



Reintroduction of Post-Baccalaureate Doctor of Pharmacy (PharmD, Post-Bac) Program in Nepal: Exploration of the Obstacles and Solutions to Move Forward

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Abstract: This commentary article highlights the status of clinical pharmacy education in Nepal, explores the challenges and solutions in sustainably reintroducing Post-Baccalaureate Doctor of Pharmacy (PharmD, Post-Bac) in Nepal, as was previously launched by Kathmandu University (KU) Department of Pharmacy in 2010, and suggests a few prospects forward. Clinical pharmacy practice has remained on the sidelines and subordinate to physicians in Nepal. KU launched the PharmD (Post-Bac.) as a postgraduate program to establish the professional identity of clinical pharmacists in the country. However, despite unremitting efforts, the program did not thrive long and held since 2014. This paper aimed to explore challenges that remained at the forefront of the program and provide possible solutions for its reintroduction. The KU produced three batches of PharmD Post-Bac. graduates and now the revival of the program is crucial. Undoubtedly, a well-trained clinical preceptor can bring significant changes in the quality and competency of the PharmD graduates. Advocacy programs to foster the role of clinical pharmacists in the patient care services and revisiting of Bachelor of Pharmacy (BPharm) curriculum to complement the necessity of the PharmD program are needed. The non-sustenance of the PharmD program is emblematic of the dire mosaic that the clinical pharmacists are facing while delivering patient-oriented services in the country. Hence, strategies need to be formulated for the revival and sustainability of the program.

Keywords: clinical pharmacy, PharmD, pharmacist, Nepal

Introduction

Globally, the pharmacy profession is one of the most well-known and recognized professions. Over recent decades, the pharmacy profession has begun to undertake significant changes in practice. However, in Nepal, pharmacy practice is still in its infancy. There has been a considerable increase in pharmacy colleges and pharmacy graduates; however, a clear career path for pharmacists still lacks.^{1,2} With the continuity of this situation, the brain drain will be challenging to avoid. Clinical pharmacy is well developed and accepted in western society, but the situation is still woeful in Nepal.^{1,3,4}

Dramatic changes in the health care system are creating many new and exciting roles for pharmacists. Pharmacists are now responsible for the safe and effective distribution of prescription and non-prescription medications. However, they also assume the role of pharmaceutical therapy advisor and manager in providing patient-care services.

Most pharmacists enter either into the pharmaceutical industries or academia in Nepal and rarely in the community-level health care or hospitals. After being a part of health care for such an extended period since Kathmandu University

(KU) first launched the Bachelor of Pharmacy (BPharm) program in 1994 it is high time that pharmacists gain and implement the global experiences in hospital, clinical and community pharmacies. Later, postgraduate programs in pharmacy such as MPharm in Pharmaceutical Care, MPharm in Industrial Pharmacy were launched by KU, MPharm Clinical Pharmacy by Pokhara University (PU), and Purbanchal University. The Medical Education Commission (MEC), the only government body for regulating health science programs of all universities and affiliated colleges in Nepal, has recently permitted KU to launch two new specializations of MPharm, namely in Pharmaceutical Analysis, and Pharmacognosy and Phytochemistry. In addition, MEC has also consented to the relaunch of the postponed PharmD (Post-Bac) program. From 2022 KU would be running two clinical-oriented courses, MPharm in Pharmaceutical Care and PharmD (Post-Bac) in parallel unlike the previous year.

Unlike the developed countries where pharmacy education and curriculum change because of the changing practice, in developing countries, the demand is to change the curriculum with a hope of changing practice - a change model that is quite feasible. According to the International Pharmacy Federation (FIP) framework, the development of initiatives in education, practice or regulation can prompt or serve as drivers of change in others.⁵

PharmD Program Initiation in Nepal

To meet the demand for change in practice and realize the need to make the pharmacists eligible to provide clinical pharmacy services, PharmD, the post-baccalaureate course, was introduced in the Department of Pharmacy, School of Science, KU, in 2010 for the first time in Nepal.⁶ The PharmD (Post-Bac) curriculum was so designed that a pharmacist will advise, consult, and help doctors select and dispense medicines to patients and play a significant role in medication therapy management (MTM). The three-year PharmD program received equivalency of Master's degree in pharmacy from Tribhuvan University (TU), Nepal (the only authority in Nepal to provide equivalency and approve the programs). Other modalities of PharmD programs such as six-year PharmD and five-year PharmD from India and Pakistan, respectively, after the intermediate level, were recognized as the Bachelor's degree by TU.

