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## Need of Innovation in Pharmacy Education: Strategies for a Better Future



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### ABSTRACT

In this world of specialization and globalization, pharmacy education in India is suffering from serious backdrops and flaws. There is an urgent need to initiate an academic exercise aimed at attaining revamping of curriculum, keeping in pace with current and emerging trends in the field of pharmacy. Unfortunately all these years, enough emphasis was not laid on strengthening the components of Community Pharmacy, Hospital and Clinical pharmacy, while designing curriculum at diploma and degree levels of teaching. The curriculum followed by almost all universities in India is nowhere up to the world standards and students are still getting the 20-30 yrs older compounding practical exposure in labs during the graduation level. The article emphasizes the concept of innovation ecosystems and quality management, as the rapidly growing Indian pharmaceutical sector strives to become a global hub of original drug research and manufacturing, pharmacy graduates with the right training and knowledge have significant potential to power the industry's growth.

## 1. INTRODUCTION

Pharmacy is the science and technique of preparing, dispensing, and review of drugs and providing additional clinical services. It is a health profession that links health sciences with pharmaceutical sciences and aims to ensure the safe, effective, and affordable use of drugs.<sup>1</sup>

### **The pharmacy profession:**

Pharmacy is practiced in a wide range of settings: community pharmacies, hospitals, long term care facilities, the pharmaceutical industry, mail service, managed care, and government (Department of Defense, Department of Veterans Affairs, Indian Health Service, Public Health Service). A survey identified 112,000 pharmacists in community pharmacy (66,000 in chains; 46,000 in independents), 40,000 in hospitals, and 21,000 in consulting, government, academic, industry, and other settings.

Medicines today have great power to heal and to improve the quality of life. But medicines also may do serious harm if not taken correctly. This is where the role of the pharmacist is most important. You should choose your pharmacist as carefully as you choose a physician. It is best to use only one pharmacy so all medication records are at one location. This way there will be less risk of duplicating medicine or having one prescription interact harmfully with another.

Pharmacists who know their patients and have their medication profiles on file will be aware of possible harmful drug interactions or allergies to certain drugs. The pharmacist also will be able to discuss possible side effects; what foods, drinks, or activities that should be avoided while on medication; what to do if you miss a dose; and a wide range of other helpful information. The pharmacist is a key health care professional in helping people achieve the best results from their medications.<sup>2</sup>

In the past century, the pharmacy profession covered mainly compounding, as the compounding functions were significantly reduced in the past decade, it became mainly consisted of dispensing. However, only dispensing does not fulfill the needs and recently a new role had to be developed for the profession.<sup>3,4</sup> The role of today's pharmacist needs to be expanded to include pharmaceutical care concepts, making the pharmacist a health care professional rather than a drug seller in a commercial enterprise.<sup>5</sup> The mission of the pharmacy practice is to provide medication as well as other health care products and services

and to help people and the society to make the best use of them.<sup>6</sup> It involves identifying, preventing, and resolving drug-related problems, as well as encouraging proper use of medication, and general health promotion and education, thus helping in achieving better therapeutic outcome, by their patient-focused interventions.<sup>7</sup> A lack of integration of practice standards across different settings indicates for a need to review the standards for relevance. Moreover, pharmacists need to reevaluate workflow models and the delegation of tasks in light of new roles and responsibilities.<sup>8</sup> Different models of practice are (1) the drug information practice model, (2) the self-care practice model, (3) the clinical pharmacy practice model, (4) the pharmaceutical care practice model, and (5) the distributive practice model.<sup>9</sup> These models are practiced across the continents alone or in combination based on the understanding of the local pharmaceutical needs, the expertise of pharmacist, and their recognition of role.

### **Pharmacists:**

Pharmacists are healthcare professionals with specialized education and training who perform various roles to ensure optimal health outcomes for their patients through the quality use of medicines. Pharmacists may also be small-business proprietors, owning the pharmacy in which they practice.

### **Pharmacy technicians:**

Pharmacy technicians support the work of pharmacists and other health professionals by performing a variety of pharmacy-related functions, including dispensing prescription drugs and other medical devices to patients and instructing on their use. They may also perform administrative duties in pharmaceutical practice, such as reviewing prescription requests with medic's offices and insurance companies to ensure correct medications are provided and payment is received.

