

# Are Doctor of Pharmacy Curricula in Developing Countries Adequate to Train Graduates to Provide Pharmaceutical Care?

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## Abstract

Doctor of Pharmacy (PharmD) program is a new dimension of pharmacy education in developing countries. The PharmD graduates are expected to participate in patient health care by providing pharmaceutical care. The graduates should have enough necessary clinical knowledge, competitiveness and skills in community, hospital and clinical pharmacy related services. There is a need of curriculum that fit into the program outcome that helps to attain graduate competency. Programs in India, Pakistan, Iran and Nepal were reviewed based on the available literature. Even though it is evident that the PharmD curriculum in developing countries has made an attempt to provide patient-oriented approach for pharmacists, the existing curriculum, training and orientation have several pitfalls. It needs assessment, evaluation and improvement.

**Keywords:** Curriculum, developing countries, doctor of pharmacy

## INTRODUCTION

With the increasing in a number of medications and development in diagnosis and treatment methods, health care and especially medicine use is becoming much complicated than the past. A pharmacist is expected to be an expert in medication management and an important primary contact point for patients' health-care needs.<sup>[1]</sup> The pharmacy education in developing countries in the past was more oriented toward pharmaceutical industry-based curriculum. In the recent years, there has been a shift in these phenomena, and there has been the introduction of doctor of pharmacy (PharmD) programs.<sup>[2]</sup> PharmD program is designed with orientation to patient care and delivering pharmaceutical care. It is expected that the graduates participate in patient health by providing pharmaceutical care. Pharmaceutical care is the responsible provision of drug therapy for the purpose of achieving definite outcomes that improve a patient's quality of life.<sup>[3]</sup> These outcomes are cure of a disease, elimination or reduction of a patient's symptomatology, and arresting or slowing of a disease process.<sup>[1]</sup> To provide pharmaceutical care, the graduates should possess enough clinical competitiveness and skills necessary to identify drug therapy-related problems and pharmacotherapeutic interventions.<sup>[4]</sup> There have been already

PharmD graduates passing out from the colleges in developing countries. In this article, the authors provide brief information on the evolving PharmD education in developing countries and the competitiveness of the curriculum in developing a PharmD graduate to offer pharmaceutical care.

## DOCTOR OF PHARMACY CURRICULUM IN DEVELOPING COUNTRIES

The curriculum of PharmD program is designed to fulfill the expected graduate competency in community, hospital and clinical pharmacy, and related services. However, the existing PharmD curriculum in developing countries needs to be refined to deliver effective pharmaceutical care and to participate clinical research.<sup>[5]</sup> A quick view on the World Health Organization (WHO) core competencies required for

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clinical pharmacists and various competencies covered in the PharmD curriculum of developing countries,<sup>[6]</sup> reveal a significant deficiency in the PharmD curricula of developing countries.

## IMPORTANCE OF A CURRICULUM IN DEVELOPING A FUTURE GRADUATE

Figure 1 is an analogy to understand, (a) need for align the program for expected outcome (destination of road); (b) need for design curriculum (a vehicle that suits for road and comfortable for driver and students); (c) competent instructor (to drive the vehicle safely and smoothly); (d) learners or students (passengers who are aware of their destination and understands the need of vehicle and driver). This analogy represents the need of curriculum that fit into the program outcome that helps to attain graduate competency. The smooth journey of a student to reach destination is possible when all components are aligned and supported each other.

## EXPERT VIEW OF DOCTOR OF PHARMACY CURRICULUM IN DEVELOPING COUNTRIES

This section of the article provides the expert view on PharmD education in developing countries based on the available literature.

### India

In India, there are reports on success rate of clinical pharmacy program such as introduction of teaching hospital associated with the pharmacy colleges, clinical pharmacy services such as drug information, medication counseling, drug therapy review, adverse drug reaction reporting, and the preparation of antibiotic guidelines are assisting clinicians to improve drug therapy and patient care. It was evident that 82% of respondents had sought drug information from the Clinical Pharmacy Department. The success of this program is raising

awareness of clinical pharmacy among pharmacy educators elsewhere in India and has led to the introduction of clinical pharmacy services at other Indian hospitals.<sup>[7]</sup> The published article by Ghilzai and Dutta is quite contradictory to the existing PharmD program structure. The present curriculum of 6-year PharmD program in India is quite satisfactory to the needs of clinical pharmacy services, but yet to be redefined aligned for transdisciplinary approach for bedside practice. In addition, integrative approach of basic and allied pharmaceutical sciences-related subjects to the patient-related subjects may be recommended.<sup>[8]</sup> For the first time, PharmD regulation was introduced in 2008; now, the curriculum is under revision. Hence, the alignment approach in enriching the graduate competency may be considered in revision phase of PharmD curriculum.<sup>[9]</sup> Still, there are two patient-related programs exist in India, namely Master of Pharmacy in pharmacy practice and PharmD. The level of both programs is considered to be as equivalent to each other, but the program outcome and competency are quite unequal.<sup>[10]</sup>

