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Need of Innovation in Doctor of Pharmacy Education in India: Strategies for a Higher Destiny

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Abstract
A Doctor of Pharmacy (PharmD; Neo-Latin Pharmaciae Doctor) is an expert doctorate degree in pharmacy. In certain countries, it is a first professional degree and necessary for licensing to exercise the pharmacy career or to transform into a clinical drug specialist. The Clinical pharmacy has emerged as one of the newest branches of pharmacy in 21st Century. The clinical Pharmacists role in patient care is expanding, and the profession must prepare its graduates for direct patient care. In India there is accelerated work load on doctors who are unable to appear over usual healthcare services, hence here is an opportunity for PharmDs to explore their clinical knowledge which may improve the overall health care of society. Therefore, PharmD student should be trained to fabricate, disseminate, and apply new knowledge to determine cutting-edge research within the pharmaceutical, social, and clinical sciences; collaborate with other health professionals and to strengthen the quality of life through improved health for the people of our society and also because the global community. This article focuses on the possibility of innovative or imaginative ecosystems and trademark organization, as the rapidly developing pharmaceutical sector endeavors to turn into a global centre of unique medication examination and assembling, PharmD graduates with the proper training and knowledge have significant potential to power the clinical pharmacy growth in India

Keywords
Doctor of Pharmacy, PharmD interns, Mentorship, Innovation, Collaboration

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I. Introduction

A Doctor of Pharmacy (PharmD; Neo-Latin Pharmaciae Doctor) is an expert doctorate degree in pharmacy[1]. In certain countries, it is a first professional degree and necessary for licensing to exercise the pharmacy career or to transform into a clinical drug specialist. The PharmD program was presented by Pharmacy Council of India (PCI) under the authentic foundation of PharmD Regulation 2008. PharmD program is a Pre-PhD post graduate doctoral program which is split in to two sections. First section is PharmD regular course which has duration of 6 years and the qualification for understudies confirmation is PUC/10+2 or D.Pharm. The course is partitioned in two Phases. First stage–comprising of First, Second, Third, Fourth and Fifth academic year. Second stage–comprising of internship or residency training during sixth year including posting in several specialty unit. Another program is known as PharmD Post-Baccalaureate (P.B) which has length of 3 years and partitioned in two phases. First stage–comprising of First and Second academic year. Second stage–comprising of internship or residency training during third year involving posting in several specialty unit. PharmD Post-Baccalaureate course is for those understudies who are graduated in B.Pharm[2]. To concentrate on PharmD understudies clinical care, a minimum of 50hrs of practical training in hospital and 200 working days in each scholastic year begins from the 2nd year onwards. In the 5th year, half of a day understudies spend in going in ward rounds on a daily basis as a part of clerkship, combined with a half year of project work in area of pharmacy practice (community, hospital and clinical). In 6th year, understudies go for clinical pharmacy internship or residency (6 months in general medicine and a couple of months each in three other specialty departments that's surgery, pediatrics, gynecology and obstetrics, psychiatry, dermatology, nephrology and orthopedics). "Institutions running PharmD program must possess a hospital recognized by the Medical Council of India with minimum 300 beds"[3]. The core subjects that must be educated incorporate pharmacotherapy, pharmacology, pharmacoepidemiology, clinical and hospital pharmacy, clinical toxicology, pharmacoeconomics, clinical research, clinical pharmacokinetics, therapeutic drug monitoring, etc. The PharmD

program of India was aim to offer rise to Clinical Pharmacists who focuses on Clinical Pharmacy Services, therefore which can help in addressing the complex issues like prolonged period of hospital stay, outlandish expense of treatment, drug associated problems, unprejudiced information, fair data and control of pharmacotherapy of patients gave various co-morbidities, safe and empirical drug utilization, pharmacotherapy in special populations and dose adjustment in renal and hepatic failure which are tormenting the Indian healthcare system through "Pharmaceutical Care"[4]. As indicated by the information accessible with the Medical Council of India(MCI), the doctor to populace proportion is 1 every 1598 persons or 62.5 doctors every 100,000 populace in India. There are about 0.5 million pharmacists enlisted with different authority bodies in the diverse states[5], according to old information distributed in 2007, these numbers are often much higher at the present. As per the yearly report of Pharmacy Council of India (PCI) there are 1073 affirmed colleges running B.pharm course with an admission limit of 75,861 annually[6], moreover there are 233 academia running the PharmD (Doctor of Pharmacy) course.