## **2. Scope of pharmacy**

The scope of pharmacy practice includes more traditional roles such as compounding and dispensing medications, and it also includes more modern services related to health care, including clinical services, reviewing medications for safety and efficacy, and providing drug information.<sup>10</sup>

The scope of pharmacy includes-

Drug Inspector

Pharmacist

Scope in Pharmaceutical Marketing

Scope In Production/ Manufacturing Sector, Medical Devices, and Quality Control

Scope In Drug Regulatory Affairs

Scope In Medical Underwriting

Retail Pharmacy. <sup>11</sup>

The Schematic diagram of Pharma Tree is shown in Figure 1.

### **3. The role of pharmacists in a changing health care environment**

Pharmacist's roles are evolving along with an ever-changing health care environment, spurred by advances in technology, greater patient involvement in their own care, and a greater focus on reducing costs and improving health outcomes. The accessibility of modern pharmacists allows them to perform more patient care activities, including counseling, medication management, and preventive care screenings. Pharmacists can also play a key role in meeting rising consumer demand for access to low-cost, convenient care by making it easier for patients to access high-quality and cost-effective preventive screenings and immunization services. Pharmacist-led programs can help ease care transitions by reducing the occurrence of adverse drug events, improving medication adherence, and lowering hospital readmission rates through services such as bedside prescription transactions, counseling prior to discharge, and phone consultations.<sup>12</sup>

### **4. Pharmacy education: strategies for a better future**

Pharmaceutical education is a dynamic professional education for the development of the country, individual and with a view to protecting public health.<sup>13</sup> In this world of specialization & globalization, pharmacy education is suffering from serious backdrops & flaws. The potential for growth of the pharmacy profession is enormous if we are prepared to

upgrade our standards to international & global expectations.<sup>14</sup> It has become necessary that pharmacy colleges have to improve their status to sustain their existence.

**Hindrances in the present system of education:**

- Entry of unqualified & nonmeritorious students into the course.
- Nonfocused & unspecialized way of learning.
- Outdated curriculum & educational regulation<sup>15</sup>
- Discourages Deviance.
- Lack of ambition.
- Low-Quality Institutions.
- Educators, not Salaried Enough<sup>16</sup>
- Unskilled ways of practical & lab training in the institutes.<sup>17</sup>
- Lack of industrial and clinical exposure.<sup>18</sup>

Apart from this, the infrastructure facilities, laboratory facilities, and teaching faculty are also other major concerns that are impacting pharmacy education in the country. Many colleges are running just theoretical classes in the pharmacy curriculum. The students just conduct some dummy experiments gaining no experience of the real course they are intended to learn. In fact, in many colleges labs are just for namesake and teachers give them practice marks just based on their behavior. The teaching faculty is another big concern for pharmacy education. Many colleges do not have adequate teaching faculty. Students just go to the colleges to pass time in the classrooms. Though some colleges show full faculty on the papers, in reality, the students are taught by the dummy and unqualified people who are working on behalf of some others who have kept their certificates with the colleges. The inefficient monitoring mechanism and corrupt inspection mechanism by the pharmacy council of Indian is the main reason for the deteriorating standards of pharmacy education in the country.

## 5. Challenges

To overcome the growing challenges in pharma education, it is time for the policymakers to revamp the entire system right from admissions, infrastructure, curriculum, faculty, and training. Pharma education needs to focus more on the concept of innovating ecosystems and quality management.

The counseling system which serves to be the gateway of the students for entry into the profession should be brought under the scanner. Introducing specializations at the graduation level will result in professional expertise and excellence. Teacher-focused mastery learning should give away to student-focused learning. An educational institution should provide the student with a stress-free atmosphere for learning and developing his intellectual capabilities. Every college should have a counseling center to address the problems of students in their academic and personal life. An emphasis on the concept of the quality teacher should be included. The revival of the pharmacy education in India is the need of the hour which in turn will pave the way for the upgradation of the pharmacy profession in the country.

