



Doctor of Pharmacy Internship: A Global Comprehensive Review

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ABSTRACT

The meaning of Doctor of Pharmacy is Pharmacia Doctor is a professional degree in pharmacy. In few countries, it is the primary professional degree and a prerequisite for licensing to exercise the profession of pharmacist. The health care profession involved in drug prescribing, dispensing and administering needs reliable and unbiased drug information like dose, route, strength, frequency, dosage form, precautions, contraindications, drug-drug interactions, drug-food interactions, side effects, dose adjustment in geriatrics, pediatrics, patients with renal or hepatic impairments, pregnant and lactating patients, etc. During this review we found that the syllabus, Curriculum and official guidelines of various university throughout the many countries revealed that Patient counseling, Ward Round Participation, Providing Drug/Poison Information, Detection and Management of Drug-Drug, Drug-Food Interaction, Lab data interpretation are the prime activity done by any Pharm. D intern. Pharm. D interns have the ability to carrying out the activity such as Patient counseling, Providing Drug/Poison Information, Review of drug chart etc.

Keywords: Doctor of Pharmacy, Pharm. D, Internship, Healthcare, Pharmacist, Clinical Pharmacist.

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INTRODUCTION

The meaning of Doctor of Pharmacy is Pharmacia Doctor is a professional degree in pharmacy.¹In few countries, it is the primary professional degree and a prerequisite for licensing to exercise the profession of pharmacist. The health care profession involved in drug prescribing, dispensing and administering needs reliable and unbiased drug information like dose, route, strength, frequency, dosage form, precautions, contraindications, drug-drug interactions, drug-food interactions, side effects, dose adjustment in geriatrics, pediatrics, patients with renal or hepatic impairments, pregnant and lactating patients, etc.²The Doctor of Pharmacy (Pharm. D) degree was introduced in 2008 by the Government of India and Pharmacy Council of India (PCI).The main goal of introducing the Pharm.D program was to place the pharmacy education in heights and to give better services to the people on health needs.³

The concept of Pharm. D is quite new in India. It is a competent pharmacy doctoral program. In India, it is a complex six years program after 10+2 or Diploma in

Pharmacy which include five years of educational study and one year of internship.⁴The Pharmacy Council of India has also introduced a program called Pharm. D post baccalaureate which gives opportunities to graduates of Bachelors of Pharmacy graduates to enroll in this program which is of three years, consisting of 1 year internship and 2 years of academics. Pharmacy internship is a remarkable part of undergraduate pharmacy education throughout the globe. The internship is scheduled in 12-month period after the professional study at the university.⁵Six months of the internship and residency are spent in a general medicine department together with 2 months each in 3 other specialty departments. Pharmacy education in India is regulated by 2 major organizations: the Pharmacy Council of India (PCI), under the Pharmacy Act of 1948 and All India Council for Technical Education (AICTE), which was established under the AICTE Act of 1987.⁶

The role of pharmacists has changed from manufacturing and dispensing of medicine to becoming an integrated part of the health care profession, providing pharmaceutical expertise specially focusing on pharmaceutical care. Pharmacy internship courses are vital for students integration of theoretical knowledge into everyday practice and for learning practical skills.⁷ Medication management review is a specimen of optimal pharmaceutical care program. Medication management reviews are originally conducted by pharmacists throughout the world. Medication management reviews (MMR) have led to positive clinical outcomes, including reduction in adverse drug events, severity of illnesses,



healthcare service costs and emergency department contacts.⁸

The pharmacy graduates are working in community pharmacy, hospital pharmacy, industry or academia under the supervision of a preceptor pharmacist. Preceptors are required to verify the preregistration graduate had completed the year, but there was no requirement to complete the competency for practice.⁹

The initial internship duties are largely technical in nature while the intermediate level internship duties are professional and are supported by prerequisite knowledge about drug products. Advanced internship activities occur concurrently with or follow completion of courses in pharmacology, pharmacotherapeutics and prescription dispensing.¹⁰

Pharmacists are accountable for imparting comprehensive and enhanced patient care and are a fundamental part of the larger collaborative care model service. The final goal is to provide pharmacists anywhere should be to widen their knowledge domain and competence. These are basic components of study anywhere within the world and therefore the reason why the pharmacists still grow in their abilities to perform more difficult responsibilities. Likely, pharmacists in Scotland, Britain and a number of other parts of Canada have already been awarded with limited powers either to prescribe or to vary the prevailing prescriptions.¹¹

METHODOLOGY

This review includes data related to Pharm. D internship in various countries. Comparison of internship duties in various countries. The activity performed by interns was collected through computerized search from research articles and various guidelines related to Pharm. D internship using various journal sites.