The three-year PharmD, Post Bac. program, introduced by KU, was divided into two phases: Phase I – consisting of the first and second academic year with two semesters in each and Phase II – consisting of internship or residency training in the speciality units of hospitals during the third year. PharmD, Post-Bac students, were trained in different dimensions of pharmacy practice during the internship, such as pharmacotherapy of various body systems (eg, cardiovascular, nervous, respiratory, gastrointestinal, and others) and clinical pharmacy practice. In addition, students were deputed in different departments of hospitals (eg, medicine, surgery, anesthesiology, cardiology, dermatology, paediatrics, pharmacy, pharmacovigilance, and medicine information centre, gynaecology-obstetrics, neurology, dentistry and others). In addition to this, students were provided weekly three-day exposure to clinical ward rotations at the Dhulikhel Hospital for the first one and half years. Project work of one semester was included at the end of the second year, where the students developed and presented the report of their clinical research output akin to a thesis. Altogether, KU trained 29 PharmD, Post-Bac graduates, all of whom are contributing well to the health care arena in Nepal and abroad in clinical pharmacy setup at tertiary care and medical college hospitals, academia at universities and affiliated colleges, central and provincial government regulatory authority, pharmaceutical products development and marketing, community pharmacies and clinics, Research, training, and publication. The country demands significant input from clinical pharmacists in all these areas, including other unexplored ones such as clinical trials, consultant pharmacists, and others. More quality human resources are required. As there is already a pre-established set-up and faculty availability for the PharmD (Post-Bac) program at the department, KU can reintroduce the postponed program with the new vision. KU has developed the mechanism of providing more bed-side evidence-based clinical rounds and practice opportunities to the future PharmD aspirants under the guidance of a dedicated in-house clinical preceptor, following the pathway of the PharmD program elsewhere.⁷ The MEC has recently mandated KU to relaunch the PharmD program with ten enrollment in a batch, as of the previous format.⁸ As KU is the pioneer in introducing undergraduate and postgraduate programs in pharmacy in Nepal, the introduction or postponement of any of its programs carries national attention. The ad-hoc

postponement of the only PharmD (Post-Bac) program was not free of its national-level impact in clinical pharmacy and the whole pharmacy profession in the country. The Department of Pharmacy (KU) initiated the Pharm D (Post-Bac) program to produce specialized, trained human resources to cater for the needs of individualized patient care and support the paradigm shift towards patient-oriented practice. Despite realizing the untapped potential of clinical pharmacists, the university was bound to keep the PharmD program on hold. Amidst the multiple arrays of challenges faced, the most significant setback was the frail job market for the clinical pharmacists and the relatively low pay scale offered by the working institutions. Considering the risk of unemployment along with challenges mentioned above, an unpleasant decision for holding the program was taken. However, a silver lining was seen when the Ministry of Health and Population (MOHP), Nepal, developed the Hospital Pharmacy Directive 2072 in 2015, stating the recruitment of a clinical pharmacist in every hospital with 51–100 beds.⁹ This was thought to amplify the importance and platforms of clinical pharmacists seemingly. However, as of 2021, the implementation is hardly visible in practice, irrespective of positive changes. Despite reflecting on the many challenges that still can stand as an impediment to the program, KU spearheaded a second bold attempt to change the status quo for clinical pharmacists and an effort to consolidate a more patient-oriented approach in health care.