## 6. Nourishing

In order to improve the situation, every pharmacy college should provide the students with an atmosphere to nourish his internal skills and qualities. A system should be devised so that each and every student gets an opportunity to freely think and develop his skills to the maximum. Professionalism can be cultivated only through rational ways of thinking and performing. Students should come out with their ideas and suggestions in any aspect of education and especially be focused on innovative research. Most of the students are lacking an initial pull, which should be given by the teachers or the college. Students should also be trained to improve their presentation skills & personality.

Coming to the educational aspect, much emphasis should be given to industrial and practical exposure. Clinical and practical training should be given more importance and made a part of the curriculum. Research oriented way of learning is more effective rather than mugging up a lot of theory. The knowledge of a pharmacy student should be current and always be updated. He should be aware of what are the latest changes going in the field of pharmacy. A student should learn to evaluate himself and try to continuously improve his knowledge levels.

## 7. Quality

In any sector, quality is what matters. The quality of pharmacy education imparted by an institution will have an everlasting impact on quality of health care offered to society. So any lapse in upgrading the current pharmacy curriculum will definitely lead to problems in the future.

It is the responsibility of the present generation and the academicians to prepare the students to meet challenges and professional requirements in higher education. Keeping in view, the current status of pharmacy education in developed and many developing countries, it is ripe time for us to initiate a national debate on the introduction of graduation in pharmacy as the minimum qualification for registration as a pharmacist. As the world of today is undergoing rapid social economic, political and technological advancement, it is high time that the policymakers of the nation devise suitable standards in the pharmacy education and earmark minimum qualification for registration of pharmacists. In fact, pharmacy education should satisfy the needs of today and tomorrow for continuous professional development.

## 8. Upgradation

In order to stand up to the global standards, a comprehensive and focused revamp is necessary for India. To face the global challenges the Indian government needs to establish a Pharmacy University to have better control over pharmaceutical education. In addition to the government, both at the state and central levels should make a network of innovators and a network of users to constantly keep track of the changes. To ensure the quality of education, pharmacy teachers should be encouraged to attend international conferences and visits abroad. Education institution should follow the practice of exchange of experts from foreign countries to have better scientific and fruitful interaction. Organizing seminars, refresher programmes, workshop, and training programmes continuously in collaboration with industries and establishing technology transfer offices in each institute to teach and practice patenting, IPR, etc will definitely help the quality of pharmacy education and improve and update the knowledge to face global challenges.<sup>19</sup>

As much as possible, maintain a positive attitude both before and during your study session. Some ways to improve your attitude are:

- By reminding yourself that you're preparing for an outstanding career and that this is one step along the way.
- By avoiding the worst case scenario thinking. Rather than dwelling on the fact that you don't have much time to study and might fail the test, focus on the fact that you'll probably get much more studying done than you thought possible.
- By not comparing yourself to others. Set personal goals and strive to beat those goals. You're not trying to be someone else, you're only working towards becoming your best self. At the risk of sounding like a Tee Ball coach, doing your best is what matters.<sup>20</sup>

**Focus on skill-based education:**

The focus of management institutes need to shift from theoretical knowledge to skill-based education with a more practical and dynamic approach, the core skill set required by the industry will change fast and newer skills like creative thinking, higher level problem solving, interpersonal skills, innovation, decision making will be in great demand.<sup>21</sup>

Our education system is geared towards teaching and testing knowledge at every level as opposed to teaching skills. “Give a man a fish and you feed him one day, teach him how to catch fishes and you feed him for a lifetime.” I believe that if you teach a man a skill, you enable him for a lifetime. Knowledge is largely forgotten after the semester exam is over. Still, year after year Indian students focus on cramming information. The best crammers are rewarded by the system. This is one of the fundamental flaws of our education system.

**Reward creativity, original thinking, research, and innovation:**

Our education system rarely rewards what deserves the highest academic accolades. Deviance is discouraged. Risk taking is mocked. Our testing and marking systems need to be built to recognize original contributions, in the form of creativity, problem-solving, valuable original research and innovation. If we could do this successfully Indian education system would have changed overnight.



**Implement massive technology infrastructure for education:**

Instead of focusing on outdated models of brick and mortar colleges and universities, we need to create educational delivery mechanisms that can actually take the wealth of human knowledge to the masses.