Pharm. D Internship in India

The Pharm. D institutions are aligned with adjacent hospitals in order to provide real-time training including ward rounds. Students are acknowledged with practical in clinical pharmacy and medical pharmacy. After completion of the course, students are gained with the skills in diagnosis, therapeutic usage of drugs, treatment and selection of diseases.

The total internship duration of 12 months, 6 months training in General Medicine, two months training each for any 3 specialty departments.

Each student is required to maintain the logbook of services provided on a daily basis. The log book should be signed by a preceptor on a weekly basis and provide feedback to the intern.

Table 1: Role of clinical pharmacists and Pharm. D interns in Indian hospital

Activity	Role
1. Medication History Interview	Asking the patient about their past medication history to improve the quality of current assessment of therapy.
2. Ward round Participation	Taking participation to patient care therapy and to promote the rational use of drug.
3. Providing Drug/ Poison information	Providing information about accurate and relevant clinical aspects of drugs. This information should be given to the physicians/clinicians who are directly involved in prescribing, administering, monitoring. Information is provided verbally or in written form. Giving information about poison to physicians.
4. Detection, assessment and management of drug interaction	Reviewing the current assessment of drug chart for drug interaction. Suggesting suitable management plan for the drug interaction. Taking appropriate steps to avoid further recurrence of drug interaction.
5. Management of ADR (Adverse drug reaction)	Detecting and assess the ADR. Managing and documenting the ADR. Encouraging other healthcare professionals such as nursing staff and medical staff as well as patients to report ADR.
6. Medication Order review	Ensuring that the patient receives appropriate drug in appropriate dose and dosage form at right time of interval. Minimizing drug related issues. Evaluating and monitoring patient's drug therapy. Evaluating and determining the outcomes of the treatment.



7. TDM (Therapeutic Monitoring)	Drug	Measuring specific drugs at designated intervals to maintain a constant concentration in a patient blood stream
8. Drug therapy selection		Ensuring that drug selection follows the local guidelines and hospital formulary where applicable
9. Patient counseling process		Providing drug related information (e.g. to have drug with or without food, Adverse effects of drugs, dosing time etc) as well as disease related information.
10. Liaison with patient care services		Encouraging the patient they should communicate with physicians about special problem, e.g. adverse drug reaction of drugs. Providing various counseling points on pharmacologic and non-pharmacologic therapy. Encouraging the patient to contact the hospital pharmacist if needed. ¹

Table 2: Evaluation Criterion: Intern’s performance is evaluated using the following scoring system

Poor	Fair	Below Average	Average	Above Average	Excellent
0	1	2	3	4	5

A score of 3 and above represents satisfactory completion of internship for the issue of internship completion certificate.¹

The pharmacists are enrolled to provide the clinical pharmacy services as shown in Figure 1. Patient medication counseling is regarded as the preeminent job for a Pharm. D candidate from patient’s perspective. Being a Pharm. D candidate, they should have wide knowledge about various clinical views of medication. Candidates may provide clinical pharmacy service in the hospital, patient counseling including therapeutic and non-therapeutic, patient information, Pharmacoeconomics, Pharmacovigilance and various community services.¹²

Pharmacy Internship in Jordan

Requirements of clinical program (Pharm. D) in Jordan are 219 credit hours. The final year or sixth year is the experiential year, during which candidates put in 14 weeks in community and hospital pharmacies, followed by rotations in different medical specialties for 5 consecutive 6-weeks. KHCC began and implemented the pharmacy internship program in comprehensive cancer center of 170 bed in Amman, Jordan. KHCC being the only expertise cancer center in Jordan serves over 3500 cancer patients. It began with a pilot phase in the year 2005, adding up 2 year residency programs in the three part-time intern positions in the pharmacy department. It is compulsory to have completed three years since they are presented to the basic pharmaceutical and clinical training. The initial 2 years makes up for general science. No other eligibility criteria existed. The interns were hired as KHCC employee’s and received a fixed monthly stipend. They started the program with the general orientation given to all hospital employees. They were required to work for 12 h per week and 35h per week (mostly weekends) during the academic year and summer and winter holiday’s respectively.