The Clinical pharmacy has emerged as one of the newest branches of pharmacy in 21st Century[7]. The thought was to teach and prepare pharmacy students in India to meet the scarcity of pharmacists in Indian hospitals and to match the entry-level PharmD curriculum within the United States[8]. Also the main goal of introducing the PharmD program was to place the pharmacy education in heights and to supply higher services to the residents on health needs[9]. In India there is accelerated work load on doctors who are unable to appear over usual healthcare services, hence here is a opportunity for PharmDs to explore their clinical knowledge which may improve the overall health care of society. For the survival and boom of PharmDs in India, it has to acquire welcome by the medical profession, and the end result of this task relies upon on the quality and understanding of existing PharmD college students and current PharmaD graduates[10]. A large portion of the Indian pharmacy colleges are confronting difficulties in distinguishing, creating and sustaining quality practice sites that meet the normal instructive goals for exploratory training. So it is the duty of Indian government and Pharmacy Council of India to take better strategies to give an obligation unit to PharmD experts and furthermore PharmD colleges to provide a decent clinical or experimental setup and mentor/preceptor in PharmD education to give good clinical and research knowledge which will help in the foundation of a decent Doctor-PharmD relationship in hospitals. This article focuses on the possibility of innovative or imaginative ecosystems and trademark organization, as the rapidly developing pharmaceutical sector endeavors to turn into a global centre of unique medication examination and assembling, PharmD graduates with the proper training and knowledge have significant potential to power the clinical pharmacy growth in India.

Roles and obligations of PharmD pharmacists

Role	***Description of Activity***
Medication Distribution and Dispensing	Pharmacists determine legitimacy of prescriptions, eligibility for coverage, appropriateness and safety of the medication for the patient.
Patient Safety	Promote rational drug remedy with the aid of conducting drug utilization reviews, identifying potential prescription-related problems like drug-drug interactions, duplication of medicine, regarded allergies, underneath or overdosing or inappropriate medication, close monitoring of therapy, follow pharmacokinetic ideas for the safe and effective therapeutic management of drugs in an individual, growing and enforcing a high-quality assurance programs.
Improvement of Clinical Program	Apply evidence-based clinical and research data within the management of disease and evaluate scientific evidence in order to identify appropriate drugs for a special population.
Collaboration with Patients, Prescribers and Pharmacists	It helps prescribers to settle on appropriate drugs which meets the patient need and increase the standard of life. Also provide patient counseling on proper drug use, workout and proper diet to fight with disease. Collect medication history which will help to spot potential adverse drug reactions or duplicate therapies.
Pharmaceutical Benefit Design	Determining of pharmaceutical advantage cost in each monetary and scientific terms. Decide whether a formulary should be used, and whether it should be “restricted” or “open” and also establish the standards and procedures for drug utilization.
Business Management	Communicate with producers and negotiate with them for reductions on drug procurement.
Cost Management	Helps in the encouragement of prescribers to make a value tremendous drug picks and perceive the compliance and noncompliance with prescribing guidelines.

Roles and obligations of PharmD pharmacist[11].

Advantages of PharmD[12]

1. Benefits to the patient

- Patient receiving pharmaceutical consideration

- Patient directing (regarding proper use of medicines, diseases, lifestyle modifications and diet)
- Psychological guide to the patient
- Prevention of drug misuse
- Patient instruction for avoiding medication errors
- Medication aids counseling

2. Benefits to physicians, nurses and other healthcare providers

- Getting fair-minded medication and toxin data
- Reporting and evaluation of Adverse drug Reactions(ADRs)
- Determination and counteraction of drug-drug and drug-food interactions
- Drug therapy observing
- Determination of medication incompatibilities
- Preventions of prescription blunders

3. Benefits to the hospital as an entire

- Better patient care
- Better and new lookup possibilities and lookup help in community services of the hospital

4. Benefits to industries

- Industries may get knowledgeable and clinically propelled individual for recruitment.
- Industries with new thoughts with in pharmacy exercise may additionally improve in India e.g. pharmacoeconomics, Health technology, assessment, contract research agencies etc.