### Pakistan

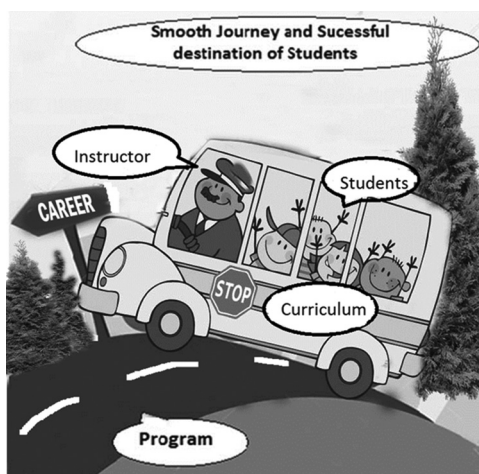
Babar reviewed the situation in Pakistan and argued that the PharmD is probably more linked for graduates to get employed in developed countries that providing pharmaceutical care. Thus, the implementation of the PharmD program must largely emphasize pharmaceutical care encompassing areas of patient care such as hospital and clinical pharmacy. It should not be used as a tool for the pharmacist to be employed internationally or as a sole instrument of professional power and status. If it is so, then implementation of the PharmD degree is certainly questionable and merits justification.<sup>[7]</sup>

### Iran

In Iran, the PharmD graduates have good theoretical knowledge of medicines; however, they are weak at putting pharmacological science to practical use as drug consultants to patients and health-care teams. First and foremost among the drawbacks of this system is an unpleasant feeling of uselessness and job dissatisfaction in pharmacy graduates, which pushes them toward irresponsibility, thus suggesting a need for revisions. This revised curriculum must make possible gaining of applied clinical experience for pharmacy students. It is only after receiving proper training that pharmacy students should be expected to have an interactive participation in the activities of health-care teams.<sup>[11]</sup> A quick look at the curriculum of pharmacy education progress and pharmaceutical services in Iran shows the education is not in line with social needs. Hence, a serious scientific review of the pharmacy education including the system and its curriculum is not a mere idea but a vital necessity.<sup>[12]</sup>

### Nepal

In Nepal, there have been limitations in terms of providing clinical orientation and training to the PharmD students. One university in Nepal has started the PharmD program, and there have been numerous challenges. With the existing infrastructure, workforce, and resources, it appeared to be



**Figure 1:** An analogy that represents a suitable and fruitful learning system for graduates (where, Road – Program; Vehicle – Curriculum; Driver – Instructor; Passenger – Students): A model developed by Dr. Ramalingam Peraman

nearly impossible to bring quality PharmD graduates in the country.<sup>[13]</sup>

Jamshed *et al.* are skeptical about the capability of the current PharmD curriculum in the developing countries to provide clinical-oriented services to patients. They further emphasized that a PharmD program must have components of pharmaceutical care that incorporating patient care elements.<sup>[5]</sup> In one of the short reports, Anderson and Futter argued the relevance of PharmD education in developing countries and provided an insight on the importance of need-based curriculum rather than focusing on adopting PharmD from developed countries without a proper preparation.<sup>[14]</sup>

## CAREER OPPORTUNITY FOR DOCTOR OF PHARMACY GRADUATES IN DEVELOPING COUNTRIES

In this context, there are few career opportunities for PharmD graduates. They have options in hospitals, where they deliver pharmaceutical care; education institutes that include health education, faculty position, and trainer; and research which includes clinical trials and postmarketing surveillance. These opportunities are minimal and are available for technically competent PharmD graduates.

Unfortunately, the existing curriculum for PharmD does not fulfill the required competencies for graduates. To produce competent graduates, still there is a need for refinement in aspects of: (a) alignment of medicinal chemistry with pharmacology; (b) chemistry-oriented principle in toxicity and adverse drug reactions; (c) alignment of pharmacogenomics with personalized medicine; (d) integration of clinical and pharmaceutical care management, etc.