Training during the pilot phase was mainly operational pharmacy, rotating between the hospital’s inpatient and outpatient pharmacies. During the program’s pilot phase, the clinical section was in its early stages of development, and therefore the interns received only one clinical rotation in the second year of their internship.

During rotations, the interns carried out all the tasks of a pharmacy technician and observed the practice of pharmacists during clarifications, interventions, drug information, order processing and patient counseling. After the pilot phase of 2-year , internship was approved as an official training program offered by the Pharmacy Department and assigned a senior pharmacist as program director by the pharmacy administration. Changes about eligibility criteria and the scheme was organized to comprehend both operational and clinical rotations. Initially, the program was promoted by word of mouth but was later promoted during pharmacy career days at schools of pharmacy. Over time passed by, the program has expanded to an aggregate of 12 intern positions at any one time, keeping in turn 6 interns in each internship year.

Students could apply for the program by simply submitting an application form writing down their educational and employment history. Assessment period was modified in the eligibility criteria which were typically conducted during the summer holiday. Applicants can spend 2 months in one of the Hospital pharmacies, whereby they were assigned to a preceptor, training them in operational pharmacy and checking them in technician-related piece of works. The preceptors would assess the candidates, by their professionalism, ability to dedicate themselves to work schedule and assigned tasks, as well as their heed in moving along with their knowledge and skills.

The first year of internship program comprised only operational rotations, while the second had added clinical



rotations. Interns were trained on all the Technician-related aspects in the inpatient and outpatient pharmacies in operational level except those related to chemotherapy and sterile product preparation, they were also entitled to cover technician shifts within their set schedules.

In order to permit them to attend everyday rounds and observe daily activities of the clinical pharmacist the clinical rotations were scheduled midst the interns' summer and winter holidays. The clinical pharmacists were checked on so as to provide their availability during the interns' holidays. The interns could ask for the preferred departments but they were encouraged to commence their first rotation with a general service such as internal medicine or pediatrics and move on to other specialization departments such as the ICU and bone marrow transplant for later rotations.

Weekly sessions were also carried out throughout enabling a chance that program director to meet with the interns. In order to discuss the various aspects of operation and clinical pharmacy. The discussion was mainly the matters related to their daily practice, and their observations at the KHCC and correlating them to their previous knowledge. Assignments were required to be done by interns based on their practice in the operations section, which was discussed subsequently. Each intern was asked to present a case or clinical topic after each clinical rotation that they had encountered during the time. The interns' were analyzed based on their, choice of topic, presentation skills and clinical content and these were openly discussed.

Research became an integral part as it was with the department's vision and capacity with the development of a research training program. When achievable, the interested interns were matched with a clinical preceptor working on active research, and elaborately involved them in data collection. However it did not put back their required rotations and therefore, it was performed along on-going rotations of interns and thus the results and time scale had to be modified based on the rotation of interns. After rotations and completing of each training year, the interns were met by group of program directors obtain their feedback. They were asked to detail in their input to the program, their self-evaluation of, the program's impact on their knowledge, their abilities skills and professionalism, the various difficulties they were facing, task issues, and the program flow and content. The opinions were then used to further refine the schedule and content.