Challenges for PharmDs

At present, there are some challenges to PharmDs.

PharmD is the primary educational requirement in many developed nations for pharmacists in the world however not in India E.g. USA, Pakistan etc. Additionally, various countries are upgrading their pharmacy education from 'industrial' to 'clinical'. Selected nations that specialize in clinical pharmacy education are, Australia, Thailand, Tunisia, Japan etc. Current pharmacy education framework in India has numerous downside in it, no appropriate clinical/hospital exposure for pharmacists, entry of non-meritorious students into the PharmD program, various schedules for different colleges, non-focused method of learning, obsolete educational plan, absence of modern and clinical introduction, unskilled approaches of realistic and laboratory training, absence of commercial and poor research etc[13,14]. Besides, understudies inside the foundation offering both B.pharm and PharmD may experience the superiority-inferiority complex which is unhealthy[13]. India has been inadequate with regards to the CPs and that we feel propelling of the CPs is that the need of great importance inside country. Presently, India is in extraordinary need of CPs which may unravel the diverse pharmaceutical health related issue.

Inadequacy of PharmD programme in india are

• Entry of unfit and non- meritorious understudies into the course.
• Non engaged and unspecialized method of learning.
• Out dated curriculum and instructional regulations[15].
• Underutilization and absence of acknowledgment.
• Lack of commercial and clinical exposure[16].
• Dual control of PharmD program (PCI and AICTE).
• Low-Quality Institutions, Unskilled ways of practical and lab training within the hospitals.
• Inferiority of education (most teaching staffs are not from the field of pharmacy practice).
• Institutional base of research study in India is incredibly narrow, genuine research is constrained to a few 'first class' foundations.

To beat the growing challenges in pharmD education, it is time for the policymakers to revamp the whole gadget proper from from admissions, infrastructure, curriculum, faculty, and training. PharmD education must focus more on the concept of innovating ecosystems and quality management. In order to enhance the situation, each and every pharmacy college needs to provide the students with an environment to nourish their internal skills and qualities. As a PharmD-6th Year student and graduate, we unequivocally reinforce this developing PharmD course in India which is certainly going to leave a critical change within the forthcoming years and will have a splendid potential for accomplishment in the field of expert practice in medication. Though the PCI has added PharmD course in 2008, still there are few of things to enhance form college and hospital side. In 5th year PharmD, students have to do research project for which I felt most of PharmD college are not having good mentor or preceptor to supply quality research. "Research is defined as a study performed to establish facts or reach conclusions. Research helps students to improve their knowledge, self-directed learning abilities, critical thinking faculties, and problem-solving skills"[17,18]. Understanding the contrast between a

practicum and an internship can better prepare pharmD students for the curriculum demands of their degree programs. In fifth year pharmD, understudies should begin with their thoughts and recommendations in any aspect of education and particularly be focused on innovation research. Most of our college students are missing an initial pull, which should tend by the mentors or preceptors of the college. Students should even be trained to reinforce their presentation skills and their personality. Developing research project skills is an important part of PharmD programs, and an honest understanding of the importance of research may help to extend the quantity and quality of research being conducted. Factors which will aid the development of research skills include optional and mandatory research courses, attending conferences, and modification of pharmacy courses to help foster these skills[19]. Study directed in Malaysia indicated that students conclude that the research would be an influential a part of their succeeding profession, which, manifest good attitudes with reference to clinical research. However, the study also identified barriers facing students that limited their involvement in research[20]. Therefore to reinforce the experience and attitudes toward research of PharmD students, various strategies should be implemented. A study in Syria found that encouragement, support, and good mentorship by professors can make students more curious about writing and publishing research[21]. During the sixth year, students autonomously complete their clinical pharmacy internship. In any medical and clinical pharmacy profession, internship play an important role in Professionalism which may be cultivated only through collaboration between doctors, clinical pharmacists, hospital staffs, colleges and rational ways of thinking and performing.

