quinine salts was taken up in government factories in Darjeeling and Nilgiris which had been up earlier.
10. By 1930, the manufacturing of biological like Sera and vaccines, Anaesthetics like Ether, Chloroform, few simple drugs like based on coal tar distillation products began in the country.
11. With the outbreak of World war-II, Indian Pharmaceutical Industry started undertaking the production of no. of plant based, synthetic and biological
12. It was during this period, the manufacture of Anti-dysentery drugs like Iodochlor, Chemotherapeutic drugs like Arsenical, Antileprotic drugs and colloidal preparations of Calcium, Silver, Iodine etc was started. Also the production of biological like liver extracts, pituitary extracts and Adrenaline solution was taken up
13. To co-ordinate the various activities of Industrial Research and Development in India, CSIR was registered on Mar 12, 1942
14. However, till Independence, pharmaceutical Industry remained relatively small and the production was confined mainly to galenicals, simple formulations, some vaccines and sera. The total production when India became independent was around 10 crore.

Post Independence Era:

1. Realising the role of pharmaceutical Industry, the Govt. of India paid a special attention to the needs of this industry. In 1948, a survey was carried out and a programme of development was undertaken in the first five years which was subsequently followed every five years.
2. In order to reduce the dependency on import and to increase the production of Antibiotics, "Hindusthan Antibiotics Ltd.," was set up in 1954 at Pimpri near Pune.
3. In the early 1960's the Indigenisation of the Industry started R&D collaboration between the Industries, National laboratories and academia. The Indian Drugs and Pharmaceutical Ltd., was set up by the Government in 1964 to provide a boost to the production of bulk drugs and formulations.
4. The 1970's saw an upsurge of R&D within the Industry the Industry because of the encouragement provided by the Government to establish R&D units within the Industry in the form of liberal tariff, tax concessions and financial incentives
5. Special provision in Patent Act 1970, to exclude product patents for drugs and medicines, food and chemical provided the right climate for technology innovation.
6. The 1980's and 1990's saw the setting up of drug manufacturing units both in the organized and unorganised sectors

Present status:

Presently, Indian Pharmaceutical Industry is estimated to a \$10 billion industry with drastic Industry expansion in the last two decades. Pharmaceutical Industry in India is highly competitive sector with more than 23,000 registered units of which 300 are large scale companies and 10,000 small companies including 5 central public sector units. Leading 300 pharmaceutical companies contribute to 70% of the total Indian pharmaceutical industry produces 70,000 different drugs and the most important segment of domestic market is the anti-infectives accounting for one-quarter of total turnover followed by cardiovascular preparations, cold remedies and pain killers each accounting for one-tenth of the total turnover.

Some of the India's major pharma companies like Nicholas Piramal, Wockhardt, Sun Pharma, Cipla, Aurabindo, Ranbaxy, Dr. Reddy's have achieved world class technological infrastructure during the past few years. India ranks 14th in terms of value and 3rd in terms of volume of drugs produced, as Indian economic survey report 2009-2010. Statistics revealed that Indian pharma Industry has grown from 1500 crore turnover in 1980 to 78,000 crores in 2008. It registered 14% growth rate in bulk drugs and 20% growth rate in formulations during 2007-2008. Indian Pharma Industry has grown consistently at 9.5% CAGR compared to 7% annual growth rate of the world market.