**Make reservation irrelevant:**

We have a reservation in education today because education is not available universally. Education has to be rationed. This is not a long term solution. If we want to emerge as a country built on a knowledge economy, driven by highly educated people we need to make good education so universally available that reservation will lose its meaning.

**Re-define the purpose of the education system:**

Our education system is still a colonial education system geared towards generating babus and pen-pushers under the newly acquired skin of modernity. The goal of our new education system should be to create entrepreneurs, innovators, artists, scientists, thinkers, and writers who can establish the foundation of a knowledge-based economy rather than the low-quality service provider nation that we are turning into.

**Personalize education – one size does not fit all:**

Assembly line education prepares assembly line workers. However, the drift of the economic world is away from assembly line production. The Indian education system is built on the presumption that if something is good for one kid, it is good for all kids.

Some kids learn faster, some are comparatively slow. Some people are visual learners, others are auditory learners, and still, some others learn faster from experience. If one massive monolithic education system has to provide education to everyone, then there is no option but to assume that one size fits all. If however, we can effectively decentralize education, and if the government did not obsessively control what would be the "syllabus" and what will be the method of instruction, there could be an explosion of new and innovative courses geared towards serving various niches of learners.<sup>22</sup>

### **Technological transformations and innovative learning tools:**

Technology has brought about a significant transformation in teaching and learning. Online resources are used extensively by students. In some cases, these have replaced the personal tutor.

A key part of our education is interdisciplinary and project-based learning, This helps the students acquire communication, project management, time management, and leadership skills.

### **A 'brand' matters for an educational institution:**

Brand brings trust and it cannot be built in a day. Brand means quality, and quality has no substitute. Brand in the educational scenario means stability and viability and that's why it matters a lot.<sup>23</sup>

“one of the biggest changes in pharmacy education over the past 30 years is the realization that learning from classroom lectures is insufficient to prepare students to practice pharmacy.” As a fourth-year pharmacy student, I understand the importance of not only acquiring the technical skills of pharmacy practice but also developing professional qualities such as flexibility and handling difficult situations. While I look forward to the end of my structured didactic education, I recognize that my lifelong professional education as a pharmacist is just beginning. I believe that more hands-on experiential education is needed earlier in the curriculum as it has been argued that didactic coursework and technical skills are not enough to make a good pharmacist. It is my opinion that providing these diverse experiential learning opportunities will pave the way for pharmacy students to meet the ever-changing health care needs.<sup>24</sup>

### **Course introduction and design:**

In order to achieve this task, we need to strengthen the base of our educational system so that the height of the pyramid of excellence could be enhanced.<sup>25</sup> As parts of pharmacy syllabus have now become outdated; many pointless issues of very slight value are present in it. Our curriculum is irrelevant when it comes to practical application. It needs to be flexible in terms of the needs of students, e.g., students with interest in marketing don't need to attend classes on pharmaceutical mathematics as well as analytical chemistry. They can instead attend

something more productive. Similarly, students with an interest in regulatory affairs should be taught regulatory-based subjects. Research oriented way of learning is more effective rather than mugging up a lot of theory.<sup>26</sup>

Remembering reaction mechanisms and formulations and writing them in exams is in no way a proof of one's ability. The curriculum should be modified to deliver students with updated information by focusing on new areas and overlooking onto outdated issues. Regular up gradation of the curriculum will generate manpower in ready to use a mode that could be utilized and absorbed by industries. More value should be given to projects/assignments, conceptual and practical approaches of teaching so that students can spend more time on understanding the subject and develop specific skills. Involvement of industry experts in framing the syllabus is yet another way to get updated with industrial developments. Designing of model curriculum, systems and procedures for academics will help in seeding ready-to-serve quality students. In the proposed students' course program, it is the students who can self assess their interest and intrinsic ability to reach their ultimate goals. The course duration should be of a total of four years as it presently is. To gear up the present curriculum to meet the industrial needs, we can design a curriculum in a manner that in the first two years of the course, the basic pharmacy knowledge could be imparted to students (special subjects) and in the last two years they should have an option to select the subject of their choice for specialization.<sup>27</sup>