Potential Areas for PharmD Graduates in Hospitals of Nepal

With the increase in various general and specialty hospitals in Nepal, there is an emerging scope for PharmD graduates in Nepal. After PharmD graduation, clinical pharmacists can play an essential role in identifying, preventing, and mitigating drug therapy-related problems and stand as pharmaceutical care providers. A few of the potential clinical pharmacy areas that PharmD graduates can focus on and are doing well in the capacity of clinical pharmacists are listed in [Table 1](#).

PharmD graduates have other potential roles as well besides those mentioned in [Table 1](#), such as academics, clinical research, marketing, and regulatory affairs.³⁸

Challenges and Potential Solutions to the PharmD Program

Comparison of PharmD Program with MPharm Pharmaceutical Care and MPharm Clinical Pharmacy Programs

Although two-year courses MPharm in Pharmaceutical Care (being run by KU), and MPharm Clinical Pharmacy (being run by PU and Purbanchal University) may appear to be potential alternatives to the PharmD program, these programs are devoid of dedicated annual internship in their core curricula. The PharmD graduates undergo an intensive internship of one year to empower them with the knowledge and skills required to provide individualized patient care, medication review, therapeutic drug monitoring (TDM), clinical ward round participation, etc.

Owing to the one-year short duration, these two programs have condensed internship exposures to only six weeks in hospitals and have aligned more of their focus to academia and research practice. Hence, PharmD program can surpass all theoretical, practical, and clinical practice requirements of these programs and can successfully cater to many service-based requirements in the hospital and community pharmacies, academia, research, and regulatory affairs. Also, PharmD can better be viewed as a practice-based course that prepares the graduates exclusively for direct patient care services with the needful knowledge, exposure, and competency. Besides, PharmD is the only program globally compatible for further specialty certification courses like Board-Certified courses in the USA.

The dominant driving force behind pioneering the PharmD program in Nepal was meeting national need for skilled human resources with clinical competency to practice in a team of health-care professionals involved in direct patient care. Though small, PharmD graduates of this university have made their decent presence in various clinical settings, government regulatory settings, pharmaceutical products development and marketing, research areas with multiple publications in renowned journals, and academia, which clearly reflects success of the program.

There are several possible challenges, such as recognising the role of clinical pharmacists, implications of higher course fees and return of investment, and availability of trained clinical preceptors ([Table 2](#)). However, despite the possible hurdles, their national need for skilled human resources with clinical competency to practice in a team of health-care

Table I Potential Areas for PharmD Graduates

SN	Potential Areas	Comments
1	Medication Information Services	There are poorly resourced medication and poison information services in the country. Pharmacists with relevant skills in medication therapy management (MTM) and responding to medication information services are needed. ¹⁰
2.	Medication Counselling	Pharmacists can counsel patients and other health professionals regarding prudent use of medicines. ^{11,12}
3	Medication therapy adherence clinics	Pharmacists can motivate patients towards better health implications of medication adherence, offer support, and explain the pros and cons of therapies, especially for patients with chronic diseases. Pharmacists can help build adherence strategies for non-compliant patients. ¹³
4	Clinical ward round participation in specialty units of the hospital	Clinical pharmacists may participate in clinical ward rounds in the medical and nursing staff team and monitor the therapy measures of patients. During active ward rounds, they can document detailed information and advice on medication provided to and help set the therapeutic goals, reduce preventable adverse drug events (ADEs), provide drug information, and aid in optimizing drug therapy. ¹⁴
5	Clinical pharmacokinetics service	An extension of pharmacy service provides individualized patient care based on biopharmaceutics and pharmacokinetic considerations of the medicines and population pharmacokinetics database. Planning measurement of drug concentration in biological fluid and dosage regimen adjustment based on the plasma drug level are basic clinical responsibilities. ¹⁵
6	Parenteral nutrition	Pharmacists and dietitians may assist physicians in providing optimal nutrition and parenteral nutrition therapy to patients who are unable to receive nutrition by the enteral route. Pharmacists can help in compounding, dispensing and assuring the quality of parenteral nutrition and thus support the Nutrition support team. ¹⁶
7	Emergency department (ED)	There is a high chance of medication error in ED, and currently, there is no recruitment of clinical pharmacists in the EDs of hospitals, necessitating their role in the same. ¹⁷
8	Pharmacovigilance and materiovigilance	Clinical pharmacists can contribute to the existing and new regional pharmacovigilance (PV) centers, detect, monitor, and prevent adverse drug reactions (ADRs) related to medications and medical devices (via specific dimension of pharmacovigilance, ie, materiovigilance). ¹⁸⁻²⁰ They can also report ADRs to the Department of Drug Administration (DDA), the national PV center in the country, to liaise ADRs reports to the Uppsala PV Center. ²¹
9	Oncology pharmacy services	Clinical pharmacists can provide oncology pharmacy services to cancer patients in oncology hospitals/ departments, ²² and have been providing the same. ²³⁻²⁵ However, additional clinical pharmacists are needed to enhance patient outcomes.
10	Prevention and monitoring of drug interactions	Clinical pharmacists can prevent and monitor the potential drug-drug, drug-food interactions. ²⁶⁻²⁸
10	Health care waste management	This is the novel area where clinical pharmacists can contribute to the management of healthcare waste, including medicines. ^{29,30}
11	Providing training to healthcare professionals	Clinical pharmacists can provide therapeutic and evidence-based training to health professionals and patients to increase their knowledge and practice. ³¹ They can also provide continuing pharmacy education to the pharmacists. ³²
12	Infectious Diseases	Clinical pharmacists can play an advocacy role in managing the spread of infectious diseases such as COVID-19, where they can provide drugs (including preventive measures with vaccines and personal protective equipment use), disease information to the public, patients and health professionals. ³³ In hospitals, they can monitor the drugs of COVID-19 patients ³⁴ and monitor and detect ADRs of COVID-19 vaccines. ³⁵