## CORE CURRICULUM REQUIREMENT TO DELIVER PHARMACEUTICAL CARE

Pharmaceutical care focuses the attitudes, behaviors, commitments, concerns, ethics, functions, knowledge, responsibilities, and skills of the pharmacist on the provision of drug therapy with the goal of achieving definite therapeutic outcomes toward patient health and quality of life. In this process, the pharmacist uses his clinical judgment to assess the level of pharmaceutical care that is needed for each patient, the level of pharmaceutical care may vary from patient to patient. Examples of situations where comprehensive pharmaceutical care could be applied are:

- Patients belong to infants and elderly, with kidney, liver, or respiratory failure, are highly vulnerable to adverse events because they are physiologically compromised
- Patients with diabetes mellitus, asthma, hypertension, and congestive heart failure conditions required evaluation, and manipulation of drug therapy for their drug regimens to achieve optimal results
- Patients, who are prescribed with multiple medications, who need clarification of their prescription for the risk

of complex interactions such as drug–drug, drug–disease interactions, and drug–food interactions

- Patients who are under therapy of extremely toxic drugs (anticancer, anticoagulant, and narcotics) are needed for appropriateness of dose, route, frequency, and time of administration.

Thus, it is understood that the PharmD curriculum must address and train the graduates in the above-mentioned aspects.

## EXPECTED COMPETENCIES FOR DOCTOR OF PHARMACY GRADUATES

As per the WHO and several resources on the role clinical pharmacists, PharmD program introduces a clinical pharmacist to participate in health-care system.<sup>[15]</sup> A clinical pharmacist can deliver pharmaceutical care, only when he possesses following abilities:

- Identify the drug-related problems such as side effects, drug interactions, and improper drug use
- Assess the symptoms described by patients and self-diagnosed conditions
- Make decision on action whether pharmacist is appropriate or collaboration with other health
- Initiate or modify drug/nondrug therapies by independent action on drugs that can be provided by pharmacists without a prescription (e.g., lifestyle changes and medical devices)
- Participate in collaborative action for medically prescribed drugs
- Perform drug products selection, prescription assessment, dispensing, compounding, packaging, and labeling
- Design and implement pharmaceutical care plans such as patient education and counseling
- Monitor for therapeutic outcomes and implement pharmaceutical care cycle follow-up action, if needed
- Participate in metabolite-induced toxicity studies and bioequivalence studies.

## PITFALLS IN THE EXISTING DOCTOR OF PHARMACY CURRICULUM OF DEVELOPING COUNTRIES

The existing curriculum has several pitfalls and needs assessment, evaluation, and improvements. Some of the common pitfalls in PharmD curriculum of developing countries are as below:

- Absence of transdisciplinary approach
- Lack of gap analysis of existing curriculum
- The course is developed more toward the industry-focused curriculum
- Lack of higher cognitive competency in clinical approach
- Lack of course and competency mapping to the expected competency
- Poor options for self-directed learning.

## PITFALLS IN THE CLINICAL TRAINING AND ORIENTATION

A successful PharmD graduate is expected to have a strong competency in clinical knowledge. On the contrary, there have been several pitfalls in the clinical teaching as well:

- Often there have been affiliations for PharmD colleges in India which do not have adequate hospital setups with active drug information centers. Thus, the hospital training component is missing, and the graduates are often left with theoretical knowledge with fewer skills on clinical applications and interpretations
- There has been a lack of clinical pharmacists in the hospitals to provide clinical orientation for PharmD students. This scenario is even noticed even in developed countries like the United States,<sup>[16]</sup> and then it is easy for one to interpret the status in developing countries.

## SUGGESTED RECOMMENDATIONS TO IMPROVE THE DOCTOR OF PHARMACY EDUCATION IN DEVELOPING COUNTRIES

Some of the suggestions to improve PharmD teaching in developing countries are listed below:

- The gap analysis is needed for the existing PharmD curriculum to align the competency of clinical pharmacist
- The curriculum should provide in-depth knowledge on patient-related subjects that helps in higher learning and research
- Integrated approach may be recommended to elicit higher cognitive learning skills
- Bedside teaching can be integrated with clinical subject, provided that proximity of learning institute and training hospital is assured
- Source of teaching hospital for bedside learning needs to be upgraded and improvised for clinical practice
- Awareness of PharmD program among health professionals needs to be established

Despite curricular content of PharmD, the success rate of PharmD still depends on the following:

- There is always a need for perception change among physician view on clinical pharmacists
- The accessibility for running PharmD program in hospital setup at par with medical sciences
- Need for unidirectional learning process of PharmD graduate in higher level learning
- Regulatory provision to accommodate clinical pharmacist at hospital setup to deliver clinical pharmacy services.

## CONCLUSION

It is evident that the PharmD curriculum in developing countries has made an attempt to provide patient-oriented

approach for pharmacists. Yet, there have been limitations in terms of curriculum content and clinical orientation of the students. There is also a shortage of qualified and trained clinical pharmacists in providing clinical training to the PharmD students. These issues have to be addressed so as to provide a better pharmaceutical care by pharmacists in developing countries.

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