## 9. CONCLUSION

The changing face of pharmacy practice requires that the pharmacy schools should intervene with their programs with the competence to take up the challenge of changing the role of the pharmacy profession. The education should provide the ability for critical thinking, improve problem-solving skills, and decision making during pharmacotherapy. The student should be trained to create, transmit, and apply new knowledge based on cutting-edge research in the pharmaceutical, social, and clinical sciences; collaborate with other health professionals and to enhance the quality of life through improved health for the people of our society and as well as the global community.<sup>28</sup>

Each pharmacy institute should operate a model pharmacy; this would not only improve the image of pharmacists in Indian society but provide an opportunity for pharmacy students to train in community practice. To prepare pharmacist capable of providing high quality health


care to meet the diverse needs of the society and to achieve the excellence in pharmaceutical education training and research through well defined planning and practice, it is better to think over creative, positive and well aspects about pharmacy professionals by responsible persons who can control and monitor pharmacy education in India.

Technical and controlling authority of this country should strictly be controlled, monitor, assessed, evaluated, accredited pharmacy institutions strictly with the respective syllabus, teacher and student quality and feedback. Permission to start new colleges and approval should be considered by thinking of output of candidates and their futures. Present situation intimates extra and quality less output as per demand, which will indirectly affect the overall development of country and society. It will be better if our government, regulatory bodies, best teachers, quality students, pharma experts, and decision-makers will decide to fulfill the requirement as needed and it will be a valuable boon for all of us.<sup>29</sup>

## 10. Declaration of Interest

No conflicts of interest.

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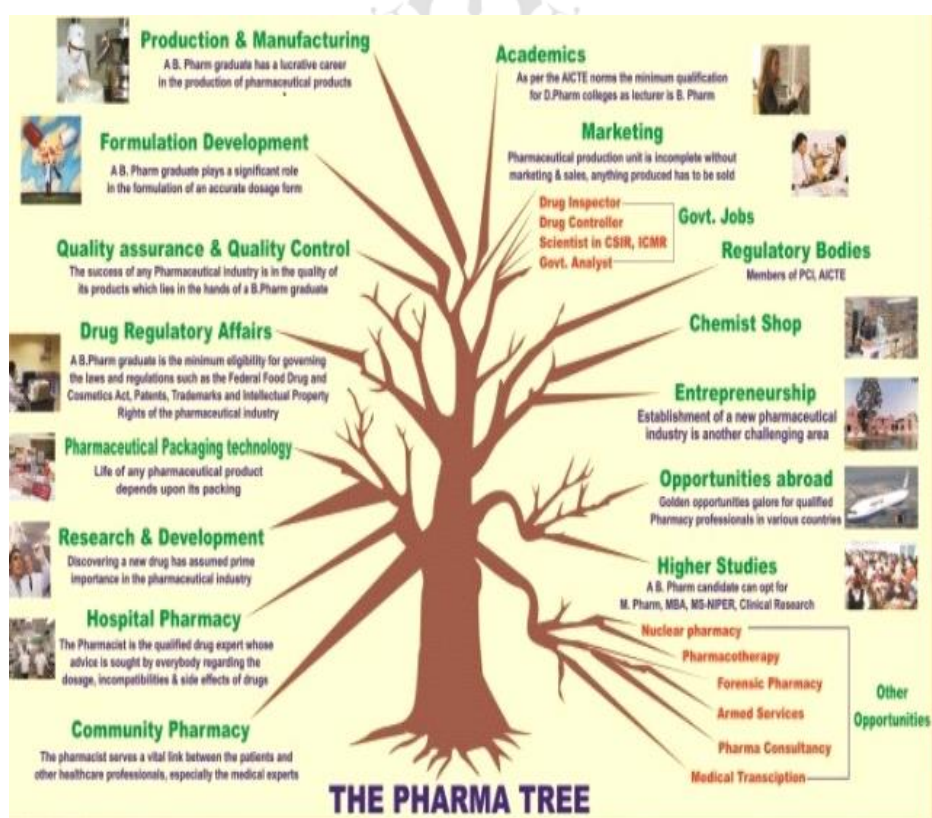


Figure 1: The Pharma Tree