(Continued)

Table 1 (Continued).

SN	Potential Areas	Comments
13	Medical Devices	This is a new area to be explored where the pharmacists/clinical pharmacists can educate health professionals and the public on the rational use of medical devices. ³⁶
14.	Pediatric Pharmacy Services	Drug-related problems are more prevalent in pediatrics owing to their pharmacokinetic and pharmacodynamics variations. Pediatric pharmacist participation reduces the incidence of medication errors, ADRs, mortality and morbidity in the given population. ³⁷
15	Others	Clinical pharmacists can involve in other areas in the hospital such as antimicrobial stewardship, critical care services, dosage adjustment in special populations, drug utilization evaluation, medication reconciliation, medication error assessment, therapeutic drug monitoring (TDM), cost management and drug and therapeutic committee. ^{3,38,39}

professionals involved in direct patient care was the dominant driving force behind pioneering the PharmD program in Nepal.

This achievement was due to the headstrong impulse the graduates moved ahead to establish their identity amidst the challenges. The graduates from the previous batches are firmly in favour of reviving the PharmD program, which according to them, is one of the avenues to revamp the shadowed and unexplored profession of clinical pharmacy. However, they believe that the past three years' experience of running the PharmD must be brought to the best of its use to bring it up as a sustainable program in the future. The department has greatly valued their feedback and has developed a modality to gradually address these in the reintroduction phase of the program to make the program viable and sustainable and make the impact of the program a milestone in the clinical pharmacy practice in the country.

Higher Cost

Those with PharmD qualifications might have a higher expectation for salary firstly due to the relatively higher cost of the program and the challenging nature of clinical practice jobs. There exists a difference in the tuition fees of MPham in Pharmaceutical Care and PharmD, Post Baccalaureate programs. Secondly, a PharmD graduate spends one extra year to achieve the degree in contrast to the two-year postgraduate programs in Pharmaceutical Care and Clinical Pharmacy. A higher expected salary for those with PharmD qualifications might be a barrier to entering the market later. However, this is a subjective perception that may vary among individuals.

The challenges and solutions to the PharmD program are shown in [Table 2](#).