Advisory encounter one- on- one session were conducted with the program director as needed. No formal survey was done to measure the outcome, apart from feedback from the Interns and preceptors, no formal survey was done.¹³

Pharmacy Internship in Pakistan

In Order to get Pharm. D degree, it's required to finish a clinical pharmacy clerkship. As no structured or organized plan is given for clerkship in official curriculum, different universities have established their own clerkship programs by collaborating with hospitals in their vicinity. For an

example, Islamia University Bahawalpur, a public university, where author studied Pharm. D, have devised very structured practice model. Students were divided in various groups to visit Bahawal Victoria Hospital. In 4th year students perform prescription evaluation at hospital or community pharmacy. They must also complete a research project in group. While in 5th year, during hospital orientation they visit different wards and fill following reports example Pharmacist clinical ward report, Pharmacist ward round report, Farm notes, Prescription translation, and lab findings. They present case histories during class discussions, where teacher evaluates their performance.¹⁴

Pharmacy Internship in Nepal

Seven students in first batch Pharm. D students started the internship at KISTMC on October 28th, 2012 and completed their internship on April 26th, 2013. After their internship at KISTMC they did internship in various other multi-specialty hospitals. Faculties from each clinical department were identified as preceptors before the start of internship which they were responsible for supervision and evaluation of these interns. Interns rotated through Anesthesiology, Dentistry, Emergency & Medical Practice, Pharmacy, Medication Counseling Center, Pharmacovigilance Center, Research, Pharmacology, Pediatrics, Medical science, Nephrology and Obstetrics-Gynecologic. The students maintained a log book during internship that's used to record the students' activities and observations during internship.

They developed a teaching and learning module for college students rotating through Pediatrics, so that, they learn effectively in a very holistic way during the duration of three weeks of posting within the department. The other clinical departments like dermatology, psychiatry, surgery had developed their own guidelines based on the inputs which are obtained from Pharm. D programs in different countries.

The objective of rotating interns in Pediatrics is to assist intern learn to integrate pharmacological principles within the management of childhood illness.¹⁵

Pharmacy Internship in USA

In USA Pharm. D interns work with the physician cooperatively to ensure the best possible therapy for the each individual patient. This work together will take place in all different settings in which patient receive care. In USA the Pharm. D intern must attend rounds and become familiar with the patient condition and severity. Pharmacists also participate in potential use of ambulatory care. Pharm. D intern should also be aware of over-the-counter drugs. In USA mainly physician allow Pharmacist to select the source of prescribed drug product. Pharmacist plays an important role in the emergent health care system with role of drug information expert for each center in primary, secondary, and tertiary health care system Pharm. D students can play larger role in the health team by accepting more responsibility as pharmacists. There is



option for Summer Internship also in USA. The American College of Clinical Pharmacy (ACCP) offers six self-assessment programs: Ambulatory Care Pharmacy, Cardiology Pharmacy, Critical Care Pharmacy, Infectious Diseases Pharmacy, Pediatric Pharmacy and Pharmacotherapy.

Activity done by Interns:

- Assessing the status of the patient's health related problems and determining whether the prescribed medications are optimally meeting the patient's needs and goals of care.
- Evaluating the appropriateness and effectiveness of the patient's medications.
- Recognizing untreated health problems that could be improved or resolved with appropriate medication therapy.
- Following the patient's progress to determine the effects of the patient's medications on his or her health.
- Consulting with the patient's physicians and other health care providers to select the medication therapy that best meets the patient's needs and contributes effectively to the overall therapy goals.
- Advise the patient on how to take his or her medications.

- Supporting the health care team's efforts to educate the patient to improve or maintain health, such as exercise, diet, and preventive steps like immunization.
- Refer the patient to the physician or other healthcare professionals to address specific health, wellness, or social services concerns.¹⁶

Pharmacy Internship Program in UK

The internship program in UK is for 12 month period supervised by post-graduation training at designated centers in community, hospital administrative, or regulatory affairs. In community pharmacy Pharm. D interns should learn about the prescription interpretation, dispensing skills, pharmaceutical care, patient counseling, and public related health activities. At hospital Pharm. D interns are supposed to acquire clinical skills in solving medication related problems and at the same time gain skills in the basic procurement and supply the chain management. At present the active involvement of Pharm. D intern on critical care is relatively non-existent and the knowledge and skills gained during the internship program and interns are required to acquire knowledge and skills in drug regulation. Pharmacists perceived preparedness to practice and career choice is influenced by nature of their undergraduate education prepared them for professional practice and the issue of transition shock or stress was not felt by this cohorts of interns. There is option for summer internship in UK.¹⁷