II. Mentor/Preceptor

Mentoring is described as a symbiotic relationship between the mentor and trainee (or mentee)[22]. Mentoring is defined as "off-line advice from one individual to another to assist the recipient in making significant advances in their personal, professional or career development"[23]. In the enhancement of mentoring, the emphasis is on mentees to find their very own options to the challenges of career development rather than straight recommendation giving or 'gifting' of probability[24]. The enthusiasm for mentoring as method for creating worker capability altogether expanded in 1978 and 1979 after the Harvard Business Review published the articles "Everyone Who Makes It Has a Mentor and Much A do About Mentors"[25,26]. Kram's evaluation of mentors and trainees the mentor as no longer solely supplying a career or vocational function, however also a psychosocial function[27]. The psychosocial factors of a mentor act as a accurate instance and giving support, guiding, and colleagueship. The mentor acts as a task model when the trainee is in a position to watch the mentor's interaction with others, including the observation of conflict, and that of balancing private and expert demands. The mentor encourages the trainee with the aid of constructing self-confidence through emotional aid and positive feedback. The mentor counsels the trainee regarding personal and career-related problems while also offering colleagueship. The aim of this psychosocial feature of the mentor is to furnish the trainee with a sense of identity, competence, and confidence[27,28]. Mentorship is seen as one of the most critical variables in choosing occupation accomplishment through improving students' objectives and productivity. A suitable mentoring relationship can drive students' objectives to realization by offering assistance so pioneering risk can be taken and disappointments can be reconsidered into learning encounters. Therefore Pharmacy Council of India have to consider the comments of Pharm.D college students toward theoretical and practical teaching techniques, knowledge and realistic competencies of mentor or preceptors at clinical sites.

III. Pharm.D Internship

Pharmacy internship programs are described as compensated on-the-job training for students, generally executed all through final year of the PharmD curriculum. The quality improvement isn't completely about making things better by doing an equivalent things and making an attempt harder. Instead, quality enhancement requires a exclusive strategy to ordinary truth primarily based learning and wishes a substitute set of information and skills to place this strategy in to practice. For the requirements of this program, preparing in quality improvement was characterized as any movement that explicitly intended to teach health professionals about methods or skills that would be utilized to improve quality. Internship and research study under good mentorship can assist set apart interns looking for after post-graduate preparing or get ready alumni for direct patient consideration employments. In developed countries PharmDs and clinical drug specialists have a noteworthy activity in the human services framework. In the United States, clinical pharmacy interventions directed by PharmDs are related with quality/safety improvement, antibiotic stewardship, discontinuing medications and preventing adverse drug reactions, which has brought about significant expense savings[29]. In United States, PharmDs were investing more energy in instructive and clinical exercises and less time in remedy preparing contrasted with bachelor degree pharmacist[30]. Students generally become more focused on professional/career planning and evaluation in the closing year of their PharmD internship. Internship gives knowledge and experience at a quicker tempo and in a extra systematic manner that can be obtained in an entry level pharmacist position and also gives the possibility for inter-professional collaboration, instills personal and

professional confidence, gives avenues in which to suggest for the career of pharmacy, and broadens scientific choice making abilities.