Conclusion

This commentary targets reflection on the challenges faced in the past and internalizing the possible remedies to the PharmD program's reintroduction and making it sustainable. There is a realization that we need to be more patient-oriented health professionals and be a part of the health-care team. When considering education as a practice change driver, it is essential to consider various elements like infrastructure, availability of hospital-based pharmacy practice environment and exposures, employment opportunities, etc., to ensure the program sustainability. The initiation of the PharmD course by KU Department of Pharmacy had provided a roadmap for the upliftment of clinical pharmacy practice in Nepal. However, the sudden postponement of the program has created an irreparable vacuum to the same, which is, fortunately, being fulfilled by the MEC's new decision of authorizing the university to reintroduce the program from 2022 intake. Reintroducing the program with the new vision of evidence-based clinical ward rounds in speciality units of the hospital in the guidance of a dedicated in-house clinical preceptor would help the program be sustainable in the days to come.

Table 2 Challenges and Solutions of PharmD Program

S. N.	Challenges/Problems	Possible Solutions
1	Consolidating the approach to initiate any academic program in universities or colleges	<ul style="list-style-type: none"> • The university must liaise with the government beforehand to create and identify the environment and employment prospects. • A strong liaison with tertiary care hospitals is required to train the PharmD students. However, this readiness should not be limited to the administrative level of the hospital and should also be reflected at the level of the individual physician. • Longevity and sustainability of any program, including the PharmD program, also significantly resides on the students' and the graduates' performance, contribution to patient care and their success in maintaining professional relationships with the healthcare team.⁴
2	Getting a clinical preceptor with excellent exposure in clinical pharmacy	<ul style="list-style-type: none"> • The program can be more effective if the preceptors are physicians and clinical pharmacists working at the same hospital where the PharmD students are exposed to. • The students should be liable to the individual physician and pharmacist mentor in the individual department to provide patient care in their supervision and document and report the progress.
3	Lack of recognition of PharmD graduates and the students among healthcare fraternity ³	<ul style="list-style-type: none"> • PharmD students must be trained to cater to patient care services similarly to the MBBS interns or the MD residents during a one-year internship period. The internship should focus on providing holistic pharmaceutical care services at the patients' bedside rather than presenting hypothetical case studies.
4	The traditional approach of the current BPharm curriculum	<ul style="list-style-type: none"> • Lack of in-depth knowledge of specific subjects like anatomy and pathophysiology among the PharmD students should be fulfilled to make them understand the pathogenesis and disease management process and actively interact with the doctors during ward round participation. • Also, pharmacist mentors should always be present with the PharmD students every day for the full-time internship periods, in a similar way the nursing preceptors become available to their fellow nursing students. • Interested and motivated candidates for the PharmD program must be screened from the first or second year of BPharm level. The courses for these candidates and the candidates interested in Industrial Pharmacy and other areas of pharmacy should be designed separately to focus on their future interests.
5	Higher fees compared to MPharm in Pharmaceutical Care	<ul style="list-style-type: none"> • Problems associated with higher fees can be resolved to some extent by introducing some scholarship schemes. For example, the University Grant Commission (UGC), Nepal, offers formula funding scholarships to a limited number of eligible candidates from the Master program. Also, the MEC has set a scientific fee based on the national and international scenario of the program. As a result, the program now costs very low compared to the same in neighbouring countries. • The UGC also offers research support grants to some of the selected candidates.
6	Perspective from other stakeholders	<ul style="list-style-type: none"> • Further studies should be conducted to explore the perspectives of other stakeholders from the universities and academicians.
7	Need of qualified academic staffs	<ul style="list-style-type: none"> • A fresh momentum should be given to the capacity building of the internal academic staff and recruiting qualified academicians from outside. Short-term training or exposure to community or hospital practice in international sectors can be one of the avenues. FIP Pharmabridge, for instance, supports the exchange of pharmacists, pharmacy educators globally to foster communication and exchange of ideas, knowledge, and resources to uplift pharmacy services and education in low-income countries. • Visiting faculties from reputed international universities can be invited to take some specific courses. • Adjunct professors with excellent practice experience can also be approached for specified courses.
8	Limited number of Hospitals with Clinical Pharmacy Services	<ul style="list-style-type: none"> • Strategies to be developed in the hospitals of Nepal to create awareness of the importance of clinical pharmacy services.

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