Table 3: Comparison of Pharm.D Internship around the World

India	Pakistan	Jordan	Nepal	USA	UK
Pharm. D was introduced by Government of India and Pharmacy Council of India (PCI) in 2008.	It was established by Pharmacy council of Pakistan, with the previous approval of the Federal Govt. in 2005.	Launched by Jordan University of science and technology in 2001.	Department of Pharmacy, Kathmandu University initiated Pharm. D in 2010.	Pharm. D was started by ACPE.	Pharm. D was introduced by RPSGB.
Duration Of Internship in India is about 12 Months.6 months of internship should be done in general medicine and other 6 months in other 3 specialized departments.	Internship accounts for about 12 Months. The division of department remains the same.	The time span of Internship is about 12 Months and the academic year should not be less than 200 working days.	Duration Of Internship in Nepal is about 12 Months.	The time span of Internship is about one full Year.	Internship accounts in UK for about 12 Months.
In the span of 1 year of internship, Interns are taking part in Medication History Interview in which they should collect the data about their previous medication.	Interns in Pakistan should participate in Collection of previously used drug information	Intern in Jordan should collect Medication History Information.	Interns should actively participate in collecting Information about medication history of patients.	In USA the Intern should take participation Medication History Interview.	They also should take participate in Collection of previously used drug information.
Pharm. D intern students should actively participate in providing Drug/Poison related information.	Students are required to participate in providing Drug/Poison information.	Intern should provide Drug/Poison information to physicians.	They should actively participate in providing Drug/Poison	Interns are asked to provide Drug/Poison information to physicians.	During Internship students should take participation in providing Drug/Poison information.



			related information.		
Prime activity done by interns is to detect and assess drug interaction.	Detection and assessment of drug interaction activity done by interns only.	Drug interaction should be reported and documented by interns.	Detection and assessment of drug interaction activity done by interns only.	Drug interaction should be reported in detail and documented by intern students.	Interns are asked to report and document the respective drug interactions during their internship period.
Intern should detect ADR, and management plan should be done by intern only.	Detection of Adverse Drug Reaction (ADR) and management plan are sole responsibilities Pharm. D intern.	Interns are in charge of assessing and preventing of ADR.	Detection of ADR, and management plan should be performed by interns.	Assessment and prevention of ADR are to be functioned by interns.	Interns are asked to perform their activities like assessing and preventing of ADR.
Intern should counsel the patient and should deliver information about their drugs and life style modification. ¹²	Pharm. D intern's prime role is to counsel patient with his/her furnished knowledge. ¹³	Interns are required to do patient counseling offer information about patient related issue. ¹⁴	Patient counseling is an essential activity of a Pharm. D intern. ¹⁵	Interns are asked to execute patient counseling and communicate to the patient regarding his/her disease related aspects. ¹⁶	Interns mostly execute their professionalism in patient counseling and patient follow up in order to give better care. ¹⁷

CONCLUSION

Results of various articles, Syllabus, Curriculum and official guidelines of various university throughout the many countries revealed that Patient counseling, Ward Round Participation, Providing Drug/Poison Information, Detection And Management of Drug-Drug, Drug-Food Interaction, Lab data interpretation are the prime activity done by any intern Student. Interns must also ensure that patients have an appropriate indication for every drug they are taking and whether the therapy is effective, safe and complies with drug therapy and other aspects. Though Pharm. D is a well-recognized course in India as well as some other countries like USA, UK, Canada and Jordan etc.

The present review provides a comprehensive review of the Literature regarding Pharm. D internship and the activity carrying out by an intern student in different countries. Internship is referred as the clinical and hospital training of pharmacy students following successful passing of the college graduation requirements. A Pharm. D interns have the ability to carrying out the activity such as Patient counseling, Providing Drug/Poison Information, Review of drug chart etc. The intern should behave and think like a pharmacist during all the rotation and utilizing his/her pharmaceutical and clinical knowledge.

List of Abbreviation:

KHCC- King Hussein Cancer Centre

WHO- World health Organization

PCI- Pharmacy Council of India

ADR- Adverse drug reaction

AICTE- All India Council for Technical Education

MMR- Medication management reviews

KISTMC- KIST Medical College

ACPE- Accreditation council of Pharmacy Education

RPSGB- Royal Pharmaceutical Society of Great Britain

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