The graduating PharmDs are now going through challenges to get hospital/clinical jobs due to their poor acceptance in the health care setup[31]. Therefore for the survival of PharmDs and its grow; it must get acceptance by the medical professionals and community as a whole. Additionally, extra hard work is predicted to prolong and enhance the PharmD program in creating nations with the goal that its advantages can be harvested by the society. Strengthening the PharmD curriculum through offering more training and practical skills, setting up ideal pharmacy practice clinical setups, utilizing the practical experience gained in academic settings by interning in present clinical initiatives, enforcing care based interventions during ward rounds, tailoring models like problem based learning and "pharmacy curriculum development and validation model" are some of the suggestions that can allow pharmacy educators to produce ideal pharmacists that can supply direct patient care[32] and additionally the lack of PharmDs and clinical pharmacists in hospitals where students are doing their internship creates a special set of challenges. In most internship packages the interns work beneath the instruction and supervision of senior contributor of their personal profession. If the pharmD interns work under doctors or along with medical interns, it'll be wonderful gain to share their knowledge, ready to network and set up relationships with working expert in clinical pharmacy area for quality activity of patient safety. Fostering these professional connections are frequently beneficial for anything from career suggestion to employment recommendation. Therefore, I feel if the PharmD colleges appoint a doctors as teaching faculty especially for core subjects, it'll be an excellent initiative in the favor of PharmD program. Another significant issue to consider is if PharmDs does not get enough chances, they may move to developed countries. In one investigation from Pakistan, 90% of pharmacy graduates left their country after graduation[33]. The answers for this issue could be combination of this prepared trainee into the present medicinal services framework, offering help and open door for extra trainings. The legislature has additionally perceived the necessity of this trained manpower both at strategy level and usage level. The role of Pharmacy Council of India is additionally immense for regulation and professional development of PharmDs.

IV. Collaboration Between Doctor And Pharm.D Interns

"The roles of the doctor and PharmD are complementary and it has been established that the expertise of PharmDs when channeled through a co-operative relationship with doctors has a positive impact on patient outcomes"[34,35]. The advantages of such collaboration within the hospital environment include the taking of complete and accurate drug histories, the supply of drug information by medicines information pharmacists, "the utilization of evidence based prescribing, improved detection of prescribing errors and improved drugs safety through careful drug level monitoring"[35,36]. Poor doctor-pharmacist collaboration and communication have a negative impact on the health care provided and therefore the outcome for a patient[36]. Collaboration between pharmacists and nursing staff is important to make sure that drugs are administered appropriately, that ward stocks are replete which nurses are conscious of common and dangerous side effects of medicines. Interacting with and welcoming foundation doctors and other junior doctors during their induction period or even earlier via interprofessional learning and group work between final year medical and PharmD students are often an excellent way of encouraging a positive attitude towards doctor-pharmacist collaboration.

"Cheung and co-worker found that some doctors believe it would be helpful for a pharmacist to join the ward round"[37]. With increasing shift work among junior medicals staff, the ward Pharm.D interns may act a key elements in the continuity of patient care. Education and training of PharmDs and medical intern doctors should be a collaborative two-way approach. Doctors should offer teaching to PharmD students, which can reciprocally enhance PharmDs understanding of doctors role, responsibility, personal accountability and actively encourage effective communication between the professions. The organizations and individuals should recheck their working practices and ensure obstacles to collaboration are overcome. Therefore professional bodies representing doctors and PharmDs should provide guidance on effective collaboration and include it as a part of their good practice guidelines.

V. Conclusion

The changing face of pharmacy practice requires that the Pharm.D colleges should get involve with their programs with the competence to select up the challenge of revamping the role of the pharmacy profession. Therefore, PharmD student should be trained to fabricate, disseminate, and apply new knowledge to determine cutting-edge research within the pharmaceutical, social, and clinical sciences; collaborate with other health professionals and to strengthen the quality of life through improved health for the people of our society and also because the global community[38.] To prepare pharmacist capable of providing high quality health care to satisfy the different needs of the society and to perceive the excellence in pharmaceutical education training and research through well defined planning and practice, it's better to think over creative, positive and well aspects

about pharmacy professionals by responsible persons who can control and monitor the Pharm.D education in India.

Present situation intimates extra and quality less output as per demand, which may indirectly affect the overall development of country and society. It'll be better if our govern regulatory bodies, best teachers and doctors, quality students, pharma experts, and decision-makers will decide to fulfill the necessity as needed then it will be a beneficial for all folks.

CONFLICTS OF INTEREST

All authors have declared that there are no conflicts of interest in relation to the subject of this study.

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